GANESAR COLLEGE OF ARTS AND SCIENCE

(Accredited with 'B' grade by NAAC)

MELAISIVAPURI - 622 403, PUDUKKOTTAI, TAMILNADU

Phone: 04333 – 247218, 247603

STUDENTS PROJECT

ACADEMIC YEAR 2019-20

வ.எண்	மாணவர்கள் பெயர்	பதிவு எண்	கட்டுரைத் தலைப்பு	வழிகாட்டியின் பெயர்
1.	பெ.அடைக்காத்தாள்	P18100211	உரிப்பொருள் நோக்கில் கார்நாற்பது	முனைவர் வே.அ.பழனியப்பன்
2.	ரா.அழகுலெட்சுமி	P18100212	அறிவுமதியின் வெள்ளைத்தீ சிறுகதைத் தொகுப்பில் பெண்ணியம்	முனைவர் சி.முடியரசன்
3.	க.அனிதா	P18100213	உதயம் சிறுகதைத் தொகுப்பில் சமுதாயச் சிந்தனைகள்	முனைவர் பெரி.அழகம்மை
4.	ரா.தீபஜோதி	P18100214	பெருமாள் திருமொழியில் இறையியல் சிந்தனைகள்	முனைவர் சி.குறிஞ்சி
5.	து.திவ்யா	P18100215	சங்க இலக்கியத்தில் கலைஞர்கள் வாழ்வியல்	முனைவர் கதி.முருகேசன்
6.	செ.ஜெயசீலன்	P18100216	பாரியின் பறம்பு – ஓர் ஆய்வு	முனைவர் ம.செல்வராசு
7.	லெ.கௌசல்யா	P18100218	நிழல் முற்றம் நாவல் - ஓர் ஆய்வு	முனைவர் ம.செல்வராசு
8.	இரா.லெட்சுமி	P18100219	புறநானூற்றில் பரணர் பாடல்கள்	முனைவர் பெரி.அழகம்மை
9.	அ.நவரெத்தினம்	P18100220	குறிஞ்சிப்பாட்டில் வாழ்வியல் சிந்தனைகள்	முனைவர் பொன்.கதிரேசன்
10.	ரா.பெரியம்மாள்	P18100221	நெடுநல்வாடை – பெருமலைப்புலவர் உரைத்திறன்	முனைவர் வே.அ.பழனியப்பன்
11.	பி.போதுமணி	P18100222	பரிபாடலில் வையை – ஓர் ஆய்வு	முனைவர் வே.அ.பழனியப்பன்
12.	வ.ராதா	P18100223	ஐங்குறுநூற்றில் இளமைப் பெயர்கள்	முனைவர் மா.தமிழ்ச்செல்வி
13.	அ.ரேவதி	P18100224	குறும்பலூர் மக்களின் வாழ்வியல்	முனைவர் ம.செல்வராசு
14.	வி.சிந்து	P18100226	சங்க இலக்கியத்தில் பெருநகரங்கள்	முனைவர் கதி.முருகேசன்
15.	ம.சிவரஞ்சனி	P18100227	பாணாற்றுப்படையில் வாழ்வியல் சிந்தனைகள்	முனைவர் சே.பிருந்தா
16.	சோ.சுதா	P18100228	நா.முத்துக்குமாரின் அணிலாடும் முன்றில் முன்வைக்கும் உறவுகள்	முனைவர் சி.முடியரசன்
17.	ப.தியாகராஜன்	P18100229	முத்தொள்ளாயிரத்தில் மூவேந்தர்களின் சிறப்புகள்	முனைவர் பொன்.கதிரேசன்
18.	ப.வாணி	P18100230	பட்டினப்பாலையில் புகார் நகரம்	முனைவர் மா.தமிழ்ச்செல்வி

PRINCIPAL
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MELASIVAPURI - 622 403

நெறியாளர் சான்றிதழ்

முனைவர் ம. செல்வராசு எம். ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,
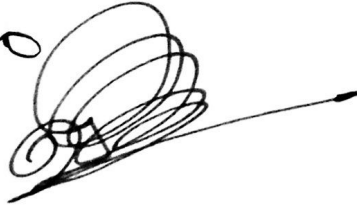
இணைப் பேராசிரியர்

தமிழ்த்துறைத் தலைவர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி – 622 403.

"பாரியின் பறம்பு – ஓர் ஆய்வு" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்டப்பாடப் பகுதிக்கு செல்வன். செ. ஜெயசீலன் (பதிவு எண்: **P18100216)** செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரித் தமிழ்த் துறையில் பயின்ற காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்று சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 20/3/20

நெறியாளர்
26/8/20
இணைப் பேராசிரியர் & துறைத் த...
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

சிவ - சௌரமம்
20 - 03 - 2020
முதல்வர்

முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் ம. செல்வராசு எம். ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,
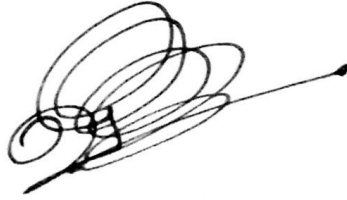
இணைப் பேராசிரியர்

தமிழ்த்துறைத் தலைவர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி – 622 403.

"நிழல் முற்றம் நாவல் – ஓர் ஆய்வு" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்டப்பாடப் பகுதிக்கு செல்வி. லெ. கௌசல்யா (பதிவு எண்: **P18100218**) செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரித் தமிழ்த் துறையில் பயின்ற காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்று சான்றளிக்கிறேன்.
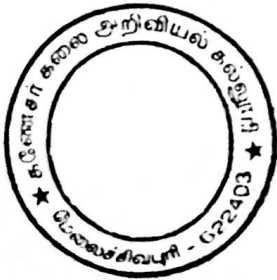
இடம்: மேலைச்சிவபுரி

நாள்: 20|3|20

இணைப் பேராசிரியர் ம. செல்வராசு
எம்.
இணைப் பேராசிரியர் & தலைவர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

சிவ. செந்தூரம்
20 - 03 - 2020
முதல்வர்

முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் ம.செல்வராசு எம்.ஏ.,எம்.்.பில்.,பி.எட்.,பிஎச்.டி.,

இணைப்பேராசிரியர்,

தமிழ்த் துறைத்தலைவர்

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி-622 403.

"குறும்பலூர் மக்களின் வாழ்வியல்" என்னும் தலைப்பில் **அ.ரேவதி**

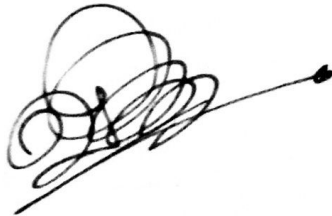(பதிவெண்: P18100224) அவர்கள் செய்துள்ள இவ்வாய்வேடு அவர் பாரதிதாசன்

பல்கலைக்கழகத்தின் எம்.ஏ பட்டம் பெறுவதற்காகக் கணேசர் கலை அறிவியல்

கல்லூரியில் தமிழ்த்துறை மாணவியாக இருந்து ஆய்வு செய்த காலத்தில்

தன்னியலாகச் செய்யப் பெற்றதெனச் சான்றளிக்கிறேன்.

இடம் : மேலைச்சிவபுரி

நாள் : 20|3|20

நெறியாளர் ்்் செல்வா

இணைப் பேராசிரியர் & துறைத் தலைவ

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி

ம. செல்வணம்

20 - 03 - 2020

முதல்வர்

முதலவா

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர்சி.முடியரசன்,

உதவிப் பேராசிரியர்,

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி– 622 403.

"அறிவுமதியின் வெள்ளைத்தீ சிறுகதைத் தொகுப்பில் பெண்ணியம்" என்னும் தலைப்பில் ரா.அழகுலெட்சுமி (பதிவுஎண்.P 18100212) செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரி, தமிழ்த்துறை எம்.ஏ மாணவியாக இருந்து ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்றும், இவ்வாய்வுக்காக அவருக்கு எப்பட்டமும் அளிக்கப்பெறவில்லை என்றும் சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 20. 03. 2020

நெறியாளர் சி.முடியரசன்
உதவிப் பேராசிரியா,
தமிழ் உயராய்வு மையம்
கணேசர் கலை மற்றும் அறிவியல் கல்லூரி
மேலைச்சிவபுரி 622 403
புதுக்கோட்டை மாவட்டம்

சிவ.செந்திலை
20-03-2020
முதல்வர்
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

ஆணைவர் சி.குறிஞ்சி எம்.ஏ.,எம்.ஃபில்.,பி.எட்.,பிஎச்.டி.,

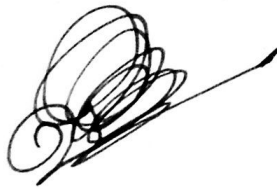உதவிப்பேராசிரியர்,

தமிழ்த் துறை

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி-622 403.

"பெருமாள் திருமொழியில் இறையியல் சிந்தனைகள்" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலைப் பட்டத்தின் பகுதி நிறைவாக அமைந்த இவ்வாய்வேடு எனது மேற்பார்வையில் கணேசர் கலை அறிவியல் கல்லூரி மாணவி ரா.தீபஜோதி (பதிவெண்: P18100214) என்பவரால் வழங்கப் பெற்றதாகும். இவ்வாய்வு ஆய்வாளரால் தன்னியலாகச் செய்யப்பட்டது என்றும் இவ்வாய்வின் மீது அவருக்கு வேறு எந்தப் பட்டமும் வழங்கப்பெறவில்லை என்று சான்றளிக்கிறேன்.

இடம் : மேலைச்சிவபுரி

நாள் : 20/3/2020

20/3/2020

நெறியாளர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி

20 - 03 - 2020

முதல்வர்

முதல்வர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் சே.பிருந்தா எம்.ஏ.,பிஎச்.டி.,

உதவிப்பேராசிரியர்,

தமிழ்த்துறை

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி-622 403.

"பாணாற்றுப்படையில் வாழ்வியல் சிந்தனைகள்" என்னும் தலைப்பில் ம.சிவரஞ்சனி (பதிவெண்: P18100227) அவர்கள் செய்துள்ள இவ்வாய்வேடு அவர் பாரதிதாசன் பல்கலைக்கழகத்தின் எம்.ஏ பட்டம் பெறுவதற்காகக் கணேசர் கலை அறிவியல் கல்லூரியில் தமிழ்த்துறை மாணவியாக இருந்து ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப் பெற்றதெனச் சான்றளிக்கிறேன்.

இடம் : மேலைச்சிவபுரி

நாள் : 20.3.2020

நெறியாளர் 20/3/2020

கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

சிவ. செல்லம்
20 - 03 - 2020

முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் மா.தமிழ்ச்செல்வி எம்.ஏ.,பிஎச்.டி.,

உதவிப்பேராசிரியர்,

தமிழ்த் துறை,

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி-622 403.

"பட்டினப்பாலையில் புகார் நகரம்" என்னும் தலைப்பில் ப.வாணி
(பதிவு எண்: P18100230) அவர்கள் செய்துள்ள இவ்வாய்வேடு அவர் பாரதிதாசன்
பல்கலைக்கழகத்தின் எம்.ஏ. பட்டம் பெறுவதற்காகக் கணேசர் கலை அறிவியல்
கல்லூரியில் தமிழ்த்துறை மாணவியாக இருந்து ஆய்வு செய்த காலத்தில்
தன்னியலாகச் செய்யப்பெற்றதெனச் சான்றளிக்கிறேன்.

இடம் : மேலைச்சிவபுரி

நாள் :

நெறியாளர்

முனைவர்.M.T.
உதவிப் பேரா...   ...ராய்வு மையம்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி-622403

சி.ம.ஏசூரண்
20-03-2020
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் மா.தமிழ்ச்செல்வி எம்.ஏ.,பிஎச்.டி.,

உதவிப்பேராசிரியர்,

தமிழ்த் துறை,

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி-622 403.

       "ஐங்குறுநூற்றில் இளமைப் பெயர்கள்" என்னும் தலைப்பில் வ.ராதா (பதிவுஎண்:P18100223) அவர்கள் செய்துள்ள இவ்வாய்வேடு அவர் பாரதிதாசன் பல்கலைக்கழகத்தில் எம்.ஏ. பட்டம் பெறுவதற்காகக் கணேசர் கலை அறிவியல் கல்லூரியில் முதுகலை தமிழ்த்துறை மாணவியாக இருந்து ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப்பெற்றதெனச் சான்றளிக்கிறேன்.

இடம் : மேலைச்சிவபுரி

நாள் : 20·3·20

நெறியாளர் 20/3/20

முனைவர்.மா.தமிழ்ச்செல்வி எம்.ஏ.,பி.எச்.டி
உதவிப் பேராசிரியர், தமிழ் உயராய்வு மையம்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி-622403

சிவ. செழியன்
20 – 03 –2020
முதல்வர்
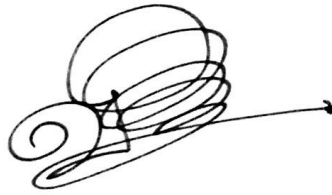
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் கதி. முருகேசன் எம். ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி,
உதவிப் பேராசிரியர்
தமிழ்த்துறை
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி – 622 403.

"சங்க இலக்கியத்தில் பெருநகரங்கள்" என்னும் தலைப்பில்
பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்டப்பாடப்
பகுதிக்கு செல்வி. வி. சிந்து (பதிவு எண்: **P18100226**) செய்துள்ள
இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரித் தமிழ்த்
துறையில் பயின்ற காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்று
சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 20/03/2020

நெறியாளர்

முனைவர்.கதி.முருகேசன்
உதவிப்பேராசிரியர், தமிழ் உயராப்வுமையம்
கணேசா கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி - 622403

சிவ.ஷொர்ணம்
20 – 03 – 2020
முதல்வர்

முதல்வா
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் **வே. அ. பழனியப்பன்,** எம்.ஏ.,எம்..∴.பில்.,பி.எட்.பி.,எச்.டி.,

உதவிப்பேராசிரியர்,

தமிழ்த்துறை,

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி — 622 403.

"பரிபாடலில் வையை — ஓர் ஆய்வு" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலைப்பாடத்தின் பகுதி நிறைவாக அமைந்த இவ்வாய்வேடு, எனது மேற்பார்வையில் கணேசர் கலை அறிவியல் கல்லூரி மாணவி **பி. போதுமணி (பதிவெண்: P18100222)** என்பவரால் வழங்கப்பெற்றதாகும். இவ்வாய்வு ஆய்வாளரால் தன்னியலாகச் செய்யப்பட்டது என்றும் இவ்வாய்வின் மீது அவருக்கு வேறு எந்தப் பட்டமும் வழங்கப்பெறவில்லை என்றும் சான்றளிக்கின்றேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 20-03-2020

நெறியாளர்

முனைவர் வே. அ. பழனியப்பன்
எம்.ஏ., எம்.பில்., பி.எட், எம்.பில்., பிஎச்.டி.,
உதவிப பேராசிரியர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச சிவபுரி – 622 403.

சிவ. சௌந்தரம்
20-03-2020
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் பெரி.அழகம்மை எம்.ஏ.,பிஎச்.டி.,
உதவிப்பேராசிரியர்,
தமிழ்த் துறை
தமிழ் உயராய்வு மையம்,
கணேசர் கலை அறிவியல் கல்லூரி,
மேலைச்சிவபுரி-622 403.

"புறநானூற்றில் பரணர் பாடல்கள்" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்ட பாடப் பகுதிக்கு அளிக்கப்பெற்ற இவ்வாய்வேடு என் மேற்பார்வையில், மாணவி இரா.லெட்சுமி (பதிவெண்: P18100219) என்பவரால் வழங்கப் பெற்றதாகும்.

இவ்வாய்வு ஆய்வாளரால் தன்னியலாகச் செய்யப்பட்டது என்றும் இவ்வாய்வின் மீது அவருக்கு வேறு எந்தப் பட்டமும் வழங்கப்பெறவில்லை என்றும் சான்றளிக்கிறேன்.

இடம் : மேலைச்சிவபுரி
நாள் : 20 : 03 : 2020

நெறியாளர்
முனைவர் பெரி.அழகம்மை எம்.ஏ.,பிஎச்.டி.,
உதவிப் பேராசிரியர், தமிழ் உயராய்வு மையம்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி-622403

20 — 03 — 2020
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் பொன். கதிரேசன் எம். ஏ., எம். ஃபில்., டி. பிடி., பிஎச். டி.,

உதவிப் பேராசிரியர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி – 622 403.

"குறிஞ்சிப்பாட்டில் வாழ்வியல் சிந்தனைகள்" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்டப்பாடப் பகுதிக்கு செல்வன். அ. நவரத்தினம் (பதிவு எண்: **P18100220**) செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரித் தமிழ்த் துறையில் பயின்ற காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்று சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 20 . 03 . 2020

நெறியாளர் 20 . 03 . 2020

Dr. PON. KATHIRESAN M.A., M.Phil., T.P.T., (UGC(NET)., DIP(Yoga)., Ph.D.,
ASSISTANT PROFESSOR OF TAMIL & RESEARCH GUIDE
GANESAR COLLEGE OF ARTS & SCIENCE
MELAISIVAPURI (PO)., PUDUKKOTTAI (DT)-622 403.
Cell: 93605 07675 Email: umaponkathir@gmail.com

சிவ. செல்லம்மை
20 - 03 - 2020
முதல்வர்

முதல்வர்
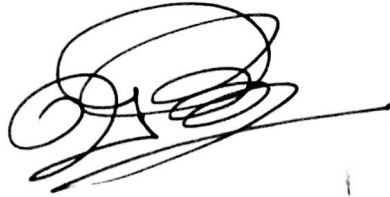கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் வே. அ. பழனியப்பன் எம். ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,

உதவிப் பேராசிரியர்

தமிழ்த்துறை

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி – 622 403.

"**நெடுநல்வாடை – பெருமலைப்புலவர் உரைத்திறன்**" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்டப்பாடப் பகுதிக்கு செல்வி. ரா. பெரியம்மாள் (பதிவு எண்: **P18100221**) செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரித் தமிழ்த் துறையில் பயின்ற காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்று சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்:20-03-2020

நெறியாளர்

முனைவர் வே. அ. பழனியப்பன்
எம்.ஏ., எம்.எஸ்ஸி., பி.எட, எம்.ஃபில்., பிஎச்.டி,
உதவிப் பேராசிரியர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி - 622 403.

20 - 03 - 2020
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் வே. அ. பழனியப்பன் எம். ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,

உதவிப் பேராசிரியர்,

தமிழ்த்துறை,

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி – 622 403.

"உரிப்பொருள் நோக்கில் கார்நாற்பது" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக்கழக முதுகலை ஆய்வேட்டுத் திட்டப்பாடப் பகுதிக்கு செல்வி. பெ. அடைக்காத்தாள் (பதிவு எண்: **P18100211**) செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரித் தமிழ்த் துறையில் பயின்ற காலத்தில் தன்னியலாகச் செய்யப்பட்டது என்று சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 20 – 03 – 2020

நெறியாளர்

முனைவர் வே. அ. பழனியப்பன்
எம்.ஏ., எம்.எஸ்ஸி., பி.எட், எம்.ஃபில்., பிஎச்.டி,
உதவிப் பேராசிரியர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி – 622 403.

20 – 03 – 2020
முதலவர்

முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் கதி. முருகேசன் எம்.ஏ.,எம்.பில்.,பி.எட்.,பி.எச்.டி.,

உதவிப் பேராசிரியர்,

தமிழ்துறை,

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி - 622 403.

      "சங்க இலக்கியத்தில் கலைஞர்கள் வாழ்வியல்" என்னும் தலைப்பில் பாரதிதாசன் பல்கலைக் கழக முதுகலைப்பட்டத்தின் பகுதி நிறைவாக அமைந்த இவ்வாய்வேடு, எனது மேற்பார்வையில் கணேசர் கலை அறிவியல் கல்லூரி மாணவி து. திவ்யா (பதிவு எண் : P18100215) என்பவரால் வழங்கப்பெற்றதாகும். இவ்வாய்வு ஆய்வாளரால் தன்னியலாகச் செய்யப்பட்டது என்றும் இவ்வாய்வின் மீது அவருக்கு வேறு எந்தப் பட்டமும் வழங்கப்பெறவில்லை என்றும் சான்றளிக்கின்றேன்.

இடம் : மேலைச்சிவபுரி

நாள் : 19/03/2020

நெறியாளர்

முனைவர்.கதி. முருகேசன்
உதவிப்பேராசிரியர், தமிழ் உயராய்வுமையம்
கணேசா கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி - 622403

சிவ. சொர்ணம்
19 - 03 - 2020
முதல்வர்
முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

கணேசர் கலை அறிவியல் கல்லூரி, மேலைச்சிவபுரி

தேர்வு மையம் எண்: 010

2019-2020 எம்.பில் திட்டக்கட்டுரைத் தலைப்புகள்

வ.எண்	மாணவர்கள் பெயர்	பதிவு எண்	கட்டுரைத் தலைப்பு	நெறியாளர் பெயர்
1.	ந.மலர்விழி	2K19FT-21774	இறையனார் அகப்பொருள் உரையில் களவும் கற்பும்	முனைவர் பொன்.கதிரேசன்
2.	மு.மேனகா	2K19FT-21775	சங்க இலக்கியம்	முனைவர் வே.அ.பழனியப்பன்
3.	க.சங்கீதா	2K19FT-21776	ஐங்குறுநூற்றில் பாலைத்திணை வாழ்வியல்	முனைவர் கதி.முருகேசன்
4.	த.சத்பா	2K19FT-21777	பெருமாள் முருகன் நாவல்களில் பாத்திரப்படைப்பும் சமூக உறவுகளும்	முனைவர் ம.செல்வராசு

Head
Department of Tamil
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 622403

PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403

நெறியாளர் சான்றிதழ்

முனைவர் ம. செல்வராசு ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,
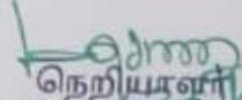
இணைப் பேராசிரியர் & முதல்வர்
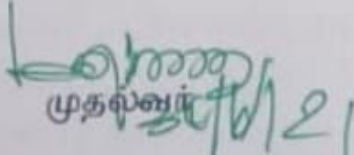
கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி – 622 403.

"பெருமாள்முருகன் நாவல்களில் பாத்திரப்படைப்பும் சமூக உறவுகளும்" என்னும் தலைப்பில் மேலைச்சிவபுரி கணேசர் கலை அறிவியல் கல்லூரித் தமிழ் உயராய்வு மைய ஆய்வாளர் கு. சத்யா (பதிவு எண்: 2K19FT – 21777) அவர்கள் செய்துள்ள இளமுனைவர் பட்ட ஆய்வேடு என் நெறியாள்கையின் கீழ், அவர் ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப்பட்டதென்றும், இவ்வாய்வேடு மீது வேறெந்தப் பட்டமும் ஆய்வாளருக்கு அளிக்கப்படவில்லை என்றும் சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 28·06·2021

நெறியாளர்

முனைவர். ம. செல்வராசு

எம்.ஏ.,எம்.பில்.,பி.எட்.,பிஎச்.டி

இணைப்பேராசிரியர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி-Po, புதுக்கோட்டை-Dt.-622 403

முதல்வர்

முதல்வர்

கணேசர் கலை அறிவியல் கல்லூரி

மேலைச்சிவபுரி

நெறியாளர் சான்றிதழ்

முனைவர் கதி. முருகேசன் எம். ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,
உதவிப் பேராசிரியர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி – 622 403.

    "ஐங்குறுநூற்றில் பாலைத்திணை வாழ்வியல்" என்னும் தலைப்பில் மேலைச்சிவபுரி கணேசர் கலை அறிவியல் கல்லூரித் தமிழ் உயராய்வு மைய ஆய்வாளர் க. சங்கீதா (பதிவு எண்: **2K19FT – 21776**) அவர்கள் செய்துள்ள இளமுனைவர் பட்ட ஆய்வேடு என் நெறியாள்கையின் கீழ், அவர் ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப்பட்டதென்றும், இவ்வாய்வேடு மீது வேறெந்தப் பட்டமும் ஆய்வாளருக்கு அளிக்கப்படவில்லை என்றும் சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 25|06|2021

                                  நெறியாளர்

முனைவர்.கதி.முருகேசன்
உதவிப்பேராசிரியர், தமிழ் உயராய்வுமைய
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி – 622403

PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403

முனைவர் பொன்.கதிரேசன் எம்.ஏ.,எம்.ஃபில்.,டி.பிடி.,பிஎச்.டி.,

உதவிப் பேராசிரியா் & ஆய்வுநெறியாளர்,

தமிழ் உயராய்வு மையம்,

கணேசர் கலை அறிவியல் கல்லூரி,

மேலைச்சிவபுரி – 622 403,

புதுக்கோட்டை.

"இறையனார் அகப்பொருள் உரையில் களவும் கற்பும்" என்னும் தலைப்பில் **ந. மலர்விழி** (பதிவு எண: 2K19FT – 21774) செய்துள்ள இவ்வாய்வேடு அவர் கணேசர் கலை அறிவியல் கல்லூரியில் எம்.ஃபில் தமிழ்த்துறை மாணவியாக இருந்து ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப்பட்டதெனச் சான்றளிக்கின்றேன். இதற்கு முன் வேறு எந்தப் பட்டம் பெறுவதற்கும் இவ்வாய்வேடு அளிக்கப்பெறவில்லை என உறுதியளிக்கின்றேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 30. 03. 2021.

ஆய்வு நெறியாளர்

முனைவர் **பொன்.கதிரேசன்**
M.A., M.PHIL.,T.P.T.,UGC(NET).,DIP.YOGA.,PH.D.,
உதவிப்பேராசிரியர் & ஆய்வுநெறியாளர்
தமிழுயராய்வுமையம் கணேசர் கலை அறிவியல் கல்லூரி,
மேலைச்சிவபுரி, புதுக்கோட்டை மாவட்டம் - 622 403.
செல்பேசி: 9360507875,ponkathir@gmail.com

PRINCIPAL

Ganesar College of Arts & Science

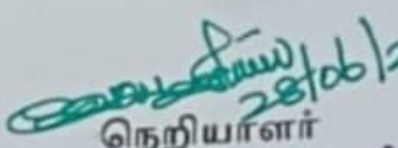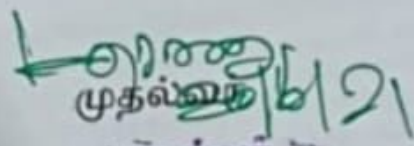MELASIVAPURI 622 403

நெறியாளர் சான்றிதழ்

முனைவர் வே. அ. பழனியப்பன் ஏ., எம். ஃபில்., பி. எட்., பிஎச். டி.,

உதவிப் பேராசிரியர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி – 622 403.

"குறுந்தொகையில் உயிரியல் சூழல்" என்னும் தலைப்பில் மேலைச்சிவபுரி கணேசர் கலை அறிவியல் கல்லூரித் தமிழ் உயராய்வு மைய ஆய்வாளர் மு. மேனகா (பதிவு எண்: 2K19FT – 21775) அவர்கள் செய்துள்ள இளமுனைவர் பட்ட ஆய்வேடு என் நெறியாள்கையின் கீழ், அவர் ஆய்வு செய்த காலத்தில் தன்னியலாகச் செய்யப்பட்டதென்றும், இவ்வாய்வேடு மீது வேறெந்தப் பட்டமும் ஆய்வாளருக்கு அளிக்கப்படவில்லை என்றும் சான்றளிக்கிறேன்.

இடம்: மேலைச்சிவபுரி

நாள்: 28. 06. 2021

28/06/2021

நெறியாளர்

முனைவர் **வே.அ.பழனியப்பன்**
எம்.ஏ., பி.எட்., எம்.ஃபில்.(போன்) எம்.ஃபில்., பிஎச்.டி.,
உதவிப்பேராசிரியர் & ஆய்வு நெறியாளர்
கணேசர் கலை அறிவியல் கல்லூரி,
மேலைச்சிவபுரி, புதுக்கோட்டை மாவட்டம் - 622403.
மின் அஞ்சல்: arasupalani45@gmail.com

முதல்வர் /21

முதல்வர்
கணேசர் கலை அறிவியல் கல்லூரி
மேலைச்சிவபுரி

Ganesar College of Arts and Science, PG Dept of Commerce
Project Details from 2019 -20

S.NO	NAME	TITLE [2019-2020]	GUIDE	REG.NO
1	R.ABINAYA	A STUDY ON CUSTOMER SATISFACTION TOWARDS POST OFFICE SCHEME IN PONNAMARAVATHY	S.LAKSHMANAN	P18110191
2	B.ARUNKUMAR	A STUDY ON ANALYSIS OF ELECTRONIC PAYMENT SYSTEM IN VIJAYA BANK KOTHAMANGALAM	C.BALAMURUGAN	P18110192
3	P.BHAVANI	CONDITION OF STREET VENDORS IN KARAIKUDI TOWN IN SIVAGANGAI DISTRICT	M.MOHAMED IBRAHIM MOOSA	P18110193
4	V.CHINNAPPOTTU	A STUDY ON EFFECTIVENESS OF TRAINING IN BHARAT SANCHAR NIGUM LIMITED (BSNL), KARAIKUDI	M.MOHAMED IBRAHIM MOOSA	P18110194
5	C.DURAIPANDI	TOWARDS GOODS AND SERVICE TAX (GST)	S.MANJULA	P18110195
6	R.JAYESWARI	A STUDY ON CUSTOMER SATISFACTION TOWARDS CELLULAR SERVICE WITH SPECIAL REFERENCE TO RELIANCE JIO SIM	A.DURAIPANDI	P18110197
7	M.KAMALAM	A STUDY ON CUSTOMER SERVICE QUALITY OF PANDIYAN GRAMA BANK IN PONNAMARAVATHY TALUK	V.TAMILSELVI	P18110198
8	P.KANIMOZHI	A STUDY ON JOB SATISFACTION OF EMPLOYEES IN TVS LIMITED PUDUKKOTTAI	C.BALAMURUGAN	P18110199
9	PL.KARTHIKA	A STUDY ON CONSUMER PREFERENCE TOWARDS INDUCTION STOVE IN MARAPARAI TALUK	A.DURAIPANDI	P18110200
10	V.KARTHIKA	TOWARDS HONDA ACTIVA WITH SPECIAL REFERENCE TO TRICHY DISTRICT	V.TAMILSELVI	P18110201
11	P.LOGESHWARAN	A STUDY ON CUSTOMER OPINION TOWARDS MOBILE BANKING IN KARAIKUDI TOWN	S.LAKSHMANAN	P18110202
12	V.PRASANAKUMAR	LOGISTICS SERVICES QUALITY IN FREIGHT FORWARDING DIVISION	M.MOHAMED IBRAHIM MOOSA	P18110203
13	K.RAJALAKSHMI	TOWARDS FOUR WHEELER WITH SPECIAL REFERENCE TO SUZUKI IN PUDUKKOTTAI TOWN	S.MANJULA	P18110206
14	A. RAJESH KUMAR	AN ANLAYSIS ON CUSTOMER SERVICE PRACTICES AND STRATEGIES ADOPTED BY THE LOGISTICS	S.MANJULA	P18110207
15	M.RAMYA	A STUDY ON CONSUMER PERCEPTION OF HYUNDAI SANTRA CARS IN COIMBATORE DISTRICT	M.MOHAMED IBRAHIM MOOSA	P18110208
16	M.SARADHA	BRITTANNIA BISCUITS IN PUDUKKOTTAI TOWN	C.BALAMURUGAN	P18110209
17	S.SATHIYA PRIYA	TOWARDS INTERNET BANKING WITH SPECIAL REFERENCE TO	A.DURAIPANDI	P18110210

18	R.SONIYA	A STUDY ON BUYING BEHAVIOUR OF CONSUMER OF DIFFERENT BRANDS OF CHOCOLATES IN PONNAMARAVATHY TALUK.	S.MANJULA	P18110211
19	A.THENMOZHI	A STUDY ON CUSTOMER SATISFACTION TOWARDS USING LAPTOP WITH SPECIAL REFERENCE TO PONNAMARAVATHY TALUK	V.TAMILSELVI	P18110213

HOD
Head
Department of Commerce
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 622403

Dt:

Principal
PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403

"A STUDY ON CUSTOMER SATISFACTION TOWARDS POST OFFICE SCHEME IN PONNAMARAVATHY"

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

Researcher

R.ABINAYA

Reg.No : P18110191

Under the Guidance of

Mr.S.LAKSHMANAN M.Com.,M.Phil.,B.Ed.,

DEPARTMENT OF COMMERCE

Ganesar College of Arts & Science

Melasivapuri- 622 403

APRIL- 2020

Mr.S.LAKSHMANAN M.Com.,M.Phil.,B.Ed.,

Assistant Professor ,

Department of Commerce,

Ganesar College of Arts and Science,

Melasivapuri, Pudukkottai District - 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CUSTOMER SATISFACTION TOWARDS POST OFFICE SCHEME IN PONNAMARAVATHY" by R.ABINAYA (Reg.No: P 18110191) is a work under my guidance and supervision during the academic year 2019- 2020.

Date: 17.03. 21020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

SN- Sovnam

17- 03 -2020

Signature of the Principal

PRINCIPAL

Ganesar College of Arts & Science

MELASIVAPURI - 622 403.

24/38

Dr. L. LEO FRANKLIN,
M.Com.,M.Phil.,M.Com.,C.A.,Ph.D.,SET.,
Assistant Professor,
PG & Research Department of Commerce
11 College of Arts and Science,
Pudukkottai - 622

A STUDY ON ANALYSIS OF ELECTRONIC PAYMENT SYSTEM IN VIJAYA BANK - KOTHAMANGALAM

Project Report Submitted to Bharathidasan University in Partial
Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

Researcher

B. ARUNKUMAR

Reg.No : P18110192

C 609

Under the Guidance of

Mr.C.BALAMURUGAN M.Com.,M.Phil.,B.Ed.,(Ph.D).,SET.,

Assistant Professor

DEPARTMENT OF COMMERCE

Ganesar College of Arts & Science

Melasivapuri- 622 403

APRIL- 2020

Mr.C.BALAMURUGAN M.Com.,M.Phil.,B.Ed.,(Ph.D).,SET.,

Assistant Professor

Department of Commerce,

Ganesar College of Arts and Science,

Melasivapuri, Pudukkottai District - 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON ANALYSIS OF ELECTRONIC PAYMENT SYSTEM IN VIJAYA BANK - KOTHAMANGALAM"   B. ARUNKUMAR Reg.No : P18110192 is a work under my guidance and supervision during the academic year 2019-2020.
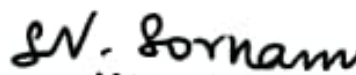
Date: 17·03·2020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

ያN. Sornam

17 – 03 – 2020

Signature of the Principal

PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

"A STUDY ON SOCIO ECONOMIC CONDITION OF STREET VENDORS IN KARAIKUDI TOWN IN SIVAGANGAI DISTRICT"

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

Master of Commerce

2019 – 2020

Researcher

P.BHAVANI

Reg.No : P18110193

Under the Guidance of

Dr.M.MOHAMED IBRAHIM MOOSA M.Com.,B.Ed.,M.Phil.,Ph.D.,

C 61 0

Department of Commerce

Ganesar College of Arts & Science

Melasivapuri – 622 403

April - 2020

Dr.M.MOHAMED IBRAHIM MOOSA M.Com.,B.Ed.,M.Phil.,Ph.D.,
Assistant Professor in PG Commerce and HOD of Bank Management,
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Melasivapuri, Pudukkottai District – 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON SOCIO ECONOMIC CONDITION OF STREET VENDORS IN KARAIKUDI TOWN IN SIVAGANGAI DISTRICT" by P.BHAVANI (Reg.No: P 18110193) is a work under my guidance and supervision during the academic year 209- 2020.

Date: 17 - 03 - 2020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

SN, Sornam
17 –03 –2020
Signature of the Principal
PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

L. Leo Franklin 8/11/2020

Dr. L. LEO FRANKLIN,
M.Com.,M.Phil.,M.Com.,C.A.,Ph.D.,SET.,
Assistant Professor,
P.G & Research Department of Commerce
J.J. College of Arts and Science (Autonomous),
Pudukkottai - 622 422.

A STUDY ON EFFECTVENESS OF TRAINING IN BHARAT SANCHAR NIGAM LIMITED (BSNL), KARAIKUDI

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

Researcher
V. CHINNAPPOTTU
Reg.No : P18110194

Under the Guidance of

Dr.M.MOHAMED IBRAHIM MOOSA M.Com., B.Ed.,M.Phil.,Ph.D.,
Assistant Professor in PG Commerce &
H.O.D of Bank Management

DEPARTMENT OF COMMERCE
Ganesar College of Arts & Science
Melasivapuri- 622 403

APRIL- 2020

Dr.M.MOHAMED IBRAHIM MOOSA M.Com.,B.Ed.,M.Phil.,Ph.D.,

Assistant Professor in PG Commerce &

Head of the Department of Bank Management

Ganesar College of Arts and Science,

Melasivapuri, Pudukkottai District - 622 403.

CERTIFICATE

This is to certify that the project report entitled **"A STUDY ON EFFECTVENESS OF TRAINING IN BHARAT SANCHAR NIGAM LIMITED (BSNL), KARAIKUDI"** V. CHINNAPPOTTU Reg.No : P18110194 is a work under my guidance and supervision during the academic year 2019-2020.
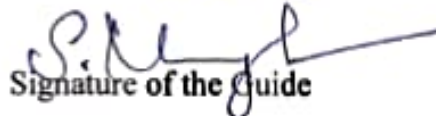
Date: 17 - 3 - 2020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

SN. Somam

17 – 03 – 2020

Signature of the Principal

PRINCIPAL
Ganesar College of Arts & Science
MELASIYAPURI - 622 403.

Dr. L. LEO FRANKLIN,
M.Com.M.Phil.,M.Com.,C.A.,Ph.D.,SET.,
Assistant Professor
P.G & Research Department of Commerce
J.J. College of Arts and Science (Autonomous),
Pudukkottai - 622 422

"A STUDY ON CONSUMER PERCEPTION TOWARDS GOODS AND SERVICE TAX (GST)"

Project Report Submitted to Bharathidasan University in Partial Fulfillment
of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

Researcher

C. DURAI PANDI

Reg.No : P18110195

Under the Guidance of
S.MANJULA M.Com., M.Phil., PGDCM

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DEPARTMENT OF COMMERCE

Ganesar College of Arts & Science

Melasivapuri- 622 403

APRIL- 2020

S.MANJULA M.Com., M.Phil., PGDCM.,
Assistant Professor of commerce,
Ganesar College of Arts and Science,
Melaisivapuri, Pudukottai District – 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CONSUMER PERCEPTION TOWARDS GOODS AND SERVICE TAX (GST)" by C.DURAI PANDI (Reg.No : P18110195) is a work under my guidance and during the academic year 2019-2020

Date: 17 - 03 - 2020 ✓ 17.3.2020

Place: Melaisivapuri   17.3.2020

Head of the Department   Signature of the Guide

SN. Sornam
17 - 03 - 2020
Signature of the Principal
PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

22/38

Dr. L. LEO FRANKLIN,
M.Com,M.Phil.,M.Com.,C.A.,Ph.D.,SET.,
Assistant Professor.
PG & Research Department of Commerce
J.J. College of Arts and Science (Autonomous)
Pudukkottai - 622 422.

"A STUDY ON CUSTOMER SATISFACTION TOWARDS CELLULAR SERVICE WITH SPECIAL REFERENCE TO RELAIANCE JIO SIM"

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

Master of Commerce

2019 – 2020

Researcher

R.JAYESWARI

Reg.No : P18110197

Under the Guidance of

A.DURAIPANDI M.Com., M.Phil., (Ph.D)

Department of Commerce

Ganesar College of Arts & Science

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Melasivapuri – 622 403

April - 2020

Dr.A.DURAIPANDI M.Com.,M.Phil.,(Ph.D).,

HOD of Commerce,

Ganesar College of Arts and Science,

Melasivapuri, Pudukottai District – 622 403.
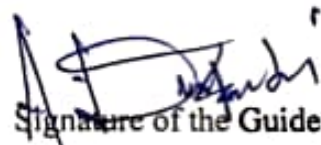
CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CUSTOMER SATISFACTION TOWARDS CELLULAR SERVICE WITH SPECIAL REFERENCE TO RELAIANCE JIO SIM" by R.JAYESWARI (Reg.No: P 18110197) is a work under my guidance and supervision during the academic year 2019- 2020.

Date: *17 - 03 - 2020*

Place: *Melasivapuri*

Head of the Department

Signature of the Guide

N. Sornam
17- 03-2020
Signature of the Principal

PRINCIPAL
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Dr. L. LEO FRANKLIN,
M.Com.M.Phil.,M.Com.,C.A.,Ph.D.,
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Pudukkottai - 622 422

A STUDY ON CUSTOMER SERVICE QUALITY OF PANDYAN GRAMA BANK IN PONNAMARAVATHY TALUK

Project Report Submitted to Bharathidasan University in Partial
Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE

2019-2020

Researcher

M.KAMALAM

Reg.No : P18110198

Under the Guidance of

V.TAMILSELVI,M.Com.,M.Phil.,M.A(Eng).,B.Ed.,(Ph.D).,SET.,

DEPARTMENT OF COMMERCE

Ganesar College of Arts & Science

Melasivapuri- 622 403

APRIL- 2020

V.TAMILSELVI,M.Com.,M.Phil.,M.A(Eng).,B.Ed.,(Ph.D).,SET.,
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Melasivapuri, Pudukkottai District - 622 403.
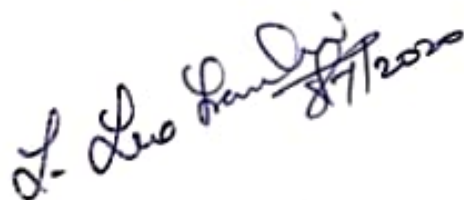
CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CUSTOMER SERVICE QUALITY OF PANDYAN GRAMA BANK IN PONNAMARAVATHY TALUK" by M.KAMALAM (Reg.No : P18110198) is a work under my guidance and supervision during the academic year 2019-2020

Date: 17 - 03 - 2020

Place: Melaisivapuri
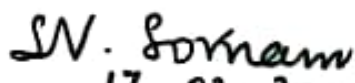
Head of the Department

Signature of the Guide

SN. Sornam
17—03— 2020
Signature of the Principal
PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

Dr. L. LEO FRANKLIN.
M.Com.M Phil. M.Com. L.A
Assistant Professor
PG & Research Department of Commerce
J.J College of Arts and Science
Pudukkottai - 622 40.

A STUDY ON JOB SATISFACTION OF EMPLOYEES IN TVS LIMITED - PUDUKKOTTAI

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

Researcher

P. KANIMOZHI

Reg.No : P18110199

Under the Guidance of

Mr.C.BALAMURUGAN M.Com.,M.Phil.,B.Ed.,(Ph.D).,SET.,

Assistant Professor

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DEPARTMENT OF COMMERCE

GANESAR COLLEGE OF ARTS & SCIENCE

MELASIVAPURI- 622 403

APRIL- 2020

Mr.C.BALAMURUGAN M.Com.,M.Phil.,B.Ed.,(Ph.D).,SET.,

Assistant Professor

Department of Commerce,

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CERTIFICATE

This is to certify that the project report entitled "A STUDY ON JOB

SATISFACTION OF EMPLOYEES IN TVS LIMITED -

PUDUKKOTTAI" P.KANIMOZHI REG.NO : P18110199 is a work

under my guidance and supervision during the academic year 2019-2020.

