Preparing birnessite-type MnO_2 Electrode to enhance the supercapacitor behaviour and its characterization

Prabhavathi R*, Subitha A, Magara Jothi Lakshmi S*** and Ahila M******

Department of Physics

Sri Sarada College for women, Tirunelveli-627 011

E-mail ID: *Prabharavi111998@gmail.com, **subimphil@gmail.com,

***jothisankar1633@gmail.com, ******ahilam.ahila@gmail.com

Abstract: *Manganese dioxide (MnO_2) nanoparticles were synthesized by co-precipitation method which is the simple way to prepare in aqueous solution. The prepared samples were characterized using various techniques such as XRD, Raman spectrum, UV-DRS and FTIR. The average crystallite size of MnO_2 nanoparticles was calculated from the XRD study. The crystal structure of MnO_2 is also supported by Raman spectrum due to molecular vibration. The band gap energy for $MnO_2$was found using UV-DRS and Tauc plot. The FT-IR spectra of MnO_2 showed the peaks corresponding to stretching and bending vibration. In future, it will be applied to the potential applicationin the field of electrode materials in different rechargeable batteries.*

Keywords: *MnO_2, Co-Precipitation method, RAMAN and FTIR analysis.*

Introduction

Manganese oxide is an inorganic compound with the formula MnO_2.It is an important metal oxide, which is technologically attractive for application in different fields such as absorbent of toxic metals, ion-sieves, molecular-sieves, artificial oxides, component of the dry cell, inorganic pigment in ceramics, electrodes for electrochemical batteries electrode for supercapacitor [1,2,3].Elsa Cherian et al [4] synthesised MnO_2nanoparticles with controlled particle size by co-precipitation method with the help of salt such as sulphatesandNaOH.In the article of S. Zhu et al.[5],MnO_2 nanoparticles was synthesised by sonochemical method and resultant nanostructures were characterized by transmission electron microscopy (TEM), nitrogen adsorptionand X-Raydiffraction (XRD). MnO_2 incorporate into carbon delivered an improved discharge performance of 223 mA h g^{-1} at a relatively high rate of 1 A g^{-1}. There are a lot of methods to prepare or synthesize MnO_2 nanoparticles. One of the methods is the conventional co-precipitation method which had been widely used because it is cheap and affordable. Crystal structure of MnO_2 is shown in Fig. 1. Its physical and chemical properties are tabulated in Table: 1 and crystal structure details are listed in Table: 2.

Table:1 Physical and chemical properties

Properties	
Chemical formula	MnO_2
Molar mass	86.9368 $g.mol^{-1}$
Appearance	Brown-black soild
Oder	Odourless
Density	5.026 g/cm^3
Melting Point	535ºC
Atomic number	2
Solubility in water	Insoluble
Band gap	2.16 eV
Point group	4/mmm
Magnetic Susceptibility(x)	$+2280.0*10^{-6}cm^3/mol$
Specific Gravity	5.0
Refractive index (n_D)	2.4764 s

Table:2 Crystal structure details

Structure	
Crystal Structure	Tetragonal, tP6
Space Group	$P4_2/mnm$
Lattice Constant	a=4.5333

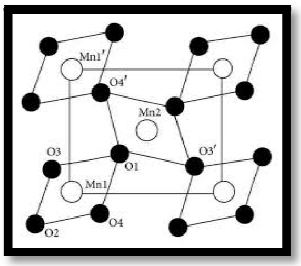

Fig. 1: Crystal structure of MnO_2

In this work, birnessite-type MnO_2 nanoparticles were synthesised successfully by co-precipitation method. Its structural properties were analysed through XRD and Raman. Appropriate optical properties were discussed through UV-DRS. The vibrational modes of functional group were present in the prepared samples discussed through FTIR. At last, suitable properties are amalgamated to supercapacitor application.