Date: 17-03-2020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

Dr. L. LEO FRANKLIN,
M.Com.M.Phil M.Com.,C.A.,Ph.D.,SET.
Assistant Professor
PG & Research Department of Commerce
J.J College of Arts and Science
Pudukkottai - 622 422

SN. Sornam
17-03-2020
Signature of the Principal

PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

"A STUDY ON CONSUMER PREFERENCE TOWARDS INDUCTION STOVE IN MANAPPARI TALUK"

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

Master of Commerce

2019 – 2020

Researcher

PL.KARTHIKA

Reg.No : P18110200

Under the Guidance of

A.DURAIPANDI M.Com., M.Phil., (Ph.D)

Department of Commerce

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Melasivapuri – 622 403

April - 2020

Dr.A.DURAIPANDI M.Com.,M.Phil.,(Ph.D).,

HOD of Commerce,

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Melasivapuri, Pudukottai District – 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CONSUMER PREFERENCE TOWARDS INDUCTION STOVE IN MANAPPARI TALUK" by PL.KARTHIKA (Reg.No: P 18110200) is a work under my guidance and supervision during the academic year 2019- 2020.

Date: 17/ 3/ 2020

Place: melasivapuri

Head of the Department

Signature of the Guide

SN. Sornam

17– 03–2020

Signature of the Principal

PRINCIPAL

Ganesar College of Arts & Science

MELASIVAPURI - 622 403.

8/11/2020

Dr. L. LEO FRANKLIN,
M.Com.,M.Phil M.Com., C.A., Ph.D.,SET.
Assistant Professor
P.G & Research Department of Commerce
J.J College of Arts and Science (Autonomous)
Pudukkottai - 622 422

"A STUDY ON CUSTOMER SATISFACTION TOWARDS HONDA ACVTIVA WITH SPECIAL REFERENCE TO TRICHY DISTRICT"

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

Master of Commerce

2019 – 2020

Researcher

Y.KARTHIKA

Reg.No : P18110201

Under the Guidance of

V.TAMILSELVI M.Com.,M.Phil.,M.A(Eng)., B.Ed., (Ph.D)., SET

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Department of Commerce

Ganesar College of Arts & Science

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April - 2020

V.TAMILSELVI M.Com.,M.Phil.,M.A(Eng)., B.Ed., (Ph.D)., SET

Assistant Professor in Commerce

Ganesar College of Arts and Science,

Melasivapuri, Pudukottai District – 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CUSTOMER SATISFACTION TOWARDS HONDA ACVTIVA WITH SPECIAL REFERENCE TO TRICHY DISTRICT" by Y.KARTHIKA (Reg.No: P 18110201) is a work under my guidance and supervision during the academic year 2019- 2020.

Date: 17 - 03 - 2020

Place: Melasivapuri

Head of the Department

Signature of the Guide

SN. Sornam

17 – 03 – 2020

Signature of the Principal

PRINCIPAL

Ganesar College of Arts & Science

MELASIVAPURI - 622 403.

L. Leo Franklin 8/7/2020

Dr. L. LEO FRANKLIN,

M.Com,M.Phil.,M.Com.,C.A.,Ph.D.,SET.,

Assistant Professor,

P.G & Research Department of Commerce

J.J. College of Arts and Science (Autonomous)

Pudukkottai - 622 422.

A STUDY ON CUSTOMER OPINION TOWARDS MOBILE BANKING SERVICES IN KARAIKUDI TOWN

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

Researcher

P.LOGESHWARAN

Reg.No : P18110202

Under the Guidance of

Mr.S.LAKSHMANAN M.Com.,M.Phil.,B.Ed.,

Assistant Professor

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DEPARTMENT OF COMMERCE

Ganesar College of Arts & Science

Melasivapuri- 622 403

APRIL- 2020

Mr.S.LAKSHMANAN M.Com.,M.Phil.,B.Ed.,

Assistant Professor ,

Department of Commerce,

Ganesar College of Arts and Science,

Melasivapuri, Pudukkottai District - 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CUSTOMER OPINION TOWARDS MOBILE BANKING SERVICES IN KARAIKUDI TOWN" P.LOGESHWARAN (Reg.No : P18110202) is a work under my guidance and supervision during the academic year 2019-2020
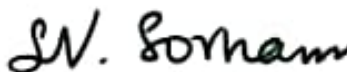
Date: 17 - 03 - 2020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

SN. Somam
17—03 - 2020
Signature of the Principal
PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

Customer preferences towards on Himalaya Face cream (A study with special reference to Ponnamaravathy Town)

~~A STUDY ON ANALYSIS ON IMPROVING LOGISTICS SERVICE QUALITY IN FREIGHT FORWARDING DIVISION~~

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE

~~2019-2020~~

2022 - 2023

Researcher

~~V. PRASNAKUMAR~~ M. Rasika

~~Reg.No: P18110203~~ Reg. No: P21110382

Under the Guidance of

R. Kalaiselvi   M. com., M. phil, B. Ed., SET, (A.D.)

~~Dr. M. MOHAMED IBRAHIM MOOSA M.Com., B.Ed., M.Phil., Ph.D.,~~
~~Assistant Professor in PG Commerce &~~
~~H.O.D of Bank-Management.~~
Department of Commerce

C601.

DEPARTMENT OF COMMERCE

Ganesar College of Arts & Science

Melasivapuri- 622 403

2023

APRIL-~~2020~~

R. kalaiselvi   M·com·M Ihil., B·td,(Ph·D) SET,

Dr. M.MOHAMED IBRAHIM MOOSA M.Com.,B.Ed.,M.Phil.,Ph.D.,

Assistant Professor, in PG Commerce & Dept. of . Commerce,

Head of the Department of Bank Management

Ganesar College of Arts and Science,

Melasivapuri, Pudukkottai District - 622 403.

CERTIFICATE

"Customer

This is to certify that the project report entitled "A STUDY Preferences towards on Himalaya face cream ON ANALYSIS ON IMPROVING LOGISTICS SERVICE A study with special references to Ponnamaravalthy, QUALITY IN FREIGHT FORWARDING DIVISION" towarg M. Rasika   Reg NO: P2 1110 382 V. PRASNAKUMAR Reg.No : P18110203 is a work under my 2022 - 2023 guidance and supervision during the academic year 2019-2020.

Date: 17 05 2020

Place: Melaisivapuri
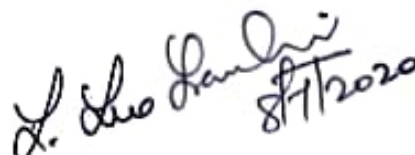
Head of the Department

Signature of the Guide

L. Leo Franklin
8/7/2020

SN. Sorham
17 03 2020
Signature of the Principal

PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

"A STUDY ON CUSTOMER SATISFACTION TOWARDS FOUR WHEELER WITH SPECIAL REFERENCE TO MURUTI SUZUKI IN PUDUKKOTTAI TOWN"

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

Master of Commerce

2019 – 2020

Researcher

K.RAJALAKSHMI

Reg.No : P18110206

Under the Guidance of

Mrs. S.MANJULA M.Com., M.Phil., PGDCM.,

Department of Commerce

Ganesar College of Arts & Science   ᒪ602

Melaisivapuri – 622 403

April - 2020

S.MANJULA M.Com., M.Phil., PGDCM.,

Assistant Professor of commerce,

Ganesar College of Arts and Science,

Melaisivapuri, Pudukottai District – 622 403.

CERTIFICATE

This is to certify that the project report entitled "A STUDY ON CUSTOMER SATISFACTION TOWARDS FOUR WHEELER WITH SPECIAL REFERENCE TO MURUTI SUZUKI IN PUDUKKOTTAI TOWN " by K.RAJALAKSHMI (Reg.No: P 18110206) is a work under my guidance and supervision during the academic year 2019- 2020.

Date: 17 - 03 - 2020

Place: Melaisivapuri

Head of the Department

Signature of the Guide

SN. Sornam
17 —03 2020
Signature of the Principal
PRINCIPAL
Ganesar College of Arts & Science
MELASIVAPURI - 622 403.

8/7/2020

Dr. L. LEO FRANKLIN,
M.Com,M.Phil.,M.Com.,C.A,Ph.D.,SET.,
Assistant Professor,
P.G & Research Department of Commerce
J.J. College of Arts and Science (Autonomous)
Pudukkottai - 622 422.

AN ANALYSIS ON CUSTOMER SERVICE PRACTICES AND STRATEGIES ADOPTED BY THE LOGISTICS SERVICE PROVIDERS IN TIRUCHIRAPPALLI

Project Report Submitted to Bharathidasan University in Partial Fulfillment of the Requirement for the Degree of

MASTER OF COMMERCE
2019-2020

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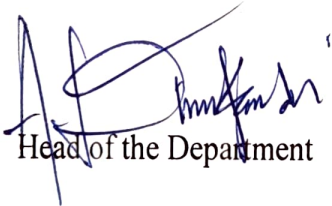Department of Bank Management

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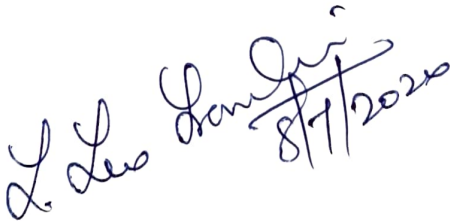
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"A STUDY ON CONSUMER PERCEPTION OF HYUNDI SANTRO CARS IN COIMBATORE DISTRICT"

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A STUDY ON BRAND AWARENESS OF BRITANNIA BISCUITS IN PUDUKKOTTAI TOWN

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"A STUDY ON CONSUMER PREFERENCE TOWARDS INTERNET BANKING WITH SPECIAL REFERENCE TO SIVAGANGAI (DT)"

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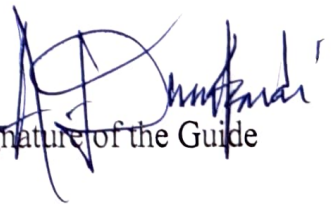
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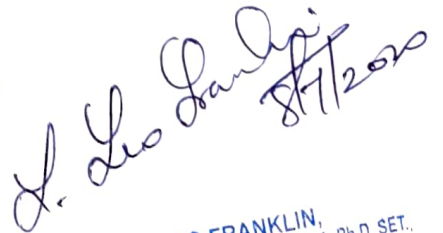
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"A STUDY ON BUYING BEHAVIOUR OF CONSUMER OF DIFFERENT BRANDS OF CHOCOLATES IN PONNAMARAVATHY TALUK"

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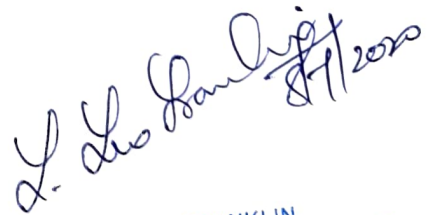
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"A STUDY ON CUSTOMER SATISFACTION TOWARDS USING LAPTOP WITH SPECIAL REFERENCE TO PONNAMARAVATHY TALUK"

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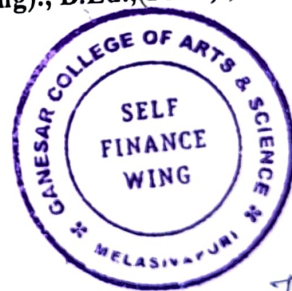
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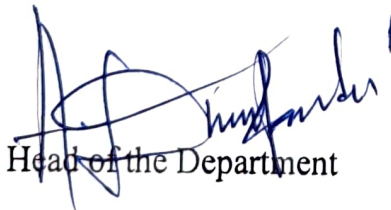Melasivapuri- 622 403

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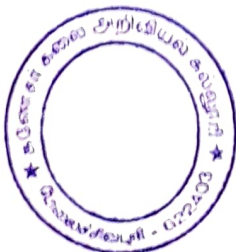
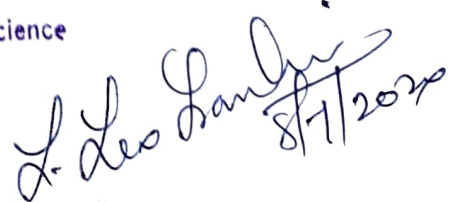Date: 17 - 03 - 2020

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"A STUDY ON CUSTOMER SATISFACTION TOWARDS FOUR WHEELER WITH SPECIAL REFERENCE TO MURUTI SUZUKI IN PUDUKKOTTAI TOWN"

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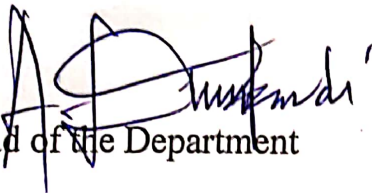
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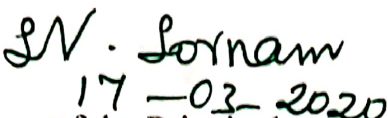
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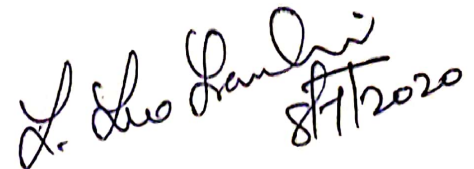
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DECLARATION

I hereby declare that the project work entitled **"A STUDY ON CUSTOMER SATISFACTION TOWARDS FOUR WHEELER WITH SPECIAL REFERENCE TO MURUTI SUZUKI IN PUDUKKOTTAI TOWN"** submitted by me for the degree of Master of Commerce to Bharathidasan University, Thiruchirapalli is my original work and that it has not previously formed the basis for the award of any degree, diploma, associate ship, fellowship, or any other similar title.

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With immense pleasure I express my special thanks to **ALL STAFF MEMBERS** of Ganesar College of Arts & Science, Melaisivapuri encouragement and spontaneous blessings.

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K. Rajalakshmi

K.RAJALAKSHMI

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INTRODUCTION

INTRODUCTION

1.1 INTRODUCTION

In the last few years, the Indian Maruti Suzuki car industry has been spectacular growth. The country stands next to the China and Japan in terms of production and sales respectively. This distribution was achieved due to variety of reasons like restrictive policy followed by the government of India towards the passenger car industry. Majority of Indians, especially the youngsters prefer rather than cars.

The first car that the company produced was a four-door Maruti 800 and the second car that the company produced was a Maruti-Utility vehicle called Omni. Between 1994 and 1996 Maruti released the Esteem, the Gypsy, the Omni, the Gypsy King, Zen and Esteem. It also opened a second plant in Manesar whose capacity at the time of opening was 2, 00,000 units.

1.2 SIGNIFICANCE OF THE STUDY

Customer satisfaction is defined as "the number of customers, or percentage of total customers. Whose reported experience with a firm, its products, or its services exceeds specified satisfaction goal". The studied entitled "customer satisfaction towards Maruti Suzuki cars" mainly focus on the satisfaction on customer in the Maruti Suzuki company for the analysis of satisfaction in the features of cars. The sample design taken for the study is convenient sampling for the study is convenient sampling for collecting the data primary and secondary methods are used.

Customer satisfaction is the key factor in knowing the success of any retail store or business; therefore it is very important to measure it and to find the factors that

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affect the consumer satisfaction. Consumers are most likely to appreciate the goods and services they buy, provided if they are made to feel special. This occurs when they feel that the goods and services that they buy have been specially produced for people like them. Gaining high levels of consumer satisfaction is very important to a business because satisfied consumers are most likely to be loyal to a business.

It is true fact that if you are satisfied you recommended to others. Word of mouth and customer satisfaction play a very important role in determining market perception about an automobile. It is the market perception that determines the success of a company and so it is very important for the car manufacturer to measure the "willingness of existing users of a product to recommend it to others". The same is a lot of interest to customer as well for it helps them make the purchase decision. A car is one of the most significant purchases that an Indian household makes and this project addresses the most important question that perplexes car manufactures:

"What makes the perfect car that influence wilfully purchases?"

The project highlights the factors that influence the buying decision of a consumer. The factor under consideration would be:

Price

- ❖ Income of the consumer
- ❖ Features in the car
- ❖ Safety standard
- ❖ Warranty scheme
- ❖ Finance facility

Is an Indian consumer ready for more? Which is the driving motive behind the effective demand of the car? How the coming of new models like swift does is going to effect the buying decision of consumer and especially the Tata 1 lakh car. In other words, from the spread of choice offered by various manufactures under various segments, of which one the customer will finally turn the ignition and drive.

Customer satisfaction index: some of the most advance thinking in the business world recognizes that customer relationships are best treated as assets, and that methodical analysis of these relationships can provide a road map for improving them "If you cannot measure it, you cannot improve it"- lord William Thomson Kelvin (1824-1907)

Major attributes of customer satisfaction can be summarized as:

- ❖ Product quality
- ❖ Product packaging
- ❖ Keeping delivery commitments
- ❖ Price
- ❖ Responsiveness and ability to resolve complaints and reject reports
- ❖ Overall communication, accessibility and attitudes

1.3 SCOPE OF THE STUDY

There is a tremendous amount of scope for future research in this area, that is the Automobile Industry, some possibilities can be:

- ❖ Comprehensive research on all the competitors in the market.
- ❖ Research on the buying behaviour which would include brand performance, brand attitudes, product satisfaction, purchase

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behaviour, purchase intentions, brand awareness, segmentation studies, etc.

❖ Study of perception among people regarding automobiles (Maruti) and their preferences of the type of vehicles (cars).

1.4 OBJECTIVES OF THE STUDY

❖ To study the customer satisfaction with the usage of vehicles of MARUTI SUZUKI.

❖ To study the impact of different factors of marketing on customer satisfaction.

❖ To know the customers are satisfied with price and service network.

❖ To know the whether Maruti performance matching with the customer expectations.

❖ To know whether the dealer renders after sales service, and if he, how far the consumers are satisfied with services rendered by dealer.

1.5 NEED AND IMPORTANCE FOR THE STUDY

In the modem times the business organizations are adopting new techniques and methods for the growth of the business. The organizations are giving better services to their customers to face challenge posed by the competitors for every business, it is not only important to retain the present customers but also attract the new customers. So there is needed to ascertain the customers the regarding the services providing by reputed organization like Maruti Suzuki. With the increase market study there is a cut through competition among the businessman in the industry some of the other major

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competitors in this area like Hyundai, large or small. The satisfaction of the customer is an all important task. Hence there is a need for the study.

1.6 STATEMENT OF THE PROBLEMS

The title of the study is customer satisfaction with special reference in MARUTI SUZUKI.

- ❖ This study has been conducted to study the customer response, market share, and customer satisfaction and response for MARUTI SUZUKI.
- ❖ It is aimed at different customer satisfaction with reference to age, purpose of purchase, focusing on the target group.
- ❖ To analysis the findings or recommend the changes in service towards customers.

1.7 RESEARCH METHODOLOGY

Research in common refers to a search for knowledge. Research methodology is a way to systematically solve the problem. It may be understand as science of studying how research is done scientifically.

Sample Design:

The sample design which is used in the study is convenience sampling. Respondents from Pudukkottai were selected on the basis of convenience.

Sample size:

Sample size taken for the study is 100 respondents.

Sources of data:

The data is collected through in two ways.

Primary data: The primary data was collected freshly and thus it was original in character. It has been collected through questionnaire. The questionnaires were given to the respondents when they visited respective show rooms and consumers

Secondary data: Secondary data are data which have already been collected by someone. Its main sources are Journals, Newspapers, Magazines, and Internet etc.

Area of analysis:

The study was conducted in Pudukkottai town.

Tools used for analysis:

- ❖ Percentage analysis
- ❖ Chi square test

1.8 LIMITATIONS OF THE STUDY

- ❖ The analysis of the present study has been carried out based on the information has collected from the Maruti Suzuki cars user who are residing at Pudukkottai district.
- ❖ The study is an opinion survey: caution may have to be exercised while extending the result to other areas.
- ❖ Due to time constrict only 100 numbers of respondents were considered.
- ❖ The result fully depends on the information given by the respondents which may be based.

1.9 CHAPTER SCHEME

Chapter I

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1.3 Scope of the study

1.4 Objectives of the study

1.5 Need and importance of the study

1.6 Statement of the problem

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Chapter III

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CHAPTER II
REVIEW OF LITERATURE

REVIEW OF LITERATURE

Customer satisfaction, of a construct, has been fundamental marketing for over three decades. As early as 1960, Keith (1960) defined marketing as *"satisfying the needs and desires of the consumer"*. Hunt (1982) reported that by the 1970s, interest in customer satisfaction had increase to such extent that over 500 studies were published. This trend continued and by 1992, Peterson and Wilson estimated the amount of academic and trade articles on customer satisfaction to be over 15,000.

Several studies have shown that it costs about five times to gain a new customer as it does to keep an existing customer (Naumann, 1995) and this result into more interest in customer relationships. Thus, several companies are adopting customer satisfaction as their operational goal with carefully designed framework. Hill and Alexander (2000) wrote in their book that *"companies now have big investment in database marketing, relationship management and customer planning to move closer to their customers"*. Jones and Sasser (1995) wrote that *"achieving customer satisfaction is the main goal for most service firms today"*. Increasing customer satisfaction proved profits, positive recommendation, lower marketing expenditures (Pizam and Ellis, 1999).

Parker and Mathew (2001) expressed that there are two basic definitional approaches of the concept of customer satisfaction. The first approach defines satisfaction as a process and the second approach defines satisfaction as an outcome of a consumption experience. These two approaches are complementary, as often one depends on the other.

Customer satisfaction as a process is defined as *an evaluation between what was received and what was expected* (Oliver, 1977, 1981; Olson and Dover, 1979;

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Tse and Wilton, 1988), *emphasizing the perceptual, evaluate and psychological processes that contribute to customer satisfaction* (Vavra, 1997, p.4).

Parker and Mathews (2001) however noted that the process of satisfaction definitions concentrates on the antecedents to satisfaction rather than satisfaction itself.

Satisfaction as process is the most widely adopted description of customer satisfaction and a lot of research efforts have been directed at understanding the process approach of satisfaction evaluations (Parker and Mathews, 2001). This approach has its origin in the discrepancy theory (Porter, 1961), which argued that satisfaction is determined by the perception of a difference between some standard and actual performance.

Cardozo (1965); and Howard and Sheth (1969) developed the contrast theory, which showed that consumers would exaggerate any contrasts between expectation and product evaluations.

Olshavsky and Miller (1972); and Olson and Dover (1979) developed the assimilation theory, which means that perceived quality is directly increasing with expectations. Assimilation effects occur when the difference between expectations and quality is too small to be perceived.

Anderson (1973) further developed this theory into assimilation-contrast theory, which means if the discrepancy is too large to be assimilated then the contrast effects occur. The assimilation-contrast effects occur when the difference between expectations and quality is too large to be perceived and this difference is exaggerated by consumers.

According to parker and Mathews (2001), the most popular descendant of the discrepancy theories is the expectation disconfirmation theory (Oliver, 1977, 1981), which stated that the result of customers perceptions of the difference between their perceptions of performance and their expectations of performance. Positive disconfirmation leads to increased satisfaction, with negative disconfirmation having the opposite effect. Yi (1990) expressed that customers buy products or services with pre-purchase expectations about anticipated performance, once the bought product or service has been used, outcomes are compared against expectations. If the outcome matches expectations, the result is confirmation. When there are differences between expectation and outcomes, disconfirmation occurs. Positive disconfirmation occurs when product or services performance exceeds expectations. Therefore, satisfaction is caused by positive disconfirmation or conformation of customer expectations, and dissatisfaction is the negative disconfirmation of customer expectations (Yi, 1990).

While several studies support the disconfirmation paradigm, others do not. For instance, Churchill and Surprenant (1982) found that neither disconfirmation nor expectations had any effects on customer satisfaction with durable products.

Weiner (1980, and 1985); and Folkes (1984) proposed the attribution theory, which stated that when a customer purchase a product or service, if the consumption is below expectation, the customer is convinced that the supplier cause the dissatisfaction. The complaining customer is focused on restoring justice and the satisfaction outcome is driven by perceived fairness of the outcome of complaining.

Westbrook and Reilly (1983) proposed the value-percept theory, which defines satisfaction as an emotional response caused by a cognitive-evaluative

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process, which is the comparison of the product or service to one's values rather than an expectation. So, satisfaction in a discrepancy between the observed and the desired.

Fish and Young (1985); Swan and Oliver (1985) proposed the quality theory, which stated that individuals compare their input and output ratios with those of others and feel equitable treated. Equity judgement is based on two steps; first, the customer compares the outcome to the input and secondly, performs a relative comparison oh the outcome to the other party.

Pizam and Ellis (1999) reported that there are two additional distinct theories of customer satisfaction apart from the seven aforementioned ones and these include:

1. Comparison-level
2. Generalized negativity; and

The outcome approach of the customer satisfaction defined as the end-state satisfaction resulting from the experience of consumption. This post-consumption state can be an outcome that occurs without comparing expectations (Oliver, 1996); or may be a cognitive state of reward, an emotional response that may occur as the result comparing expected and actual performance or a comparison of reward and costs to the anticipated consequences (Vavra, 1997, p.4).

Parker and Mathews (2001) expressed that attention has been focused on the nature of satisfaction of the outcome approach which include:

1. Emotion – satisfaction is viewed as the surprise element of product and service purchase and or consumption experiences (Oliver, 1981), or is an affective response to a specific consumption experience (Westbrook and

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Reilly, 1983). This acknowledge the input of comparative processes but goes further by stating that these may be just one of the determinants of the affective "state" satisfaction (Park and Mathews, 2001).

2. Fulfilment –The theories of motivation state that people are driven by the desire to satisfy their needs (Maslow, 1943) or by their behaviour aimed at achieving the relevant goals (Vroom, 1964). However, satisfaction can be either way viewed as the end-point in the motivational process. Thus *"consumer satisfaction can be seen as the consumer's fulfilment response"* (Rust and Oliver, 1994, p.4).

3. State- Oliver (1989) expressed that there are four framework of satisfaction, which relates to reinforcement and arousal. *"Satisfaction-as-pleasure" results from positive reinforcement, where the product or service is adding to an aroused resting state, and "satisfaction-as-relief" results from negative reinforcement.* In relation to arousal, low arousal fulfilment is defined as *"satisfaction –as contentment"*, *a result of the product or service performing adequately in an ongoing passive sense.* High arousal satisfaction is defined as *"satisfaction as either positive (delight) or negative surprise" which could be a shock* (Rust and Oliver, 1994).

Willard Hom (2000) present two broadly classified customer satisfaction models viz. Macro- models, which place the customer satisfaction among a set of related constructs in marketing research and Micro-models, which theorize the elements of customer satisfaction. The paper also gives various models of customer satisfaction from the perspective of the marketing research discipline.

Vavra, T.G. (1997) in the book suggests specific programmes to improve the measurement of customer satisfaction in an organization. The author describe five critical skills required for this taskviz.sampling /customer-participant selection,

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questionnaire design, interviewing /survey administration, data analysis, and quality function deployment-building action plans.

Peyton, R.M. (2003) in their working paper submitted at the Allied Academies International conference presented a comprehensive review of the literature on various customer satisfaction and Dissatisfaction (CS/D) theories proposed. The literatures are specifically prior to the 1990s. This review focuses on the major components of the decision-making process, also addresses the measurement-related issues relevant to this body of literature.

Prasanna Mohan Raj (2013): studied the factors influencing customer brand preference of the economy segment SUV's and MUV's. Data collection was made through direct interaction and customer intercept survey using questionnaire. Descriptive analysis was used to transform data into understand format and factor analysis was used for identification of factors influencing customer preference. In light of study findings, the preference of a given brand can be explained in terms of six factors namely product reliability, monetary factor, trendy appeal, frequency of non-price promotions offered, trustworthiness and customer feeling or association towards brand. There is need for marketers to take the factors into consideration when crafting product innovations in the SUV segment of Automobile market.

Jhanshahi, A.A. et al. (2001): stated that the automotive industry in India is one of the large in the world and one of the fast growing globally. Customer satisfaction and loyalty are the most important factors that affect the automotive industry. On the other hand, customer service can be considered as an innate element of industrial products. Customer service quality, product quality, and Loyalty can be measured at different stages, for example, at the beginning of the

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purchase, and one or two years after purchase and hence they conducted a research to find the Relationship between customer service and product quality with customer satisfaction and loyalty in the context of the Indian automotive industry the population of the study is all of the Tata Indicia car owners in Pune. Hypotheses of the study will be analyzed using regression and ANOVA. Results of the study show that there are high positive correlations between the customer satisfaction and loyalty.

Datsomor, H.K. (2012): Adopted the SERVQUAL service quality model with its five dimensions (tangible, reliability, responsiveness, assurance and empathy) to measure customer's perception of service quality and to investigate its effect on their loyalty. A self-completion questionnaire with a total of 45 closed questions and 2 open ended questions was developed to gather filed data from 5 Toyota Ghana branches nationwide. All of the items were measured by using a five point Liker-type response scale. SPSS software was used to carry out reliability test, descriptive analysis (frequency and percentage distributions), correlation co-efficient tests and regression model analysis on the data obtained. Responses to the open ended questions were also studied and this study affirms that each of the dimensions of service quality has positive impact on customer loyalty.

Shuqin, W. and Gang, l. (2012): conducted an empirical study on the relationship between after sales service qualities in China Automobile sector and they found that fairness, empathy, reliability and convenience have significant positive impact on customer satisfaction while responsiveness doesn't have a significant impact on the customer satisfaction and that the same time satisfaction has a significant positive impact on trust and trust has a significant positive impact on commitment. They also found satisfaction and commitment both have

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significant positive impact on relationship value but trust cannot impact relationship value directly.

Nikhil Monga, Bhuvender Chaudhary, Saurabh Tripathi (2012): this research attempts to answer some of the questions regarding brand personality of selected cars in India by conducting the market research. This personality sketching will help in knowing what a customer (or a potential customer) thinks about a given brand of car and what are the possible factors guiding a possible purchase. Similarly, the idea of measuring the customer satisfaction will serve the same purpose of determining the customer perception. Thus, by measuring the willingness of exciting users of a car to recommend it to others will help the car manufacturers to check out the entire customer Buying Behaviour. The study shows that brand perception is something which starts building up before a car is purchased and goes on with its use and is reflected in the recommendations. The customer makes to his acquaintances for the same car. Also it is seen that the customer might not be using the car still he holders the perceptions about it. Brand personality of a car is enforced by the sellers in the mindsets of the customers and customers react to it by forming their perception about the car and this reflects in the overall brand image of the car. So brand image and brand personality complement each other and the brand perception.
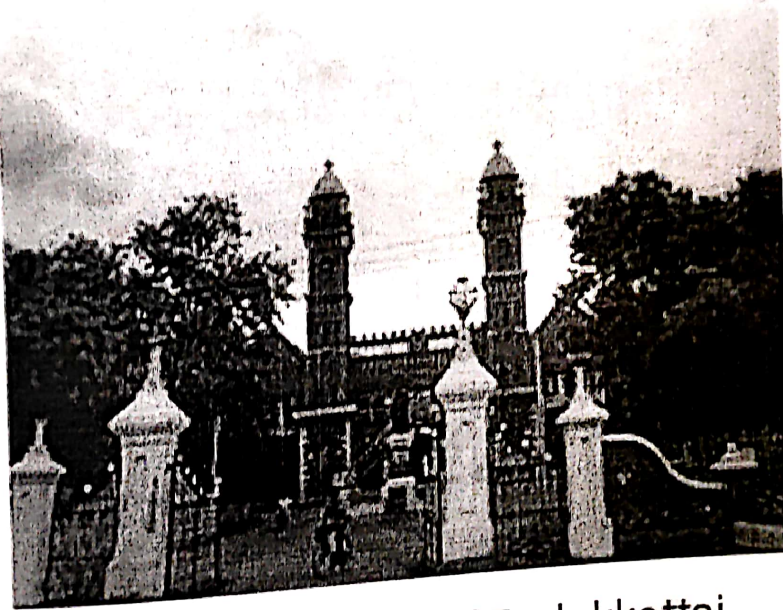
CHAPTER III

PROFILE OF THE AREA

Pudukkottai

புதுக்கோட்டை

Thondaiman seemai,The New Fort

City

The district court of Pudukkottai

Nickname(s): Pudugai

PROFILE OF THE PUDUKKOTTAI TOWN

Pudukkottai is the administrative headquarters of pudukkottai District in the Indian state of Tamil Nadu. It is a big town located on the River Vallaru,[1] it has been ruled, at different times, by the Cholas, Mutharaiyas, Early Pandyas, Thondaimans, and British. It is situated about 395 kilometers (245 mi) southwest of the state capital Chennai and about 55 kilometers (34 mi) southeast of Tiruchirappalli. The people in the city are employed majorly in the teritiary sector activities. Tamil Nadu's first women Asiad Santhi Soundarajan is from Pudukkottai.[2]

Location in Tamil Nadu, India

Coordinates: 10.38°N 78.82°E

Country	India
State	Tamil Nadu
District	Pudukkottai
Collector	Sri.Umamaheswari, IAS
Superintendent of Police	Dr. J. Loganathan, IPS
Region	Chola Nadu
Government	
Body	Pudukkottai Municipality
Area	
Total	21.25 km^2(8.20 sq mi)
Evaluation	87.78 m(287.99 ft)
Population (2011)	
Total	117,745
Density	5,500/km^2 (14,000/sq mi)
Languages	
Official	English, Tamil
Time zone	UTC+5.30 (IST)
PIN	622001-622006
Telephone code	04322
Vehicle Registration	TN-55
Sex ratio	995 per 1000 males
Website	www.pudukkottai.co.in

HISTORY

Being the district headquarters, Pudukkottai accommodates the district administration offices, government educational institutes, collages and schools. Pudukkottai is a part of Pudukkottai constituency and elects its member of legislative assembly every five years, and a part of the Ramanathapuram, Sivaganga, Tiruchiapp alli karur constituencies that elects its member of parliament. The city is administered by a selection-grade municipality established in 1912 as per the M unicipal Corporation Act. The city covers an area of 21.25 km² and hand a population of 117745 in 2011. Roadways is the major mode of transport to the city, while it has also got rail connectivity. The nearest airport is Tiruchirappalli International Airport, located at a distance of 45 km from the city.


Coin of the Roman emperor Augustus from the Pudukottai hoard (British Museum).

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The princely state of Pudukkottai was created by Raghunatha Kilavan Sethupati of Ramnad (1673-1708 A.D.) married Kathali Nachiar, the sister of Thonaiman. He appointed his brother–in-law, Raghunatha Thondaiman, as a chief of the district of Pudukkottai. Raghunatha Thondaiman's services, Ragunatha Kilvan Sethupati gave Pudukkottai as an honour for his services. In later centuries, the Thondaiman rulers, while nominally feudatories of the Ramnad state, often pursued an independent foreign policy, a trend common in all parts of India at that time. After the death of Raghunatha Kilavan Sethupati Raghunatha Thondaiman become ruler of Pudukkottai. [3]

After becoming the ruler of Pudukkottai, Thondaiman fought against the Nayaks of Tanjore and conquered Thirukkattupalli, a very important place. Then there was a direct clash between the Thondaimans of Pudukkottai and the Nayaks, rulers of Tanjore. [4]Thondaiman conquered the west of Thirukkattupalli. The next ruler, Raja Vijaya Reghunatha Raya Thondaiman, helped the Arcot Nawab against Hyder Ali, the ruler of Mysore. He was also loyal to the British Government. After some time, when Hyder Ali's army tried to enter Pudukkottai, Thondaiman's army defeated them and drove Hyder's army away. Thondaiman captured Kilanilai and Aranthangi. He helped the British government against Tipu Sultan.

Pudukkottai finally came under formal British protection. This was arguably unavoidable, since the Thondaimans were much menaced in that period by a resurgent Mysore, ruled by Hyder Ali and Tipu Sultan. When Tipu Sultan sought to leverage the power of the French against his British adversaries, Pudukkottai, in common with its neighbours, such as Thanjavur and Travancore, found it expedient to ally with the British. [5]

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Raja Rajagopala Thondaiman (1928-1948), the last and ninth in the line of Thondaiman rulers, was selected by the British Government and was crowned when he was six years old. After Indian independence in 1947, the Pudukkottai Princely State was amalgamated with the Indian Union on 3 April 1948 and became a division in Tiruchirappalli District. The long history of the Thondaiman's rule came to an end.
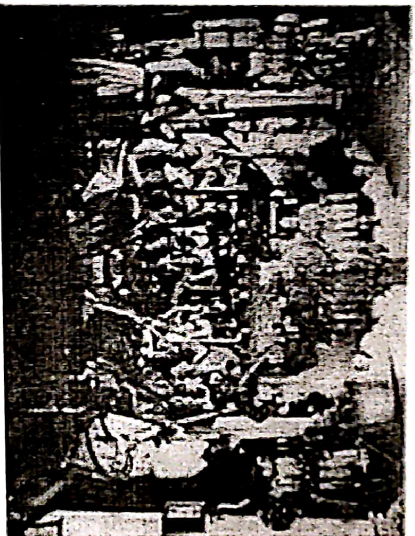

Thondaiman King in his Durbar, Pudukkottai, 1858.

Revenue stamp issued by the princely state of Pudukkottai with a portrait of Martanda Bhairava Tondaiman

Some of the major kings of the dynasty are Raghunatha Raya Thondaiman (1686-1730), Vijaya Raghunatha Raya Tondaiman, (1730-1769), Raya Raghunatha Tondaiman (1769-Dec 1789), Vijaya Raghunatha Raya Tondaiman (Dec 1789-1 February 1807), Vijaya Raghunatha Raya Tondaiman (1 Febuary 1807-June 1825), Raghunatha Tondaiman (June 1825-13 July 1839), Vijaya Raghunatha Tondaiman (13 July 1839-15 April 1886), Marthanda Bhairava Tondaiman (15 April 1886-28May 1928) and Rajagopala Tondaiman (28 October 1928-4 March 1948).
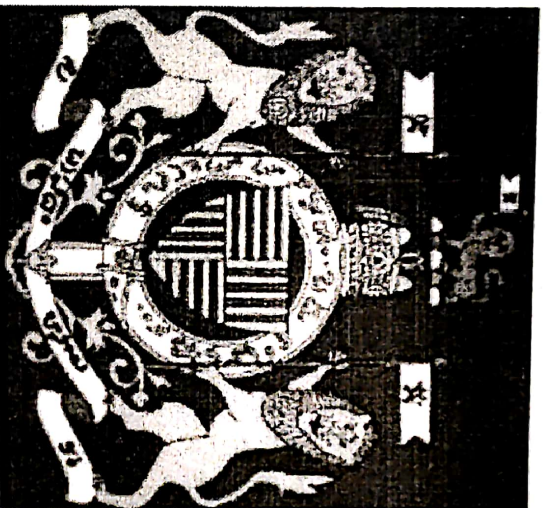
The coat of arms of Pudukkottai state

Pudukkottai became a princely state of British India under the political authority of Madras Presidency. The stated had an area of 380,000. The Rajas of Pudukkottai were entitled to a 17-gun salute. The last Thondaiman raja of Pudukkottai acceded to newly Independent India in 1948, and the state became a division of the Trichinopoly District of Madras State. The state was reorganised twice in the succeeding decade, taking its present form in 1956; it was renamed Tamil Nadu in 1968. On 14 January 1947, the present Pudukkottai District was formed from parts of Tiruchirappalli and Thanjavur districts.[6]

GEOGRAPHY

Pudukkottai is located at 10.38°N 78.82°E in the valley of river Vellar. The city has a semi-arid climate with high temperatures throughout the year, and relatively low rainfall. The city is located in Pudukkottai district of the South Indian state, Tamil Nadu, at a distance of 390 km (240 mi) from Chennai. Pudukkottai has a plain terrain with a few rocky hills intersped in the outskirts. Urugumalai, Athimalai, Chennaimalai are the hills that surround the city. The rivers that flow in Pudukkottai are Amaravathy, Noyal, Bhavani, and Kaveri. There are no notable mineral resources available in and around the city. Red loam and red sand are the types of soil found in the town. Paddy, groundnuts, bananas and sugarcane are the major crops in the region. Pudukkottai experiences hot and dry weather throught the year. The temperature ranges from a maximum of 39.7°C (103.5°F) to a minum of 17.8°C (64.0°F). Like the rest of the state, April to June are the hottest months and December to January are the coldest. Pudukkottai receives an average of 978.8 mm (38.54) of rainfall yearly. The South west monsoon, with an onset in June and lasting up to August, brings scanty rainfall. Bulk of the rainfall is received during the North East monsoon in the months of October, November and December.[7] The municipality covers an area of 21.25 km² (21,250,000 m²)[8][9][10]

TRANSPORATION

The Pudukkottai municipality maintains 122.84 km (76.33 mi) of roads. The city has 4.16 km (2.58 mi) concrete roads, 9.78 km (6.08 mi) WBM roads, 6 km (3.7 mi) gravel roads, 2.5 km (1.6 mi) footpaths and 100.4 km (62.4 mi) bituminous road. A total of 19.908 km (12.370 mi) of state highways is maintained by the State Highways Department and national highwats by the National Highways Department.[44]

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There are two national highways namely the NH 336 Trichy-Ramanathapuram road and NH 226 Perambalur-Manamadurai road that pass via Pudukkottai. There pass via the town-SH 26 Trichy-Mimisal road and SH 71 Musiri-Sethubavachatram road. The other major district roads connect Pudukkottai to other parts of the district. The Pudukkottai bus stand is a B-grade bus stand located in the centre of the town. The State Express Transport Corporation operates long distance buses connecting the city to important cities like Chennai and Bengaluru. TNSTC Kumbakonam division operates frequent intercity and intrastate buses to cities like Rayavaram, Tiruchirapalli, Thanjavur, Madurai, Coimbatore, Aranthangi, Karaikudi, Devakottai, Sivagangai, Pattukkottai, Ponnamaravathy, Rameswaram, Kodaikanal, Dindigul, Theni, Tiruppur, Karur, Palani, Salem, Erode, Mettupalayam, Velankanni, Villupuram, Vellore, Tiruvannamalai, Nagercoil, Tiruchendur and Thoothukudi.[45][46] KSRTC operates daily buses between Bengalur and Pudukkottai.

Pudukkottai railway station has daily express trains to and from Chennai, Rameswaram and weekely express trains to Coimbatore, Puducherry, Kanyakumari, Varanasi and Bhubaneshwar. The town has passenger train services to Trichy, Manamadurai, Rameswaram and Karaikudi.[47][48]

The nearest local and international airport is the Tiruchirapalli International Airport, located 45 km from the town.

PLACES OF INTEREST

Brahadambal and Shiva Temple located in the main town.

Sri Vyakrapureeswarar Temple, Thiruvengaivasal, Pudukkottai district. Sittannavaasal (Ancient drawings and Stone beds).

Government Museum (This is the second largest museum of Tamil Nadu).

Thirumayam Fort.

Avudayarkoil Athmanatha swamy temple.
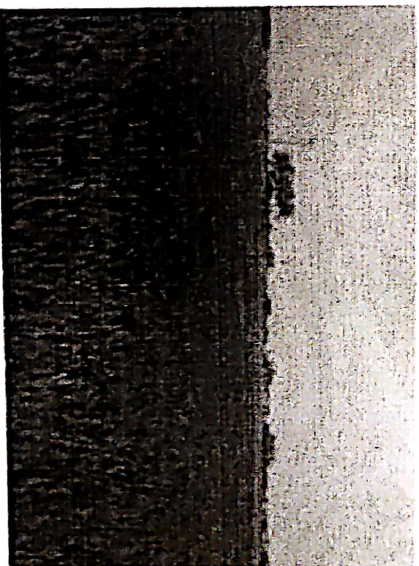
Porpanaikkottai Temple.

Pudukulam (this is a large man made tank supporting the water needs of Pudukkottai town)

Pudukkottai palace-A sand casket with a mantra written by saint Sadasiva Brahmendra of 18th century is preserved. A grand palace in Pudukkottai.

ECONOMY

A Paddy field in Regunathapuram Village of Pudukkottai district

The SIPCOT Industrial Complex is located on Tiruchirappalli-Rameswaram National Highways (NH 210). This Industrial complex is well connected by Road, Rail and Air. It was established in 1980. The allotment of land commenced in 1982 to accommodated Engineering and General Industries. The total extent of complex area is 421.10 acres (1.7041 km²).

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Pudukkottai district is predominantly an agricultural oriented district. Generally a dry and hot climate previls in this disrict and this district's agricultural production depends mainly and the rainfall. The normal annual rainfall of Pudukkottaidistrict is 922.8 mm. out of which 52.2 mm is received in hot weather period, 351.9 mm is received during South West Monsoon and 394.1 mm is received in North East Monsoon. Recently Tamil Nadu Agricultural University started Diploma college in agriculture at Kudiimiyanmalai with a strength of appoximately 50 students including girls.

There are 5,451 irrigation tanks available in this district, of whichh 172 tanks are system tanks fed by Grand Anaikat Channel and the remaining are rainfed tanhs. There are about 47,583 wells in the district catering an area of 100,993 Ha.[49] Paddy is the major crop oh this district. 90000 Ha. of area is covered under paddy, out of which 135000Ha. of area is fed with Kaveri Mettur Project through G.A. canal. The remaining area is well and tank fed. The present productivity level is 4.985 Mt.of Paddy/Ha. Other than Paddy, Groundnut is the major crop in this district which is mainly cultivated under rain fed condition. Groundunut is being cultivated in 36000 Ha. as rain fed crop and 8000 Ha. under irrigated condition. Millet, pulse, cotton, sugarcane, gingelly are the other crops cultivated in this district.

EDUCATION AND UTILITY SERVICES

As of 2011, there were 33 schools in Pudukkottai: nine primary schools, seven middle schools and 17 high and higher secondary schools. There were three arts and science colleges, namely, H.H. The Rajah's college for men, Govt. arts college for Women and Govt. college and Education. There were five industrial training institute ITI in the town, namely, DIET, Govt. industrial Technical

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Institute, Advanced I.T.I., Central ITI, Little flower ITI and SriBrahathambai ITI.[50]

Electricity supply to Pudukkottai is regulated and distributed by the Tamil Nadu Electricity Board (TNEB). A chief Distribution engineer is stationed at the regional headquarters.[51] Water supply is provided by the Pudukkottai Municipality from the Cauvery river through Jeyapuram head water works located 86 km (53 mi) away and Ammaiyappatti water works located 86 km (5.63 mi). in the period 2000-2001, a total of million litres of water was suppliedeveryday for households in the town.[52] As the municipal data for 2011, about 30-35 metric tonnes of solid waste were collected from Pudukkottai every day by door-to-door collection and subsequently the source segregation and dumping was carried out by the sanitary department of the Pudukkottai municipality. The coverage of solivd waste management in the town by the municipality had an efficiency of 100% as of 2001.[53]There is no underground drainage system in the town and the sewerage system for disposal of sullage is through septic tanks, open drains and public conveniences.[54]

The municipality maintained a total of 191 km (119 mi) of storm water drains in 2011:55 km (34 mi) pucca drains and 136 km (85 mi) open drains.[55] As of 2011, there were a total of 31 hospitals, municipal dispensary, private dispensaries and private general clinics and five clinical labls that take care of the health care needs of the citizens.[56] As of 2011, the municipality maintained a total of 4,039 street lamps: 631 sodium lamps, 3,450 tube lights and one high mast beam lamp.[57]The municipality operates one weekly market, two daily vegetable markets and needs of the rural areas around it.[58]

SPORTS

There is a very famous sports club in Pudukkottai called Kavinadu Sports Club. This club trains young talented athletes who are doing really good in District, State, Country and even World level sports. Two mainlong distance runners that India has at the moment (2017) are Miss. Surya and Mr. Lakshmanan who have been trained in this club. Lakshmanan received gold medals for both 5,000 and 10,000 meters running in AsianAthletic championship, 2017. He is the first person from India to win two gold medals in Asian Athletic championship. He also took part in world championships in London, 2017 and finished the 5,000 matres heat with a personal best 0f 13:35.69 minutes.

COMPANY PROFILE

Maruti Suzuki India Limitted, formely known as **Maruti Udyong Limitted,** is an automobile manufacturer in india. It is a 56.21% owned subsidiary of the japanese car and motorcycle manufacture Suzuki Motor Corporation.[7]As of July 2018, it had a market share of 53% of the indian passenger car market.[8][better source needed] Maruti Suzuki manufactures and sells popular cars such as the Ciaz, Ertiga, Wagon R, Alto K10 and Alto 800, Swift, Celerio, Swift Dzire, Baleno and Baleno RS, omni, baleno, Eeco, Ignis, S-Cross, Vitara Brezza and newly launched S-Presso small SUV. The company is headquartered at New Delhi.[2]in May 2015, the company produced its fifteen millionth vehicle in India, a Swift Dzire.[9]
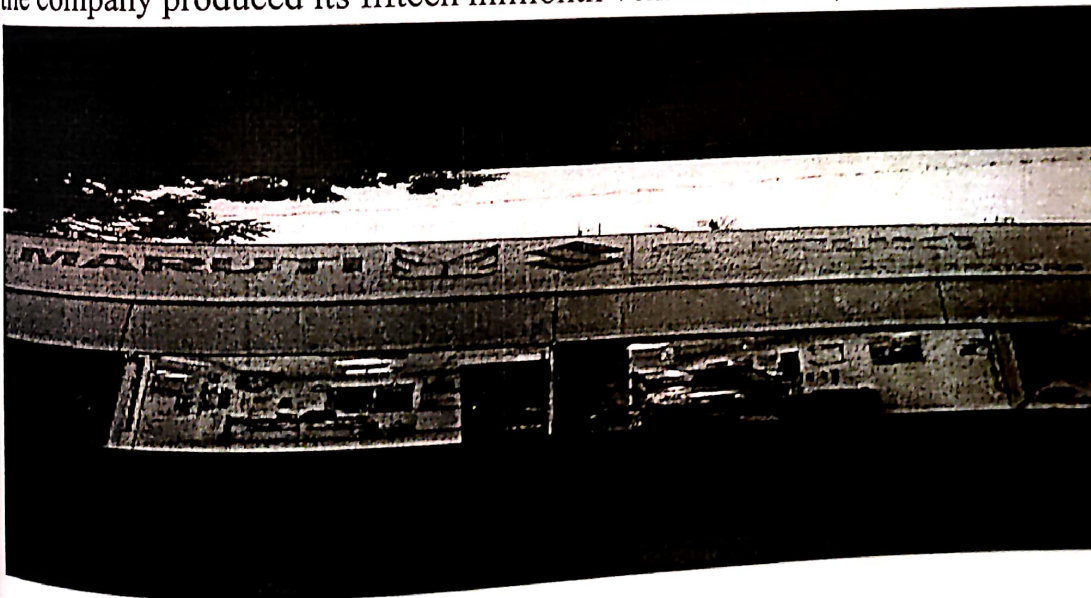
CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

TABLE 4.1

GENDER WISE CLASSIFICATION OF RESPONDENT

S.NO	Gender	NO.OF Respondent	Percentage
1	Male	80	80%
2	Female	20	20%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.1 shows that 80% of the respondents were male, 20% of the respondents were female. It inferred that 80% majority of the respondents were male.
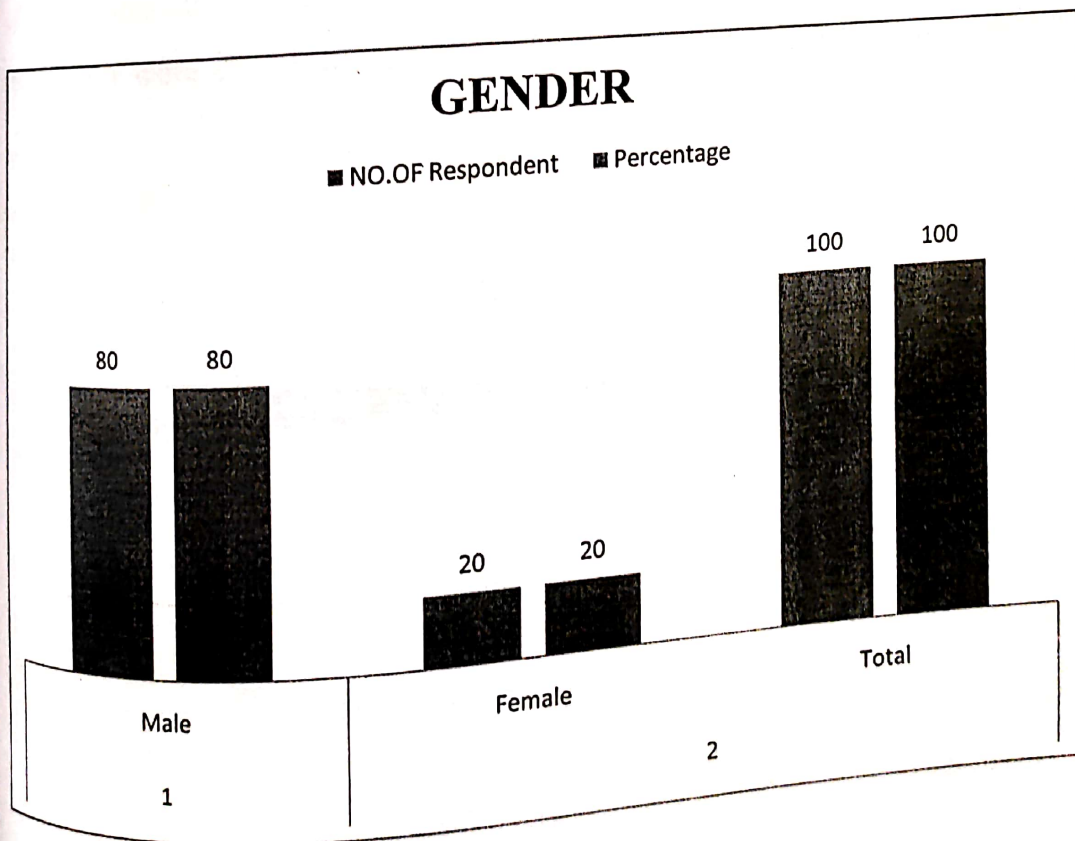
GENDER

■ NO.OF Respondent   ▨ Percentage

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TABLE 4.2

AGE WISE CLASSIFICATION OF RESPONDENT

S.NO	Age	No. of respondent	Percentage
1	25 to 30	84	84%
2	30to 35	12	12%
3	35 to 40	2	2%
4	Above 40	2	2%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.2 shows that 84% of the respondents were 25-30, 12% of the respondents were 30-35, 2% of the respondents were 35-40, 2% of the respondents were above 40. It inferred that 84% majority of the respondents were 25-30.
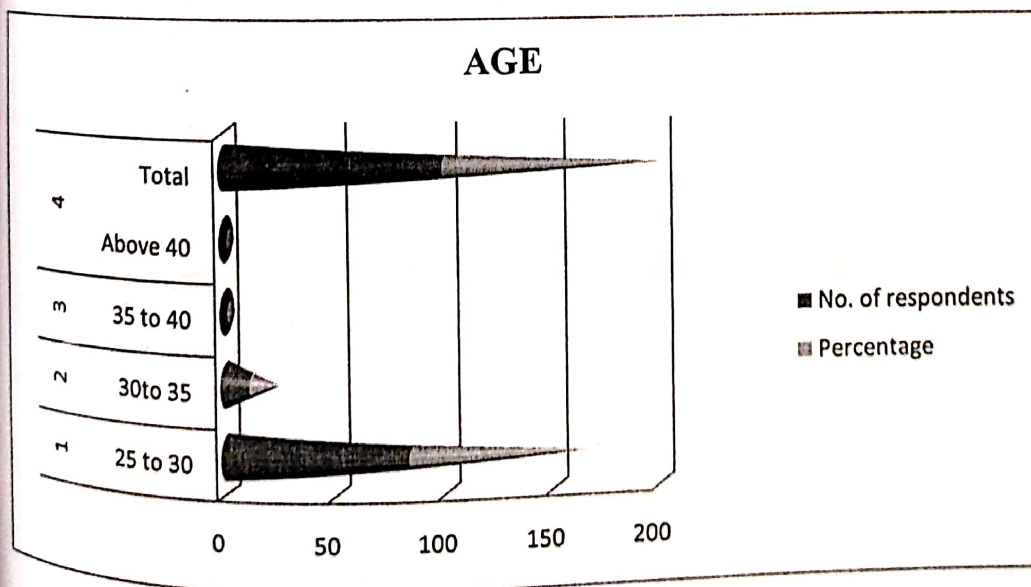
TABLE 4.3

RESPONDENTS OF OCUPATION

S.NO	Occupation	NO.OF respondent	Percentage
1	Self employed	24	24%
2	Business people	38	38%
3	Salaried	10	10%
4	Others	28	28%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.3 shows that 24% of the respondents were self employed, 38% of the respondents were business people, 10% of the respondents were salaried, 28% of the respondents were others. It inferred that 38% majority of the respondents were business people.

OCCUPATION

■ NO.OF respondent ■ Percentage

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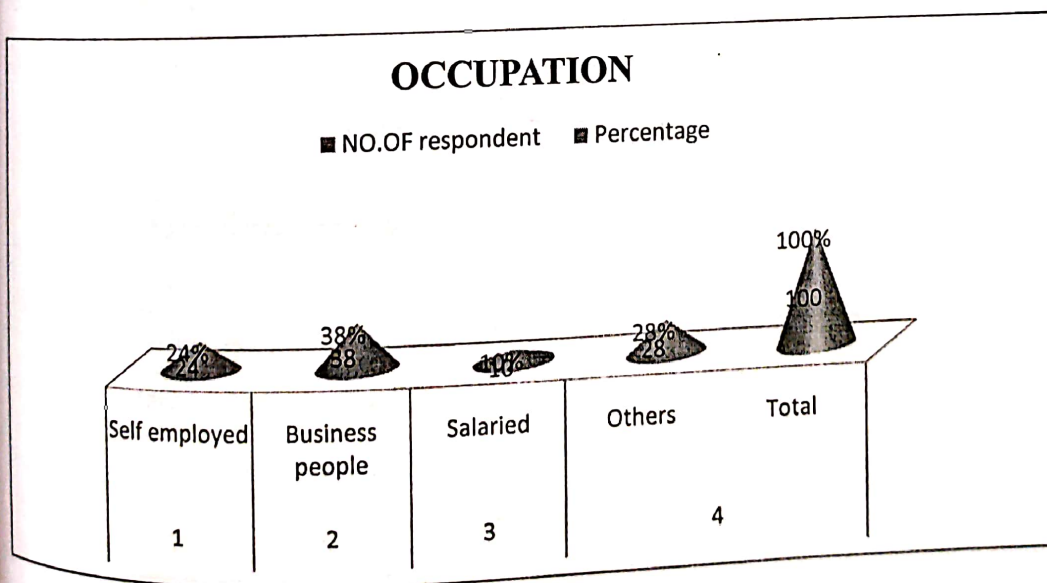
TABLE 4.4

MODEL OF RESPONDENT IN MARUTI SUZUKI CAR

S.NO	Own model	NO.OF respondent	Percentage
1	Vitara Brezza	16	16%
2	Baleno	40	40%
3	Ertiga	14	10%
4	Swift	30	30%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.4 shows that 16% of the respondents ere vitara brezza, 40% of the respondents were baleno, 10% of the respondents were ertiga, 30% of the respondents were swift. It inferred that 40% majority of the respondents were Baleno.


OWN MODEL

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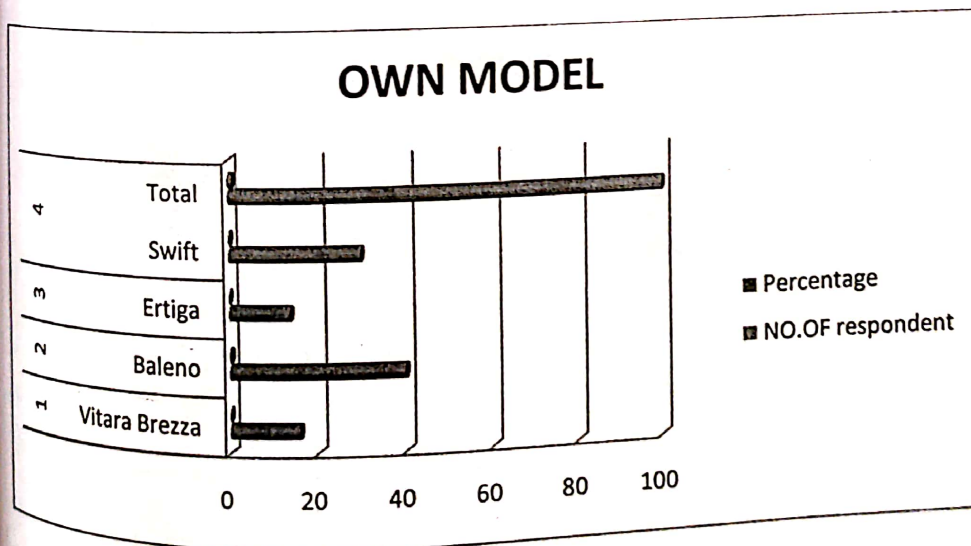
TABLE 4.5

FAVOURITE SMALL CAR OF RESPONDENTS IN MARUTI SUZUKI

S.NO	Small car	NO.OF respondent	Percentage
1	Vitara Brezza	20	20%
2	Baleno	30	30%
3	Eritiga	14	14%
4	Swift	36	36%
	Total	100	100%

Source: Primary data

INTERPRETARION

From the above table 4.5 shows that 20% of the respondents were vitara brezza, 30% of the respondents were baleno, 14% of the respondents were eritiga, 36% of the respondents were swift. It inferred that 36% majority of the respondents were swift.

SMALL CAR
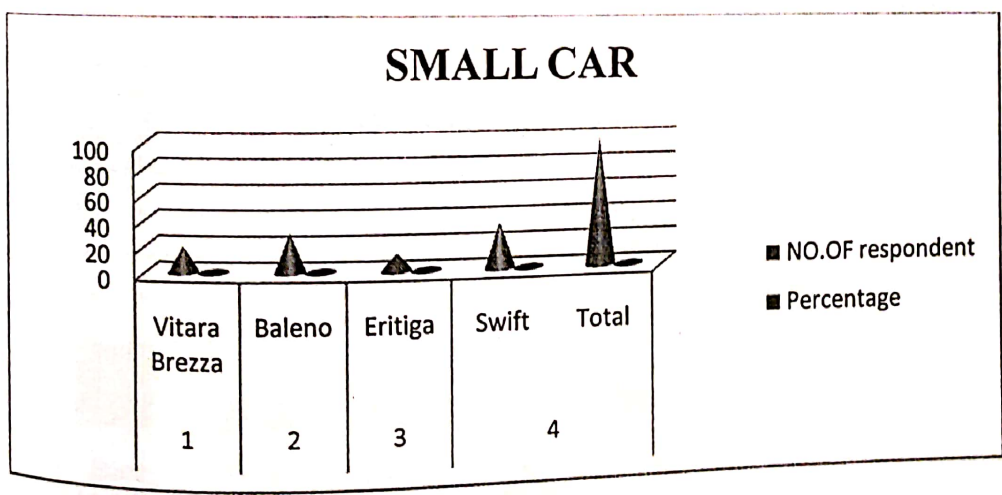
TABLE 4.6

FIRST PREFERENCE OF RESPONDENTS IN MARUTI SUZUKI CAR

S.NO	First preference	NO.OF respondent	Percentage
1	Good facilities	40	40%
2	Price	16	16%
3	Good designs	10	10%
4	Better mileage	34	34%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.6 shows that 40% of the respondents were good facilities, 16% of the respondents were price, 10% of the respondents were good designs, 34% of the respondents were better mileage. It inferred that 40% majority of the respondents were good facilities.

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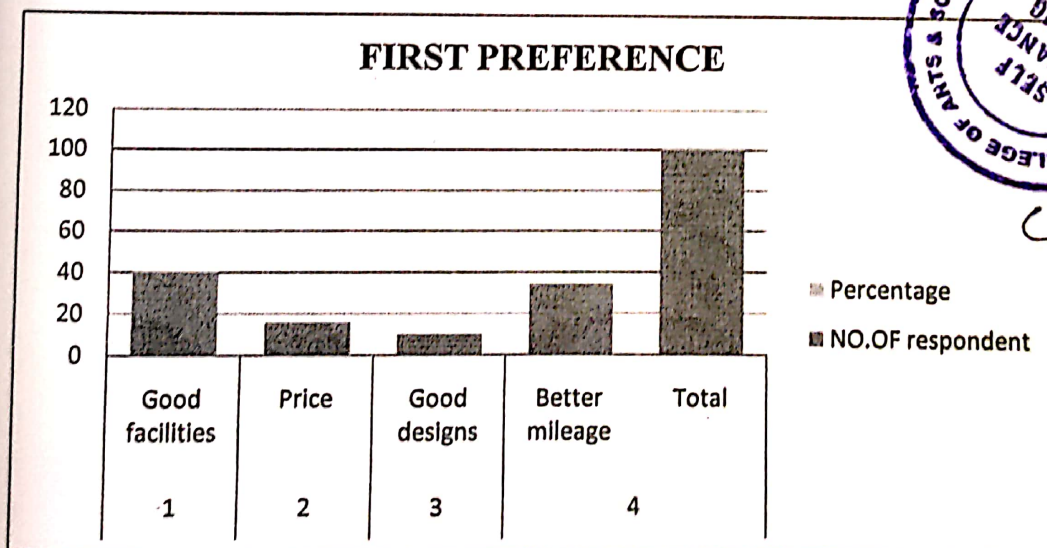
TABLE 4.7

VARIANT OF RESPONDENTS LIKE TO PURCHASE CARS IN MARUTI SUZUKI

S.NO	Model version	NO.OF. respondent	Percentage
1	Diesel	22	22%
2	Engine	44	44%
3	Petrol	34	34%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.7 shows that 22% of the respondents were diesel, 44% of the respondents were engine, 34% of the respondents were petrol. It inferred that 44% majority of the respondents were engine.
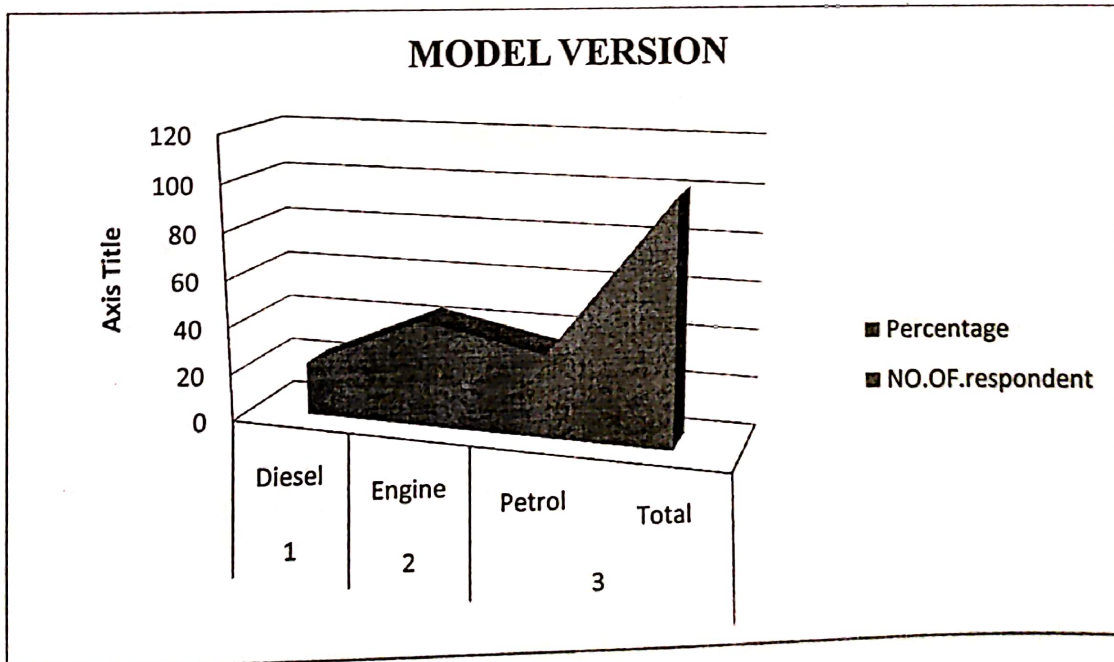
TABLE 4.8

OPINION OF RESPONDENTS ABOUT IN MARUTI SUZUKI CARS

S.NO	Price	NO.OF respondent	Percentage
1	High	56	56%
2	Reasonable	34	34%
3	Low	10	10%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.8 shows that 56% of the respondents were high, 34% of the respondents of were reasonable, 10% of the respondents of were low. It inferred that 56% majority of the respondents were high.


PRICE

35
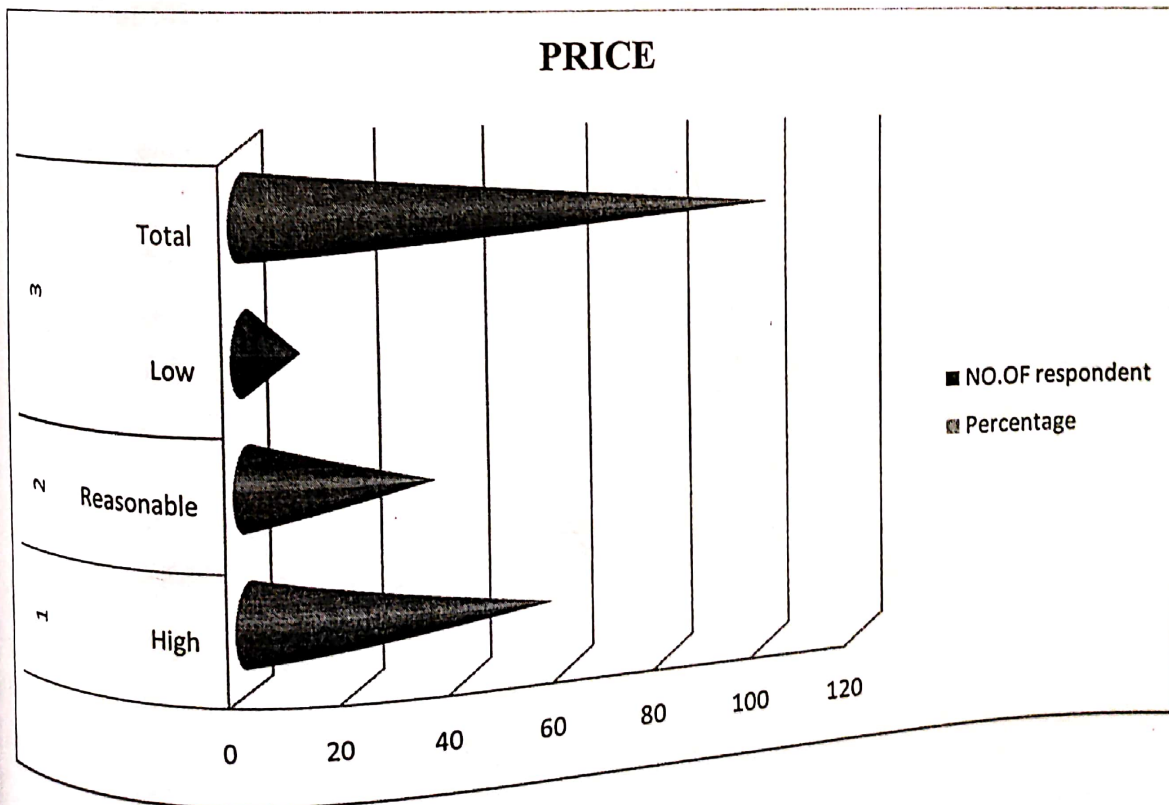
TABLE 4.9

OPINION OF RESPONDENTS IN SPARE PARTS OF MARUTI SUZUKI CARS

S.NO	Spare parts	NO.OF respondent	Percentage
1	High	50	50%
2	Reasonable	32	32%
3	Low	18	18%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.9 shows that 50% of the respondents were high, 32% of the respondents were reasonable, 18% of the respondents were low. It referred that 50% majority of the respondents were high.

SPARE PARTS

36
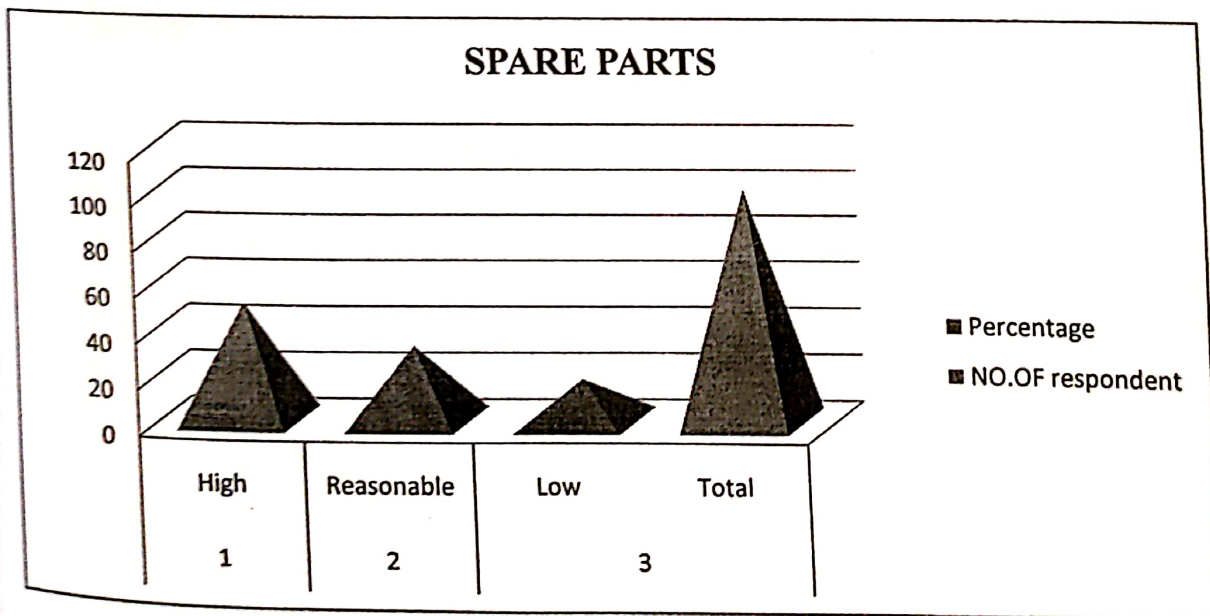
TABLE 4.10

PROMOTIONAL MEDIA OF RESPONDENTS INFLUENCING BUY MARUTI SUZUKI CARS

S.NO	Promotional media	NO.OF respondent	Percentage
1	Broad casting	18	18%
2	Product demonstration	22	22%
3	Word of mouth	6	6%
4	Better mileage	54	54%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.10 shows that 18% of the respondents were broad casting, 22% of the respondents were product planning, 6% of the respondents were word of mouth, 54% of the respondents were better mileage. It inferred that 54% majority of the respondents were better mileage.

37
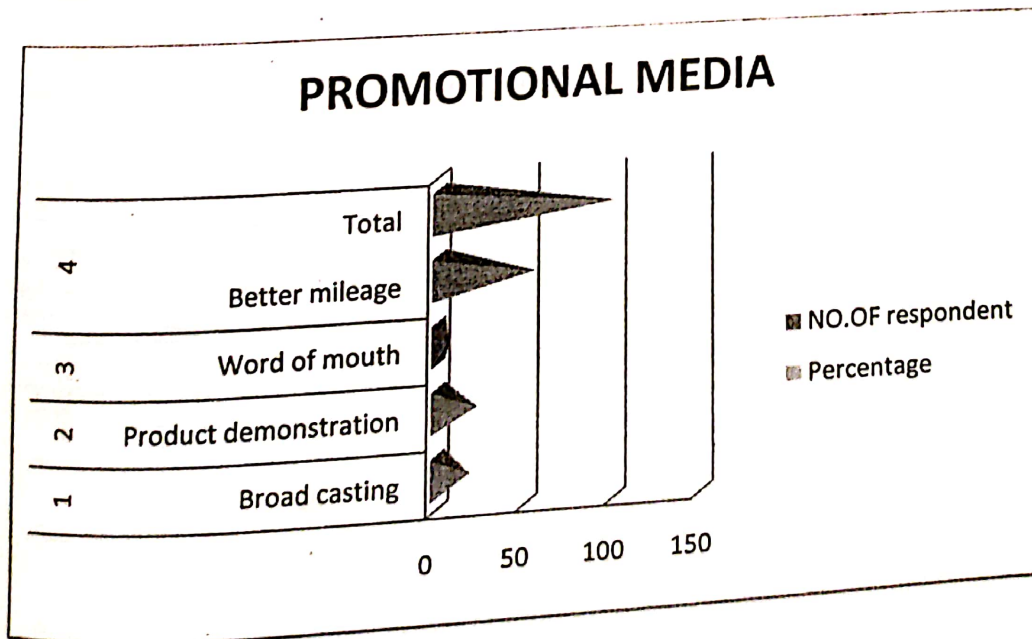
TABLE 4.11

COMPANY OF RESPONDENTS SECOND CHOICE APART FROM BUYING MARUTI SUZUKI

S.NO	Second choice	NO.OF respondent	Percentage
1	Ford	12	12%
2	Hyundai	26	26%
3	Tata	24	24%
4	Mahindra	38	38%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.11 shows that 12% of the respondents were ford, 26% of the respondents were Hyundai, 24% of the respondents were tata, 38% of the respondents were Mahindra. It inferred that 38% majority of the respondents were Mahindra.


SECOND CHOICE
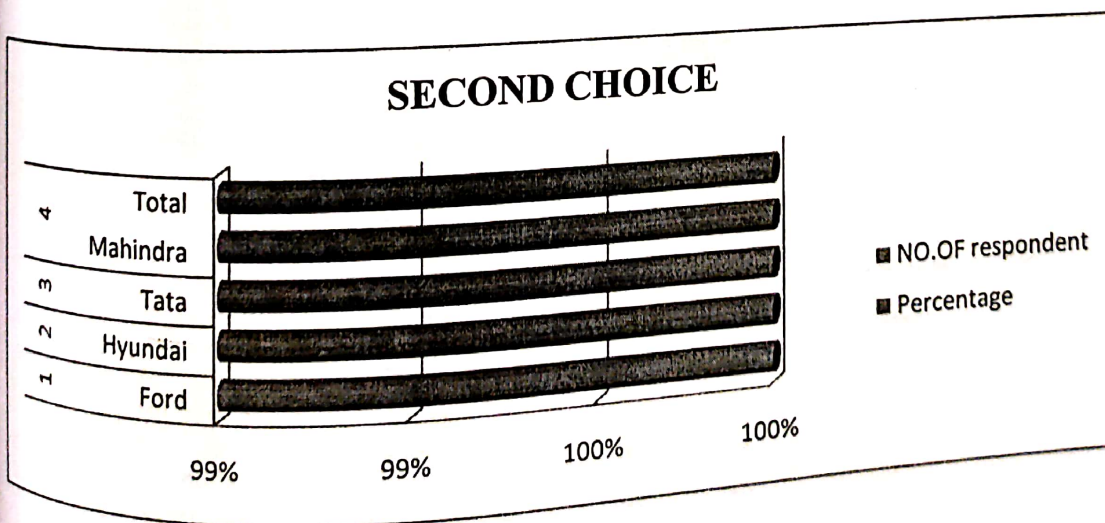
TABLE 4.12

CHOICE OF RESPONDENTS

S.NO	Reason choice	NO.OF respondent	Percentage
1	Brand name	24	24%
2	Feat	10	10%
3	Price	18	18%
4	Mileage	48	48%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.12 shows that 24% of the respondents were brand name, 10% of the respondents were feat, 18% of the respondents were price, 48% of the respondents were mileage. It inferred that 48% majority of the respondents were mileage.
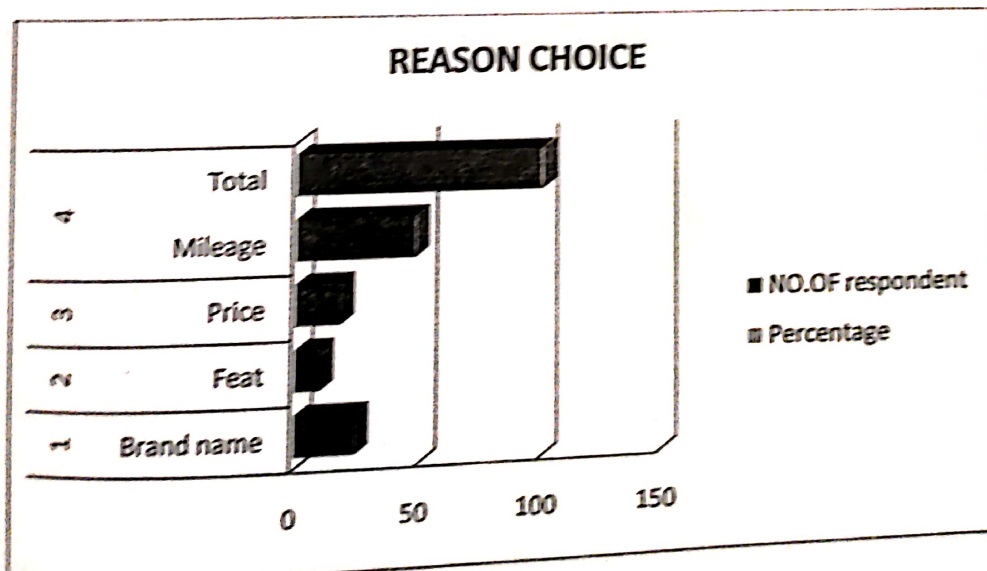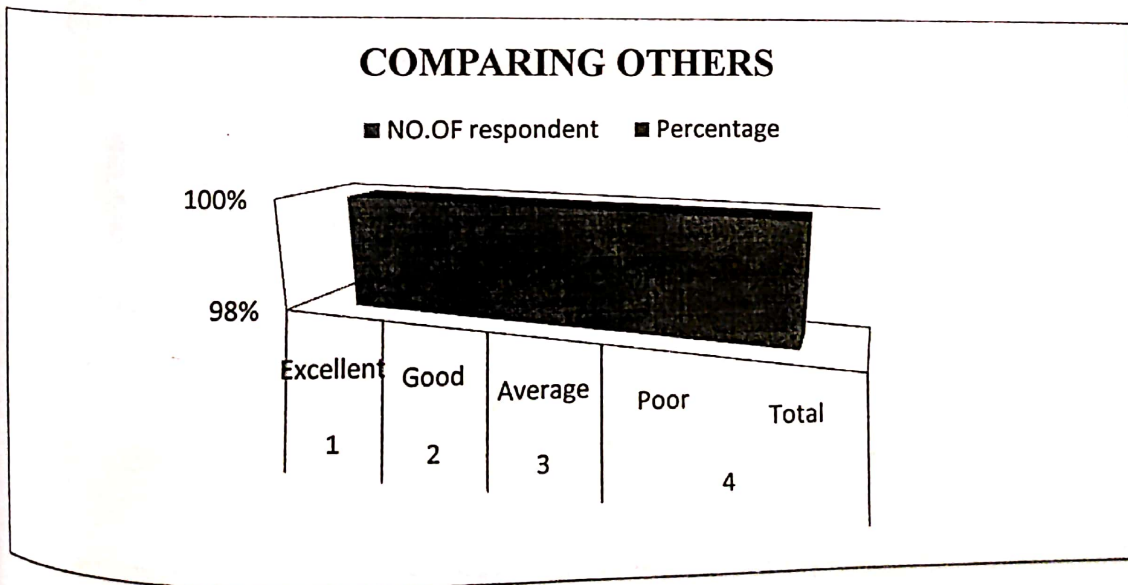
TABLE 4.13

OPINION OF RESPONDENT ABOUT SERVICES IN MARUTI SUZUKI COMPARING OTHERS

S.NO	Comparing others	NO.OF respondent	Percentage
1	Excellent	40	40%
2	Good	52	52%
3	Average	6	6%
4	Poor	2	2%
	Total	100	100%

Source: Primary data

INTREPRETATION

From the above table 4.13 shows that 40% of the respondents were excellent, 52% of the respondents were good, 6% of the respondents were average, 2% of the respondents were poor. It inferred that 52% majority of the respondents were good.

COMPARING OTHERS

■ NO.OF respondent   ■ Percentage

TABLE 4.14

LEVEL OF USING RESPONDENTS IN MARUTI SUZUKI CARS

S.NO	Usage	NO.OF respondent	Percentage
1	1-5 year	56	56%
2	6-10 year	16	16%
3	11-15 year	14	14%
4	16 years& above	14	14%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.14 shows that 56% of the respondents were 1-5 year, 16% of the respondents were 6-10 year, 14% of the respondents were 11-15 year, 14% of the respondents were 16 years& above. It inferred that 56% majority of the respondents were 1-5 year.