Materials and methods

All chemicals used were analytical grade. MnO_2 nanoparticles were synthesized by co-precipitation method. 1M manganese sulphate ($MnSO_4.H_2$) and 2M sodium hydroxide (NaOH) were used as reactant materials. Freshly prepared aqueous solution of 2M NaOH was added drop by drop to $MnSO_4.H_2O$ solution. The solution was stirred continuously at 60°Cfor 2h to precipitate the nanoparticles. Then, the precipitate was separated from the reaction mixture and washed several times with deionized water and dried in hot air oven at 120°Cfor 24h. Finally, dried samples were annealed at 500°C for 4h to enhance the crystallinity. Fig.2 shows the flowchart of overall work carried out.

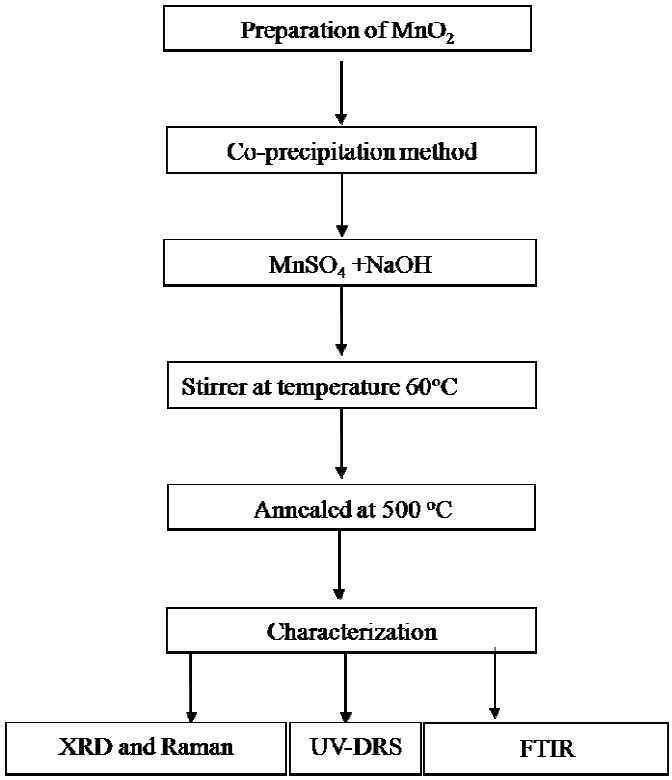

Fig.2: Flow chat of over all work on the preparation of MnO_2

Results and discussionStructural studies

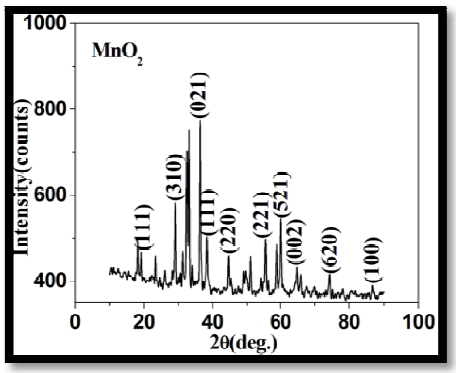

Fig.3: XRD Pattern of MnO_2 nanoparticles

X-ray diffraction measurements are performed to examine the crystallinity of the MnO_2 nanoparticles [6]. XRDpattern of MnO_2 nanoparticles are prepared by precipitation method has been shown in Fig.3. The XRD analysis reveals structural characteristics which shows the evident sharp peaks at 2θ angle value of 19.25°, 29.14°,36.28°, 38.42°, 44.63°, 55.37°, 58.70°, 64.86°, 74.39° and 86.70° corresponding to

its crystal plane are (1 1 1), (3 1 0), (0 2 1), (1 1 1), (2 2 0), (2 2 1), (5 2 1), (0 0 2), (6 2 0) and (1 0 0) respectively. These peaks are attributed to the MnO_2 phase in agreement with similar XRD patterns reported in literature. All the peaks for the sample indexed to a pure body centred tetragonal MnO_2 phase with lattice constant a = 4.5333 nm, c =2.866 Å which are in agreement with the standard values of JCPDS 73-1539. The results show that MnO_2 nanoparticles have rutile structure.Obtained micro strain and dislocation density of MnO_2 nanoparticle is 0.035 $x10^{-6}$ and 3.56 x 10^{14} $(L/1^3)m^{-2}$[7].