41
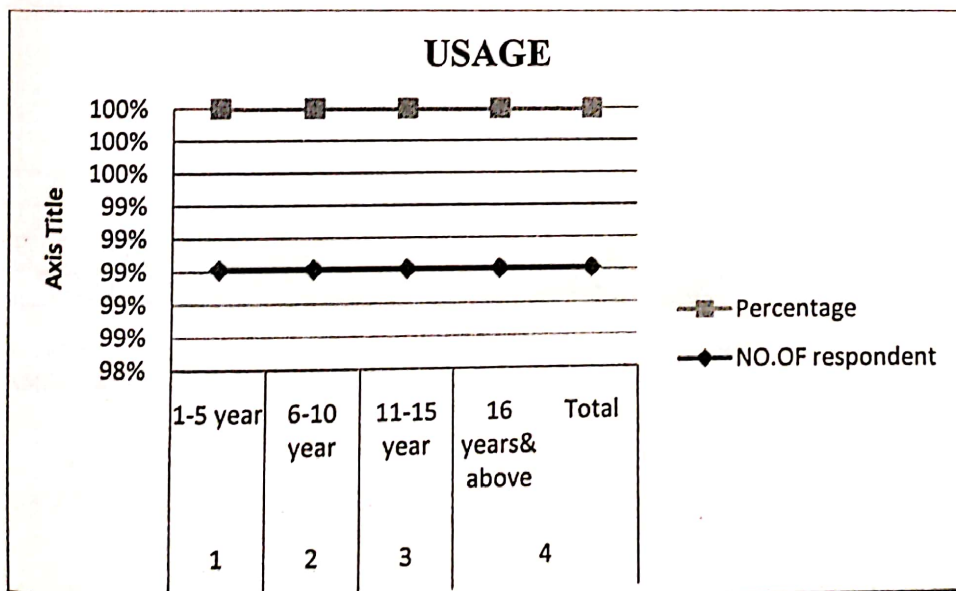
TABLE 4.15

FEEL OF RESPONDENTS DRIVEIN MARUTI SUZUKI CAR

S.NO	Feel	NO.OF respondent	Percentage
1	More comfortable	20	20%
2	Comfortable	64	64%
3	Less comfortable	2	2%
4	Un comfortable	14	14%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.15 shows that 20% of the respondents were more comfortable, 64% of the respondents were comfortable, 2% of the respondents were less comfortable, 14% of the respondents were UN comfortable. It inferred that 64% majority of the respondents were comfortable.
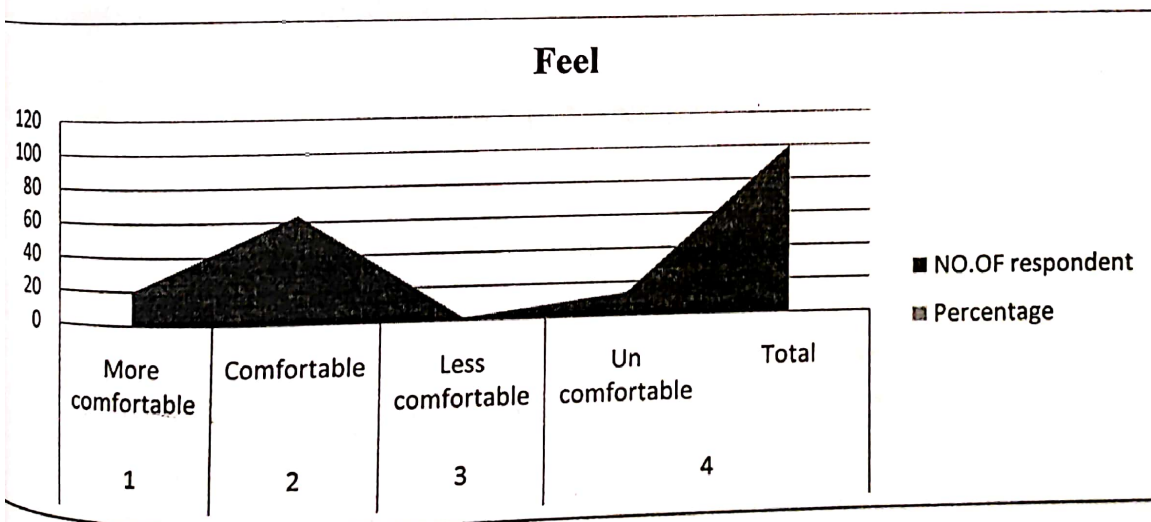
TABLE 4.16

QUALITIES INCLUDE WHILE INTRODUCTION OF NEW CAR IN RESPONDENT

S.NO	Quality intro	NO.OF respondent	Percentage
1	Good designs	36	36%
2	Good facilities	44	44%
3	Reduction in price	10	10%
4	Affordable price	10	10%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.16 shows that b36% of the respondents were good designs, 44% of the respondents were good facilities, 10% of the respondents were reduction in price, 10% of the respondents were affordable price. It inferred that 44% majority of the respondents were good facilities.
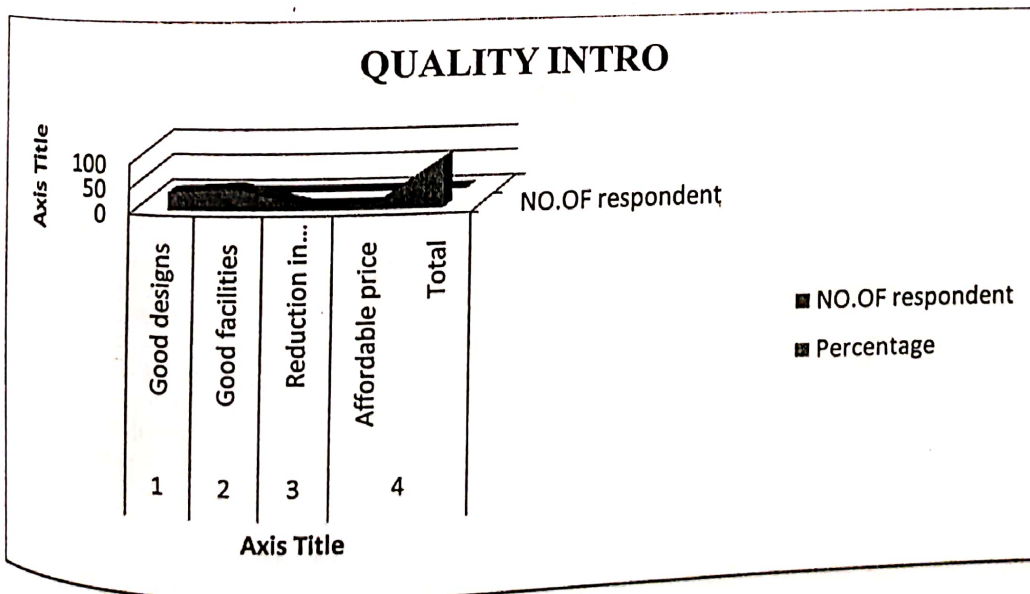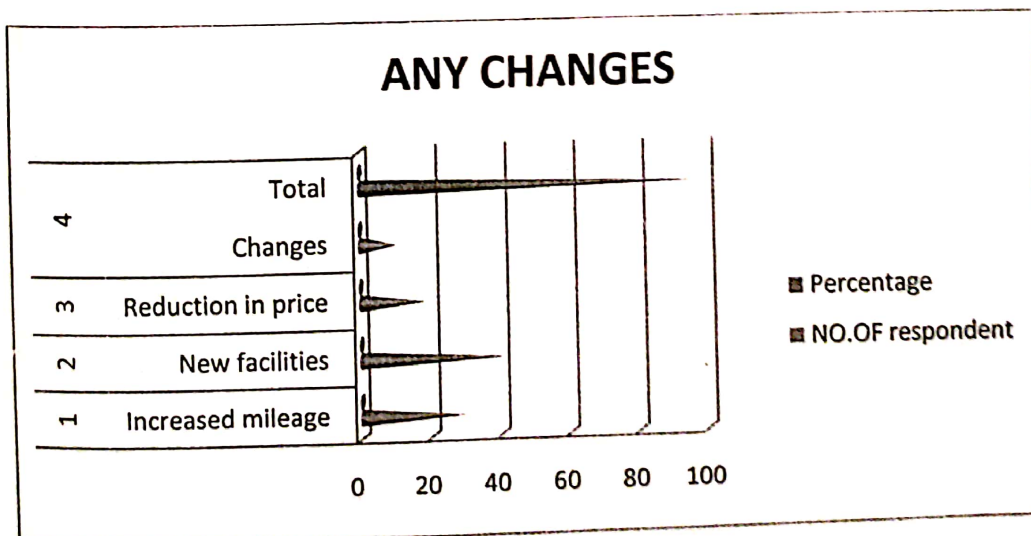
TABLE 4.17

KIND OF CHANGE OF RESPONDENTS EXPECTING IN MARUTI SUZUKI CARS

S.NO	Any changes	NO.OF respondent	Percentage
1	Increased mileage	30	30%
2	New facilities	42	42%
3	Reduction in price	18	18%
4	Changes	10	10%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.17 shows that 30% of the respondents were increased mileage, 42% of the respondents were new facilities, 18% of the respondents were reduction in price, 10% of the respondents were changes. It inferred that 42% majority of the respondents were new facilities.

TABLE 4.18

FAVOURITE COLOUR OF RESPONDENTS IN MARUTI SUZUKI CARS

S.NO	Favourite colour	NO.OF respondent	Percentage
1	White	18	18%
2	Black	35	35%
3	Red	10	10%
4	Blue	37	37%
	Total	100	100%

Source: Primary data

INTERPRETATION

From the above table 4.18 shows that 18% of the respondents were white, 35% of the respondents were black, 10% of the respondents were red, 37% of the respondents were blue. It inferred that 37% majority of the respondents were blue.

FAVOURITE COLOUR
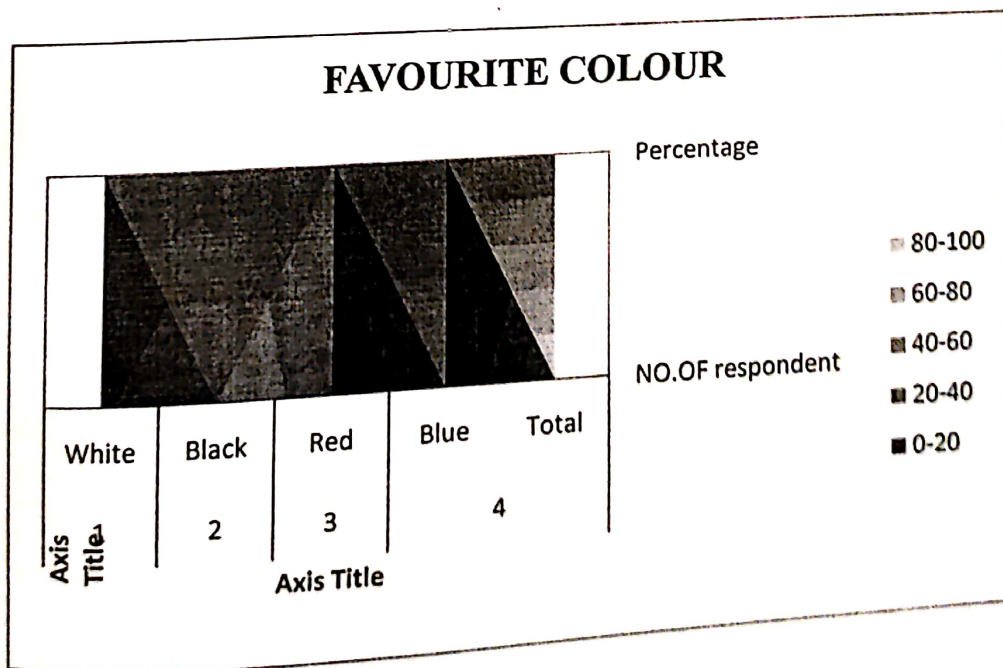
CHAPTER V

FINDINGS, SUGGESTIONS, CONCLUSIONS

FINDINGS

* ❖ (80%) of the respondents were male category.
* ❖ (84% of the respondents are between the Age of 25-30.
* ❖ (38%) of the respondents are business people.
* ❖ (40%) of the respondents are use Baleno model.
* ❖ (36%) of the respondents use small car as swift.
* ❖ (40%) of the respondents first preference of maruti Suzuki were good facilities.
* ❖ (44%) of the respondents like to purchase car for engine facilities.
* ❖ (56%) of the respondents opinion about maruti Suzuki were high.
* ❖ (50%) of the respondents opinion of spare parts were high.
* ❖ (54%) of the respondents promotional media were better mileage.
* ❖ (38%) of the respondents second choice were Mahindra.
* ❖ (48%) of the respondents choice of purchase of car because of mileage.
* ❖ (52%) of the respondents opinion about maruti Suzuki were good.
* ❖ (56%) of the respondents level of using the car were 1-5 years.
* ❖ (64%) of the respondents feel of driving were comfortable.
* ❖ (44%) of the respondents for introduction of new car were good facilities.
* ❖ (42%) of the respondents change of kind were new facilities.
* ❖ (37%) of the respondents favourite colour were blue.

SUGGESTIONS

Based on this study the following suggestions are made.

- ❖ Reduce the price level.
- ❖ Introduce more colours.
- ❖ Equal safety security to the all type of brands.
- ❖ As majority of the customer are attracted by credit facilities it should be extended.
- ❖ The company should avoid unnecessary selling expenses.
- ❖ The company should introduce different type of new technology model cars, for customer satisfaction so that it can retain the customers.
- ❖ The company should provide effective, attractive advertisement to increase the sales.
- ❖ Company should improve its sales offer service because it badly affects the company market share.
- ❖ Customer service should be provided.
- ❖ Customer considered quality as their first preference, so company should give more stress on this.
- ❖ Scheme should be offered as it is most preferred by the customer.

CONCLUSION

The Maruti Suzuki cars are the best and fast moving brands. Now a day the demand for the cars by customer shows increasing trend, at the same time they expected easy handling, safety and security, higher performance etc. Which makes the advanced technologies and adopt new model.

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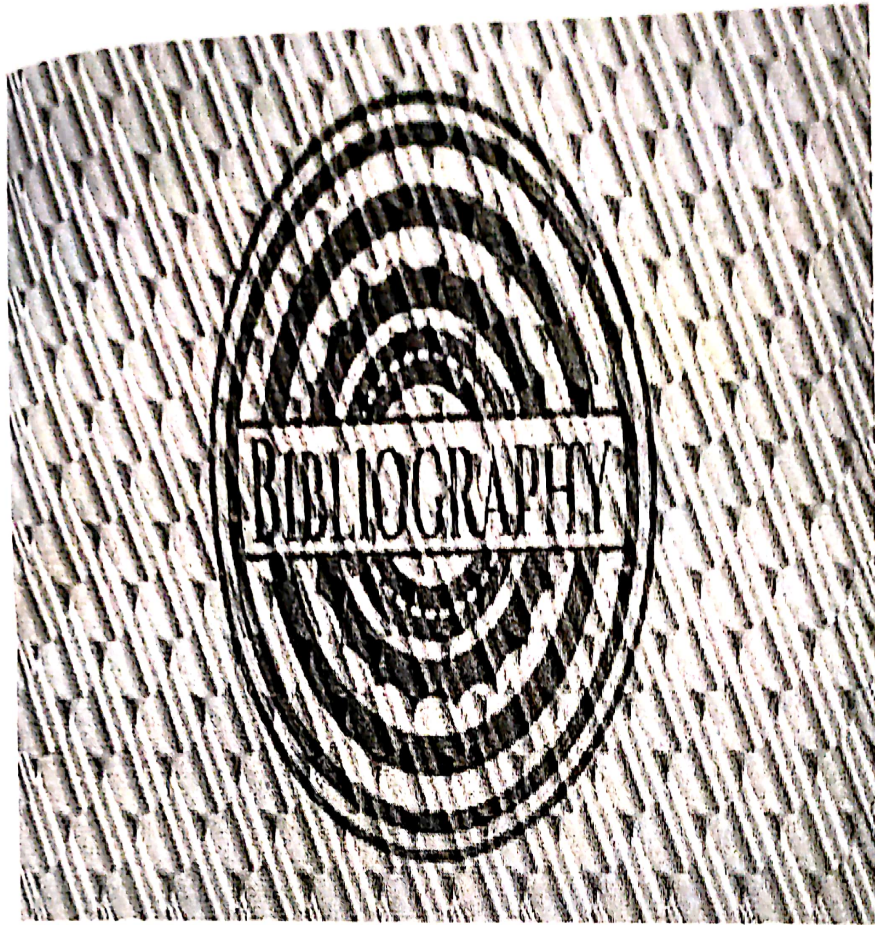
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QUESTIONNAIRE

"A STUDY ON CUSTOMER SATISFACTION TOWARDS FOUR WHEELER WITH SPECIAL REFERENCE TO MARUTI SUZUKI IN PUDUKKOTTAI TOWN"

QUESTIONNAIRE

1. Name of the respondent:

2. Gender of the respondent:

   a) Male   b) Female

3. Age of the respondent:

   a) 25 to 30   b) 30 to 35

   c) 35 to 40   d) Above 40

4. Occupation of the respondent:

   a) Self employed   b) Business people

   c) Salaried   d) Others

5. Which model in MARUTI SUZUKI car do you own?

   a) Vitara Brezza   b) Baleno

   c) Ertiga   d) Swift

6. Which is your favourite small car in MARUTI SUZUKI?

   a) Vitara Brezza   b) Baleno

   c) Ertiga   d) Swift

Why are you giving first preference to MARUTI SUZUKI while buying a car?

   a) Good facilities   b) Price

   c) Good designs   d) Better mileage

In which variant are you like to purchase cars in MARUTI SUZUKI?

   a) Diesel   b) Engine   c) Petrol

9. Opinion about price of MARUTI SUZUKI car?

   a) High   b) Reasonable   c) Low

10. Opinion about price for spare parts in MARUTI SUZUKI cars?

   a) High   b) Reasonable   c) Low

11. Which promotional media is influencing you to buy MARUTI SUZUKI cars?

   a) Broad casting   b) Product demonstration

   c) Word of mouth   d) Better mileage

12. Which company is your second choice apart from buying MARUTI SUZUKI?

   a) Ford   b) Hyundai

   c) Tata   d) Mahindra

13. Reason for choice?

   a) Brand name   b) Feat

   c) Price   d) Mileage

14. What is your opinion about services in MARUTI SUZUKI comparing with others?

a) Excellent
b) Good

c) Average
d) Poor

15. How long your using MARUTI SUZUKI car?

a) 1-5 year
b) 6-10 year

c) 11-15 year
d) 16 year & above

16. How do you feel when you drive yours MARUTI SUZUKI car?

a) More comfortable
b) Comfortable

c) Less comfortable
d) UN comfortable

17. What are the qualities they have to include while introduction new cars?

a) Good designs
b) Good facilities

c) Reduction in price
d) Affordable price

18. What kind of changes are you expecting in MARUTI SUZUKI cars?

a) Increased mileage
b) New facilities

c) Reduction in price
d) Changes

19. Which is your favourite colour in MARUTI SUZUKI cars?

a) White
b) Black

c) Red
d) Blue

C602

A STUDY ON FUZZY SOFT MULTI SET RELATION

Submitted in partial fulfillment of the

Requirement for the degree

Of

MASTER OF SCIENCE IN MATHEMATICS

Of

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April-2020

A STUDY ON TYPES OF FUZZY IDEALS IN FUZZY LATTICES

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A STUDY ON MAX – AVERAGE NORM AND SQUARE NORM OF FUZZY MATRICES

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A STUDY ON CONVERGENCE IN FUZZY SEMI – METRIC SPACE

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A STUDY ON FUZZY LINEAR AUTOMATA AND SOME EQUIVALENCES

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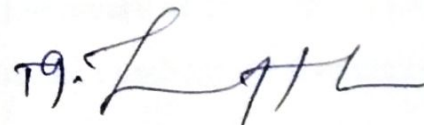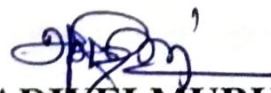
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A STUDY ON FUZZY TOPOLOGICAL SPACES

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A STUDY ON FUZZY SOFT RINGS

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A STUDY ON FIXED POINT THEOREMS IN COMPLEX VALUED METRIC SPACE

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Head of the Department

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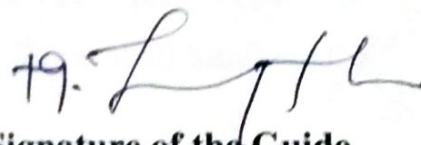MELASIVAPURI - 622 403.
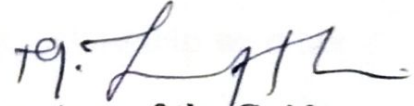
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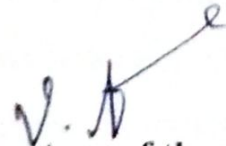
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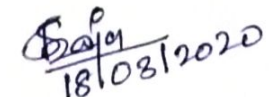
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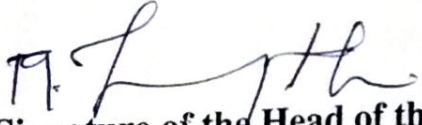
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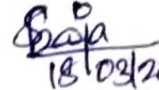
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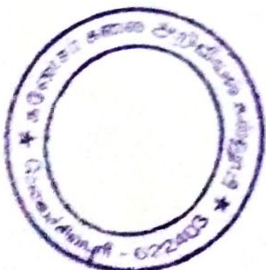
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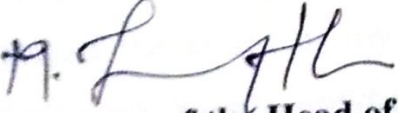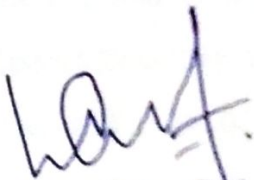
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A STUDY ON FUZZY LINEAR AUTOMATA AND SOME EQUIVALENCES

Submitted in partial fulfillment of the

Requirement for the degree

Of

MASTER OF SCIENCE IN MATHEMATICS

Of

BHARATHIDASAN UNIVERSITY

Submitted by

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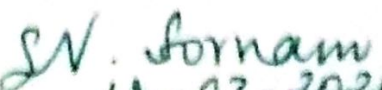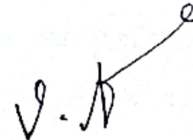## CERTIFICATE

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DECLARATION

I hereby declare that the dissertation entitled, **"A STUDY ON FUZZY LINEAR AUTOMATA AND SOME EQUIVALENCES"** submitted to the Ganesar college of Arts & Science is a partial fulfillment of the requirements for the award of the degree of master of science in mathematics is a record of work by me during the period 2019-2020 of my study in the Department of Mathematics, Ganesar College of Arts & Science, Melaisivapuri under the guidance and dissertation has not formed the award of my Degree, Diploma, Associate Ship, fellowship or other similar title to the candidate of university.

Place: Melaisivapuri

Date: 18. 03. 2020

S. Nanthini

Signature of the candidate

J. K

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ABSTRACT

We present two new normal forms for fuzzy linear grammars.
Moreover, we introduce two new classes of fuzzy machines. The first is the class of fuzzy automata (FLA). We show that automata of this type are equivalent to the fuzzy linear grammar, i.e., we prove that the class of fuzzy language is recognized by fuzzy linear automata. Finally, we introduce the class of fuzzy nondeterministic 2 – tape automata (FNTA), show the equivalence between them and fuzzy linear automata.

INTRODUCTION

Formal language theory focuses, on the study of sets of words called "Languages" and in t he algebraic structures that is generated and recognized by these sets of words. As said in some of these algebraic structures that generate these sets are called "grammars ". The original Chomsky's hierarchy is composed by four formal languages classes which has been widely and deeply studied. This hierarchy has been extended with some others important classes of formal languages.

CHAPTER - I

Definition: 1. 1

A **set** is any well - defined collection of objects, that object called the elements or members of the set.

Example: 1.1

- The collection of computers in the lab.
- The collection of mathematics students in Ganesar College of arts and science, Melaisivapur.

Definition: 1. 2

A is a **subset** of B if every element of A is also contained in B. this is written, $A \subseteq B$.

Example: 1.2

The set of integers,

$\{\dots,-3,-2,-1, 0, 1, 2, 3\dots\}$.

- $\{a,b,e\} \subseteq \{a,b,c,e,g\}$
- {dog, cat} is not a subset of {dog, pig, goat}.

Definition: 1.3

A **membership function** for a fuzzy set A on the universe of discourse X is defined as $\mu_A : X \rightarrow [0,1]$ when each element of X is mapped to a value between 0 and 1. This value is called membership value or degree of membership quantifies the grade of membership of the element in X to the fuzzy set A.

Definition: 1.4

A definition of **a fuzzy set** is given by the membership function

$$\mu_F : U \rightarrow [0,1]$$

elements of the universe of discourse U, can belong to the fuzzy set With any value between 0 and 1.

If X is an universe of discourse and X is a particular element of X, then a fuzzy set A defined on X and can be written as a collection of ordered pairs

$$A = \left\{ \left(x, \mu_A(x) \right), x \in X \right\}$$

Example: 1.3

- Let $X = \{g_1, g_2, g_3, g_4, g_5\}$ be the reference set of students.

- Let A' be the fuzzy set of "smart" students, where "smart" is fuzzy terms.

$$A' = \{(g_1, 0.4)(g_2, 0.5)(g_3, 1)(g_4, 0.9)(g_5, 0.8)\}$$

Here A' indicates that the smartness of g_1 is 0.4 and so on.

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Fuzzy set:

- Membership function: user specifies.

- Membership degree [0, 1].

Crisp set:

➤ Membership function : $\mu_A(x) = \begin{cases} 1, & \text{if and only if } x \in A \\ 0, & \text{if and only if } x \notin A \end{cases}$

➤ Membership degree : $\{0, 1\}$

Examples of fuzzy set and crisp set:

Fuzzy set is a generalization of the classical set or crisp set.

Examples of fuzzy set	Examples of crisp set
1. Tall men	1. Men with height $\geq$ 5 ft
2. Good boys	2. Boys passed in 1st class.

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Definition: 1.5

A **Fuzzy subset** in X is the collection of ordered pairs

$$\left(x, \mu_\alpha(x)\right) with\, x \in X$$

and a membership functions $\mu : X \rightarrow [0,1]$. The value $\mu_a(x)$ of x denotes the degree to which an element x may be a member of α.

Thus a fuzzy subset α of X is denoted by $\alpha = \left\{\left(x, \mu_a(x)\right) : x \in X\right\}$

Where $\mu_a(x) = 1$, indicates strictly the containment of the element x in α (full membership) and $\mu_a(x) = 0$ denotes that x does not belong to α (non membership).

A fuzzy set α can also be represented in the following way

$$\alpha = \left\{x : \mu_a(x), \forall x \in X\right\}$$

The set of all fuzzy subset on X is denoted by I_X .

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Definition: 1. 6

Let U be a domain and A , B be fuzzy sets on U.
Then

1. Union:

Union of A and B denoted by A ∪B, is defined as that fuzzy set on U for which

$$(A \cup B)(x) = \max(A(x), B(x))$$

for every x in U.

2. Intersection:

Intersection of A and B denoted by A ∩ B is defined as that fuzzy set on U for which

$$(A \cap B)(x) = \min(A(x), B(x))$$

3. Complement: composition

Complement of A, denoted by A' , is defined as that fuzzy set on U, for which

$$(A')(x) = 1 - A(x)$$

Definition: 1.7

Let $E \subset R$ the function $\chi_E : R \to R$ defined by

$$\chi_E(x) = \begin{cases} 1, & \text{if } x \in E \\ 0, & \text{if } x \notin E \end{cases}$$

is called the **characteristic function.**

Definition: 1. 8

Automata theory deals with the definitions and properties of mathematical models of computation.

Models of computation:

- Finite automata
- Pushdown automata
- Turning machine

■ Automata theory is the study of abstract computational devices.

■ Abstract devices are (simplified) models of real computations.

Definition: 1.9

A **fuzzy automaton** its states are characterized by fuzzy sets and the production of responses and next states is facilitated by appropriate fuzzy relations.

(or)

An automaton will say that string W belongs to the language with problem P.

The difference with the probabilistic automata is that,

- ❖ The total sum of probabilistic may be different than 1 (may even be infinite).
- ❖ The fuzzy automaton cannot be used as a generator of string.

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Definition: 1. 10

A fuzzy subset of X' is called a fuzzy language in X.

A **fuzzy language** accepted by a fuzzy automaton $M = (Q, X, \delta, \sigma_0, \sigma_1)$ denoted as $f_M : X' \to L$ if

$$f_M(u) = v\left\{\sigma_0(p) \otimes \delta^*(p, u, q) \otimes \sigma_1(q) : p, q \in Q\right\}$$

for all $u \in X'$.

A fuzzy language which is accepted by a fuzzy finite automaton is called a **regular language**.

Definition: 1.11

A **Fuzzy Automata** is a 5 - tuple $M = (Q, X, \delta, \sigma_0, \sigma_1)$.

Where, Q & X are non empty sets called the set of states and the set of inputs respectively.

$\delta : Q \times X \times Q \to L$ is a fuzzy subset of $Q \times X \times Q \to L$ is a fuzzy subset of $Q \times X \times Q$ called a fuzzy transition function and $\sigma_0, \sigma_1 : Q \to L$ are fuzzy subsets of Q called fuzzy initial and final state respectively.

Definition: 1.12

A **Finite Automata** is a five tuple $(Q, \Sigma, \delta, q_0, F)$. Where,

- Q is a finite set of states.
- Σ is a finite set called input alphabet.
- $\delta : Q \times \Sigma \to Q$ is a transition function.
- q_0 is a initial state.
- F is a set of final states.

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Finite automata:

Two categories of finite automata:

❖ **Deterministic Finite Automata (DFA)**
  - The machine can exist in only one state at any given time.

❖ **Non - deterministic Finite Automata (NFA).**
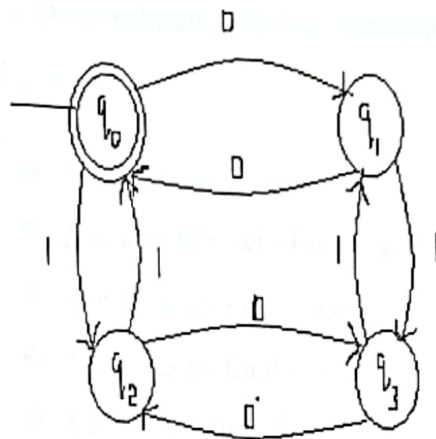 - The machine can exist in multiple states at the same time.

Definition: 1.13

A Deterministic Finite Automata (DFA) is a five tuple $M = (Q, \Sigma, \delta, q_0, F)$.

Where,

❖ Q is a finite set of states.

❖ Σ is a finite set of input alphabet $\Sigma = [0,1]$

❖ δ is a function $\delta: Q \times \Sigma \rightarrow Q$ called transition function.

❖ $q_0 \in Q$ is called the start state.

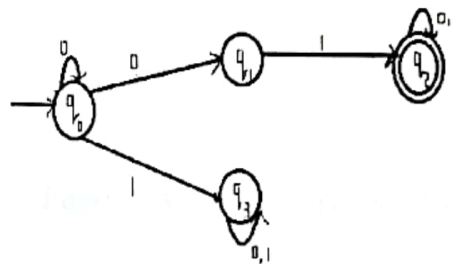❖ $F \subseteq Q$ is called the set of accepting states or final states.

Example: 1.4

state	Input	
	0	1
q_0	q_1	q_2
q_1	q_0	q_3
q_2	q_3	q_0
q_3	q_2	q_1

Definition: 1.14

A Non – Deterministic Finite Automata (DFA) by a five tuple $M = (Q, \Sigma, \delta, q_0, F)$. Where,

  ❖ Q is a finite set of states.
  ❖ Σ is an finite set of input alphabet $\Sigma = [0,1]$
  ❖ $q_0 \in Q$ is an initial state.
  ❖ $F \subseteq Q$ is an final state.
  ❖ δ is a function $\delta : Q \times \Sigma \rightarrow 2^Q$ is an transition function.

Example: 1.5

	Input	
state	0	1
q_0	$\{q_0, q_1\}$	$\{q_3\}$
q_1	$\varnothing$	$\{q_2\}$
q_2	$\{q_2\}$	$\{q_2\}$
q_3	$\{q_3\}$	$\{q_3\}$

Definition: 1.15

A **Fuzzy Finite State Automata** is a quintuple
$M = (Q, \Sigma, \mu, i, f)$
Where,

- ❖ Q is a finite non-empty set of state.
- ❖ Σ is a finite non-empty set of input symbols.
- ❖ The fuzzy subset $\mu : Q \times \Sigma \times Q \to [0,1]$ is a function, called the fuzzy transition function.
- ❖ i is a fuzzy subset of Q, i.e., $i : Q \to [0,1]$ called the fuzzy subset of initial state.
- ❖ f is a fuzzy subset of Q, i.e., $f : Q \to [0,1]$ called the fuzzy subset of final state.

Definition: 1.16

A **Deterministic Fuzzy Automata** is a five tuples $M = (Q, X, \delta, q_0, \beta)$, Where,

- ➤ Q & X are sets called the finite set of states and the input alphabet respectively. $X = [0, 1] \in R \Rightarrow X = [0.1, 0.2]$
- ➤ $\delta : Q \times X \to Q$ is a map called transition map.
- ➤ $\beta : Q \to L$ is a map called fuzzy set of final states.
- ➤ $q_0 \in Q$ is a fixed state called the initial state.

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Example:1.6
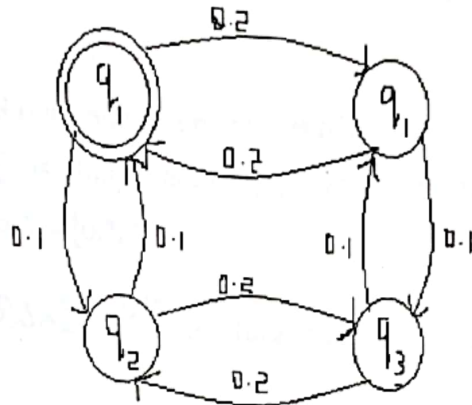
State	Input	
	0.1	0.2
q_0	q_2	q_1
q_1	q_3	q_0
q_2	q_0	q_3
q_3	q_1	q_2

13

Definition: 1.17

A **Non – Deterministic Fuzzy Automata** of five tuples $M = (S, \Sigma, \delta, s_0, F)$
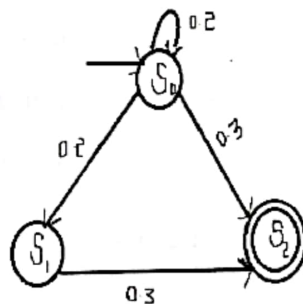Where,

- ❖ S is a finite non-empty set of state.
- ❖ Σ is finite non-empty set of alphabet, X= [0, 1]
  $$\Rightarrow X = [0.2, 0.3]$$
- ❖ $\delta: S \times \Sigma \rightarrow 2^{f(S)}$ is a fuzzy transition function.

Where,

$2^{f(S)}$ is a power set and f(S) represents the set of all fuzzy subset of S.

- ❖ $s_0 \in S$ is an fuzzy initial state.
- ❖ $F \subseteq f(S)$ is the subset of final state.

Example: 1.7

state	Input	
	0.2	0.3
s_0	$\{s_0, s_1\}$	$\{s_2\}$
s_1	$\varnothing$	$\{s_2\}$
s_2	$\varnothing$	$\varnothing$

Definition: 1.18

A **Context – Free Grammar (CFG) or just grammar** is denoted $G = (V, T, P, S)$, where

- V and T are finite sets of variables and terminals respectively.

We assume that V and T are disjoint.

- P is a finite set of productions, each production is of the form $A \rightarrow \alpha$.
- A is a variable and α is a string of symbols from $(V \cup T)^*$.
- S is a special variable called the star symbol.

Definition: 1.19

A normed linear space is a linear space N which to each vector x there corresponds a real number denoted by $\|x\|$ and called the **Norm** of x, in such a manner that,

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- $\|x\| \geq 0 \ \& \ \|x\| = 0 \Leftrightarrow x = 0$
- $\|x + y\| \leq \|x\| + \|y\|$
- $\|\alpha \ x\| = |\alpha| \|x\|$

Definition: 1.20

A **t-norm** is a function $T:[0,1] \times [0,1] \rightarrow [0,1]$ which satisfies the following properties:

- Commutativity : $T(a,b) = T(b,a)$
- Monotonicity : $T(a,b) \leq T(c,d)$ if $a \leq c \ \& \ b \leq d$
- Associativity : $T(a,T(b,c)) = T(T(a,b),c)$
- 1-neutral : $T(a,1) = a$

Definition: 1.21

A function $S:[0,1]^2 \rightarrow [0,1]$ is called **Triangular conorm**

(t-conorm) if and only if it fulfills the following properties for all $x, y, z \in [0,1]$:

- $S(x,y) = S(y,x)$,i.e., the t-conorm is commutative.
- $S(S(x,y),z) = S(x,S(y,z))$,i.e., the t- conorm is associative.
- $x \leq y \Rightarrow S(x,z) \leq S(y,z)$,i.e., the t-conorm is monotone.
- $S(x,0) = x$,i.e., a neutral element exists, which is 0.

CHAPTER – II

Definition: 2.1

An **alphabet** Σ is an non – empty finite set, the elements of Σ are called letters (or symbols).

Definition: 2.2

For some integer $n \geq 0$ and any alphabet Σ, is defined the set Σ^n of all words of size n.

Remark: 2.1

Notice that the set Σ^0 contains only the empty word, i.e., $\Sigma^0 = \{\lambda\}$

Definition: 2.3

Define $L^0 = \{\varepsilon\}$ and $L^i = LL^{i-1}$ for $i \geq 1$.

The **kleene closure (or just closure)** of L, denoted by L^* , is the set

$$L^* = \bigcup_{i=0}^{\infty} L^i$$

Where, L^* denotes words constructed by concatenating any number of words from L.

The **positive closure** of L, denoted L^+ , is the set

$$L^+ = \bigcup_{i=1}^{\infty} L^i$$

Where, L^+ is the same, but the case of zero words, whose "concatenation "is defined to be ε, is excluded.

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Definition: 2.4

Fuzzy positive closure and kleene closure:

For any alphabet Σ is defined, the **positive closure**, denoted by Σ^+

such that, $\qquad \Sigma^+ = \bigcup_{i=1}^{\infty} \Sigma^i$ and

the **kleene closure**, denoted by Σ^*,

Where, $\Sigma^* = \Sigma^0 \cup \Sigma^+$.

Definition: 2.5

Let $w \in \Sigma^*$ be a word, such that

$$w = \lambda \quad or \quad w = x_1 x_2 \ldots x_{n-1} x_n \quad with \quad x_i \in \Sigma$$

The functions $R_l, R_r, M_l M_r : \Sigma^* \to \Sigma^*$ are defined by:

$$R_l(w) = \begin{cases} x_1, & if \ |w| > 0 \\ \lambda, & else \end{cases}$$

$$M_l(w) = \begin{cases} x_2 \ldots x_{n-1} x_n, & if \ |w| > 1 \\ \lambda, & else \end{cases}$$

$$R_r(w) = \begin{cases} x_n, & if \ |w| > 0 \\ \lambda, & else \end{cases}$$

$$M_r(w) = \begin{cases} x_1 x_2 \ldots x_{n-1}, & if \ |w| > 1 \\ \lambda, & else \end{cases}$$

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Example: 2.1

For the word "Brazil" we have that

$$R_l \left(Brazil \right) = B$$

$$M_l \left(Brazil \right) = razil$$

$$R_R \left(Brazil \right) = l \quad and$$

$$R_M \left(Brazil \right) = Brazi$$

Definition: 2.6

A language L is a subset of words on Σ^*, i.e., $L \subseteq \Sigma^*$

Definition: 2.7

Let U be a non-empty universe set. A fuzzy set A on U is Characterized by the function $\mu_A : U \to [0,1]$, where $\mu_A(x)$ is the membership value of the element $x \in U$ on fuzzy set A.

Remark: 2.2

The fuzzy set A can be seen as the set of ordered pairs,

$$A = \left\{ \left(x, \mu_A(x) \right) : x \in U \right\}$$

Definition: 2.8

Let U be a non-empty universe set. A positive **fuzzy semi – set** A on U is characterized by the partial function $\psi_A : U \rightarrow \,]0,1]$

Definition: 2.9

A function $\otimes : [0,1]^2 \rightarrow [0,1]$ is a **t – norm** if the following properties are satisfied:

T_1. *Commutativity:* $\otimes(x,y) = \otimes(y,x)$

T_2. *Associativity:* $\otimes\left(x, \otimes(y,z)\right) = \otimes\left(\otimes(x,y), z\right)$, then

T_3. *Monotonicity:if* $x \leq x' \,\&\, y \leq y'$

$$\otimes\left(x, y\right) \leq \otimes\left(x', y'\right) \, and$$

T_4. $1 - neutral : \otimes\left(x,1\right) = x$

An element $x \neq 0$ is called **zero divisor** on a t – norm $\otimes$ if there exist $y \neq 0$ such that, $\otimes(x,y) = 0$

Definition: 2.10

A function $\oplus : [0,1]^2 \rightarrow [0,1]$ is a **t – conorm** if the following properties are satisfied:

S_1. $Commutativity : \oplus\left(x, y\right) = \oplus\left(y, x\right)$

S_2. *Associativity*: $\oplus\left(x, \oplus(y, z)\right) = \oplus\left(\oplus(x, y), z\right)$

S_3. *Monotonicity*: if $x \le x'$ & $y \le y'$, then

$$\oplus(x, y) \le \oplus(x', y') \ and$$

S_4. $0 - neutral$: $\oplus(x, 0) = x$

As presented t-norms and t-conorm are binary operations, however, it is interesting and convenient extends so that they can receive an n-tuple of input arguments, this extension of the t-norm is defined recursively for some positive integer as being,

$$\overset{n}{\underset{i=1}{\otimes}} x_i = \otimes\left(\overset{n-1}{\underset{i=1}{\otimes}} x_i, x_n\right)$$

$$= \otimes\left(x_1, x_2, \ldots\ldots x_n\right) \ and$$

$$\overset{n}{\underset{i=1}{\oplus}} x_i = \oplus\left(\overset{n-1}{\underset{i=1}{\oplus}} x_i, x_n\right)$$

$$= \oplus\left(x_1, x_2, \ldots, x_n\right)$$

Remark: 2.3

In the particular case of n=1 we have that,

$$\otimes\left(x_1\right) = x_1, \oplus\left(x_1\right) = x_1$$

Definition: 2.11.

A fuzzy language L is a fuzzy set on $\sum$. Thus L is a set of ordered pairs

$$L = \left\{ \left(w, \mu_L(w) \right) : w \in \sum{}^* \right\}$$

As said in fuzzy grammars are sets of rules capable of generating the elements of a fuzzy set, thus, are generators of fuzzy languages.

Definition: 2.12

A Fuzzy Context – Free Grammar (FCG) *is* a structure

$$\wp = \left\langle V, \Sigma, \hat{S}, \otimes, \oplus, \hat{P} \right\rangle \quad \text{Where,}$$

- V is a finite set of variables and $\sum$ is an alphabet.

- $\hat{\delta} = V \rightarrow [0,1]$ is a non – empty fuzzy set.

- $\hat{P} : V \times (V \cup \Sigma)^* \rightarrow \,]0,1]$ is positive fuzzy semi – set of the productions.

- $\otimes$ is a t- norm and $\oplus$ is a t- conorm.

As for simplicity, $\hat{P}(\alpha, \beta) = \sigma$ is written as $\alpha \xrightarrow{\sigma} \beta$ for some

$$\sigma \in [0,1], \alpha \in V \,\,\&\,\, \beta \in (V \cup \Sigma)^*$$

In this case we denote $\alpha \xrightarrow{\sigma} \beta \in \hat{p}$

Example: 2.2

The structure

$$\wp = \left\langle \{A, B, X\}, \{a, b\}, \{(X, 0, 9)\}, P, \min, \max \right\rangle$$

is a FCG where $\hat{p} = \{X \xrightarrow{0.8} A, X \xrightarrow{0.8} B, A \xrightarrow{0.5} A \xrightarrow{0.6} b, B \xrightarrow{0.4} A, B \xrightarrow{0.2} a\}$

Definition: 2.13

Given a fuzzy grammar $\wp$, *for all* $w, w' \in (V \cup \Sigma)^*$ we define the set,

$$\overline{w, w'} = \left\{\sigma : (\exists x, y, \alpha, \beta \in \Sigma^*), w = x\alpha y, w' = \alpha\beta y \ \& \ \alpha \xrightarrow{\sigma} \beta \in \hat{p}\right\}$$

We say that $w' \in (V \cup \Sigma)^*$ is **directly derived** from $w \in (V \cup \Sigma)^*$ *in a FCG* $\wp$, denoted by relation $w| = \wp w'$, *if* $\overline{w, w'} \neq \emptyset$. There are several forms of calculating the membership value of direct derivation from one word to another and here we present our interpretation of how to obtain such a value.

Definition: 2.14

Let $\wp$ be a fuzzy grammar, the membership value $w| = \wp w'$ is given by the function $d\wp : (V \cup \Sigma)^+ \times (V \cup \Sigma)^* \to [0,1]$

Where $d\wp$ is defined as:

$$d\wp(w, w') = \vee \overline{w, w'}$$

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With $\vee$ being the operation of supremum in the poset $\langle [0,1]\leq \rangle$.

If $w_1, w_2, \ldots, w_{n-1}, w_n \in (V \cup \Sigma)^*$ and

$$w_1 \big| =_\wp w_2, \quad w_2 \big| =_\wp w_3, \ldots, w_{n-1} \big| =_\wp w_n,$$

Then we say that there exists a derivation from w_1 *onto* w_n.

We defined the binary relation $\big| =_\wp^*$ as being the reflexive and transitive closure of $\big| =_\wp$ and its membership value is defined as follows.

Definition: 2.15

Let $\wp$ be a fuzzy grammar, the membership value of $w \big| =_\wp^* w'$

is given by the function $\hat{d}\wp : (V \cup \Sigma)^+ \times (V \cup \Sigma)^* \to [0,1]$

defined by:

$$\hat{d}\wp (w, w') = \begin{cases} 1, & \text{if } w = w' \\ \displaystyle\bigoplus_{w'' \in (V \cup \Sigma)^*} \left(\otimes \left(\hat{d}\wp (w, w''), d_\wp (w'', w') \right) \right) & \text{else} \end{cases}$$

Example: 2.3

Let G be the fuzzy grammar of example 2. The membership value of $X \big| =_\wp^* a$ is obtained by:

$$\hat{d}(X,a) = \max \left(\min \left(\hat{d}(X,A), d(A,a) \right), \min \left(\hat{d}(X,B), d(B,a) \right) \right)$$

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$$= \max\left(\min\left(\max\left(\min(1,0.8), \min\left(\hat{d}(X,B),4 \right) \right), 0.5 \right), \min\left(\hat{d}(X,B),0.2 \right) \right)$$

$$= \max\left(\min\left(\max\left(0.8, \min(0.8,0.4) \right), 0.5 \right), \min(0.8,0.2) \right)$$

$$= \max\left(\min(0.8,0.5), 0.2 \right)$$

$$= 0.5$$

The membership value 0f $w \in \Sigma^*$ be generated by a FCG $\wp$, is the value of all derivations from α onto w, where $\alpha \in V$, such membership value is given by the equation,

$$\mu_\wp(w) = \underset{\alpha \in V}{\oplus}\left(\otimes\left(\hat{S}(\alpha), \hat{d}(\alpha,w) \right) \right)$$

Definition: 2.16

The fuzzy language of a fuzzy grammar $\wp$ is the fuzzy set of all words generated by G, defined by,

$$L(\wp) = \left\{ (w, \mu_\wp(w)) \mid w \in \Sigma^* \right\}$$

Definition: 2.17

Let $\wp$ is a FCG, the productions of the form

$A \overset{\sigma}{\longrightarrow} C \in \hat{P}$ with A, C $\in$ V are called **unitary productions.**

Definition: 2.18

A FCG $\wp$ will be said be a **Fuzzy Linear Grammar (FLG)** if for all $\alpha \overset{\sigma}{\longrightarrow} \beta \in \hat{p}$, we have

$$\beta = x_1 A x_2 \quad \& \quad A \in (V \cup \{\lambda\}) \quad \& \quad x_1, x_2 \in \Sigma^*$$

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Definition: 2.19

A fuzzy language L is a **Fuzzy Linear Language**, if there exists a FLG $\wp$ such that $L(\wp) = L$.

Definition: 2.20

A FLG $\wp$ will be in **Linear Normal Form (LNF)** only when $V_L^{\wp} \cap V_R^{\wp} = \emptyset$. Unlike the normal form in the LNF does not require grammar to be strict in a direction.

Definition: 2.21

A FLG will be in **Stronger Linear Normal Form (SLNF)** if all productions of $\hat{P}$ are the form $A \xrightarrow{\sigma} aB$ or $A \xrightarrow{\sigma} Ba$ with $A \in V$, $B \in V \cup \{\lambda\}$ $a \in \Sigma \cup \{\lambda\}$ and $\sigma > 0$.

Definition: 2.22

A FLA is a machine with a memory (tape) read and two heads for reading of tape. Working with FLA's we can adopt the idea of **Instant Description (ID)**. A ID is a pair (q, w) where $q \in (Q_L \cup Q_R)$ and $w \in \Sigma^*$

CHAPTER-III

Fuzzy Linear Automata:

Definition: 3.1

Let $\wp$ be a FLG, then for all $\alpha \in V$ we say:

❖ α is **left – linear** (or LL), if for all $\alpha \xrightarrow{\sigma} \beta \in \hat{p}$, we have $\beta = Ba$, where $a \in \Sigma^{+}$ & $B \in V$.

❖ α is **right – linear** (or RL), if for all $\alpha \xrightarrow{\sigma} \beta \in \hat{p}$, we have $\beta = aB$, where $a \in \Sigma^{+}$ & $B \in V$

❖ α is **without direction** (or WD), if for all $\alpha \xrightarrow{\sigma} \beta \in \hat{p}$, we have $\beta \in \Sigma^{*}$ or $\beta \in V$

Definition: 3.2

Let $\wp$ be a FLG we define the sets,

$$V_{L}^{\wp} = \left\{ \alpha \in V \mid \alpha \text{ is } LL \right\}$$

and

$$V_{R}^{\wp} = \left\{ \alpha \in V \mid \alpha \text{ is } RL \right\}$$

Lemma: 3. 1

For all FLG $\wp$, there exists a FLG $\wp'$ in LNF without production of the form $A \xrightarrow{\sigma} uBv$ with $A, B \in V$ & $u, v \in \Sigma^+$ such that $L(\wp) = L(\wp')$

.Proof:

Without loss of generality, assume $\wp = \left\langle V, \Sigma, \hat{S}, \otimes, \oplus, \hat{P} \right\rangle$ does

not contain unitary productions .Thus we build $\wp' = \left\langle V', \Sigma, \hat{S}, \otimes, \oplus, \hat{P}' \right\rangle$ by the following algorithm.

❖ Initially do $V' = V$ & $\hat{P}' = \hat{P}$

❖ For all $A \in V$ do:

if $A_u = \left\{ A \xrightarrow{\sigma} uBv \in \hat{P} \middle| \text{ for some } B \in V \ \& \ u, v \in \Sigma^* \right\} \neq \emptyset$

Then for each production $A \xrightarrow{1} uC$ & $C \xrightarrow{\sigma} Bv$ in $\hat{P}'$ the

Production $A \xrightarrow{\sigma} uBv \in A_u$ defined in $\hat{P}'$, where C is a new variable add in V', finally remove $A \xrightarrow{\sigma} uBv$ of the $\hat{P}'$.

To show that $L(\wp) = L(\wp')$

We must show that for all production in $\wp$ there exists a derivation equivalent in $\wp'$.

Suppose that in $\wp$ there exist $A \xrightarrow{\sigma} uBv \in \hat{P}$

therefore by definition:

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$$\hat{d}_\wp(A, uBv) = \oplus\left(\otimes\left(\hat{d}_\wp(A, A), d_\wp(A, uBv)\right)\right)$$

$$= \oplus\left(\otimes(1, \sigma)\right)$$

$$= \sigma$$

$$= d_\wp(A, uBv)$$

exist in $\hat{P'}$ productions $A \xrightarrow{1} uC$ & $C \xrightarrow{\sigma} Bv$, so in $\wp'$

We have,

$$\hat{d}_{\wp'}(A, uBv) = \oplus\left(\otimes\left(\hat{d}_{\wp'}(A, uC), d_{\wp'}(uC, uBv)\right)\right)$$

$$= \oplus\left(\otimes\left(\oplus\left(\otimes\left(\hat{d}_{\wp'}(A, A), d_{\wp'}(A, uC)\right)\right), d_{\wp'}(uC, uBv)\right)\right)$$

$$= \oplus\left(\otimes\left(\oplus\left(\otimes(1, 1)\right), \sigma\right)\right)$$

$$= \oplus\left(\otimes(1, \sigma)\right)$$

$$= \sigma$$

$$= d_\wp(A, uBv)$$

$$= \hat{d}_\wp(A, uBv)$$

Thus, for all derivation that uses production of the form

$A \xrightarrow{\sigma} uBv$ in $\wp$ *there exist in* $\wp'$ a derivation equivalent that use the productions $A \xrightarrow{1} uC$ & $C \xrightarrow{\sigma} Bv$.

$\therefore$ we can conclude that the algorithm preserves degrees membership, so for all $x \in \Sigma^*$ we have to that $\mu_\wp(x) = \mu_{\wp'}(x)$,

Hence $L(\wp) = L(\wp')$

Hence the proof.

Theorem: 3.1

For all FLG $\wp$ there exist a FLG $\wp'$ in LNF such that $L(\wp) = L(\wp')$.

Proof.

Without loss of generality,

Assume that $\wp = \langle V, \Sigma, \hat{S}, \otimes, \oplus, \hat{P} \rangle$ does not contain productions $A \xrightarrow{\sigma} uBv$, so

all production in $\hat{P}$ are of forms LL, RL & WR, thus $\wp = \langle V', \Sigma, \hat{S}, \otimes, \oplus, \hat{P}' \rangle$

where $\hat{P}'$ is build by the following algorithm:

- Initially do $V' = V$ & $\hat{P}' = \hat{P}$
- For all $A \in V$ do:

If $A \in V_L^{\wp} \cap V_R^{\wp}$, then for each $A \xrightarrow{\sigma} Bu \in \hat{P}'$ add the productions

$A \xrightarrow{1} C$ & $C \xrightarrow{\sigma} Bv$ in $\hat{P}'$ such that C is a new variable. add C in V', finally

remove $A \xrightarrow{\sigma} Bv$ of the $\hat{P}'$.

Is easy see the algorithm guarantees that for all $A \in V$ if

$A \in V_L^{\wp'}$, then $A \notin V_R^{\wp'}$, so after executing the algorithm we will have

that $V_L^{\wp'} \cap V_L^{\wp'} = \emptyset$. Now notice that, if $A \xrightarrow{\sigma} Bv \in \hat{P}'$ by definition,

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$$\hat{d}\wp(A, Bv) = \oplus\left(\otimes\left(\hat{d}\wp(A, A), d\wp(A, Bv)\right)\right)$$

$$= \oplus\left(\otimes(1, \sigma)\right)$$

$$= \sigma$$

But by algorithm from construction of $\wp'$, we have $A \overset{1}{\longrightarrow} C, C \overset{\sigma}{\longrightarrow} Bu \in \hat{P}$ and by definition,

$$\hat{d}\wp'(A, Bv) = \oplus\left(\otimes\left(\hat{d}\wp'(A, C), d\wp(C, Bv)\right)\right)$$

$$= \otimes\left(\otimes\left(\oplus\left(\otimes\left(\wp'(A, A), d\wp'(A, C)\right)\right), d(C, Bv)\right)\right)$$

$$= \oplus\left(\otimes\left(\oplus\left(\otimes(1, 1)\right), \sigma\right)\right)$$

$$= \oplus\left(\otimes(1, \sigma)\right)$$

$$= \sigma$$

$$= \hat{d}\wp(A, Bv)$$

Thus, for all $A \in V_L^{\wp} \cap V_R^{\wp}$ we have that for all yours productions of the form $A \overset{\sigma}{\longrightarrow} Bv, there\ exist\ in\ \hat{P}'$ the productions $A \overset{1}{\longrightarrow} C\ \&\ C \overset{\sigma}{\longrightarrow} Bu$

So for all derivation thatuseproductions of the form $A \overset{\sigma}{\longrightarrow} Bv$ there exist in $\wp'$

A derivation equivalent that use the productions $A \overset{1}{\longrightarrow} C \& C \overset{\sigma}{\longrightarrow} Bu$.

∴ We can conclude that the algorithm preserves degrees membership, so for all $x \in \Sigma^*$.

We have to that $\mu\wp(x) = \mu\wp'(x)$,

Hence $L(\wp) = L(\wp')$

Hence the proof.

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Theorem: 3.2

For all fuzzy linear grammar $\wp$. There is a linear fuzzy grammar fuzzy $\wp'$ in SLNF such that $L(\wp) = L(\wp')$.

Proof.

Without loss of generality

Assume $\wp = \left\langle V, \Sigma, \hat{S}, \otimes, \oplus, \hat{P} \right\rangle$ is in form LNF. We build then $\wp' = \left\langle V', \Sigma, \hat{S}, \otimes, \oplus, \hat{P}' \right\rangle$ using the algorithm:

❖ Initially do $V' = V$ & $\hat{P}' = \hat{P}$

❖ For all $A \in V'$ & $a \in \Sigma$, if $A^a = \left\{ A \xrightarrow{\sigma} ya \in \hat{P} \,\middle|\, y \in \Sigma \, or \, |y| \geq 2 \right\} \neq \emptyset$

then add a new variable C in V' and for all productions

$A \xrightarrow{\sigma} ya \in A^a$ define in $\hat{P}$ the productions $A \xrightarrow{1} Ca$ & $C \xrightarrow{\sigma} y$

and remove $A \xrightarrow{\sigma} ya$ from $\hat{P}'$.

❖ For all $A \in V'$ & $a \in \Sigma$, if $A_a = \left\{ A \xrightarrow{\sigma} ay \in \hat{P} \,\middle|\, y \in \Sigma \, or \, |y| \geq 2 \right\} \neq \emptyset$

Then add a new variable C in V' and for all productions

$A \xrightarrow{\sigma} ay \in A_a$ define in $\hat{P}$ the productions $A \xrightarrow{1} Ca$ & $C \xrightarrow{\sigma} y$

and remove $A \xrightarrow{\sigma} ay$ from $\hat{P}'$.

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To show that $L(\wp) = L(\wp')$ as before, we must show that the algorithm does not change the membership value of derivations.

Suppose that $A \in V$ & $A \xrightarrow{\sigma} ya$ with $|y| \geq 2$ or $y \in \Sigma$ & $\sigma > 0$, so we have,

$$\hat{d}\wp(A, ya) = \oplus \left(\otimes \left(\hat{d}\wp(A, A), d\wp(A, ya) \right) \right)$$

$$= \oplus \left(\otimes (1, \sigma) \right)$$

$$= \sigma$$

By construction of the $\wp'$ exits the productions $A \xrightarrow{1} Ca$ & $C \xrightarrow{\sigma} y$. So,

$$\hat{d}\wp'(A, ay) = \oplus \left(\otimes \left(\hat{d}\wp'(A, Ca), d\wp'(Ca, ya) \right) \right)$$

$$= \oplus \left(\otimes (1, \sigma) \right)$$

$$= \sigma$$

$$= \hat{d}\wp(A, ya)$$

So the algorithm preserved membership value of derivations,

Since for every production $A \xrightarrow{\sigma} ya$ the algorithm constructs the productions $A \xrightarrow{1} Ca$ & $C \xrightarrow{\sigma} y$, thus is easy to see that if in a derivation in $\wp$ that use the production $A \xrightarrow{\sigma} ya$, then there exist in $\wp'$ an derivation equivalent that use the productions $A \xrightarrow{1} Ca$ & $C \xrightarrow{\sigma} y$.

$\therefore$ for all $x \in \Sigma^*$ we have, $\mu\wp(x) = \mu\wp'(x)$

Hence $L(\wp) = L(\wp')$

Hence the proof.

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Definition: 3.3

Fuzzy Linear Automata (FLA) are structures

$$M = \left\langle Q_L, Q_R, \Sigma, \varphi, \hat{I}, F, \otimes, \oplus \right\rangle$$

Where,

Q_L & Q_R are disjoint finite sets of states;

Σ is a alphabet;

$\varphi : (Q_L \cup Q_R) \times (\Sigma \cup \{\lambda\}) \times (Q_L \cup Q_R) \to \ ]0,1]$ is a positive fuzzy semi-set of instructions;

$\hat{I} : (Q_L \cup Q_R) \to [0,1]$ is a non-empty fuzzy set of initial states;

$F \subseteq (Q_L \cup Q_R)$ is a set of final states;

$\otimes$ is a t-norm and $\oplus$ is a t-conorm.

Definition: 3.4

Let M be a FLA, for all ID (Instant Description) (q, w) we define the sets

$$\lambda_{suc}^{(q,w)} = \left\{ (q',w) \,\middle|\, q' \in (Q_L \cup Q_R) \ \& \ (q,q')_\lambda \in \varnothing \right\}$$

$$L_{suc}^{(q,w)} = \left\{ (q',w') \,\middle|\, q' \in (Q_L \cup Q_R), w' = M_l(w) \ \& \ (q,q')_{R_l(w)} \in \varnothing \right\}$$

$$R_{suc}^{(q,w)} = \left\{ (q',w') \,\middle|\, q' \in (Q_L \cup Q_R), w' = M_r(w) \ \& \ (q,q')_{R_r(w)} \in \varnothing \right\}$$

$$SUC^{(q,w)} = \lambda_{suc}^{(q,w)} \cup L_{suc}^{(q,w)} \cup R_{suc}^{(q,w)}$$

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For all (q, w) & $\left(q',w'\right)$ the relation $(q,w) \succ M\left(q',w'\right)$ denotes the relation of computations, from (q,w) *onto* $\left(q',w'\right)$ *on* FLA M.

The membership value of computation of (q,w) *onto* $\left(q',w'\right)$ *defined below.*

Definition: 3.5

We defined the fuzzy set $D_M : \left(Q_L \cup Q_R\right) \times \Sigma^* \times \left(Q_L \cup Q_R\right) \times \Sigma^* \to [0,1]$ as being.

$$D_M\left(q,w,q',w'\right) = \begin{cases} \left(q,q'\right)_\lambda, & \text{if } \left(q',w'\right) \in \lambda_{suc}^{(q,w)} \\ \left(q,q'\right)_{R_l(w)}, & \text{if } q \in Q_L \ \& \ \left(q',w'\right) \in L_{suc}^{(q,w)} \\ \left(q,q'\right)_{R_r(w)}, & \text{if } q \in Q_R \ \& \ \left(q',w'\right) \in R_{suc}^{(q,w)} \\ 0, & \textit{any other case} \end{cases}$$

Example :3.1

Let $M = \left\langle \{q_0, q_1\}, \{p_0\}, \{a, b, c\}, \mu, \{(q_0, 0.9), (q_1, 1)\}, \{q_0, q_1\}, \min, \max \right\rangle$

be a FLA, where $\left(q_0, p_0\right)_a = 0.9$, $\left(q_0, q_1\right)_b = 1$ $\& \left(p_0, q_0\right)_c = 0.7$. Thus the membership value of $\left(q_0, abaa\right) \succ M\left(p_0, baa\right)$ is

$$D_M\left(q_0, abaa, p_0, baa\right) = \left(q_0, p_0\right)_{R_l(abaa)}$$
$$= \left(q_0, p_0\right)_a$$
$$= 0.9$$

The relation binary $\succ_M^{\bullet}$ is the reflexive and transitive closure of $\succ_M$ and we extend the D_M function by the function $\overline{D}_M$ below.

Definition: 3.6

The membership value of $\left(q, w\right) \succ_M^{\bullet} \left(q^{\bullet}, w^{\bullet}\right)$ is given by the function $\overline{D}_M : \left(Q_L \cup Q_R\right) \times \Sigma^{\bullet} \times \left(Q_L \cup Q_R\right) \times \Sigma^{\bullet} \rightarrow [0,1]$ define as being,

$$\overline{D}_M\left(q, w, q^{\bullet}, w^{\bullet}\right) =$$

$$\begin{cases} D\left(q, w, q^{\bullet}, w^{\bullet}\right), & if \left(q^{\bullet}, w^{\bullet}\right) \in SUC^{(q,w)} \\ \bigoplus_{\left(q^{\cdot}, w^{\cdot}\right) \in SUC^{(q,w)}} \left(\otimes\left(D_M\left(q, w, q^{\cdot}, w^{\cdot}\right), \overline{D}_M\left(q^{\cdot}, w^{\cdot}, q^{\bullet}, w^{\bullet}\right)\right)\right), & if\ SUC^{(q,w)} \neq \emptyset \\ 0, & any\ other\ case \end{cases}$$

Example: 3.2

Consider the FLA of ex 4 the membership value of chain of computation $\left(q_0, abc\right) \succ_M^{\bullet} \left(p_0, \lambda\right)$ is given by:

$$\overline{D}_M(q_0, abc, p_0, \lambda) = \max\left(\min\left(D_M(q_0, abc, p_0, bc), \overline{D}_M(p_0, bc, p_0, \lambda)\right)\right)$$

$$= \max\left(\min\left(0.9, \max\left(\min(0.7, 1)\right)\right)\right)$$

$$= \max\left(\min(0.9, 0.7)\right)$$

$$= 0.7$$

Definition: 3.7

Let $M = \left\langle Q_L, Q_R, \Sigma, \varnothing, \hat{1}, F, \otimes, \oplus \right\rangle$ be a FLA and a word $w \in \Sigma^*$.

Then the membership value that M accept w is:

$$\deg_M(w) = \underset{q \in (Q_L \cup Q_R), q' \in F}{\oplus} \left(\otimes\left(\hat{1}(q), \overline{D}_M(q, w, q', \lambda)\right)\right)$$

Definition: 3.8

The language of any FLA M is the fuzzy set of words accepted by M,

i.e., $\quad L(M)\left\{\left(w, \deg_M(w)\right) \big| w \in \Sigma^*\right\}$

Theorem: 3.4

Let $\wp$ be a fuzzy linear grammar. Then there exist a FLA. M Such that $L(M) = L(\wp)$.

Proof.

Without loss of generality

Assume that $\wp = \left\langle V, \Sigma, \hat{S}, \otimes, \oplus, \hat{P} \right\rangle$ is in the SLNF, thus build the FLA

$M = \left\langle Q_L, Q_R, \Sigma, \varnothing, \hat{S}, F, \otimes, \oplus \right\rangle$ where,

- $Q_L = \{A \mid A \text{ is a variable } LR\} \cup \{C\}$,
  $Q_R = \{A \mid \text{ is a variable } LL\}$
  and C is a new label such that $C \notin V$ and finally, F={C}.

- $\varnothing$ is defined for each $A, B \in V$ and $a \in (\Sigma \cup \{\lambda\})$ as;

$$(A, B)_a = \sigma, \text{if } A \xrightarrow{\sigma} aB \text{ or } A \xrightarrow{\sigma} Ba \in \hat{P}$$

$$(A, C)_a = \sigma, \text{if } A \xrightarrow{\sigma} a \in \hat{P}$$

Clearly M is a FLA. Now for all $(w, \sigma) \in L(\wp)$ with $w = a_1 a_2 \ldots a_{n-1} a_n$ such that $a_i \in (\Sigma \cup \{\lambda\})$ we have $\mu \wp(w) = \sigma$.

Thus, there exist a $A_1 \in V$ such that $\hat{d} \wp(A_1, w) = \sigma$, but of this, we have that the i – th production used in derivation is of the form $A_i \xrightarrow{\sigma_i} a_i A_{i+1}$ with, $A_i \in V, A_{i+1} \in (V \cup \{\lambda\}), a_i \in (\Sigma \cup \{\lambda\})$ and $\sigma_i \in]0,1]$.

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and last production used is $A_n \xrightarrow{\sigma_n} a_n$ where $A_n \in V$, $a_n \in (\Sigma \cup \{\lambda\})$.

By construction from $\varnothing$ exist fuzzy instructions corresponding to each fuzzy Production, the fuzzy instruction will be of the form:

$$(A_1, A_2)_{a_1} = \sigma_1, (A_2, A_3)_{a_2} = \sigma_2, ..., (A_{n-1}, A_n)_{a_{n-1}} = \sigma_{n-1}, (A_n, C)_{a_n} = \sigma_n$$

and by construction from Q_L & Q_R we have C$\in$F, so its easy to seen that

$$(A, w) \succ_M^* (C, \lambda),$$

$$\therefore \quad \deg_M (w) = \oplus \left(\otimes \left(\hat{S}(A) \overline{D}_M (A, w, C, \lambda) \right) \right)$$

Moreover, since each instruction in $\varnothing$ corresponds to a production in $\hat{P}$, imply that $\overline{D}_M (A, w, C, \lambda) = \hat{d} \wp (A, w)$, replacing in the previous equation we have,

$$\deg_M (w) = \oplus \left(\otimes \left(\hat{S}(A), \hat{d} \wp (A, w) \right) \right)$$

However, by definition,

$$\mu \wp (w) = \oplus \left(\otimes \left(\hat{S}(A), \hat{d} \wp (A, w) \right) \right)$$

Thus $\deg_M (x) = \mu_\wp (x)$

Conclude that $L(M) = L(\wp)$,

Hence proved.

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Fuzzy Nondeterministic 2- tapes automata:

Definition: 3.9

Fuzzy Nondeterministic 2 – tapes automata (or FNTA), are structures of form $m = \langle Q, \Sigma, O, T, v, q_{acc}, \otimes, \oplus \rangle$

Where,

Q is a set finite of states;

Σ is a alphabet;

$O: Q \to [0,1]$ is a fuzzy set of origin states;

$T: Q \to \{1,2\}$ is a choose function of tape;

$v: Q \times (\Sigma \cup \{\lambda\}) \times Q \to]0,1]$ is a positive fuzzy semi –set of the instructions;

$q_{acc} \in Q$ is the acceptance state and

$\otimes$ is a $t-norm$ and $\oplus$ is a $t-conorm$

Let write $v(q, a, q') = \sigma$ as $(q, q')^a = \sigma$ for all $a \in (\Sigma \cup \{\lambda\})$ & $q, q' \in Q$

and in this case we denote $(q, q')^a \in v$.

Example: 3.3
The structure

$$m = \left\langle \{q_0, q_1, q_2, q_{acc}\}, \{a, b\}, \{(q_0, 1)\}, T, v, q_{acc}, \min, \max \right\rangle$$

With $T(q_0) = 1, T(q_1) = 2, T(q_2) = 1, T(q_{acc}) = 1$, and v defined by

$$\psi(q_0, a, q_1) = 0.8, \psi(q_1, b, q_2) = 1, \psi(q_2, c, q_{acc}) = 0.7 \text{ is an FNTA.}$$

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Definition: 3.10

The language of any FNTA m is a fuzzy set

$$L(m) = \left\{ \left(w, A_{cc_m}(w) \right) \middle| w \in \Sigma^* \right\}.$$

Theorem: 3.5.

Let $m = \langle Q, \Sigma, O, T, v, q_{acc}, \otimes, \oplus \rangle$ be a FNTA. Then there exist an S – FLA $M = \langle Q_L, Q_R, \Sigma, \varnothing, O, \{q_{acc}\}, \otimes, \oplus \rangle$ Such that $L(M) = L(m)$.

Proof.

Let a FNTA $m = \langle Q, \Sigma, O, T, v, q_{acc}, \otimes, \oplus \rangle$, we build a machine S –FLA $M = \langle Q_L, Q_R, \Sigma, \varnothing, O, \{q_{acc}\}, \otimes, \oplus \rangle$,

Where,

> $Q_L = \left\{ q \in Q \middle| T(q) = 1 \right\} \cup \{q_{acc}\}$ & $Q_R = \left\{ q \in Q \middle| T(q) = 2 \right\}$

for all. $q, q' \in Q$ & $a \in (\Sigma \cup \{\lambda\})$, $(q, q')_a = (q, q')^a$

Clearly M is a S- FLA. Now for all $(w, \sigma) \in L(m)$ we have that,

$$A_{cc_m}(w) = \sigma \Leftrightarrow \bigoplus_{(x,y) \in \nabla_w, q \in Q} \left(\otimes \left(O(q), \hat{f}\left(q, x, y^R, q_{acc}, \lambda, \lambda \right) \right) \right) = \sigma$$

Now notice that, by construction of the M for each instruction in m of the form $(q, q')^a$ there exist a instruction equivalent $(q, q')_a$ in M. and for all $(x, y) \in \nabla_w$ & $q \in Q$,

Since that w=xy the first configuration (q', x, y^R) of the m correspond the first ID (q', xy) in M, as every instruction in m has a instruction equivalent in M we have that for all computation there exist a $(q', xy) \succ_M^* (q_{acc}, \lambda)$ equivalent in M.

i.e., $\overline{D}_M(q', xy, q_{acc}, \lambda) = \hat{f}(q', x, y^R, q_{acc}, \lambda, \lambda)$

So,

$$\deg_M(w) = \bigoplus_{(x,y) \in \nabla_w, q \in Q} \left(\otimes \left(O(q), \overline{D}_M(q, xy, q_{acc}, \lambda) \right) \right)$$

$$= \bigoplus_{(x,y) \in \nabla_w, q \in Q} \left(\otimes \left(O(q), \hat{f}(q', x, y^R, q_{acc}, \lambda, \lambda) \right) \right)$$

$$= A_{cc_m}(w)$$

Hence $L(M) = L(m)$

Hence the proof.

Theorem: 3. 6

Let $M = \left\langle Q_L, Q_R, \Sigma, \varnothing, \hat{1}, F, \otimes, \oplus \right\rangle$ be a $S - FLA$. Then there is a FNTA $m = \left\langle Q, \Sigma, O, T, v, q_{acc}, \otimes, \oplus \right\rangle$ such that $L(m) = L(M)$.

Proof.

Suppose that $M = \left\langle Q_L, Q_R, \Sigma, \varnothing, \hat{1}, F, \otimes, \oplus \right\rangle$ is a $S - FLA$, so $F = \{q_f\}$ With $q_f \in (Q_L \cup Q_R)$, Thus we can build a FNTA,

$$m = \left\langle Q_L \cup Q_R, \Sigma, \hat{1}, T, v, q_f, \otimes, \oplus \right\rangle$$

Where,

❖ For all $q \in (Q_L \cup Q_R)$ *define* $T(q) = \begin{cases} 1, & if \ q \in Q_L \\ 2, & if \ else \end{cases}$

Define. $v(q, a, q') = \varnothing(q, a, q')$, *i.e.*, $(q, q')^a = (q, q')_a$

Clearly m is a FNTA. Now for all $(w, \sigma) \in L(M)$ by definition we have that,

$$\deg_M(w) = \sigma \Leftrightarrow \underset{q \in (Q_L \cup Q_R)}{\oplus} \left(\otimes \left(\hat{1}(q), \overline{D}_M(q, w, q_f, \lambda) \right) \right) = \sigma$$

Notice that, by construction of the m we have that for each instruction in M of the form $(q, q')_a$ there exist an instruction equivalent $(q, q')^a$ in m.

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Moreover, for all w there exist a set ∇_{w} and as every instruction in M has an instruction equivalent in m we have that for all computation there exist $(q', xy) \succ^{*}_{M} (q_{acc}, \lambda)$ there exit $(q', x, y^{R}) \sqsupset^{*}_{m} (q_{acc}, \lambda, \lambda)$ equivalent in m,

$$\overline{D}_{M}\left(q', xy, q_{acc}, \lambda\right) = \hat{f}\left(q', x, y^{R}, q_{acc}, \lambda, \lambda\right)$$

and since $w = x\,y$ we have

$$A_{cc_{m}}(w) = \bigoplus_{(x,y)\in \nabla_{w}, q\in Q}\left(\otimes\left(O(q), \hat{f}.\left(q', x, y^{R}, q_{acc}, \lambda, \lambda\right)\right)\right)$$

$$= \bigoplus_{(x,y)\in \nabla_{w}, q\in Q}\left(\otimes\left(O(q), \overline{D}_{M}\left(q, xy, q_{acc}, \lambda\right)\right)\right)$$

$$= \deg_{M}(w)$$

Hence $L(m) = L(M)$

Hence the proof.

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CONCLUSION

We introduced the linear normal form (LNF) and the linear normal strong form (LNSF) for the class of linear fuzzy grammars. We show that these forms preserve the degree membership of generated words. We also propose two new fuzzy machines, which are equivalent in terms of language. We can use FLA's and FNTA's as models to characterize the class of the linear fuzzy languages.

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GANESAR COLLEGE OF ARTS AND SCIENCE, MELASIVAPURI
DEPARTMENT OF COMPUTER SCIENCE
STUDENTS UNDERTAKING PROJECT (Group Project) - APRIL 2020

S.No	Reg.No	Student Name	Name of the mentor	sub.code	Specify Projectwork/	Title of the project/Field work	Place of work done	Duration
1	CB17S180559	T.NALAPTHY	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Smart City In Pudukkottai	Ganesar College of Arts & Science	6 Months
2	CB17S180567	K.RAJAMANICKAM	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Smart City In Pudukkottai	Ganesar College of Arts & Science	6 Months
3	CB17S180539	S.ASHIKA	Miss PL.SUDHA	16SMBECSPW	PROJECTWORK	Privacy-Preserving Public Auditing For Data Storage Security In Cloud	Ganesar College of Arts & Science	6 Months
4	CB17S180574	S.SHEERINBARHANA	Miss PL.SUDHA	16SMBECSPW	PROJECTWORK	Computing	Ganesar College of Arts & Science	6 Months
5	CB17S180536	S.ABIRAMI	Miss K.KAYALVIZHI	16SMBECSPW	PROJECTWORK	Online Car Auction Site	Ganesar College of Arts & Science	6 Months
6	CB17S180547	V.KALAIVANI *	Miss K.KAYALVIZHI	16SMBECSPW	PROJECTWORK	Online Car Auction Site	Ganesar College of Arts & Science	6 Months
7	CB17S180543	M.DHANALAKSHMI	Miss K.KAYALVIZHI	16SMBECSPW	PROJECTWORK	Toll Plaza Management System	Ganesar College of Arts & Science	6 Months
8	CB17S180551	R.KAVITHA	Miss K.KAYALVIZHI	16SMBECSPW	PROJECTWORK	Toll Plaza Management System	Ganesar College of Arts & Science	6 Months
9	CB17S180568	M.RAJESHWARI	Miss PL.SUDHA	16SMBECSPW	PROJECTWORK	Online Bug Tracking And Customer Support System	Ganesar College of Arts & Science	6 Months
10	CB17S180580	S.VASUKI	Miss PL.SUDHA	16SMBECSPW	PROJECTWORK	Online Bug Tracking And Customer Support System	Ganesar College of Arts & Science	6 Months
11	CB17S180538	N.ANBU	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Online Terminal Management System	Ganesar College of Arts & Science	6 Months
12	CB17S180583	R.YUVARAJ	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Online Terminal Management System	Ganesar College of Arts & Science	6 Months
13	CB17S180544	A.GOWSALYA	Mr PL.SUDHA	16SMBECSPW	PROJECTWORK	Spatial Info-Tech Solution	Ganesar College of Arts & Science	6 Months
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41	CB17S180575	A.SHEIK ABDULLA	Miss K.KAYALVIZHI	16SMBECSPW	PROJECTWORK	Secure Distributed Deduplication System With Improved Reliability	Ganesar College of Arts & Science	6 Months
42	CB17S180548	A.KALYANASUNDARAM	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Spiritual Tourism	Ganesar College of Arts & Science	6 Months
43	CB17S180569	A.SAKTHISARAVANAN	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Spiritual Tourism	Ganesar College of Arts & Science	6 Months
44	CB17S180540	A.AZHAGAMMAL	Miss PL.SUDHA	16SMBECSPW	PROJECTWORK	smart Construction Plus	Ganesar College of Arts & Science	6 Months
45	CB17S180561	P.NANDHINI	Miss PL.SUDHA	16SMBECSPW	PROJECTWORK	smart Construction Plus	Ganesar College of Arts & Science	6 Months
46	CB17S180552	PL.KAVIYA	Mr R.RAJA	16SMBECSPW	PROJECTWORK	Secure Data Sharing In Cloud Computing Using Revocable-Storage Identity-Based Encryption	Ganesar College of Arts & Science	6 Months

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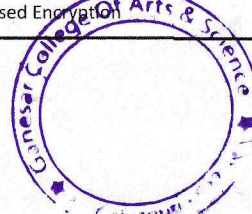
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WALK AROUND CONCEALED BUILDINGS FOR INTERNAL FLOOR PLAN STRUCTURE

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

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Reg No: CB17S180542
&
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Under the Guidance of

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CERTIFICATE
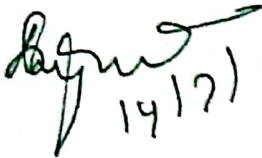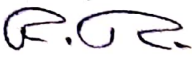
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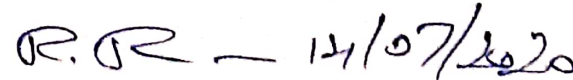
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CUSTOMER RELATIONSHIP MANAGEMENT SYSTEM USING K-MEANS ALGORITHM

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

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CAFETERIA FOR SOUTH INDIAN FOODS

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

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External Examiner

1. 14/7/2020

2. 14 /07/2020

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CLIENT SERVER BASED LIVE MEETING

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

M.MANICKAVALLI

Reg No: CB17S180556

&

S.SHOBANA

Reg No: CB17S180576

Under the Guidance of

Mr R.RAJA M.Sc., M.Phil., B.Ed.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade
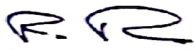
MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Mr.R.RAJA , M.Sc.,M.Phil.,B.Ed.,

Department of Computer Science,

Ganesar College Of Arts And Science,

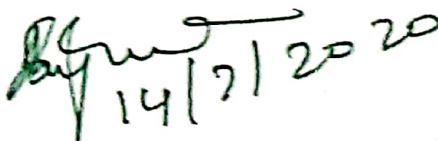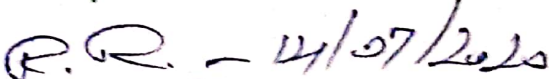Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "CLIENT SERVER BASED LIVE MEETING" is a bonafide record done by M.MANICKAVALLI (Reg No: CB17S180556) & S.SHOBANA (Reg No: CB17S180576) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14.07-2020 at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide

Head of the department

Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 6224...

External Examiner

1. 14/7/2020

2. 14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

INDIA MAPPING SOLUTI

A Project

Submitted to the Bharathidasan Univers

in partial fulfillment of the requiremen

for the award of the Degree of

BACHELOR OF COMPUTER SCIE

By

C.KANAGARAJ

Reg No: CB17S180549

&

M.SUBRAMANIAN

Reg No: CB17S180578

Under the Guidance of

Miss PL. SUDHA M.Sc., M.Phil.,

Department of Computer Science

Ganesar College of Arts and Scienc

Accredited by NAAC with "B" Grade

MELAISIVAPURI ~ 622 403

Tamil Nadu

INDIA MAPPING SOLUTIONS

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
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BACHELOR OF COMPUTER SCIENCE

By

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&

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Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

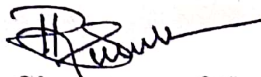MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Miss.PL.SUDHA,M.Sc.,M.Phil.,

Department of Computer Science,

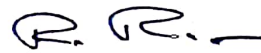Ganesar College Of Arts And Science,

Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "**INDIA MAPPING SOLUTIONS**" is a bonafide record done by **C.KANAGARAJ (Reg No: CB17S180549)** & **M.SUBRAMANIAN (Reg No: CB17S180578)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14 | 7 | 2020 at Ganesar College of Arts and science , Melaisivapuri.
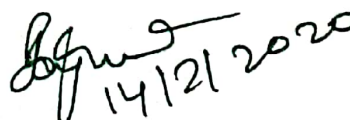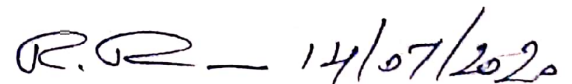
R. R

Head of the department
Head
Department of Computer Science
Ganesar College of Art and Science
Melasivapuri, Ponn. maravathi
Pudukkottai - 022

Signature of the Guide

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

External Examiner

1. 14/7/2020

2. R. R — 14/07/2020

KURINJI GIFTS

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

Submitted by

M.MURUGESH
Reg No: CB17S180557
&
A.VENGATESH
Reg No: CB17S180581

Under the Guidance of

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science
Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu
APRIL-2020

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science,

Ganesar College Of Arts And Science,

Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "KURINJI GIFTS " is a bonafide record done by **M.MURUGESH (Reg No: CB17S180557) & A.VENKATESH (Reg No: CB17S180581)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14·07·2020 at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 6224..

External Examiner

1. 14/7/2020

2. 14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

SPIRITUAL TOURISM

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

Submitted by
A.KALYANASUNDARAM
Reg No: CB17S180548
&
A.SAKTHISARAVANAN
Reg No: CB17S180569

Under the Guidance of

Mr R.RAJA M.Sc., M.Phil., B.Ed.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade
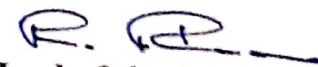
MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

R.RAJA , M.Sc.,M.Phil.,B.Ed.,

Department of Computer Science,

Ganesar College Of Arts And Science,
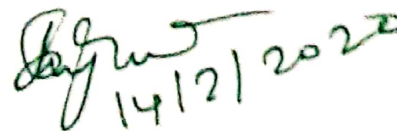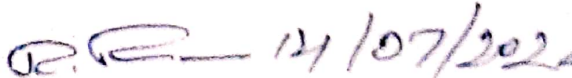
Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "SPIRITUAL TOURISM"
is a bonafide record done by A.KALYANASUNDARAM (Reg No:
CB17S180548) & A.SAKTHISARAVANAN (Reg No: CB17S180569) in
partial fulfillment of the requirements for the award of the degree of Bachelor of
Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on ___14/07/20___ at
Ganesar College of Arts and science , Melaisivapuri.

**Signature of the Guide
department**

**Head of the
Head**
Department of Computer Science
Ganesar College of Arts and Scienc
Melasivapuri, Ponnamaravathi
Pudukkottai - 622400

External Examiner

1.

2.

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

ONLINE BUG TRACKING AND CUSTOMER SUPPORT SYSTEM

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE
By
M.RAJESHWARI
Reg No: CB17S180568
&
S.VASUKI
Reg No: CB17S180580

Under the Guidance of

Miss PL. SUDHA M.Sc., M.Phil.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403
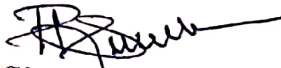
Tamil Nadu

APRIL-2020

Miss.PL.SUDHA.,M.Sc., M.Phil.,

Department of Computer Science,

Ganesar College Of Arts And Science,

Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "**Online Bug Tracking And Customer Support System** " is a bonafide record done by **M.RAJESHWARI** (**Reg No: CB17S180568**) & **S.VASUKI** (**Reg No: CB17S180580**) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on __14.07.2020__ at Ganesar College of Arts and science , Melasivapuri.

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Scien-
Melasivapuri, Ponnamarava' :
Pudukkottai - 622-

External Examiner

1. 14/12/2020

2. R.R — 14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

STUDENT AND STAFF INTERACTION SOFTWARE

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE
By
K.JOTHIKA
Reg No: CB17S180546
&
V.NARMATHA
Reg No: CB17S180562

Under the Guidance of

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science,

Ganesar College Of Arts And Science,

Melasivapuri, Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "**Student and Staff Interaction Software** " is a bonafide record done by **K.JOTHIKA (Reg No: CB17S180546) & V.NARMATHA (Reg No: CB17S180562)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

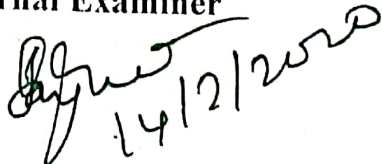The Viva-voice examination was conducted on 14-7-2020 at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 622403

External Examiner

1.

2.

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

FIRST ROUND

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

R.NATARAJAN

Reg No: CB17S180564

&

S.SUBASH

Reg No: CB17S180577

Under the Guidance of

Mr R.RAJA M.Sc., M.Phil., B.Ed.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Mr.R.RAJA , M.Sc.,M.Phil.,B.Ed.,

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Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "FIRST ROUND" is a bonafide record done by R.NATARAJAN (Reg No: CB17S180564) & S.SUBASH (Reg No: CB17S180577) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14/07/2020 at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 622.

External Examiner

1. 14/2/2020

2. 14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

ENSURING DISTRIBUTED ACCOUNTABILITY FOR DATA SHARING IN THE CLOUD

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

B.RAJAGOPAL

Reg No: CB17S180566

&

A.SARAVANAN

Reg No: CB17S180572

Under the Guidance of

Miss PL. SUDHA M.Sc., M.Phil.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Miss.PL.SUDHA,M.Sc.,M.Phil.,

Department of Computer Science,

Ganesar College Of Arts And Science,
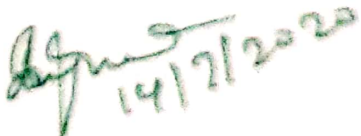
Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "ENSURING DISTRIBUTED ACCOUNTABILITY FOR DATA SHARING IN THE CLOUD" is a bonafide record done by B.RAJAGOPAL (Reg No: CB17S180566) & A.SARAVANAN(Reg No: CB17S180572) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14/07/2020 at Ganesar College of Arts and science , Melaisivapuri.

Head of the department

Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 6224.

Signature of the Guide

External Examiner

1. 14/2/2020

2. R. — 14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

EMPLOYEE TRACKER SYSTEM

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

S.SANTHIYA
Reg No: CB17S180570
&
P.SARATHA
Reg No: CB17S180571

Under the Guidance of

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Miss K.KAYALVIZHI M.Sc.,
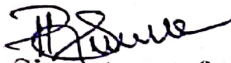
Department of Computer Science,

Ganesar College Of Arts And Science,

Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "EMPLOYEE TRACKER SYSTEM" is a bonafide record done by S.SANTHIYA (Reg No: CB17S180570) & P.SARATHA (Reg No: CB17S180571) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.
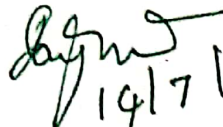
The Viva-voice examination was conducted on 14·07·2020 at Ganesar College of Arts and science , Melaisivapuri.

K.Kayalvizhi

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 62240

External Examiner

1. 14/7/2020

2. 14/07/202

Si. Sorram

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

ONLINE TERMINAL MANAGEMENT SYSTEM

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

N.ANBU
Reg No: CB17S180538
&
R.YUVARAJ
Reg No: CB17S180583

Under the Guidance of

Mr R.RAJA M.Sc., M.Phil., B.Ed.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Mr.R.RAJA , M.Sc.,M.Phil.,B.Ed.,

Department of Computer Science,

Ganesar College Of Arts And Science,

Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "ONLINE TERMINAL MANAGEMENT SYSTEM " is a bonafide record done by N.ANBU(Reg No: CB17S180538) & R.YUVARAJ (Reg No: CB17S180583) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019-- 2020.
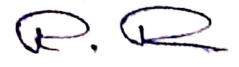
The Viva-voice examination was conducted on 14 . 07 . 2020 at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 6234..

External Examiner

1. 14/7/2020

2. R.R. 14/07/202

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

PRIVACY-PRESERVING PUBLIC AUDITING FOR DATA STORAGE SECURITY IN CLOUD COMPUTING

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

S.ASHIKA

Reg No: CB17S180539

&

S.SHEERINBARHANA

Reg No: CB17S180574

Under the Guidance of

Miss PL. SUDHA M.Sc., M.Phil.,

Department of Computer Science

Ganesar College of Arts and Science

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Miss PL. SUDHA M.Sc., M.Phil.,

Department of Computer Science,

Ganesar College Of Arts And Science,

Melasivapuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "PRIVACY-PRESERVING PUBLIC AUDITING FOR DATA STORAGE SECURITY IN CLOUD COMPUTING" is a bonafide record done by S.ASHIKA **(Reg No: CB17S180539) &** **S.SHEERINBARHANA (Reg No:** CB17S180574) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on ___14 . 7 . 2020___ at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide

Head of the department

Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 6224...

External Examiner

1.   14|7|2020

2.   14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403

ONLINE CAR AUCTION SITE

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

S.ABIRAMI
Reg No: CB17S180536
&
V.KALAIVANI
Reg No: CB17S180547

Under the Guidance of

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science

Ganesar College of Arts and Science

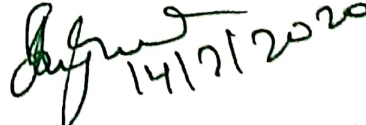Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Miss K.KAYALVIZHI M.Sc.,

Department of Computer Science,

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Melasivapuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "ONLINE CAR AUCTION SITE " is a bonafide record done by S.ABIRAMI (Reg No: CB17S180536) & V.KALAIVANI (Reg No: CB17S180547) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14·07·2020 at Ganesar College of Arts and science , Melaisivapuri.

K.Kayalvizhi

Signature of the Guide

Head of the department
Head
Department of Computer Science
Ganesar College of Arts and Science
Melasivapuri, Ponnamaravathi
Pudukkottai - 622403.

External Examiner

1. 14/7/2020

2. 14/07/2020

Principal
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403
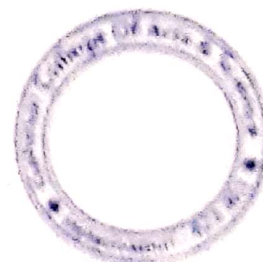
SMART CITY IN PUDUKKOTTAI

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

By

T.NALAPATHY
Reg No: CB17S180559
&
K.RAJAMANICKAM
Reg No: CB17S180567

Under the Guidance of

Mr R.RAJA M.Sc., M.Phil., B.Ed.,

Department of Computer Science

Ganesar College of Arts and Science

Accredited by NAAC with "B" Grade

MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

Mr.R.RAJA , M.Sc.,M.Phil.,B.Ed.,

Department of Computer Science,

Ganesar College Of Arts And Science,

Melasipuri,Pudukkottai Dt.-622403.

CERTIFICATE

This is to certify that the project work entitled "**SMART CITY IN PUDUKKOTTAI**" is a bonafide record done by **T.NALAPATHY (Reg No: CB17S180559) & K.RAJAMANICKAM (Reg No: CB17S180567)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

The Viva-voice examination was conducted on 14.07.2020 at Ganesar College of Arts and science , Melaisivapuri.

Signature of the Guide department

Head of the

Head
Department of Computer Science
Ganesar College of Arts and Science
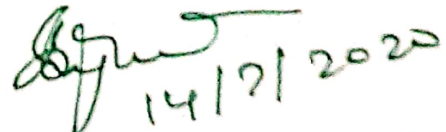**Melasivapuri, Ponnamaravathi**
Pudukkottai - 622403

External Examiner

1. 14/7/2020

2. 14/07/2020

PRINCIPAL
Ganesar College Of Arts & Science
MELASIVAPURI - 622 403
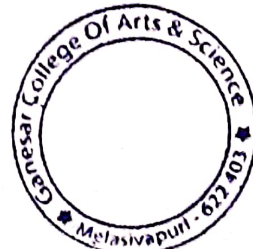
SPATIAL INFO-TECH SOLUTION

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE
By
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Under the Guidance of

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MELAISIVAPURI – 622 403

Tamil Nadu

APRIL-2020

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This is to certify that the project work entitled "SPATIAL INFO-TECH SOLUTION" is a bonafide record done by A.GOWSALYA (Reg No: CB17S180544) & N.NARMATHA (Reg No: CB17S180563) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

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TOLL PLAZA MANAGEMENT SYSTEM

A Project

Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

BACHELOR OF COMPUTER SCIENCE

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Reg No: CB17S180543

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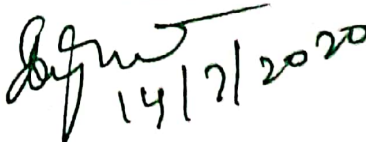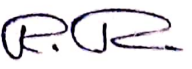This is to certify that the project work entitled "TOLL PLAZA MANAGEMENT SYSTEM" is a bonafide record done by **M.DHANALAKSHMI(Reg No: CB17S180543) & R.KAVITHA (Reg No: CB17S180551)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

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TASK MANAGER

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

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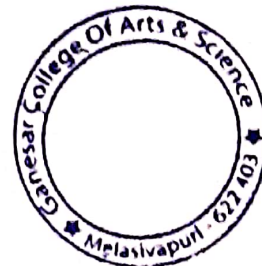
TAX INFORMATION SYSTEM

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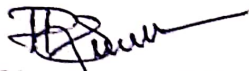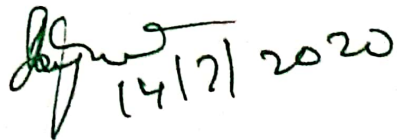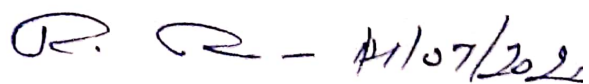
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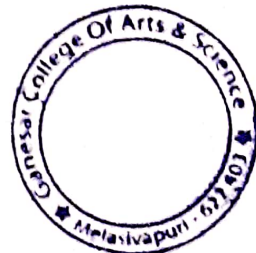
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2. $41/07/20 2$

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SECURE DISTRIBUTED DEDUPLICATIONS SYSTEM WITH IMPROVED RELIABILITY

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

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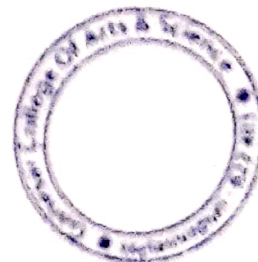
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SMART CITY IN THANJAVUR

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
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Reg No: CB17S180573

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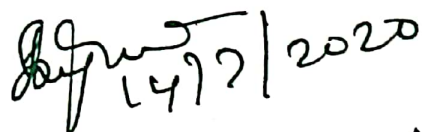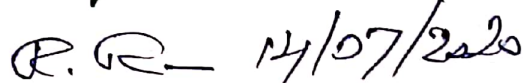Melasipuri,Pudukkottai Dt.-622403.

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This is to certify that the project work entitled "**SMART CITY IN THANJAVUR**" is a bonafide record done by **PL.SATHIYARAJ (Reg No: CB17S180573)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019–2020.

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MELASIVAPURI - 622 403

Secure Data Sharing in Cloud Computing Using Revocable-Storage Identity-Based Encryption

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

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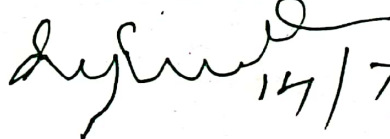Melasipuri,Pudukkottai Dt.-622403.

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This is to certify that the project work entitled "**Secure Data Sharing in Cloud Computing Using Revocable-Storage Identity-Based Encryption**" is a bonafide record done by **PL.KAVYA (Reg No: CB17S180552)** in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

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MELASIVAPURI - 622 403
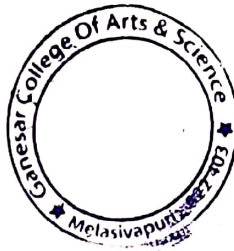
SMART CONSTRUCTION PLUS

A Project
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2. 14/07/2020

PRINCIPAL
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CUSTOMER RELATIONSHIP MANAGEMENT SYSTEM USING K-MEANS ALGORITHM

A Project
Submitted to the Bharathidasan University
in partial fulfillment of the requirements
for the award of the Degree of

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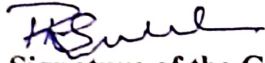
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This is to certify that the project work entitled "**Customer Relationship Management System Using K-Means Algorithm**" is a bonafide record done by SR.KEERTHANA **(Reg No: CB17S180553) & K.MUTHARASI(Reg No:** CB17S180558) in partial fulfillment of the requirements for the award of the degree of Bachelor of Computer Science, during the academic year 2019– 2020.

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Head of the department

Signature of the Guide

External Examiner

1. 19/7/2020

2. 14/07/20

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I express my thankful to our Vice Principal **Dr.M.SELVARASU M.A., M.Phil., B.Ed., Ph.D.,** for the all the assistance and encouragement rendered to me during my project work.

I express our profound thank to **Mr R.RAJA M.Sc., M.Phil., B.Ed.,** Head, Department of Computer Science Ganesar College of Arts and Science, who have given us a valuable advice throughout my project work.

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I express my thanks and gratitude to my parents and all my friends who have helped me to complete this project successfully.

CONTENT

ABSTRACT

1. ABSTRACT

The K-means algorithm is the most widely use method for discovering clusters in data, and it has been used extensively in the commercial field, such as customer analysis. However, the efficiency of the algorithm needs to be improved when faced with large amounts of data. The improved algorithm avoids unnecessary calculations by using the triangle inequality. We applies the improved algorithm for customer classification. Experiments show that the optimizated algorithm take lower time overhead than the standards K-means algorithm, and the superiority of proposed method is more remarkable as the number of Clusters increases.

In this project we are implement this CRM(Customer Relationship Management) concepts with Marketing analyzing for the customers in particular company. Suppose a company that sells products to clients by orders made up of a list of items(products). To make easy the comprehension of the problem and the data scenery, we will consider objects (x clients) and each have two attributes or features(Total order and Total amount).

Based on this model, the marketing department of that concern desires to segment the clients to offer exclusive discounts and other benefits. Our project using K-means Algorithm clustering these clients based on the marketing data set into three categories: Gold, Silver and Bronze clients. The client classification criteria must consider only the two attributes, the total of orders of each client and the total cost of the client in his all orders without discounts. The company clustering the data based on this condition, the clients that have more orders and with higher total costs will be classified as Golden clients. The clients have more order and higher total with discounts as silver. More order and less amount consider as Bronze. The project use the algorithm K-means to classify the data set in accordance to the marketing department wants. As it was only specified two attributes (Total cost and number of orders), those will be used to classify the clients. Analyzing the data, the project can predict that the client for golden therefore it's easy to see the distance between these clients and the others.

ORGANIZATION PROFILE

2.ORGANIZATION PROFILE

AONE technology is one of the leading Software Development, Website development concern in Thiruppathur, Sivagangai District. We are committed to integrating customer driven quality standards with innovation.

We adopt several upcoming latest technologies and use that for the high quality projects which are so unique in comparison. Real time problems are quickly fixed and are solved so easily as we are interested in updating the latest technologies.

Facilities are so elaborated in our company so that the development of multi-projects are possible. Application oriented, Multimedia and IEEE projects are developed so effectively. The trainees are given parallel portions of the live projects for evaluating performance levels. We offer the best information technology service analysis of project, design and implementation etc. Company level project works are done well by our trainers. This institute has been founded on 2013 started as small development industry for rural area IT development.

Our Process

Software Development in Inventory, Payroll, Finance domains.

Website Development in ASP.NET, IIS

SYSTEM
ANALYSIS

3. SYSTEM ANALYSIS

3.1 Existing System:

Many of the organization don't have the data mining process for the company growth. They are arrange the manual meeting for the company growth. And also there is no privacy for that, without using the algorithm concepts they cannot get the exact results whenever conduct the meeting.

3.2 Proposed System:

In our system will determine the development of the company based on the customers purchasing effort. Every organization have the marketing department give the feedback of the company growth in every month. Classification of the customer qualifying for the gold, bronze and silver criteria based on the K-means algorithm. This project also implement the user security whenever the customer buy the new items in that company.

SYSTEM CONFIGURATION

4. SYSTEM CONFIGURATION

4.1   HARDWARE CONFIGURATION

Processor/System	:	Intel Dual Core 2.1
Main memory	:	2GB Ram
Cache Memory	:	512 KB
Keyboard	:	101Keys
Hard disk drive	:	250 GB

4.2   SOFTWARE CONFIGURATION

Operating system	:	Windows XP
Web server	:	IIS
Front end	:	ASP .NET
Programming language	:	C#
Back end	:	MS-SQL Server 2008

1. ABSTRACT

The K-means algorithm is the most widely use method for discovering clusters in data, and it has been used extensively in the commercial field, such as customer analysis. However, the efficiency of the algorithm needs to be improved when faced with large amounts of data. The improved algorithm avoids unnecessary calculations by using the triangle inequality. We applies the improved algorithm for customer classification. Experiments show that the optimizated algorithm take lower time overhead than the standards K-means algorithm, and the superiority of proposed method is more remarkable as the number of Clusters increases.

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1

When you work on any *project*, VS.NET has several child windows to assist you in the application development. These windows are attached on the left, bottom and right sides of the main window. You can click on these small windows to expand it and see the content of them. Some of the most commonly used child windows are explained below. Most of these windows will be enabled only when you have created a project and working on a Web Form/Win Form.

Xml:

First what you are thinking is it a programming language like our c, c++ or it's presentation language like HTML .YES it's a presentation language not a programming language . Before going into deep about XML we should remember one think ie it's a case sensitive language where as HTML is not a case sensitive .As i said before that it's mainly used for structured documents. You don't have any pre defined tags here .

VS.NET editor automatically generates lot of code, allows developers to drag and drop controls to a form, provide short cuts to compile and build the application etc.

The framework's Base Class Library provides a large range of features including user interface, data and data access, database connectivity, cryptography, web application development, numeric algorithms, and network communications. The class library is used by programmers, who combine it with their own code to produce applications.

Programs written for the .NET Framework execute in a software environment that manages the program's runtime requirements. Also part of the .NET Framework, this runtime environment is known as the Common Language Runtime (CLR). The CLR provides the appearance of an application virtual machine so that programmers need not consider the capabilities of the specific CPU that will execute the program. The CLR also provides other important services such as security, memory management, and exception handling. The class library and the CLR together constitute the .NET Framework.

What is the .NET Framework? - Features of .NET

The following are major features of .NET. We will use these features throughout our journey. Here is just a brief introduction to all key features of .NET.

MSIL

Microsoft Intermediate Language (MSIL) is a platform independent language that gets compiled into platform dependent executable file or dynamic link library. It means .NET compiler can generate code written using any supported languages and finally convert it to the required machine code depending on the target machine.

Microsoft Intermediate Language (MSIL) is a language used as the output of a number of compilers (C#, VB, .NET, and so forth). The ILDasm (Intermediate Language Disassembler) program that ships with the .NET Framework SDK (Frameworks\Bin\ildasm.exe) allows the user to see MSIL code in human-readable format. By using this utility, we can open any .NET executable file (EXE or DLL) and see MSIL code. The MSIL code finally converted in to native code using by "Just In Time Compiler"

Just In-Time Compiler

The high level programming languages that need to be compiled require a runtime, so that the architecture on which the language runs is provided with details on how to execute its code. All the programming languages use its corresponding runtime to run the application. For example, to run an application developed using Visual Basic, the computer on which the application will be run must be installed with the Visual Basic runtime. The Visual Basic runtime can run only the applications developed with Visual Basic and not the ones developed with any other programming language like Java.

In the .NET Framework, all the Microsoft .NET languages use a common language runtime, which solves the problem of installing separate runtime for each of the programming languages. Microsoft .NET Common Language Runtime installed on a computer can run any language that is Microsoft .NET compatible.

The main advantage of the .NET Framework is the interoperability between different languages. As all the Microsoft .NET languages share the same common

7

runtime language, they all work well together. For example, you can use an object written in C# from Visual Basic.NET. The same applies for all the other Microsoft .NET languages.

When you compile a Microsoft.NET language, the complier generates code written in the Microsoft Intermediate Language (MSIL). MSIL is a set of instructions that can quickly be translated into native code.

A Microsoft.NET application can be run only after the MSIL code is translated into native machine code. In .NET Framework, the intermediate language is complied "just in time" (JIT) into native code when the application or component is run instead of compiling the application at development time.

The Microsoft.NET runtime consists of two JIT compilers. They are standard JIT compiler and the EconoJIT compiler. The EconoJIT compiler compiles faster than the standard JIT compiler, but the code it produces is not as optimized as the code obtained from the standard JIT compiler.

Components of .NET

.NET framework has two main components. They are:

1. Common Language Runtime
2. .NET class library

Common Language Runtime

The Common Language Runtime (CLR) is a core component of Microsoft's .NET initiative. It is Microsoft's implementation of the Common Language Infrastructure (CLI) standard, which defines an execution environment for program code. The CLR runs a form of byte code called the Common Intermediate Language (CIL, previously known as MSIL -- Microsoft Intermediate Language).

Developers using the CLR write code in a language such as C# or VB.NET. At compile time, a .NET compiler converts such code into CIL code. At runtime, the CLR's just-in-time compiler converts the CIL code into code native to the operating system. Alternatively, the CIL code can be compiled to native code in a separate step prior to

runtime. This speeds up all later runs of the software as the CIL-to-native compilation is no longer necessary.

Although some other implementations of the Common Language Infrastructure run on non-Windows operating systems, Microsoft's implementation runs only on Microsoft Windows operating systems. The CLR allows programmers to ignore many details of the specific CPU that will execute the program. It also provides other important services, including the following:

- Memory management
- Thread management
- Exception handling
- Garbage collection
- Security

The Common Language Runtime (CLR) is the environment where all programs in .NET are run. It provides various services, like memory management and thread management. Programs that run in the CLR need not manage memory, as it is completely taken care of by the CLR. For example, when a program needs a block of memory, CLR provides the block and releases the block when program is done with the block.

All programs targeted to .NET are converted to MSIL (Microsoft Intermediate Language). MSIL is the output of language compilers in .NET (see figure 2). MSIL is then converted to native code by JIT (Just-in Time Compiler) of the CLR and then native code is run by CLR.

As every program is ultimately converted to MSIL in .NET, the choice of language is pure personal. A program written in VB.NET and a program written in C# are both converted to MSIL. Then MSIL is converted to native code and run. So, whether you write program in C# or VB.NET at the end it is MSIL all that you get.

.NET Framework Class Library:

The .NET Framework includes classes, interfaces, and value types that expedite and optimize the development process and provide access to system functionality.

To facilitate interoperability between languages, most .NET Framework types are CLS-compliant and can therefore be used from any programming language whose compiler conforms to the common language specification (CLS).

The .NET Framework types are the foundation on which .NET applications, components, and controls are built. The .NET Framework includes types that perform the following functions:

- Represent base data types and exceptions.
- Encapsulate data structures.
- Perform I/O.
- Access information about loaded types.
- Invoke .NET Framework security checks.
- Provide data access, rich client-side GUI, and server-controlled, client-side GUI.

The .NET Framework provides a rich set of interfaces, as well as abstract and concrete (non-abstract) classes. You can use the concrete classes as is or, in many cases, derive your own classes from them. To use the functionality of an interface, you can either create a class that implements the interface or derive a class from one of the .NET Framework classes that implements the interface.

ASP.NET

ASP.NET is a server side scripting technology that enables scripts (embedded in web pages) to be executed by an Internet server.

- ASP.NET is a Microsoft Technology
- ASP stands for Active Server Pages
- ASP.NET is a program that runs inside IIS
- IIS (Internet Information Services) is Microsoft's Internet server
- IIS comes as a free component with Windows servers
- IIS is also a part of Windows 2000 and XP Professional

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The ASP.NET application platform uses a frame work model. Application logic is divided into components according to function, and the various application components that make up a ASP.NET application are installed on different machines depending on the application component belongs.

- Client-tier components run on the client machine.
- Web-tier components run on the server.
- Business-tier components run on the server.
- Internet information system (IIS)-tier software runs on the server.

The .NET Framework is the infrastructure for the Microsoft .NET platform. The .NET Framework is an environment for building, deploying, and running Web applications and Web Services.

Microsoft's first server technology ASP (Active Server Pages), was a powerful and flexible "programming language". But it was too code oriented. It was not an application framework and not an enterprise development tool.

The Microsoft .NET Framework was developed to solve this problem.

.NET Frameworks keywords:

- Easier and quicker programming
- Reduced amount of code
- Declarative programming model
- Richer server control hierarchy with events

About ASP.NET

The .NET infrastructure consists of all the technologies that help in creating an running robust, scalable and distributed applications. The core of the .NET infrastructure is the .NET framework, which is a collection of services and classes. It exists as a layer between .NET applications and the underlying operating system. Asp .NET is one of the languages that are directed towards meeting the objectives of the .NET initiative of creating distributed applications. It has inherited the capability of rapid application development from its earlier versions and strengthened considerably the implementation of object oriented features. Asp .NET has many new and improved features such as

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inheritance, interfaces, and overloading that makes it a powerful object-oriented programming language. Other new language features include free threading and structured exception handling. Asp .NET fully integrates the .NET Framework and the Common Language Runtime, which together provide language interoperability, garbage collection, enhanced security, and improved versioning support. As a Asp developer, we can create multithreaded, scalable applications using explicit multithreading.

FEATURES OF ASP.NET

Inheritance

ASP .NET supports inheritance by allowing you to define classes that serve as the basis for derived classes. Derived classes inherit and can extend the properties and methods of the base class. They can also override inherited methods with new implementations. All classes created with Asp.NET are inheritable by default. Because the forms you design are really classes, you can use inheritance to define new forms based on existing ones.

Exception Handling

Exceptions are unusual error conditions that occur during execution of a program or an application. Most of the programmers concentrate more towards the core functionality and, hence, handling of the exceptions is neglected. It is commonly observed practice that placing a try and catch will suffice the exception handling. But, unfortunately, that is not true. This article exposes all the exception handling strategies and the best practices in exception handling in .NET.

Whenever an exception is occurred the .NET runtime throws an object of type "XXXException." All the Exceptions thrown by .NET runtime have their base class as Exception. There are varieties of system exceptions that are thrown. Please find some of the Exceptions thrown by the .NET runtime.

> OutOfMemoryException

> NullReferenceException

> InvalidCastException

> ArrayTypeMismatchException

> IndexOutOfRangeException

> ArithmeticException

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- DivideByZeroException
- OverFlowException

Be Proactive rather than reactive: It is always a better practice to write code in a manner to avoid exceptions rather than catching and handling the same. This approach may not be possible for all kinds of Exception since it is tough to anticipate OutOfMemoryException and avoid the same.

Asp.NET supports structured exception handling, using an enhanced version of the Try...Catch...Finally syntax supported by other languages such as C++. Structured exception handling combines a modern control structure (similar to Select Case or While) with exceptions, protected blocks of code, and filters. Structured exception handling makes it easy to create and maintain programs with robust, comprehensive error handlers.

Overloading

Overloading is the ability to define properties, methods, or procedures that have the same name but use different data types. Overloaded procedures allow you to provide as many implementations as necessary to handle different kinds of data, while giving the appearance of a single, versatile procedure.

Overriding Properties and Methods

The Overrides keyword allows derived objects to override characteristics inherited from parent objects. Overridden members have the same arguments as the members inherited from the base class, but different implementations. A member's new implementation can call the original implementation in the parent class by preceding the member name with MyBase.

Assembly Manifest

Within every assembly is an assembly manifest. Similar to a table of contents, the assembly manifest contains the following: The assembly's identity (its name and version). A file table describing all the other files that make up the assembly, including, for example, any other assemblies you created that your .exe or .dll file relies on, or even bitmap or Readme files. An assembly reference list, which is a list of all external dependencies — .dlls or other files your application needs that may have been created by

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someone else. Assembly references contain references to both global and private objects. Global objects reside in the global assembly cache, an area available to other applications, somewhat like the System32 directory. The Microsoft.VisualBasic namespace is an example of an assembly in the global assembly cache. Private objects must be in a directory at either the same level as or below the directory in which your application is installed.

Design Principles

Asp .NET reflects the following design principles:

- It is recognizably the descendant of Visual Basic. An existing Visual Basic programmer will feel immediately familiar with the language.
- Its syntax and semantics are simple, straightforward, and easy to understand. The language avoids unintuitive features.
- It gives developers the major features of the .NET Framework and is consistent with the framework's conventions.
- It is reasonably upgradeable from Visual Basic. Because the .NET Framework explicitly supports multiple computer languages, it works well in a Multilanguage environment.
- It is as compatible with previous versions of Visual Basic as possible. Whenever practical, Visual Basic .NET has the same syntax, the same semantics, and the same run-time behavior as its predecessors.

These principles complement the original design principles of Visual Basic:

- It is as safe a language to write in as possible. In general, Visual Basic tries to balance reliability, ease of use, and efficiency in the definition of the language.
- It is an extremely approachable language.
- It enables rapid program development, while not compromising reliability.
- It produces predictable and efficient code.
- It works as a strongly type language, as well as a loosely typed one, for more correct user code in the former case, and for faster development in the latter.

The Microsoft .NET Framework is a software framework that can be installed on computers running Microsoft Windows operating systems. It includes a large library of

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coded solutions to common programming problems and a virtual machine that manages the execution of programs written specifically for the framework. The .NET Framework is a key Microsoft offering and is intended to be used by most new applications created for the Windows platform.

The framework's Base Class Library provides a large range of features including user interface, data and data access, database connectivity, cryptography, web application development, numeric algorithms, and network communications. The class library is used by programmers, who combine it with their own code to produce applications.

Programs written for the .NET Framework execute in a software environment that manages the program's runtime requirements. Also part of the .NET Framework, this runtime environment is known as the Common Language Runtime (CLR). The CLR provides the appearance of an application virtual machine so that programmers need not consider the capabilities of the specific CPU that will execute the program. The CLR also provides other important services such as security, memory management, and exception handling. The class library and the CLR together constitute the .NET Framework.

Storage Engine Features

Benefits

There are many benefits of the new on-disk layout, including:

- Improved scalability and integration with Windows NT Server
- Better performance with larger I/Os
- Stable record locators allow more indexes
- More indexes speed decision support queries
- Simpler data structures provide better quality
- Greater extensibility, so that subsequent releases will have a cleaner development process and new features are faster to implement
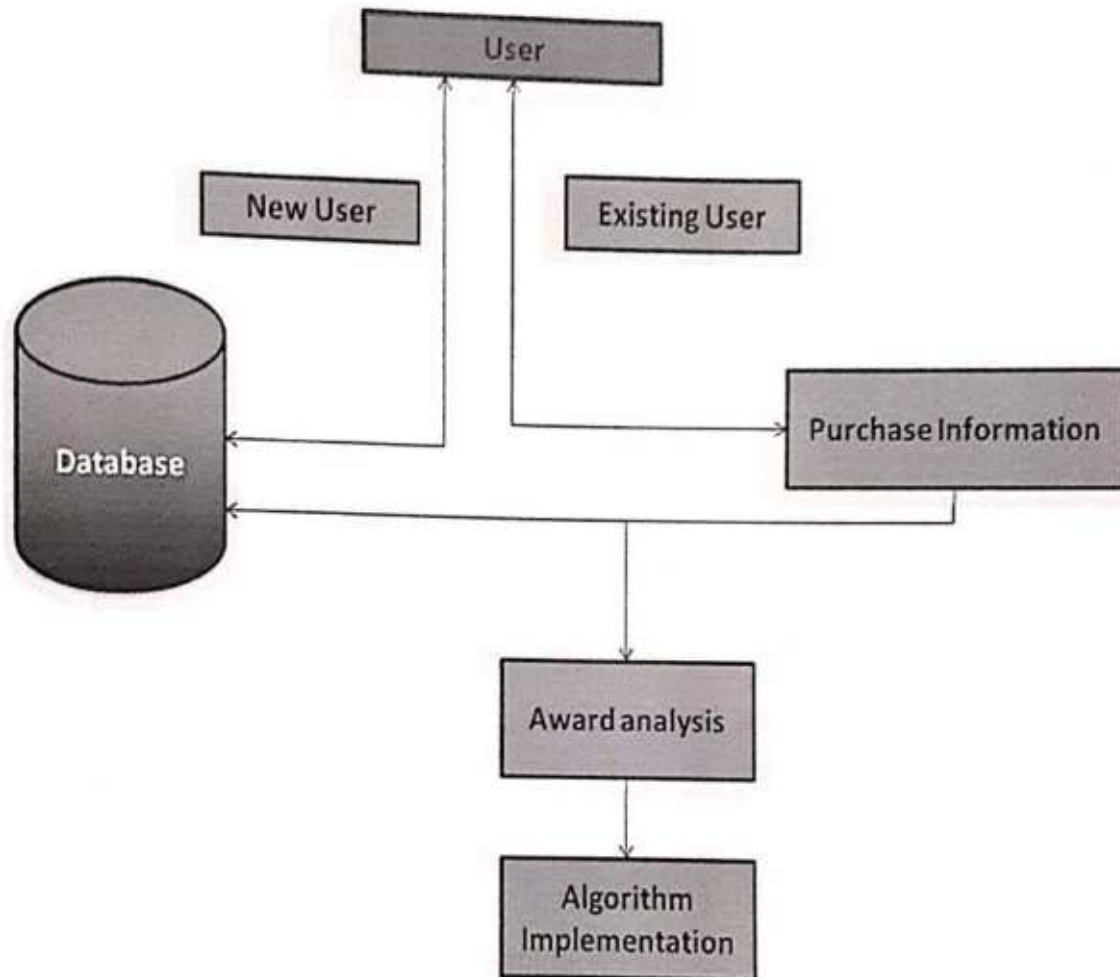
SYSTEM DESIGN

5 .SYSTEM DESIGN

5.1   FLOW DIAGRAM
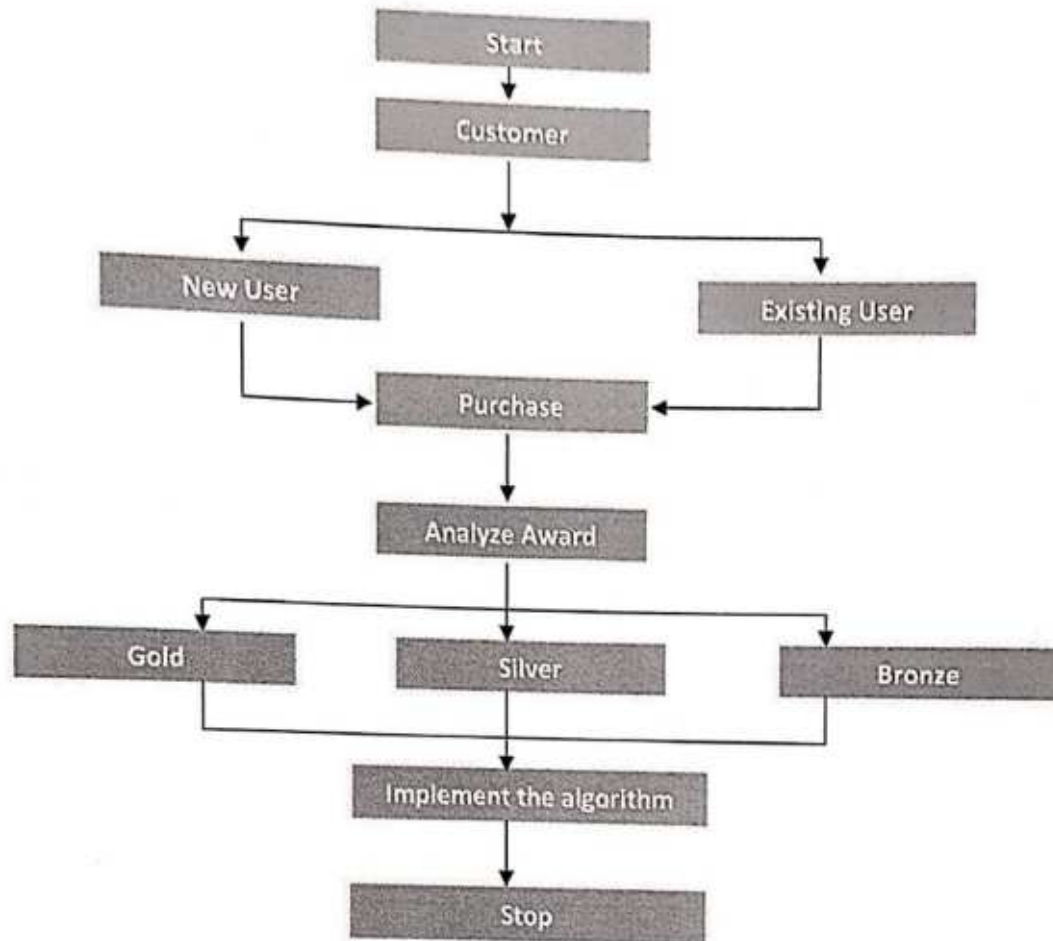
5.2 DATA FLOW DIAGRAM

5.3 DATABASE DESIGN

User Table

UserID	int
UserName	Varchar(50)
Password	Varchar(50)

Table 5.3.1

This table stored the information about the user(employee records)

Customer Table

Colum Name	Type
CID	Int
Cname	Varchar(50)
Cdno	Varchar(50)
Cstreet	Varchar(50)
Ccity	Varchar(50)
Cdistrict	Varchar(50)
Cmobile	Numberic(10,0)

Table 5.3.2

This tables has the consumer information

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Award Table

Colum Name	Type
Cid	Int
PurDate	Date
Qty	int
Amount	Numeric(18,0)
Discount	Numeric(18,0)
Status	Varchar(50)

Table 5.3.3

This table has the data of Awards

MODULE DESCRIPTION

6 . MODULES DESCRIPTION

MODULES:

1 .Customer Module

2. Purchase Module

3. Award Module

4. Data Mining Module

1. Customer Module

Using this module the organization add the new customer including their address and personal information. After accept the information it will give the Unique Customer Card Number. The customer using this card for future purchase from here.
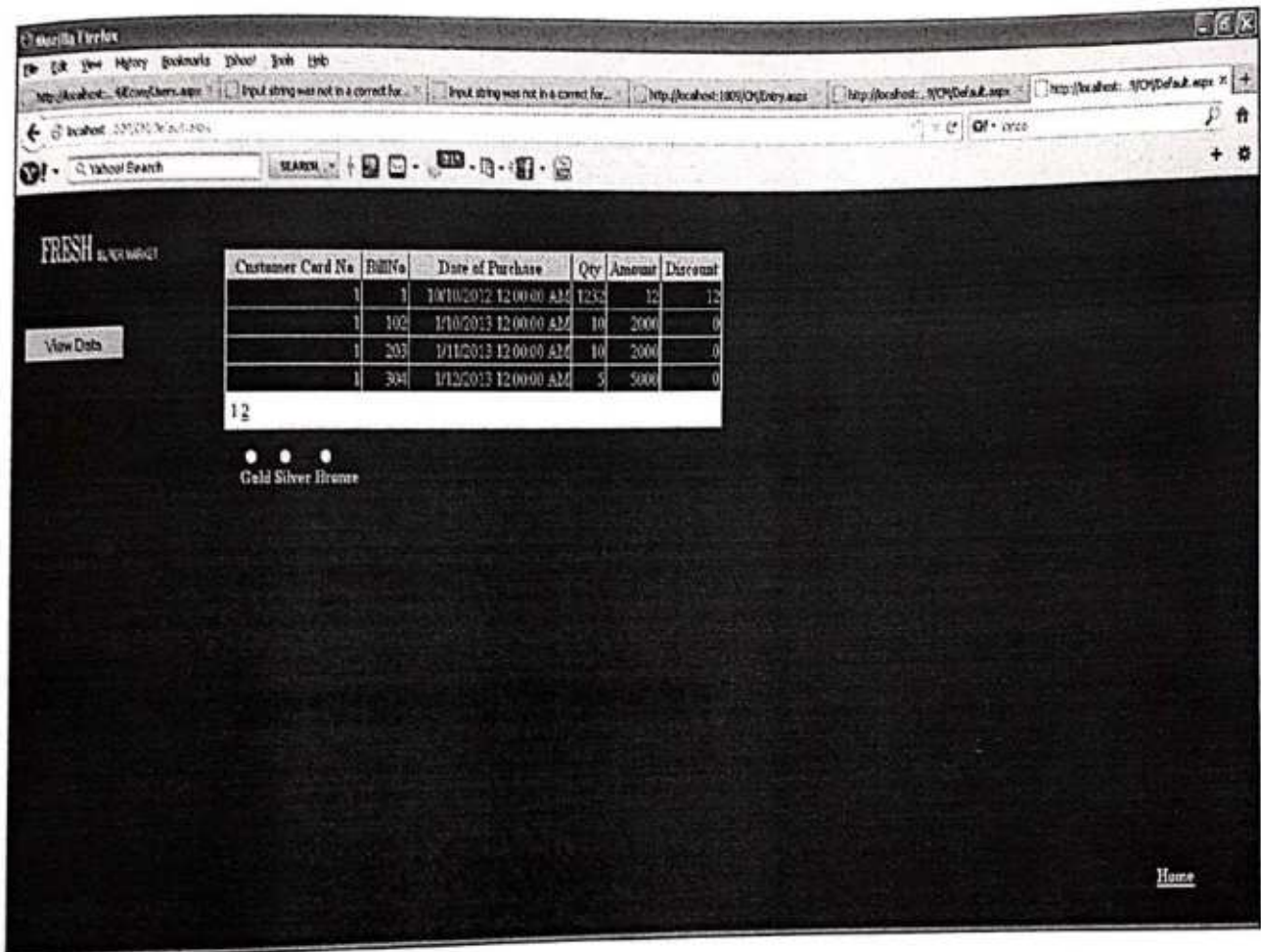
2.Purchase Module

In this module the customer show their bill to the prize competition section after pay the money. Its include the Quantity of items purchased , Total amount and Discount Details.

3.Award Module

The Shop decided to give the Gold, Silver and Bronze for their customers based on the purchase. Here the classification done

4. Data Mining

It is the Final Module, using the K-means algorithm and give the information to the marketing department including the Gold ,Silver and Bronze Customers. Its useful to develop our organization in future.

TESTING

7 .TESTING

System testing is the important phase without which a system cannot be released to a user. Testing is vital for the success of any system. It is aimed in ensuring that all processes are running according to the specifications. The logical and physical design is continuously exercised to ensure that the system will work when implemented. Programs are tested individually using test data and verified for corrections and accuracy.

System testing strategies have the following generic characteristics:

Testing begins at module level and works out towards the integration of the entire system. Different testing techniques are tried according to their appropriateness at different points in time. The developer and independent test groups conduct these tests. Testing and debugging are different activities but debugging must be accompanied by a testing strategy.

System testing makes logical assumptions that if all parts of system are corrected then the goal will be successfully achieved. Inadequate system testing may lead to errors that may appear months later.

Testing the modules separately, followed by testing the modules clustered as a unit, is carried out under system testing. This resulted in the detection of some new errors during clustered testing that did not occur during individual program modular testing such as syntax errors, logical errors etc., and such errors are found and corrected.

It is the process used to help identify the correctness, completeness, security, and quality of developed computer software. Testing is a process of technical investigation, performed on behalf of stakeholders, that is intended to reveal quality-related information about the product with respect to the context in which it is intended to operate. This includes, but is not limited to, the process of executing a program or application with the intent of finding errors.

Quality is not an absolute; it is value to some person. With that in mind, testing can never completely establish the correctness of arbitrary computer software; testing furnishes a criticism or comparison that compares the state and behavior of the product

against a specification. An important point is that software testing should be distinguished from the separate discipline of Software Quality Assurance (SQA), which encompasses all business process areas, not just testing.

White box and black box testing are terms used to describe the point of view a test engineer takes when designing test cases. Black box being an external view of the test object and white box being an internal view. Software testing is partly intuitive, but largely systematic. Good testing involves much more than just running the program a few times to see whether it works. Thorough analysis of the program under test, backed by a broad knowledge of testing techniques and tools are prerequisites to systematic testing.

Software Testing is the process of executing software in a controlled manner; in order to answer the question "Does this software behave as specified?" Software testing is used in association with Verification and Validation. Verification is the checking of or testing of items, including software, for conformance and consistency with an associated specification.

Software testing is just one kind of verification, which also uses techniques as reviews, inspections, walk-through. Validation is the process of checking what has been specified is what the user actually wanted.

BLACK BOX TESTING

Security Testing

Security_Testing is carried out in order to find out how well the system can protect itself from unauthorized access, hacking – cracking, any code damage etc. which deals with the code of application. This type of testing needs sophisticated testing techniques.

Integration Testing
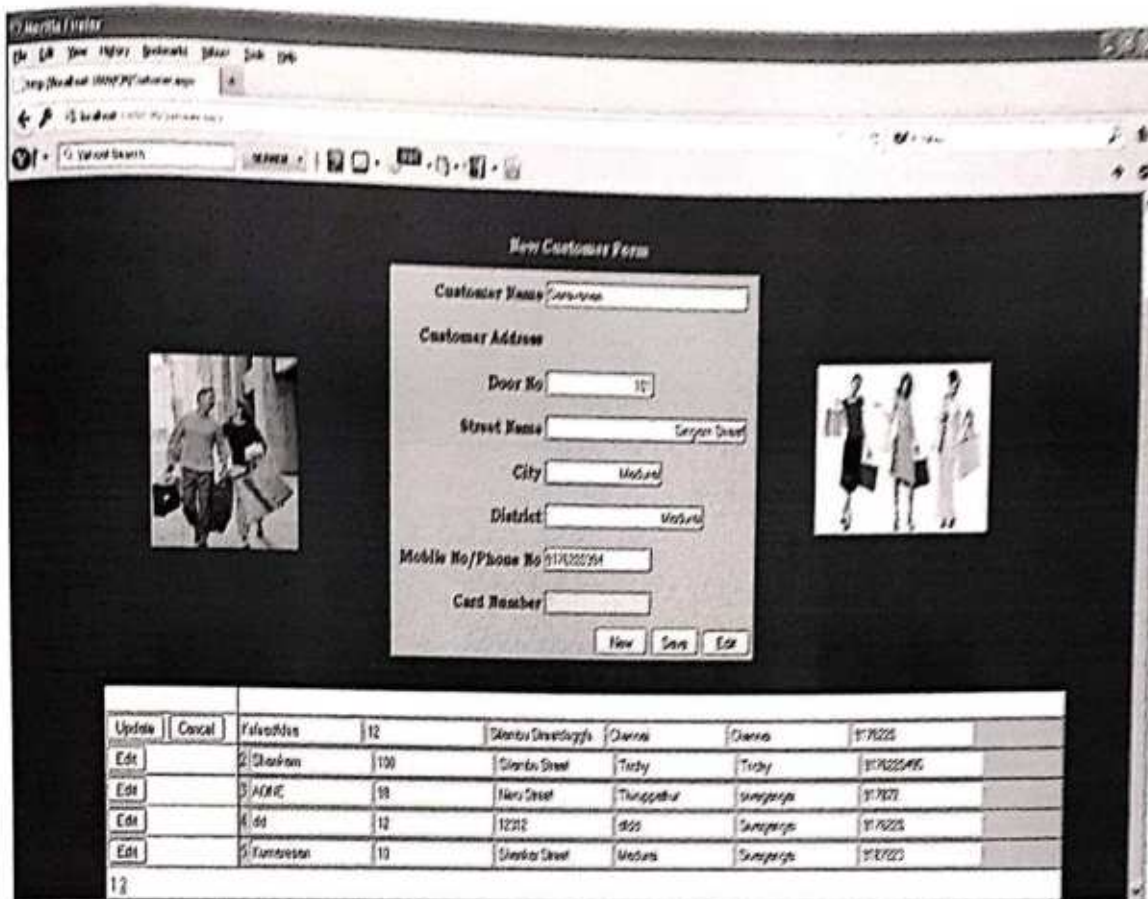
(a) again this software testing strategy has two different approaches namely the top down approach in which the integration is carried out from the top level module to the bottom and the bottom up approach in which the integration is carried out from the low level modules to the top.

(b) The modules were tested using the bottom up approach by introducing stubs for the top-level functions.

(C) This test was used to identify the errors in the interface the errors in passing the parameters between the functions and to correct them.

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Validation Testing
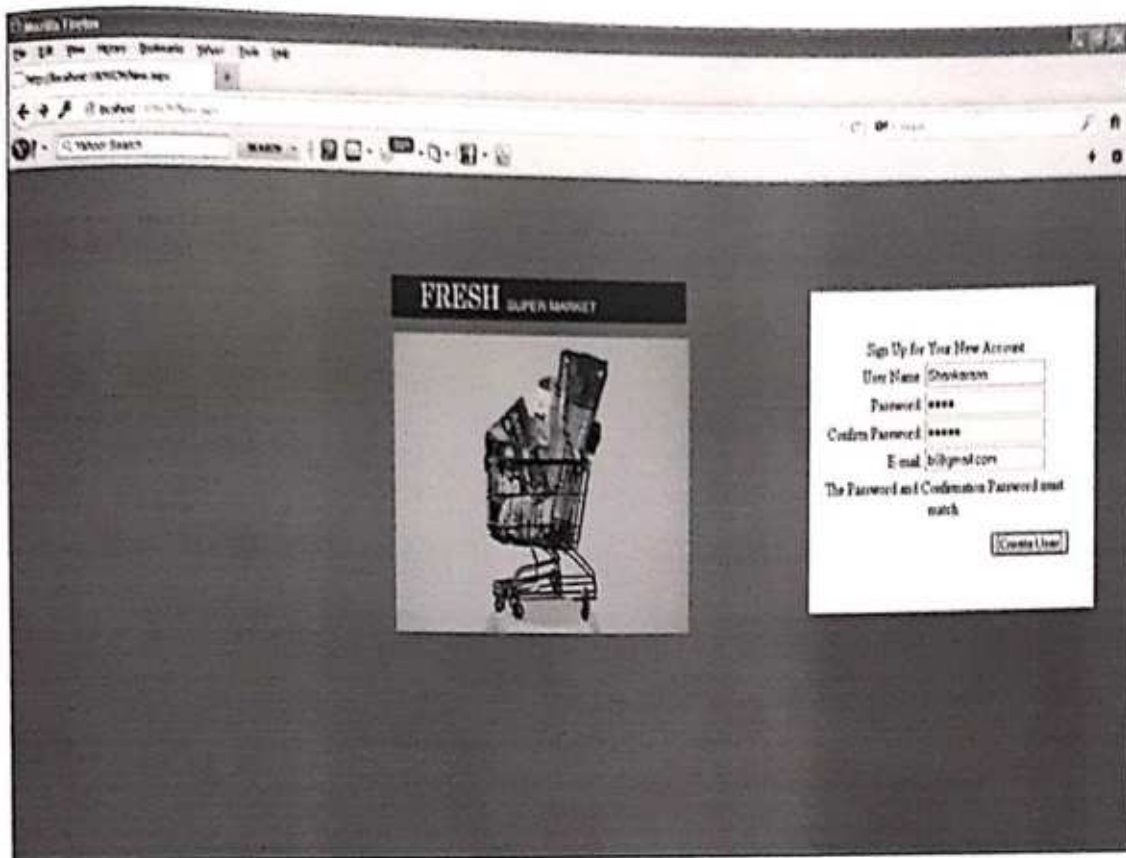
1. The main aim of this testing is to verify that the software system does what it was designed for.

2. Alpha testing was carried out to ensure the validity of the system.

The above testing is done in our system.

Maintenance Issues:

In software maintenance, an enormous mass of potential problems and cost lies under the surface. Software maintenance is of course, far more than fixing mistakes. Analysis's and programmers append for more time in maintaining the program then they do writing them. Few tools and techniques are available for maintenance. The literature on maintenance contains very few entries when compared to development activities. The software maintenance is classified into four tasks:

1. Corrective Maintenance

2. Adaptive Maintenance

3. Perfective Maintenance

Corrective Maintenance

The corrective maintenance is to correct the diagnosis errors in this project. It helps to easily identify the diagnosis errors in this software for debugging it.

Adaptive Maintenance

It modifies this project with a changing environment.

Perfective Maintenance

It recommends for new capabilities in any module, Modifications to the existing functions and increases the value of this project ie, general enhancements. The modules of the system are tested separately. This test is carried out during programming stage itself. Each module should work satisfactorily as regards to the expected from the module. There are validation checks for the fields also.

Analysis's and programmers append for more time in maintaining the program then they do writing them. Few tools and techniques are available for maintenance. The literature on maintenance contains very few entries when compared to development activities. The software maintenance is classified into four tasks.

IMPLEMENTATION

8. IMPLEMENTATION

The above four modules are implemented by C#.Net with SQL Server 2005 back end Tool. We can get proper output after the three testing namely Validation, Integration and Security Test.

8.1 SOURCE CODE

MAIN

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;
using System.Data;
using System.Data.SqlClient;


public partial class _Default : System.Web.UI.Page
{
protected void BindData()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView1.DataSource = dt.Tables[0];
GridView1.DataBind();
```

Scanned with OKEN Scanner

```
}


protected void Button1_Click(object sender, EventArgs e)
{
BindData();
RadioButtonList1.Visible = true;
}
protected void goldlevel1()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial    catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount=0", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView2.DataSource = dt.Tables[0];
GridView2.DataBind();
}
protected void silverlevel1()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount<>0", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
```

```csharp
GridView2.DataSource = dt.Tables[0];
GridView2.DataBind();
}


protected void bronzlevel1()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount<>0", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView2.DataSource = dt.Tables[0];
GridView2.DataBind();
}


protected void Button2_Click(object sender, EventArgs e)
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
if (RadioButtonList1 .SelectedItem .Text == "Gold" )
{
goldlevel1();
Button3.Visible = true;
GridView2.Visible = true;
}
else
if (RadioButtonList1.SelectedItem.Text == "Silver")
{
```

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```csharp
silverlevel1();
Button3.Visible = true;
GridView2.Visible = true;
}
else
if (RadioButtonList1.SelectedItem.Text == "Bronze")
{
bronzlevel1();
Button3.Visible = true;
GridView2.Visible = true;
}
}
protected void GoldSlevel()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial
catalog = crm; integrated security=true");        con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount=0 and qty in (select max(qty) from entry where discount=0)", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView5.DataSource = dt.Tables[0];
GridView5.DataBind();
}

protected void silverSlevel()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial
catalog = crm; integrated security=true");
con.Open();
```

```csharp
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount<>0 and qty in (select max(qty) from entry where discount<>0)", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView5.DataSource = dt.Tables[0];
GridView5.DataBind();

}
protected void bronzeslevel()

{
SqlConnection con = new SqlConnection("Data source= mypc; initial      catalog =
crm; integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount<>0 and qty in (select max(qty) from entry where qty < (select max(qty) from
entry where discount<>0))", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView5.DataSource = dt.Tables[0];
GridView5.DataBind();

}
protected void Button3_Click(object sender, EventArgs e)

{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
if (RadioButtonList1.SelectedItem.Text == "Gold")

{
GoldSlevel();
Button4.Visible = true;
```

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```
GridView5.Visible = true;
}
else

if (RadioButtonList1.SelectedItem.Text == "Silver")
{
silverSlevel();
Button4.Visible = true;
GridView5.Visible = true;
}

if (RadioButtonList1.SelectedItem.Text == "Bronze")
{
bronzeslevel();
Button4.Visible = true;
GridView5.Visible = true;
}
}

protected void goldtlevel()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount=0 and amount  in (select max(amount) from entry  where qty in (select
max(qty) from  entry where discount=0))", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView8.DataSource = dt.Tables[0];
GridView8.DataBind();
```

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```csharp
}
protected void silvertlevel()
{


SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount<>0 and amount  in (select max(amount) from entry  where qty in (select
max(qty) from  entry where discount<>0))", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView8.DataSource = dt.Tables[0];
GridView8.DataBind();
}


protected void bronzetlevel()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select CardNo as [Customer Card
No],BillNo,Dop as [Date of Purchase], Qty, Amount,Discount from entry where
discount<>0 and amount in (select max(amount) from entry where qty < (select
max(qty) from entry where qty < (select max(qty) from entry where discount<>0)))",
con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
GridView8.DataSource = dt.Tables[0];
GridView8.DataBind();
```

```
}
protected void Button4_Click(object sender, EventArgs e)

{


if (RadioButtonList1.SelectedItem.Text == "Gold")

{

goldtlevel();
GridView8.Visible = true;

}
else
if (RadioButtonList1.SelectedItem.Text == "Silver")

{

silvertlevel();
GridView8.Visible = true;

}
else
if (RadioButtonList1.SelectedItem.Text == "Bronze")

{

bronzetlevel();
GridView8.Visible = true;

}
}
protected void RadioButtonList1_SelectedIndexChanged(object sender, EventArgs e)

{
Button2.Visible = true;
GridView2.Visible = false;
GridView5.Visible = false;
GridView8.Visible = false;
Button3.Visible = false;
Button4.Visible = false;

}
protected void GridView1_PageIndexChanging(object sender, GridViewPageEventArgs
e)
```

```csharp
{
GridView1.PageIndex = e.NewPageIndex;
BindData();


}
protected void GridView2_PageIndexChanging(object sender, GridViewPageEventArgs
e)
{
if (RadioButtonList1.SelectedItem.Text == "Gold")
{
GridView2.PageIndex = e.NewPageIndex;
goldlevel1();
}
else
if ( RadioButtonList1.SelectedItem.Text == "Silver")
{
GridView2.PageIndex = e.NewPageIndex;
silverlevel1();
}
else
if (RadioButtonList1.SelectedItem.Text == "Bronze")
{
GridView2.PageIndex = e.NewPageIndex;
bronzlevel1();
}
}
protected void GridView5_PageIndexChanging(object sender, GridViewPageEventArgs
e)
{
if (RadioButtonList1.SelectedItem.Text == "Gold")
{
GridView5.PageIndex = e.NewPageIndex;
GoldSlevel();
```

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```
}
else
if (RadioButtonList1.SelectedItem.Text == "Silver")
{
GridView5.PageIndex = e.NewPageIndex;
silverSlevel ();
}
else
if (RadioButtonList1.SelectedItem.Text == "Bronze")
{
GridView5.PageIndex = e.NewPageIndex;
bronzeslevel();
}
}
protected void GridView8_PageIndexChanging(object sender, GridViewPageEventArgs
e)
{
if (RadioButtonList1.SelectedItem.Text == "Gold")
{
GridView8.PageIndex = e.NewPageIndex;
goldtlevel();
}
else
if (RadioButtonList1.SelectedItem.Text == "Silver")
{
GridView8.PageIndex = e.NewPageIndex;
silvertlevel ();
}
else
if (RadioButtonList1.SelectedItem.Text == "Bronze")
{
GridView8.PageIndex = e.NewPageIndex;
bronzetlevel();
```

```
}
}
}
```

CUSTOMER ENTRY

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;
using System.Data;
using System.Data.SqlClient;
public partial class Customer : System.Web.UI.Page
{
private DataSet getd()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select * from customer", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "customer");
return dt;
}

private void bind(DataSet ds1)
{
GridView1.DataSource = ds1.Tables[0];
this.DataBind();
}
```

```csharp
protected void Button1_Click(object sender, EventArgs e)
{
SqlConnection con = new SqlConnection("Data source= mypc; initial   catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select * from customer", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "customer");
SqlCommandBuilder cmdd1 = new SqlCommandBuilder(ada);
DataRow dr1 = dt.Tables[0].NewRow();
dr1["cname"] = TextBox1 .Text ;
dr1["ccard"] = Convert.ToDouble ( TextBox7.Text);
dr1["cdno"] = TextBox2.Text;
dr1["cstname"] = TextBox3.Text;
dr1["Ccity"] = TextBox4.Text;
dr1["cdistrict"] = TextBox5.Text;
dr1["cmobile"] = Convert.ToDouble (TextBox6.Text);
dt.Tables[0].Rows.Add(dr1);
ada.Update(dt,"Customer");
}
protected void Button2_Click1(object sender, EventArgs e)
{
GridView1.Visible = false;
SqlConnection con = new SqlConnection("Data source= mypc; initial   catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select * from customer", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "customer");

if (dt.Tables[0].Rows.Count > 0)
```

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```csharp
{
SqlCommand cmd1 = new SqlCommand("Select max(ccard) from customer", con);
SqlDataAdapter ada1 = new SqlDataAdapter(cmd1);
DataSet dt1 = new DataSet();
ada1.Fill(dt1, "customer");


TextBox7.Text =
Convert.ToString(Convert.ToDouble(dt1.Tables[0].Rows[0][0].ToString()) + 1);

}
else
{
TextBox7.Text = "1";

}
}
protected void GridView1_RowEditing(object sender, GridViewEditEventArgs e)

{
GridView1.EditIndex = e.NewEditIndex;
DataSet ds1 = getd();
bind(ds1);

}
protected void GridView1_RowUpdating(object sender, GridViewUpdateEventArgs e)

{
SqlConnection con = new SqlConnection("Data source= mypc; initial    catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand();
cmd.CommandText = "Update customer set
cname=@cname,cdno=@cdno,cstname=@cstname,ccity=@ccity,cdistrict=@cdistrict,c
mobile=@cmobile where ccard=@ccard";
cmd.Parameters .Add ("@cname",SqlDbType .VarChar).Value  = ((TextBox )
GridView1 .Rows[e.RowIndex ].Cells[1].FindControl ("T1")).Text ;
cmd.Parameters.Add("@cdno" , SqlDbType.VarChar).Value =
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T2")).Text;
```

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```csharp
cmd.Parameters.Add("@cstname", SqlDbType.VarChar).Value =
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T3")).Text;
cmd.Parameters.Add("@ccity", SqlDbType.VarChar).Value =
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T4")).Text;
cmd.Parameters.Add("@cdistrict", SqlDbType.VarChar).Value =
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T5")).Text;
cmd.Parameters.Add("@cmobile", SqlDbType.Int).Value =Convert.ToInt32 (
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T6")).Text);
cmd.Parameters.Add("@ccard", SqlDbType.Int).Value =
Convert.ToInt32(GridView1.DataKeys[e.RowIndex].Value);
cmd.Connection = con;
cmd.ExecuteNonQuery();
DataSet ds1 = getd();
bind(ds1);
}
protected void GridView1_RowCancelingEdit(object sender,
GridViewCancelEditEventArgs e)
{
GridView1.EditIndex = -1;
DataSet ds1 = getd();
bind(ds1);
}
protected void Button3_Click(object sender, EventArgs e)
{
GridView1.Visible = true;
DataSet ds1 = getd();
bind(ds1);
}
protected void GridView1_PageIndexChanging(object sender, GridViewPageEventArgs
e)
{
GridView1.Visible = true;
GridView1.PageIndex = e.NewPageIndex;
```

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```
if (!IsPostBack)
{
DataSet ds1 = getd();
bind(ds1);
}
}
}
```

CUSTOMER PURCHASE ENTRY

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;
using System.Data;
using System.Data.SqlClient ;
public partial class Account_Entry : System.Web.UI.Page
{
protected void Page_Load(object sender, EventArgs e)
{
if (!IsPostBack)
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select * from customer ", con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "customer");
DropDownList1.DataSource = dt.Tables[0];
DropDownList1.DataTextField = 'ccard';
DropDownList1.DataValueField = 'Cname';
```

44

```
DropDownList1.DataBind();
}
}
private DataSet getd()
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand("Select * from entry where CardNo=" +
Convert.ToInt32 (DropDownList1 .SelectedItem .Text ), con);
SqlDataAdapter ada = new SqlDataAdapter(cmd);
DataSet dt = new DataSet();
ada.Fill(dt, "entry");
return dt;
}
private void bind(DataSet ds1)
{
GridView1.DataSource = ds1.Tables[0];
this.DataBind();
}
protected void Button1_Click(object sender, EventArgs e)
{
TextBox2.Text ="";
TextBox3.Text ="";
TextBox4.Text = "";
TextBox5.Text ="";
TextBox7.Text ="";
}
protected void Button2_Click(object sender, EventArgs e)
{
GridView1.Visible = true;
DataSet ds1 = getd();
bind(ds1);
```

```csharp
}
protected void DropDownList1_SelectedIndexChanged(object sender, EventArgs e)
{
TextBox5.Text = DropDownList1.SelectedValue.ToString();
}
protected void GridView1_PageIndexChanging(object sender, GridViewPageEventArgs
e)
{
GridView1.Visible = true;
GridView1.PageIndex = e.NewPageIndex;
if (!IsPostBack)
{
DataSet ds1 = getd();
bind(ds1);
}
}
protected void GridView1_RowCancelingEdit(object sender,
GridViewCancelEditEventArgs e)
{
GridView1.EditIndex = -1;
DataSet ds1 = getd();
bind(ds1);
}
protected void GridView1_RowUpdating(object sender, GridViewUpdateEventArgs e)
{
SqlConnection con = new SqlConnection("Data source= mypc; initial catalog = crm;
integrated security=true");
con.Open();
SqlCommand cmd = new SqlCommand();
cmd.CommandText = "Update entry set
dop=@dop,qty=@qty,amount=@amount,discount=@discount,cname=@cname where
billno=@billno";
```

```csharp
cmd.Parameters.Add("@cname", SqlDbType.VarChar).Value =
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T1")).Text;
cmd.Parameters.Add("@dop", SqlDbType.DateTime).Value =
Convert.ToDateTime(((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("
T2")).Text).ToShortDateString(); ;
cmd.Parameters.Add("@qty", SqlDbType.Int ).Value =Convert.ToInt32 (
((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T3")).Text);
cmd.Parameters.Add("@amount", SqlDbType.Int).Value =
Convert.ToInt32(((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T4"))
.Text);
cmd.Parameters.Add("@discount", SqlDbType.Int).Value =
Convert.ToInt32(((TextBox)GridView1.Rows[e.RowIndex].Cells[1].FindControl("T5"))
.Text);
cmd.Parameters.Add("@Billno", SqlDbType.Int).Value =
Convert.ToInt32(GridView1.DataKeys[e.RowIndex].Value);
cmd.Connection = con;
cmd.ExecuteNonQuery();
DataSet ds1 = getd();
bind(ds1);
}
protected void GridView1_RowEditing(object sender, GridViewEditEventArgs e)
{
GridView1.EditIndex = e.NewEditIndex;
DataSet ds1 = getd();
bind(ds1);
}}
```
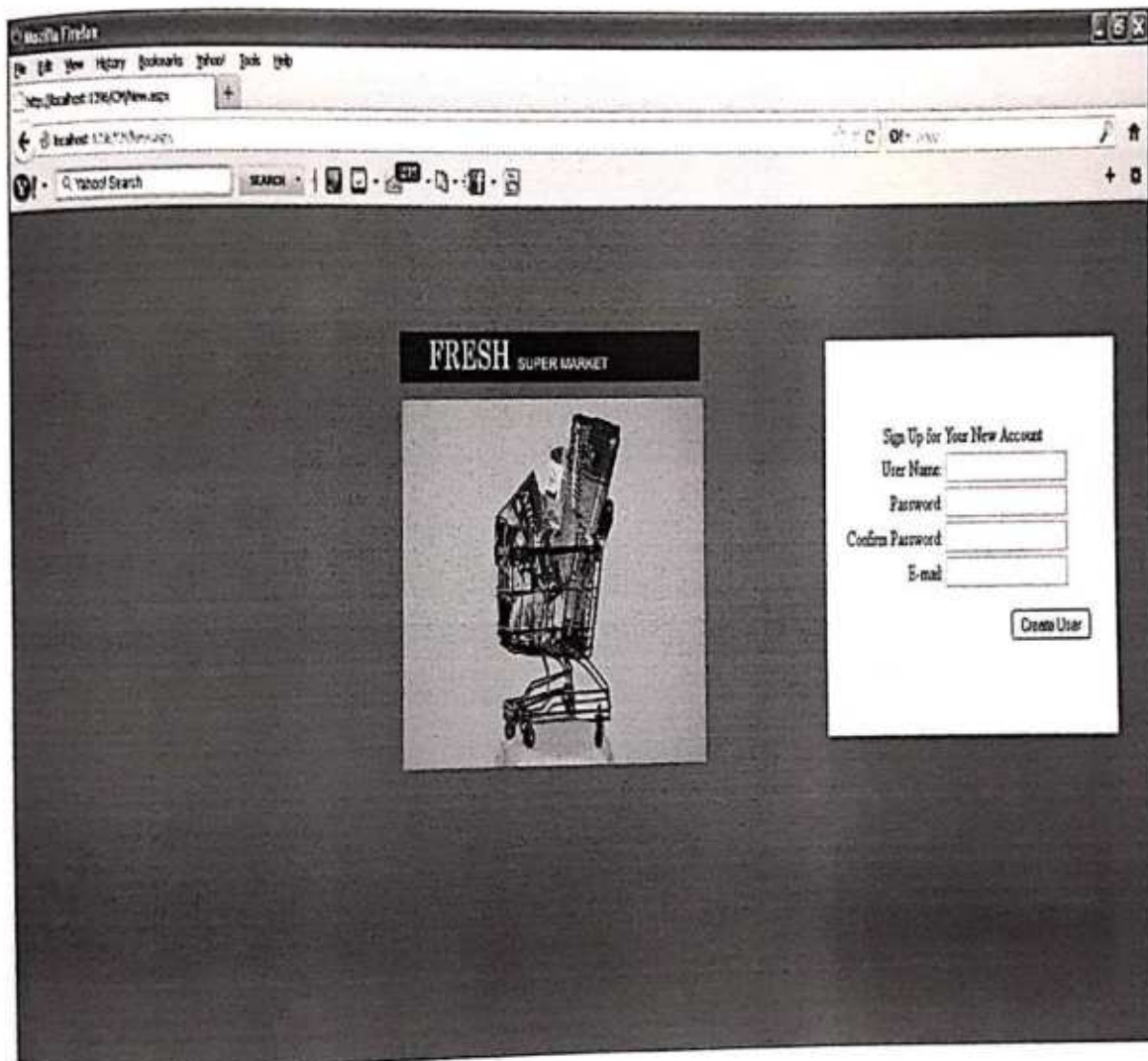
8.2   SCREEN SHOTS

Home Page

Register New User

Entry the New Customer

Modify the Existing Data (Customers)

Customer Purchase Entry

Modify the Existing Data (Customers Purchase)

Clustering of the Data

Clustering of the Data (Find out prize for the customers (Gold,silver,bronze)

Clustering of the Data (Select the Gold Coin Customers) (First Level) – More Quantity

Clustering of the Data (Select the Gold Coin Customers) – Second Level – More Quanity and More Amount

Clustering of the Data (Select the Gold Coin Customers) – Final Level – More Quanity and More Amount with No Discount

Repeat the step like selecting gold coin (for Silver)
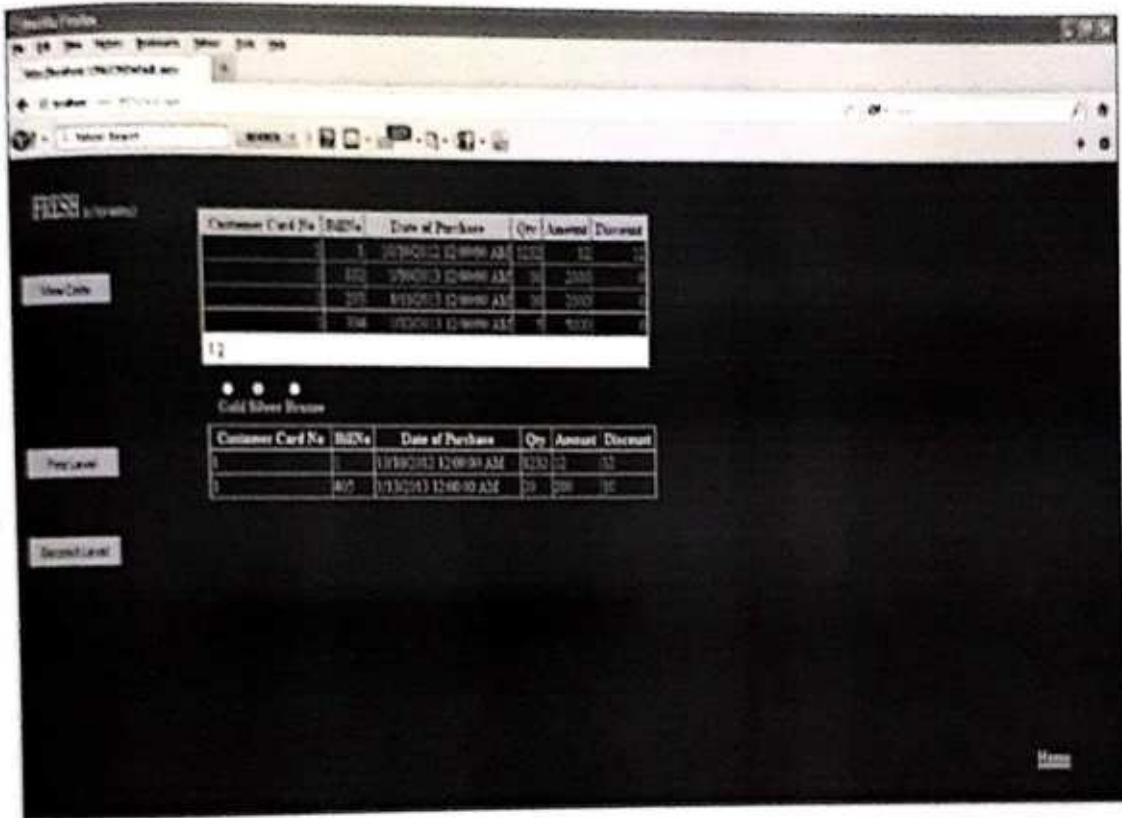
Repeat the step like selecting gold coin (for Bronze)

CONCLUSION

9. CONCLUSION

The system is user friendly to Admin and users. The administrator easily enters the master data and create new employee in easy method. Modification of master data can done by Admin. The employee enter the Patient information are very easy.

Clustering the data based one sex, age and given medical information, the user can check directly given information as well the employee will check their result as given data.

Future Enhancement

1. Now our project only find out the Gold, silver or bronze winner after the sales department finished their sales. In future we include the Shopping Cart here.

2. Winner of gold, silver, bronze persons are intimated through Mobile in future.

3. The Payment of purchasing not include here once the sales include this project we implement as Internet Banking system.

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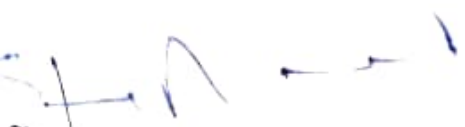Ganesar College of Arts & Science
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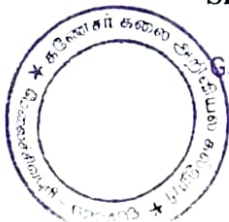
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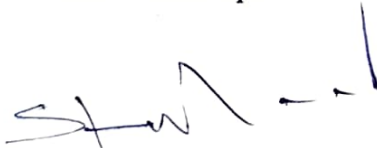
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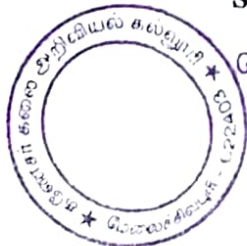
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This is to certify that the dissertation entitled **FEMINISM IN THE NOVEL OF ANITA DESAI'S 'CRY, THE PEACOCK'** Submitted by **MR. VANITHA (Reg. No: P 18050220)** Department of English, Ganesar College of Arts and Science, Melasivapuri, is a bonafide record of work done by her under my guidance in partial fulfilment of the requirement of the Degree of **MASTER OF ARTS in English.** This dissertation or any part of it has not been submitted elsewhere for any other degree.

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THE EXPRESSIONISTIC ELEMENTS IN EUGENE O'NEILL'S
'THE HAIRY APE' and 'THE EMPEROR JONES'

Project Report Submitted to **BHARATHIDHASAN UNIVERSITY, THIRUCHIRAPALLI**
In partial fulfilment of the requirement for the degree of

MASTER OF ARTS
in English
2019-2020

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DECLARATION

I hereby declare that the dissertation entitled **THE EXPRESSIONISTIC ELEMENTS IN EUGENE O'NEILL'S 'THE HAIRY APE' and 'THE EMPEROR JONES'** submitted for the M.A Degree is an original work done by **N.PAVITHRA** (Reg. No: P 18050213) under the guidance of Prof. **T.K MOHAN RAM**, M.A.,M.Phil., (Associate Professor of English)and the dissertation has not formed the basis for the award of any degree or any other similar titles.

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N.PAVITHRA

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TEXTUAL NOTE

Reference details have been given within parenthesis as per the rules found in the latest MLA Hand Book.

The following abbreviations have been used in the text for the quotations taken from the primary sources.

The Hairy Ape – THA

The Emperor Jones - TEJ

CONTENTS

CHAPTER-I

INTRODUCTION

American literature is literature written or produced in the United States of America and its preceding colonies (for specific discussions of poetry and theater). Before the founding of the United States, the British colonies on the eastern coast of the present-day United States were heavily influenced by English literature. The American literary tradition thus began as part of the broader tradition of English literature. The revolutionary period is notable for the political writings of **Benjamin Franklin, Alexander Hamilton,** and **Thomas Paine** among several others. **Thomas Jefferson's United States Declaration of Independence** solidified his status as a key American writer.

It was in the late 18th and 19th centuries that the nation's first novels were published. An early example is **William Hill Brown's The Power of Sympathy** published in 1791.Some of America's greatest poets of the nineteenth century include **Walt Whitman** and **Emily Dickinson. Edgar Allan Poe** contributed to American literature by introducing darker themes and ideas that would greatly influence later authors. Mark Twain (the pen name used by **Samuel Langhorne Clemens**) was the first major American writer to be born away from the East Coast. **Henry James** put American literature on the international map with novels like **The Portrait of a Lady.**

American writers expressed both disillusionment and nostalgia following **World War I.Ernest Hemingway** became famous with **The Sun Also Rises** and **A Farewell to Arms;** in 1954, he won the Nobel Prize in Literature. American drama

attained international status at the time with the works of **Eugene O'Neill**, who won four **Pulitzer Prizes** and the **Nobel Prize.** In the mid-twentieth century, American drama was dominated by the work of playwrights **Tennessee Williams** and **Arthur Miller,** as well as by the maturation of the American **musical.**

Jonathan Edwards and **George Whitefield** represented the **Great Awakening,** a religious revival in the early 18th century that emphasized **Calvinism.** During the 18th century, writing shifted from the Puritanism of Winthrop and Bradford to Enlightenment ideas of reason. The first book published in North America that promoted Newton and natural theology was Mather's The Christian Philosopher (1721). The enormous scientific, economic, social, and philosophical, changes of the 18th century, called the **Enlightenment,** impacted the authority of clergyman and scripture, making way for democratic principles.

In the next decade important women writers also published novels. **Susanna Rowson** is best known for her novel Charlotte: A Tale of Truth, published in London in 1791. In 1794 the novel was reissued in Philadelphia under the title, **Charlotte Temple.** In the middle of the 20th century, American drama was dominated by the work playwrights **Tennessee Williams** and **Arthur Miller.** American drama can foremost be known for its '**experimentalism**' in dramatic forms. American Drama would not be known as it is now for its different styles, characters and sets, without this shifting, setting it apart from the last decade of the 19th century American theatre; which had been largely given over to melodramas with naturalistic acting styles.

However early **Modern American Playwrights** drew their influences from **European** constructs, such as those of **Chekov;** intent on representing life within drama in a more realistic style. Known as **Modern Realism**, it represented everyday reality in a style that would seem familiar to the audiences that came to see these new plays.Realism had an influence on the American stage in this period, but mainly in terms of elaborately realistic sets.

Out of many the two most influential writers of the cannon are widely known as **Eugene O'Neill, Edward Albee, Tennessee Williams** and **Arthur Miller.** Just through focusing in-depth on the texts of these writers one may begin to establish what **Modern American Drama** is, the foundations it started on and the ways which it flowered. Their plays also present through these **'features'** many of the social and cultural changes of America, which one could suggest may have been the aim of this period, as many critics claim **"the American theatre has always been a sensitive gauge of social pressures and public issues".**

Thomas Lainer Williams III known by his pen name **Tennessee Williams** was an American playwright. He was born on March 26th, 1911. He is considered among the three foremost playwrights of 20th century American drama. **"The Glass Menagerie", "A Streetcar Named Desire", "Summer and Smoke", "The Rose Tattoo", "The Night of the Iguana", "The Eccentricities of a Nightingale",** and **"The Milk Train Doesn't Stop Here Anymore"** are the most famous works of **Tennessee Williams.** He died on February 25th, 1983.

Arthur Asher Miller was an American playwright, essayist, and a controversial figure in the twentieth-century American theatre. Arthur Miller was born on October 17th, 1915. He wrote several screen plays and was most noted for his work on 'The Misfits' (1961)."All My Sons", "Death of a Salesman", "The Crucible" and "A View from the Bridge" are the most famous works of Arthur Miller. He died on February 10th, 2005.

Jason Miller also known as John Anthony Miller was an American actor and playwright. Jason Miller was born on April 22nd, 1939. He received the Pulitzer Prize in 1973 for drama and Tony Award for Best play for his 'That Championship Season'. "That Championship Season", "The Exorcist", "The Devil's Advocate", "The Dain Curse", "The Ninth Configuration", "Toy Soldiers" and "The Exorcist II" are the most famous works of Jason Miller. He died on May 13th, 2001.

Clifford Odets was an American playwright, screenwriter, and director. Clifford Odets was born on July 18th, 1906. His works inspired the next several generations of playwrights including Arthur Miller, Paddy Chayefsky, Neil Simon, and David Mamet. His prominence was eventually eclipsed by Miller, Tennessee Williams, and in the early-to-mid-1950s, by William Inge."Waiting for Lefty", and"Golden Boy", and "The Country Girl" are the most famous works of Clifford Odets. He died on August 14th, 1963.

Eugene Gladstone O'Neill (October 16th, 1888- November 27th, 1953)was an American playwright and Nobel laureate in Literature. His poetically titled plays were among the first to introduce into U.S. drama techniques of realism earlier

associated with Russian playwright **Anton Chekhov,** Norwegian playwright **Henrik Ibsen,** and Swedish playwright **August Strindberg.**

O'Neill was born in a hotel, the Barret House, at **Broadway** and 43rd Street, on what was then Longacre Square (now **Times Square**). A commemorative plaque was first dedicated there in 1957. The site is now occupied by **1500 Broadway,** which houses offices shops and the **ABC Studios.** He was the son of Irish immigrant actor **James O'Neill** and **Mary Ellen Quinlan,** who was also of Irish descent. O'Neill was sent to **St. Aloysius Academy for Boys,** a Catholic boarding school in the Riverdale section of the Bronx, where he found his only solace in books. He attended **Princeton University** for one year.

O'Neill spent several years at sea, during which he suffered from depression and alcoholism. Despite this, he had a deep love for the sea and it became a prominent theme in many of his plays, several of which are set on board ships like those on which he worked. After his experience in 1912-13 at a **sanatorium** where he was recovering from **tuberculosis,** he decided to devote himself full-time to writing plays. O'Neill had previously been employed by the New London Telegraph, writing poetry as well as reporting.

One of these early one acts written by O'Neill was **The Web.** Written in 1913, this is the first time O'Neill explores the famous themes he thrives in his later career. The Web was one of O'Neill's first dramas. We see O'Neill explore memorable avenues within this play such as including a baby that was born out of

prostitution. This was a huge stepping stone as O'Neill is exploring fields in which have never before been explored with such success.

O'Neill first published play, **Beyond the Horizon**, opened on **Broadway** in 1920 to great acclaim, and was awarded the **Pulitzer Prize for Drama**. His first major hit was **The Emperor Jones**, which ran on Broadway in 1920. His best-known plays include **Anna Christie** (Pulitzer Prize 1922), **Desire Under the Elms** (1924), **Strange Interlude** (Pulitzer Prize 1928), **Mourning Becomes Electra** (1931), and his only well-known comedy, **Ah, Wilderness!** In 1936 he received the **Nobel Prize for Literature.**

O'Neill was married to Kathleen Jenkins from October 2, 1909 to 1912, during which time they had one son, **Eugene O'Neill, Jr.** (1910-1950). In 1950 O'Neill joined The Lambs, the famed theater club. After suffering from multiple health problems over many years, O'Neill ultimately faced a severe **Parkinson**-like tremor in his hands which made it impossible for him to write during the last 10 years of his life; he had tried using dictation but found himself unable to compose in that way.

While at Tao House, O'Neill had intended to write a cycle of 11 plays chronicling an American family since 1800s. Only two of these, **A Touch of the Poet** and **More Stately Mansions**, were ever completed. As his health worsened, O'Neill lost inspiration for the project and wrote three largely autobiographical plays, **The Iceman Cometh, Long Day's Journey into Night**, and **A Moon for the Misbegotten**. He managed to complete Moon for the Misbegotten in 1943, just before

leaving Tao House and losing his ability to write. Drafts of these uncompleted plays were destroyed by Carlotta at Eugene's request.

O'Neill died in Room 401 of the **Sheraton Hotel** (now **Boston University**'s **Kilachand Hall**) on Bay State Road in Boston, on November 27, 1953 at the age of 65. As he was dying, he whispered his last words: **"I knew it. I knew it. Born in a hotel room and died in a hotel room."** O'Neill is interred in the **Forest Hills Cemetery** in **Boston's Jamaica Plain**neighborhood.

Beyond the Horizon unfolds the tragedy of a young, farm-born dreamer, Robert Mayo. He has a romantic mind frail body. He longs for the open sea near East. He is destined for a wanderer's life. But cruel fate has confined him to this is means for all who live there. He decides to take a voyage around the world. But the night before he is to set sail for a three year's voyage comes to love in the form of a neighbor's daughter. This girl first was meant to be his brother Andrew's beloved. But Andrew is Heart-broken and decides to go on the voyage instead of his brother Robert Mayo.Then follow years of decay for that household, the tragedy of the misfit.

Anna Christie was first named **"Chris Christopherson."** The real interest of the play lies not in Chris, the father but in Anna Chris the daughter. The play begins in **"Johny-the-Priest's"** when Chris meets again the daughter whom he has long neglected. He was convinced it would be good for her to be brought up far inland, with relatives. But she has been through a cycle that began with seduction by a son of the house and has ended with prostitution.

The Great God Brown, drama in four acts and a prologue by O'Neill. The action juxtaposes its two central characters, William (Billy) Brown, a mediocre architect, and Dion Anthony, a talented but dissolute artist. Both characters are in love with Margaret, who chooses Dion because she is in love with the sensual, cynical mask he presents to the world. Billy, who has always been jealous of Dion's talent, steals Dion's mask and takes on his persona. He marries Margaret, who believes that he is Dion. Billy eventually is accused of the murder of his "old" self and is shot by the police. Margaret continues to worship Dion's Mask.

Strange Interlude was a huge success when first produced by the Theatre Guild at the John Golden Theatre in New York City in 1928. It won the Pulitzer Prize and became the most successful American play to date. The play covers a period of 25 years in the lives of mostly upper-middle-class East Coast characters. It centers on Nina Leeds, a passionate, tormented woman whose fiancé was killed in World War I and who spends the remainder of her life searching for an always-elusive happiness. This is very long play, lasting over five hours in performance. Strange Interlude was a controversial play because it dealt openly with such topics as adultery and abortion. Although it was rarely revived in the early 2000s, it was generally regarded as the first of O'Neill's work is in which he revealed his full power as a dramatist.

Ah, Wilderness! Is a comedy by O'Neill that premiered on Broadway at the Guild Theater on October 2, 1933. It differs from a typical O'Neill play in its happy ending for the central character, and depiction of a happy family in turn of the century America. It is O'Neill's well-known comedy. The play was successful in its first

Broadway production and the touring production that followed. It has since become a staple of community repertory.

The Iceman Cometh is noted for its dark realism; its setting and characters closely resemble real life. The world of the play is a cruel place. Relief comes in alcohol and pipe dreams-groundless hopes for a future that will never arrive. In spite of critical disagreement, however, the importance of The Iceman Cometh to twentieth-century theatre is undisputed. It is truly a modern classic, considered by many to be the greatest play by O'Neill.

A Moon for the Misbegotten is the story of a doomed man's guilt and the woman who tries desperately to love him. Jamie Tyrone is now older and much, much sadder than when he was first introduced in Long Day's Journey into Night. He is now the landlord of the estate, and spends nearly all of his time drinking and socializing with his tenants. He is particularly close with two of his tenants: Phil Hogan and Josie, who has long harbored romantic feelings for Jim. When Hogan hears a rumor that Tyrone plans to sell his farm to a much-hated neighbor, he hatches a plot for Josie to get Tyrone drunk and seduce him in the moonlight. What she doesn't yet realize is that Jim Tyrone is a dead man walking, constantly haunted by the ghosts of his family, tormented with guilt over his mother's death, and ultimately incapable of love.

The Hairy Ape is an expressionist play by O'Neill. It is about a beastly, unthinking laborer known as Yank, the protagonist of the play, as he searches for a sense of belonging in a world controlled by the rich. At first, Yank feels secure as he

stokes the engines of an ocean liner, and is highly confident in his physical power over the ship's engines and his men. However, when the rich daughter of an industrialist in the steel business refers to him as a "filthy beast", Yank undergoes a crisis of identity and so starts his mental and physical deterioration. He leaves the ship and wanders into Manhattan, only to find he does not belong anywhere-neither with the socialites neither on Fifth Avenue, nor with the labour organizers on the waterfront. In a fight for social belonging, Yank's mental state disintegrates into animalistic, and in the end he is defeated by an ape in which Yank's character has been reflected. The Hairy Ape is portrayal of the impact industrialization and social class has on the dynamic character Yank.

The Emperor Jones was also the first of several experiments with expressionism for O'Neill. After The Emperor Jones, O'Neill used expressionistic techniques most fully in The Hairy Ape. The Emperor Jones was also the first American play to offer a racially integrated cast to a Broadway audience and feature a black actor in its leading role. O'Neill insisted that black actor Charles Gilpin play Brutus Jones in the Provincetown Playhouse premiere of The Emperor Jones, and a precedent was set that would eventually lead to this country's present level of racial equality in the arts.

This chapter formed the introduction. The second chapter deals with the play Expressionistic Elements in the play of Eugene O'Neill's 'The Hairy Ape'. The third chapter deals with the Expressionistic Elements in the play of Eugene O'Neill's 'The Emperor Jones'. The third chapter forms the conclusion.

CHAPTER-II

THE EXPRESSIONISTIC ELEMENTS IN THE PLAY OF EUGENE O'NEILL'S'THE HAIRY APE'

Expressionism as an art-form was a movement that began in Germany before World War I. It is a revolt against '**realism**', by distorting objects, exaggerating, and breaking up time-sequences. It is less concerned with objective fact than with the external world as it appears to a troubled, sick or abnormal mind of a character. "**The Hairy Ape**", as well as "**The Emperor Jones**", of O'Neill, and "**The Adding Machine of Elmer Rice**" are 'expressionistic' plays. They use memory and dream-sequences, shifts in time, etc. to render inner reality.

Strindberg, the first dramatist to write 'expressionistic' plays ("**The Dream Play**", "**The Ghost Sonata**", **and** "**To Damascus**"- a trilogy, etc.), struck the keynote of the '**expressionistic**' theory of the theatre when he observed in his **Preface to The Dream Play** (1902) that in this play, "**Anything may happen; everything is possible and probable. Time and space do not exist. On an insignificant background of reality, imagination designs and embroiders novel patterns; a medley of memories, experiences, frees fantasies, absurdities, and improvisations.**" He rightly called this play **a dream play** because, as he declared, "**The author has tried to imitate the disconnected but seemingly logical form of the dream**".

Giving his own views on expressionism O'Neill once remarked, "**As I understand it, expressionism tries to minimize everything on the stage that**

stands between the author and the audience. It strives to get the author talking directly to the audience……The real contribution of the expressionist has been in the dynamic qualities of his plays. They express something in modern life better than did the old plays."

Expressionism is a dramatic technique which enables a dramatist to depict ·innerreality', the soul or psyche of his personages. The emphasis shifts from the external to the inner reality. The action moves backward and forward freely in space and time in harmony with the thought processes of the character concerned. There is a deeper and deeper probing of the sub-conscious, action is increasingly internalized, and what goes on within the soul becomes more important than the external action. "Instead of a dramatic sequence of events, there is a concentration on the stream of consciousness, the surface of life becomes disjointed, scattered, as in a dream, to suggest the inner reality which lies beneath the surface.

Not concerned with externals, the expressionist explores the idea, the source of conduct, until reality becomes sub-conscious, and character mere abstraction. Scenes are often brief; they sometimes succeed one another without time-sequence; they have neither order nor unity, and they suggest, as they alternate between reality and fantasy, between objective action and analysis, the disorderly, disconnected features of psycho-analysis."

Expressionism was imported from Europe to America; it was in vogue in Germany before the emergence of O'Neill. Expressionism demonstrates the artist's dissatisfaction from **naturalism** or **realism** which expresses only the surface reality. The expressionist wants to portray and present through outer symbols in reality.

Expressionism to drama is what the stream of consciousness is to modern fiction. The expressionistic playwright presents the condition and working of the mind of his characters and wants to show their **anger, sadness, sorrow, faith, sacrifice.** Characters to him are symbolic types of inner reality, man's mind and consciousness, his soul and consciences are his themes.

Expressionists make frequent use of soliloquies, asides, and interior monologues, to reveal the innermost working of the character's mind for the purpose of giving outward expression to thoughts and emotions which are normally unexpressed. They are also used by O'Neill to create depth and complexity of his dramatic techniques. He invariably employs soliloquy to unveil the self-communings of the characters in their most critical moments. He has also used the technique of thought-asides as a decisive break with realism. The asides are often said to represent the characters' subconscious minds. But they actually represent the characters' more or less conscious thoughts and their less unconscious urges.

O'Neill was a tireless experimentor who ever experimented with new methods and techniques. His early plays are realistic, in the plays of his middle period-**The Emperor Jones** and **The Hairy Ape**- he uses expressionistic methods. As **Isaac Goldberg** puts it, "O'Neill has yielded to neither the formlessness nor the incoherence of the more extreme Expressionist; even when his contact with external reality seems least firm; he yet maintains his grip upon the roots of things."

The methods of the German Expressionistshave also been effectively used by O'Neill in The Hairy Ape. In the opening scene of The Hairy Ape the setting has been realistically given. But the dramatist warns us, "The treatment of this scene, or of any

other scene in the play, should by no means be naturalistic. The effect sought after is of a cramped space in the bowels of a ship, imprisoned by white steel." Thus the realistic setting is intended to create an impression-here the impression of over-crowding –in the manner of an expressionist. The stokers have also been realistically described, "hairy-chested, with long arms of tremendous power, and low, receding brows above their small, fierce, resentful eyes.

All the civilized white races are represented, but except for the slight differentiation in color of hair, skin, eyes, all these men are alike. As O'Neill aims at unraveling the inner life of a man with its bewildering complexity, he seeks to create the characters that are living human being. In **The Hairy Ape,** Yank remains a man and everyone can recognize him as such. To O'Neill, every name is a symbol as expressive of the character's inner nature as his outward appearance. Almost every protagonist in the work of O'Neill considered himself a contemporary and not a disciple of the expressionists.

Few expressionists pay attention to form. Their plays are marked by looseness of construction and stylistic grotesqueness. They are also chaotic, hysterical and apparently meaningless. Most of the expressionists failed to impart unity to their plays. Lack of form caused pure expressionism to lose ground to the same degree as extreme naturalism against which it was a reaction. But Eugene O'Neill has yielded to neither the formlessness nor the incoherence of the more extreme expressionists. Each of his plays is well-knit and sharp in outline, solidly constructed from beginning to end. In his non-realistic and realistic plays, O'Neill demonstrates the acute sense of organic form which makes him a leader of American Expressionism.

The structure of the play, the pattern of the action, even the shaping of the dialogue always follow a strict design, usually devised for that particular play. The play opens in a ship's forecastle, the quarters for the crew located in the forward part of the boat. The firemen of the large ocean –going ship are all happily drinking, although there is discernible tension, indicating that the men are capable of violence at a moment's notice. One of the firemen, **Yank,** declares that beer is sissy and that he only drinks the "hard stuff". **Paddy** sings a song about whiskey. Yank yells at them, insisting that they are "dead". He says he wants quiet because he's trying to think.

Someone sings a sentimental song about home and Yank launches into a verbal attack of home, of emotional connections, and of women. **Long** claims they are all really living in hell and blames their miserable conditions on the people in first-class, "the damned Capitalist class. "Yank doesn't have the time or attention span for Long's talk of politics. He calls Long yellow and declares that all of the workers are better men than the people in first-class. **"Dem boids don't amount to nothing".** He gets the group riled up, drowning out Long's speech. Paddy reminisces about the old days, before boats had engines, when man and the sea and the ship became one. Yank says he's crazy, dead even. It takes a real man to work in hell he claims.

Yank sees his energy as what drives the ship. **"I'm steel,"** he says, ridiculing the idea that they are slaves. He dismisses Paddy as an outcast, a leftover from a previous page.On the promenade deck, young **Mildred Douglas** reclines in a deck chair with her aunt. Mildred says she wants "to touch life somewhere," although she has enjoyed the benefits of the wealth produced by her family's steel business.

Mildred, however, is intent on visiting the stokehole of the ship, to mingle with the common workers and experience their lifestyle. She has received permission from the ship's captain by claiming she had a letter from her father, the chairmen of the ship line, who requested that she inspect the vessel.

The second engineer escorting her to the stokehole question her white dress, since she might rub up against dirt or oil; Mildred replies she will throw it out when she comes back up because she has plenty of dresses. In the stokehole, the men are bare-chested, sweaty, ad dirty as they shovel coal into the massive furnace that peoples the ship's engines. The heat appears to be oppressive, close to unbearable. Paddy is exhausted. Yank ridicules him and brags about his own ability to face the furnace without tiring. He rallies the men as they put their energy into stoking the furnace.

At the height of their brute physical activity, Mildred and are shocked by her incongruous presence. Yank is oblivious to her and continues to work, shaking his shovel at the whistle.Mildred observes Yank's animal-like force and is appalled by it. Suddenly Yank sees her, sending a venomous, hateful glare at her. She swoons with fear, nearly fainting into her escort's arms. She asks to be taken away, labeling Yank a filthy beast. He is enraged at the insult and throws his shovel at the door through which she has exited.Yank, unlike the other fireman, has not washed himself after their shift.

The men are off-duty and entertaining them, while Yank sits, his face covered in coal soot, trying to figure out the previous events in the furnace room. The other men tease him, suggesting he's fallen in love with the stokehole's strange visitor. No,

he counters, the feeling he has for Mildred is hate. Long mentions that Mildred is the daughter of a steel magnate. Paddy suggests her visit was like a visit to the zoo, where they were pointed out as baboons. Paddy says it was love at first sight when she saw Yank, like she had seen a great hairy ape escaped from the zoo. He makes fun of how Yank threw the shovel at her exit. Yank seems to like the label "**Hairy Ape**" and imagines that his encounter with Mildred resulted in violence to her.

Long says he would have been punished for such an act, but Yank continues this fantasy, feeding his anger over the disparity in his and Mildred's social standing. As Yank shows signs of losing his temper and control, the others pile on him and hold him down. Paddy advises them to give Yank time to cool down before letting him up. It is some time after the ship's return to port, and Yank and Long walk down Fifth Avenue in New York, talking. Yank sees a group of wealthy people coming out of a church where they have been making relatively insignificant contributions to the needy. Yank verbally attacks this group saying they don't belong and bragging about his physical prowess, how people like him are the ones who make things work.

He challenges them to a fight. Before he can commit any physical violence, however, Yank is restrained by police, who arrest him. Yank is in jail, angry at being caged like an animal in the zoo. The other prisoners mock him. They ask him what crime he committed, suggesting a domestic argument. Yank explains the root of his anger-Mildred's visit to the stokehole-and his subsequent attack on the rich people. During his rant, he mentions Mildred's last name. The prisoners inform him that her father is president of the Steel Trust. One inmate suggests that Yank join a group of

labor activists, the Wobblies, whose efforts are aimed at exacting revenge upon **upper class** denizens such as Mildred and her father.

The inmate gives Yank information about the union. Yank gets very excited that a tangible solution to his problems has presented itself. He talks about the steel bars that are restraining him, imagining himself as a fire that will burn through them. His fervor becomes so intense that he bends the bars and has to be subdued by the guards. Yank shows up at the Wobblies (the nickname for the International Workers of the World) local union office. He asks to join but has to stop and think when they ask him his real name. The union members are happy to find a fireman from the shipping line who is willing to join their cause. They express an interest in organizing the line's other workers.

They want to know why Yank is joining. They ask whether he wants to change the inequality of the world with "legitimate **direct action**-or with dynamite." He responds that dynamite is the answer and indicates his desire to blow up the Douglas Steel Trust and its president. Quickly sensing that Yank is mentally unstable and dangerous, the union rejects his application. Out on the street, Yank becomes agitated repeating his belief that there is no place where he truly belongs. A pair of policemen chastises him, believing him to be a drunk.

Yank visits the monkey house at the zoo. He talks to the animals about his experiences in the city. One gorilla responds by pounding on his chest, and Yank decides that they are members of the same club, the Hairy Apes. He wonders how the animals feel, having people look at them in a cage and make fun of them. Pondering the similarities in his and the animals' situations, Yank is so moved that he pries the

cage door open. As the gorilla exits, Yank tries to exchange a secret handshake with his newfound friend. The gorilla grabs him in a crushing hug. Yank drops to the ground and, as he dies, realizes that he doesn't even belong with the hairy apes. The monkeys jump and chatter about the stage.

In an expressionistic play, the number of characters is cut down to the minimum. The attention is focused on **'the central figure'**, and the other characters are not individualized. They serve merely as a background to throw into sharp relief the central figure. Thus in **The Hairy Ape,** the other stokers are merely a chorus of voices. Except Paddy and Long, they have not even been given any names. Similarly, the prisoners in the prison-scene are mere nameless voices. The denizens of the Fifth Avenue are presented merely as a mechanical procession and the **Secretary of the I.W.W.,** and the other people in its office, are equally lacking in individuality. This enables the dramatist to focus on the obsession of Yank and what goes on within his soul.

As **Clifford Leech** points out the dramatic personages in an expressionistic play may be juxtaposed, but there is no elaborate development of their relationships. Thus Yank and Mildred confront each other only for a moment, but that one moment is enough to play havoc with the soul of Yank. "With the smallest number of characters expressionistic plays manage to create relationships and situations required for the communication of the central psychological attitudes. Mildred and Yank face each other only once but the impact of the one on the other and on the audience is complete. Similarly, just one scene is enough to present Paddy in The Hairy Ape as a sentimental, nostalgic character out of tune with his present. The secretary of the

I.W.W., the policemen, the gorilla-all appears for a few moments, but they leave indelible impressions on the mind."

The characters express themselves briefly, often in monosyllables. Their conversation is symbolic of their attitudes and revelatory of what is passing within their souls, their agitation, bewilderment, confusion, obsession, etc. The dialogues are pared down-the language is clipped-so that they become symbolic not only of particular mental attitudes but also of the basic feelings of man in the mass. "Certain expressions are frequently repeated, not only to emphasize lack of sophistication, but also to derive home to the audience the obsession of these characters. Such expressions as **"I belong"**, **"I'll fix her"**, **"I'm the end"**, **"That's me"**, **etc.** work like motifs to establish the fact that basically Yank's unsophisticated mind is guided by only a few ideas".

Further, the scenes are short and the number of scenes is cut down to a minimum, each scene being a further stage in the deeper and deeper probing of the central figure's consciousness. These scenes are not logically related nor sketched with the completeness of a realistic play. Much is left to the imagination of the audience, and the connections between the scenes are emotional and logical. In this way the action is speeded up; this explains why an expressionistic play is much shorter than a realistic one. Consequently the scenes from a series in which incidents are singly displayed. It is just like staccato effect, which sometimes become monotonous and deadening." This also accounts for the shortness of The Hairy Ape as of other expressionistic plays.

The entire action of the play is focused on the consciousness of Yank, the central figure, the only living personage in the play. The dramatist has exploited the technique of the, **"interior monologue"**, to lay bare the suffering, anguished soul of Yank. The long monologue of Yank after he has been thrown out of the I.W.W. office is a clever piece of psycho-analysis. Yank is bewildered and confused, and his mental confusion has been skillfully rendered. He had come to the I.W.W. with the conviction that he belonged to it; now his conviction receives a rude, shattering shock, a shock which is too much for him. He finds that the I.W.W. is the conventional woman's stuff, which would like to feed and dress his body and give him shorter hours of work. But the thing which hurts him is not in his belly, it is deep down at the bottom, and the I.W.W. cannot touch him. In other words, his suffering-and that of the modern worker-is spiritual and not physical, and it is the spirit which is being ignored in the modern mechanized age. Man has been degraded and de-humanized. He has been reduced to a machine, merely to a thing of steel.

Yank: **I'm a busted Ingersoll, dat's what. Steel was me, and I**

      Owned de woild. Now I ain't steel, and de woild owns

      Me. Aw, hell! I can't see-it's all dark, get me? It's all

      Wrong! Say, youse up dere, Man in de Moon, yuh

      Look so wise, gimme de answer, huh? Slip me de

      Inside dope, de information right from de stable

      Where do I get off at, huh? (THA, p 13)

He belongs neither to earth, nor to heaven. The proper place for him might be Hell. He might belong there. The eighth scene of the play is one long monologue, the gorilla in the cage being the only interlocutor. It is an admirable study of Yank's

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thought-processes and it fully brings out the disintegration of Yank's personality. Carried away by his obsession, Yank sees himself as a hairy ape. He addresses the gorilla as a **'brother'** and thinks that they both belong to the same club, the club of **'the Hairy Apes'**. Obsessed with the idea of revenge, he is no longer capable of any reasoning or rational thought. His mind has been thrown completely off the balance. The gorilla at least belongs to nature, but Yank does not belong even to that beautiful world. He belongs to the world of man, but he has been rejected and thrown out by that world. He would like to have his revenge on that rejecting world. He lets the gorilla out of the cage, shakes hand with it, intending to take him to Fifth Avenue and with his help have his revenge on the class to which Mildred belongs. But the gorilla crushes him to death, and as he dies he mutters in deep anguish,

> Yank: **Even him did not think I belonged.**
>
> **Crist, where do I get off at?**
>
> **Where do I fit in? Aw, what de hell!**
>
> **No squawkin', see! No quittin', get me!**
>
> **Croak wit your boots on!**
>
> (THA, P 60)

Alienation and isolation, is the common lot of man in the modern industrialized and urbanized society, and the full horror of the contemporary predicament has been forcefully expressed by the use of the technique of the **"interior monologue"**, a technique which has been exploited with such advantage by modern novelists, like James Joyce.

The Hairy Ape is an expressionistic play, but O'Neill's expressionism is based on reality. The play does not have the complete formlessness of the

expressionistic plays of the contemporary German and Scandinavian dramatists. There is no total decay of plot and character. First Yank sees the rich in their Sunday clothes; then he is a prisoner; then he moves outside society's institutions and seeks refuge with the anarchists, the declared enemies of society; then he goes to the zoo. All the time he is moving further away from the world of Mildred Douglas who rejected him; if not there, he must find a lower place where he may **"belong"**.

Though he has used the speed technique of the German expressionists, "he has not telescoped time and place". The action does not move backward and forward in time, nor does it ranges far and wide in space, but follows a continuous forward movement, each scene being a well-defined stage in the psychological retracing in Yank's consciousness of the various stages in human evolution. O'Neill has skillfully avoided the extremes of expressionism and maintained the coherence and integrity characteristic of a realistic play. As O'Neill himself once asserted, he has used the expressionistic technique in the play, "but the character of Yank remains a man everyone recognizes him as such".

According to the present research The Hairy Ape is observed to be an expressionist theater. With expressionism O'Neill portrays life not as he or his characters sees it to be. Expressionism has frequently gotten itself associated with social concerns. It likewise regularly delivers itself to a future, which might possibly ever be knowledgeable about the work. This approach is regularly observed as critical in that it generally discovers society to have genuine blemishes, yet most expressionist theater offers some expectation for development in spite of the fact that a character, for example, Yank does not receive the rewards of such change. Yank after his frustrated I.W.W. experiences, O'Neill wrote, "Resolves he'll blow down a

section of wall-and immediately an army of workers rebuilds the wall up before his eyes.

O'Neill's use of expressionistic techniques really is original because the play is not all expressionist as he said in 1922, nor it is a conventional progression from a representational frame story into the subjective reality of the protagonist. In The Hairy Ape O'Neill used expressionist technique skillfully, although here he used it only episodically. O'Neill insisted that he came up with the techniques that are associated with the expressionism independently of the Germans. The Hairy Ape is an expression of social protest; the protest is specific and the language incisive. Furthermore, O'Neill makes the very effective experiment of changing the expressionist focus in this play.

In the stokehole scene, the ape like traits of the workers are seen through Mildred's distorted and neurotic vision; in the Fifth Avenue scene robot like characteristics of the leisure class are seen through Yank's equally distorted vision the scene has become a classic example of expressionist technique O'Neill made occasional use of the technique in subsequent plays. His most effective use of it is in The Hairy Ape and The Emperor Jones.

The Hairy Ape's aesthetics are a dialect between expressionism and realism that O'Neill's fundamental theme in the play, Yank's inability to "belong". The trope of the cage is repeated in the scene in the jail that follows and once again the figure of Yank as the thinker contrast with the dehumanizing environment in which he has been put in the zoo. The penultimate scene, in the I.W.W. headquarters is a return to the representational as Yank interacts with the men on an equal basis.

Loss of familitise is another feature of expressionism as per as The Hairy Ape is concerned; we find that there is no reference about the family of Yank. He is living with other stokers and least bother about his family. He considers his ship as his own home and fellow workers as his family members. So through Yank, O'Neill has depicted the loss of familitise after WWII. Talking about the psychoanalytical technique, which is one of the elements of expressionism used in The Hairy Ape. The action of the play is more internal than external. What is happening in the mind of Yank and Jones is more important than any other factor.

CHAPTER – III

THE EXPRESSIONISTIC ELEMENTS IN THE PLAY OF EUGENE O'NEILL'S 'THE EMPEROR JONES'

The Emperor Jones takes place on an island in the **West Indies** and opens in the elegant throne room of the island's ruler or **"emperor"**, **Brutus Jones.** It is late afternoon and no one is present except for an old black peasant woman sneaking through the palace. A white trader named **Smithers** enters and interrogates the woman, asking her why the palace is deserted. Smithers learns that the natives of the island, led by a former native chief named **Lem,** have stolen all the horses and have headed to the nearby hills to plan a revolt against their oppressive emperor.

When the **Emperor, Brutus Jones,** enters, Smithers gradually reveals this news, but Jones remains calm. He arrived on the **United States,** where he had worked as a **porter** on a fancy **Pullman** train before going to prison for killing a man named **Jeff** over a craps game. Escaping prison, Jones had come to the island and found Smithers cheating the black natives with his trade goods. After briefly joining Smithers as an associate, Jones eclipsed Smithers and named himself **Emperor.** Convincing the natives that he had magical powers and could be killed by a silver bullet, Jones felt secure. He continues to feel secure in the face of this native revolt because he has carefully planned a response to it. He has money stashed in a foreign bank account, an escape route through the woods mapped out in his mind, and food buried at the edge of the forest. Jones has even made for himself a good luck charm out of what he thinks is the only silver bullet on the island.

But as Jones outlines his escape plan to Smithers, a drum begins to beat in the distant hills, and Jones is initially startled by it. Smithers informs Jones that the natives have begun a war dance to work up their courage for killing their "emperor" Smithers tells Jones that the natives will send ghosts after him into the dark forest, but Jones asserts that he's not afraid of ghosts and that by nightfall he will have gotten such a head start on Lem's troops that they will never catch up to him. At 3:30 in the afternoon, Jones casually sets off on foot for his getaway through the dense forest.

Night has fallen sometime after 6:30 pm, and Jones has reached the edge of the dense forest. Fatigued from his afternoon hike in the hot sun, Jones rests, listening to the steady beat of the drum, pulsating at a little more than 72 beats a minute, the rate of the normal heart beat. However, Jones can't find the food he so confidently hid near this spot. As he lights a match to see more clearly, the rate of the drum beat increases and "the Little Formless Fears"-hallucinations that represent Jones's rising doubts-slide silently out of the darkness like black, shapeless grub worms "about the size of creeping child." When the Formless Fears laugh at Jones's consternation, Jones notices them, pulls his pistol, and fires. In a flash, the Formless Fears are gone, and the drums begin beating more rapidly. Jones reassures himself and hurries into the dark forest.

It is 9:00 at night and the beams of the newly risen moon create an eerie glow on the dark forest floor as Jones enters a small triangular clearing. There, the figure of black Jeff, the man Jones killed in a crap game in the United States, seems to be mechanically throwing dice. Jones enters the clearing, his face scratched and his elegant clothes torn from forcing his way through the thick underbrush in the dark. He

hears the increasingly rapid beat of the distant drums, sees Jeff, and fires another shot. The hallucinated image of Jeff disappears with the pistol shot and Jones leaves the forest path to plunge wildly into the underbrush.

It is an hour before midnight and from the forest Jones stumbles onto a wide dirt road running diagonally across the stage. His uniform is now ragged and torn, and he begins to discard parts of it to ease himself from the stifling heat. Exhausted, he throws himself down to rest but soon begins to hallucinate again. A small gang of black convicts in striped suits are working with picks and shovels. The white prison guard, armed with rifle and whip, demands that Jones join the convict group, and for a moment the nearly hypnotized Jones does. But when the hallucinated guard beats him, Jones responds by trying to hit the guard with his imaginary shovel. Realizing his hands are actually empty, Jones fires another shot from his pistol and all the imagined figures disappear. Jones plunges again into the forest, the drum beats increasing in volume and rapidity.

It is an hour after midnight and Jones enters a large circular clearing and sits on a dead stump. In his exhaustion and misery, Jones hallucinates again and sees the stump as an auction block from the 1850s where a crowd has gathered to watch slaves bought and sold. When Jones becomes the slave being auctioned off, he fires at the auctioneer and planter trying to buy him, once again causing the images to disappear. Again Jones plunges into the forest as the drum beats quicken and increase in volume.

It is 3:00 in the morning and in a cleared space no more than five feet high under dense tree limbs Jones settles for another rest. The moonlight is shut out by the canopy and only a "vague, wan light filters through." Jones's silver bullet is all that

remains in his gun. His clothes have all been torn away and what remains is no more than a breech cloth. Gradually, two rows of seated figures appear behind Jones in his next hallucination. The small space in the forest becomes a ship at sea and Jones a member of a slave group being carried to the new world. As this hallucination fades, the drum begins to beat even louder and quicker.

It is 5:00 in the morning and at the foot of a gigantic tree near a river Jones imagines an African witch-doctor dancing and chanting before him. As the drum beat reaches a frenzied pitch, Jones is hypnotized by the Witch Doctor's performance. He begins to sway with the shaman and joins in the chanting. At the culmination of the dance, the Witch Doctor indicates that Jones must be sacrificed to the sacred Crocodile River god, but Jones rouses a final defiance and fires his remaining silver bullet into the crocodile apparition.

It is dawn and the final scene takes place in the identical spot at the foot of the forest where Jones started his journey in Scene II. Lem enters with his small band of soldiers, followed by Smithers. They examine Jones's tracks, Smithers complaining that they have wasted their evening beating the drum and casting spells, Lem confident that they will still "kotch him". The sound of snapping twigs in the forest alerts the soldiers and they shoot Jones, who has simply run in a circle all night. The sound of the drum abruptly ceases and Lem reveals that part of the evening's ceremonies involved making their own silver bullets from melted coins. The soldiers show Jones's dead body and exit, leaving Smithers to sneer at "the lot of 'em".

As J.W. Marriott rightly points out,"a realistic play is based upon superficial observation of detail- a mere photography: but expressionism has been likened to X-

ray photography." Expressionistic method is used when the dramatist aims at a probe into the unconscious. In naturalistic or realistic plays, speech and action are used to give an idea of the working of the mind, but the method is inadequate because speech does not invariably reveal the working of the mind. Speech many a time is used to conceal rather than reveal the thought. No human being wants to be seen for what he really is. This is why an expressionistic play-wright depends for correct understanding of human psyche on slips of tongue, dreams, and informal moments of the concerned character. In order to help the audience to understand the inside of a character, the expressionist uses symbols, metaphors, fables and allegories. He produces blurred figures on the darkened stage to personify good or bad motives. In short, the expressionist uses the disconnected, distorted and fantastic form of a dream in order to approximate as closely as possible to the stream of consciousness of the given character."

The Emperor Jones was the first play in which O'Neill used Expressionistic technique to express the psychological terrors and obsessions of Brutus Jones, long before he had heard of Expressionism or had read the expressionistic plays of Strindberg. The Emperor, once he has fled the palace-the first step in his fear, despite all his bluster, which was a sign of fear in the first place-wanders through the forest in rapid regression to primitivity. The tom-tom effect is remarkable, and is the culmination of O'Neill's natural response to such sensory stimuli. This is no more sound accessory, as it is in the early plays, with their fog whistles, their raindrops, their whining children, and the whirl of the wireless. The tom-tom is part and parcel of the psychological action; at first it is the call to war; then it merges into the Emperor Jones' vision of the slaves working to its beat; finally it becomes his own

throbbing, ferverish temples, and all the while it is our heart beating more and more rapidly as we follow his fate."

The play is one long soliloquy, practically. But fear talks much to itself. The visions that rise before his eyes are such as fear beholds, and truer to genuine reality then would be a blank stage. It is the surge of the Emperor's speech that makes these spectres lives for us as they do for him. Here symbol and psychology merge: analysts have found it a remarkable study, fundamentally as true of the white man as of the black; the Emperor Jones is, in addition, or simultaneously, an unobtrusive symbol of men vain boast of power." In short, **The Emperor Jones** is a gripping play which would not have been possible without the use of expressionistic techniques.

In **Emperor Jones** the attention is focused throughout on Brutus Jones, and the other characters are merely background figures. Thus Smithers serves as a foil to the Emperor and the slaves in the auction scene, the galley-slaves, the group of convicts led by the prison guard, are merely visions from his past intended to externalize the psychological terrors of the Emperor and his disintegration and regression under the impact of fear. They have no life and reality; they are merely illusions of a fevered and agitated mind.

In an expressionistic play, the dramatist makes extensive use of symbols to render inner or psychological reality for which the resources of the ordinary language are not enough. O'Neill, too, has used symbols for this very purpose in the present play. To cite only a few examples: Brutus Jones symbolizes the irrational and brutish in every man; the silver bullet is the symbol of his pride, and it also stands for worldly wealth and greed for money, the dark and dense forest symbolic of his escape from

his own self, from the memories of his criminal past: his divesting himself one by one of the trappings of emperor hood is symbolic of his regression to his racial past, i.e., to an uncivilized negro.

In order to render the inner terrors of the chief protagonist, O'Neill has made extensive use of interior monologue. There is conventional dialogue only in the first and last scenes of the play. The remaining scenes i.e. Scenes ii to vii which take place at night in the forest are extended pieces of monologue. They are in the nature of long soliloquies. It is through this expanded use of interior monologue that the dramatist has given us a peep into the anguish of the terror-stricken soul of Jones.

Jones: **Mercy, Oh Lawd! Mercy! Mercy on dis po' sinner.**

        Mercy, Lawd! Mercy!

        Lawd, save me! Lawd Jesus, head my prayer!

        De silver bullet! You don't git me yit!   **(TEJ, P 184)**

He prays to god for his mercy and protection, as his criminal past confronts him in the form of visions from his "personal sub-conscious, and later he is made to realize his oneness with the natives over whom he had tyrannized through racial memories which lurk still deeper down in his sub-conscious. Jones' stream of consciousness makes us fully aware of his spiritual disintegration and regression, and it is highly effective on the stage. Here is a soul in turmoil and the audiences are fully involved in this turmoil."

An expressionistic play is usually formless and chaotic. The action moves back ward and forward in time in keeping with the thought process of the chief

protagonist. However, O'Neill has skillfully avoided this pitfall of the expressionistic play. **Indeed, realism is the basis of O'Neill's expressionism.** Scene I and scene VII consist of realistic dialogue. Scene I give us details of the past of Jones essential for an understanding of his present. The last scene, again a piece of realistic dialogue, gives an account of his death, and the different reactions of Smithers and the natives. It is explained to us through Lem that the natives had been casting spells all the night, and that they had also moulded silver bullets. The tom-tom continued to beat at one place though it seemed to Jones that it was coming nearer and nearer to him.

Scenes ii to vii which take place at night in the forest are expressionistic. But even in these fantasy scenes the movement is straightforward. O'Neill writes with an eye on the clock, and the passing of time is clearly indicated. Each scene is a further step in the spiritual decay and regression of Jones, and the end of each scene is marked by Jones' firing a bullet. Indeed, there are as many bullets in his revolver as there are scenes and in each scene some vision from his "personal unconscious"or his "collective conscious" is presented, and the vision disappears as soon as a bullet is fired. Jones' spiritual regression goes side by side with his divesting himself, one by one, of the trappings of emperor hood and the thin veneer of western culture. By the end, not only has Jones regressed spiritually to his primordial self, physically also he has achieved total identity with his race.

Edwin Engel writes, "After the first scene, the action occurs between dusk of one afternoon and dawn of the following day in, or on the edge of, the Great Forest. The successive episodes are synchronized with Jones' revolver, the chamber of which contains approximately as many cartridges as there are scenes; as the gun is discharged, the scene changes, approaching the point where the sixth bullet, the silver

one, coincides with the completed reversion to savagery. The beating tom-tom, also serves as an important unifying factor, symbolizing as it does the pervasive and inescapable presence of the primitive. Together with the revolver, it governs the inexorable movement towards the primeval, spatially and temporally. For the tom-tom beats in the camp of the 'bush niggers'to which Jones is helplessly dawn, and it beats in Jones' body, representing the primitive blood which charges through his arteries. When he is finally killed with a silver bullet, the tom-tom instantly ceases."Thus the internal and external actions have been fully synchronized and the formlessness and chaos of the usual expressionistic play has been skillfully avoided.

In short, "The Emperor Jones is the greatest of American plays in the expressionistic mode." As Mary T. David puts it, "the story of the flamboyant Negro, enacted to the frenzy of the tom-tom, the sustained monologue and the rapidly shifting setting framed into one single desperate action, were all unique features that made the play an instant success."

According to the present research The Emperor Jones is observed to be an expressionist play with offstage drums pounding the mood of the show. The Emperor Jones symbolizes the fall of current man in the wilderness that is contemporary society. Brutus Jones, an African American dozing auto watchman who has been detained in the United States in view of a battle, has gotten away to an island in the West Indies, where probably on account of his insight, incredible physical quality and more extensive learning, he has made himself ruler of an island amid an upheaval. Jones has designated an unsavory white merchant, Smithers, as his guide. Jones turns into a despot; however he has persuaded that the local individuals that silver slung can just slaughter him. Obviously, this is the way he kicks the bucket at last. A

progression of imagination scenes advances the showiness of the dramatization. The play is likely to be offending modern sensibilities through its implicit racism, but certainly O'Neill chose a black man primarily because his story is so effectively dramatized. It would be difficult to find as clear a set of symbols of historical regression for a white character; Jones' fall is like Icarus' is a metaphor for the inability of any man to escape the limits imposed on him by the human condition. The expressionistic devices O'Neill employs make an experience this fall from within the character, and thus recognize a common truth, rather than allowing us the luxury of distance and dissociation.

The Emperor Jones is a remarkable tour de force, both as drama and as an exposition of expressionist technique. With the exception of the first and the last scenes, which Smithers is an independent intelligence, the play is pure expressionist. All the actions are the projections of Jones' mind this perfect exemplification of the expressionist manner contains no trace of the hysterical schrei of the social indignation or the fuzzy, elliptical language that characterized the German expressionism. Thus The Emperor Jones is a psychological study. In The Emperor Jones O'Neill makes an extensive use of symbols to render inner or psychological reality for which the resources of the ordinary language are not enough. Brutus Jones symbolizes the irrational and brutish for common riches and covetousness for cash. The dim and thick woodland symbolizes the internal obscurity and perplexity of Jones. In order to render the inner terrors of the protagonist, O'Neill used interior monologue, which is one of the major features of expressionism. There is conventional only in the first and last scenes of the play. The remaining scenes i.e. scenes ii to vii which take place at night in the forest are extended pieces of monologue. They are in the nature of long soliloquies. It is through this extended use

of interior monologue that the dramatist has given us a peep into the anguish of the terror stricken souls of Jones. Indeed, realism is the basis of O'Neill's expressionism. Scene I and scene VIII consist of a realistic dialogue. Scene I gives us the details of the past of Jones essential for an understanding of his present.

Smithers : **Haw-haw! If yer don't beat all 'ell!**

I'll bet yer it ain't 'im they shot at all,

Yer bleedin' looney!

Lem: **Dey come bring him now. Well, they did for yer rightenough,**

Jonsey, me lad! Dead as a' erring! Where's yer 'igh a mighty

Airs now, yer bloomin' Majesty? (TEJ, P 188)

The last scene, again a piece of realistic dialogue, gives an account of his death, and the different reactions of Smithers and the natives. In this play he has used different unseen voices with telling effect. Throughout the six forest scenes we hear a number of unseen voices. In scene ii, we have the fateful voices of the great forest, broken only by the moaning of the wind and the mocking laughter like a rustling of leaves of the little formless fears. The description of these voices is an adequate expression of Jones' primitive, superstitious nature under the pressure of guilt-ridden fears. In the last two visions the "haunts" are not only seen but are also heard and they are heard as plaintive human beings. Jones joins them in their wail, which express suffering and which reaches an unbearably acute pitch until it is succeeded by the silence of death.

CHAPTER-IV

CONCLUSION

In the end we may conclude that The Hairy Ape can be called the expressionist tragic comedy of modern industrial unrest. As the play contains many elements of expressionism like use of masks, symbolism, destructive illusions, loss of familitise, psychoanalytical technique, use of metaphors and heightened language etc. The long monologue of Yank, covers up the entire scene, gives a terrifying picture of a soul in agony. His suffering is symbolic of the suffering of an alienated soul in the contemporary world. The Hairy Ape is a forceful statement of the predicament of modern man. The title of the play is apt. It suggests the theme of the morbid obsession of Yank with the insult that has been heaped upon him and the consequent disintegration of his personality.

Alienation and search for identity is also the basic concept of the play. In the beginning, Yank seems confident and proud of his superior strength. He is in perfect harmony with his work. Yank is isolated the extent that any family associations are concerned. It is not work that Yank is looking for. What Yank needs is to realize that he "has a place"? He needs to discover what it is that has happened to the world, which isolates him from the acknowledgment that what he is doing is a fundamental and a fitting some portion of the life of the world. In short, The Hairy Ape dramatizes an important aspect of the human predicament in the machine age.

Man does not live by bread alone, spiritual health and wellbeing is also necessary. Man can be lonely even in a crowd. The tragedy of Yank is the tragedy of

millions in the modern age. The dying words of Yank are: "Ladies and gents, step forward and take a slant at de one only-(his voice weakening) - one and original-Hairy Ape from de wilds of-(He slips in a heap on the floor and dies. The monkeys set up a chattering whimpering wail. And, perhaps, The Hairy Ape at last belongs).

The Emperor Jones found to be an expressionist play from my research. O'Neill used expressionistic technique to express the psychological terrors and obsessions of the Brutus Jones, long before he had heard of expressionism. It is a complex work of art suggestive of a number of themes and ideas. It is the first serious play about a Negro, an expression of the so-called Negro renaissance-a revival of interest in the primitive, consequent upon the rise of romanticism both in England and America. This play is O'Neill's mastery of expressionistic technique. Expressionism is a concerned with the representation on the stage, in a concrete manner, of what happens in the mind of the soul of the character under the stress of external incidents and circumstances.

The Emperor Jones is very good example of the expressionism. Its action takes place in the mind of the protagonist. The little nameless fears are the projections of his terror, and the next two apparitions conjured up are the victims of his own past crimes, while the last scenes, take us farther back into the past of the negro race, with its memories of the slave auction and witch-doctor. This play is not however purely expressionist. It mixes realism with expressionism. The play in fact charts a difficult course between expressionism and realism. Till the death of Jones the audiences are carried away on a wave of expressionism.

Basically, it is a story of the flamboyant Negro, enacted to the frenzy of the tom-tom, the sustained monologue and the rapidly shifting setting framed into one single desperate action, are all unique elements which made the plat an expressionistic. Throughout the play, all the scenes are sustained pieces of dramatic monologue. Through these monologue of the ex-emperor, his tortured and anguished soul is laid bare before the readers. They are clever pieces of psychoanalysis such as had never before been presented on the American stage. Throughout the play we are concerned with what is passing in the mind of Jones; our involvement in his spiritual plight is total.

We do get involved as we share the emotions of the terrified Negro in the spirit of the participation mystique but panic is by no means the substitute for tragic exaltation. In fact O'Neill has reversed the tragic process instead of going up the spiritual ladder, we go down. The regression of Brutus is akin to Lear's stripping, but Lear gains spirituality what he loses psychologically. Instead of revealing the nobility and grandeur of the human soul. The Emperor Jones shows that the man is essentially a beast and that his progress in civilization has made him a bundle of nerves. His evolution is backwards, it is regression.

In The Emperor Jones and The Hairy Ape O'Neill uses expressionistic methods completely abandoning his earlier realism, the greatness of O'Neill as a dramatist lies in his combination of realism and expressionism. He fused naturalistic detail with symbolist mood, suggestiveness and symbol. He resorted to the expressionist dramatic style of distortion of action, speech and scene, as in the weird eavalry of his Emperor Jones through the jungle and in the fifth avenue scene of The Hairy Ape. Throughout The Hairy Ape the attention has been focused on the soul of

Yank, and expressionistic technique has used to reveal his spiritual loneliness, frustration and disintegration. The real action of the play lies in the spiritual regression of Yank from Man to The Hairy Ape.

On the other hand The Emperor Jones is an expressionistic play with formless and chaos. The action moves backward and forward in time in keeping with the thought processes of the chief protagonist. In this play O'Neill has achieved a remarkable synthesis of symbol and dramatic action, of the inward and the outward. Brutus Jones emerges as a gigantic universal figure whose terror strikes, a responsive chord in the hearts of all. We are all involved in his fate; he moves every one of us.

The Emperor Jones is a one-man play, and in Brutus Jones we have a powerful dramatic characterization of an individual destroyed by two conflicting impulses in this nature. There is on the one hand the arrogant, flamboyant, self-confident Emperor, contemptuous of the servility and superstitiousness of his own race, his head filled with the conviction that "for de big stealin' day makes you Emperor and puts you in de Hall o'Fame when you croaks," a lesson learned "in ten years on de Pullman ca's listenin' to de white quality talk"; on the other is the bewildered, frightened Negro, victim of his past, both racial and personal.

The Emperor Jones is the first of O'Neill's frankly experimental plays, and while his exploration of expressionistic techniques can probably be attributed to several factors, one of the most important is certainly that it permitted him to explore inner conflicts with greater flexibility and clarity. The essential realism of the early plays allowed for the use of symbolism; but, as we have seen, such "inanimate actors" as the sea and the fog, or visual symbols in the setting, such as the dark ring of hills,

too much throw the emphasis on a struggle between the individual and some element in life outside himself.

The "visions" in The Emperor Jones, which are neither hallucinations nor projections of Jones's thoughts, reveal the inner springs of his nature as they come in conflict with his assumed, outward character. But the role is not consciously "put on"- Jones thinks of himself as a bold and unscrupulous exploiter, albeit a fraudulent emperor-nor is he at all aware of the impulses which finally destroy him. Since he is dealing with hidden, subconscious elements in man's nature, O'Neill doesn't beat around the bush, trying to slip sly hints into a realistic medium, but presents them directly and dramatically.

There are in the play several dramatic devices, almost inanimate actors, which are external to Jones and which do not pertain directly to his nature. But the pulsating rhythm of the native drums, which dominates the action, rapidly becomes a tangible projection of Jones's rising panic-a fact that has led some commentators to see the play simply as a study in the effect of fear on a half-civilized Negro. There is the brooding, mysterious Great Forest in which Jones loses himself to find himself. It is not just a place where something happens to Jones; it is part of what happens to him, a primeval, elemental force which literally and figuratively strips him of the superficies of civilization.

This is not a play about fear; panic is simply the "acid test" which reduces Jones to his essential Nature as Man. Nor is Jones's race important; it is simply that, in the Negro, man's journey from savagery to "civilization" has been tremendously foreshortened. The play is in essence, the story of "the failure of science and

materialism"- the values implicit in "de white quality's society"-to give any satisfactory new (God) for the surviving primitive religious instinct to find a meaning for life in, and to comfort it fears of death with."

It would be foolish to suggest that all or even the majority of O'Neill's plays can be fitted into some neat and air-tight formula or even that they are all "about" the same thing. Nevertheless, many of them possess a basic pattern not unlike that of The Emperor Jones. Man having lost the faith in life and the sense of belonging which were once the concomitants of his primitive oneness with nature, is cast adrift in a storm of conflicting and mutually destructive impulses with no solid faith, no courage of his convictions, no stable set of values to give direction or meaning of them. And, as in that play, the technical devices which O'Neill chooses to employ are his attempt to reveal as directly as is possible on the stage, both this disassociation or antagonism between man and the world in which he finds himself, and the inner conflicts which this disharmony leaves him prey to.

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