Raman spectra analysis

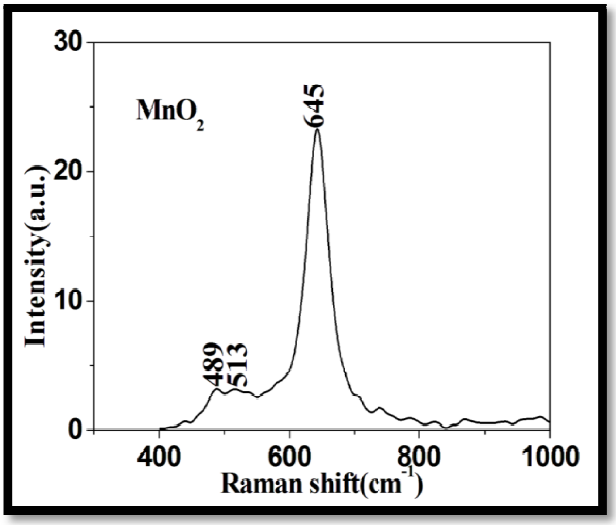

Fig.4: Raman spectrum of MnO_2

Raman spectroscopy is one of the vibrational spectroscopic techniques used to provide information on molecular vibrations and crystal structures [8, 9]. This technique uses a laser light source to irradiate a sample, and generates an infinitesimal amount of Raman scattered light, which is detected as a Raman spectrum using a CCD camera [10]. It is also possible to observe molecular vibrations by an inelastic scattering process. As shown in Fig. 4, three Raman bands of the MnO_2 nanoparticle located at 483, 513, and645 $cm^{-1}$are in good agreement with the three major vibrational features of the birnessite-type MnO_2 compounds. Therefore, the results of the Raman measurement are quite well agreeing with the XRD results confirming that the birnessite-type MnO_2 formed by co-precipitation method.

Optical studies (UV-DRS)

The UV-Visible diffuse reflectance spectrophotometer is used to obtain the reflectance spectra of the MnO_2 nanoparticles [11, 12]. It is used to estimate the band gap of MnO_2 nanoparticles sample.

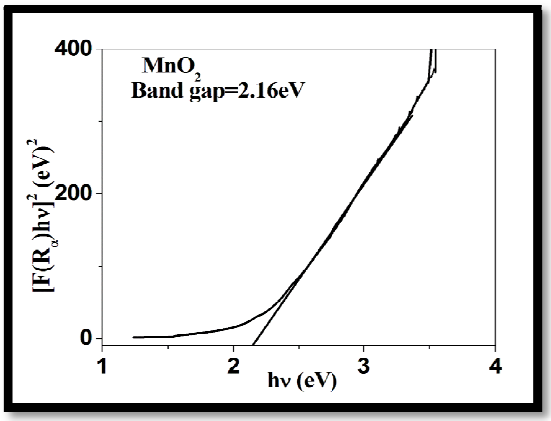

Fig.5: Band gap measurement plot of MnO_2 nanoparticles

The optical band gap of the as prepared MnO_2 nanoparticle is calculated using the relation,

$$\alpha h\upsilon = (h\upsilon - E_g)^n$$

Where,hυ is the incident photon energy, n is the exponent that determines the type of electronic transition causing the absorption and can take the values depending whether transition is direct or indirect respectively [13, 14].The value of the band gap is determined from the intercept of the straight line, which is found to be 2.16eV (Fig.5).

FTIR Analysis

FTIR relies on the fact that the most molecules absorb light in the infrared region of the electromagnetic spectrum. This absorption corresponds specifically to the bonds present in the molecule [15]. FTIR is particularly useful for identification of organic molecular groups and compounds due to the range of functional groups, side chains and cross-links involved, all of which will have characteristic vibrational frequencies in the infra-red range [16]. The frequency range are measured as wave numbers typically over the range 4000 – 500cm^{-1}.The FT-IR spectroscopy was carried out in order to ascertain the purity and nature of MnO_2 nanoparticles synthesized by co-precipitation method. Functional group present in the synthesized manganese dioxide nanoparticles are shown in Fig.6.

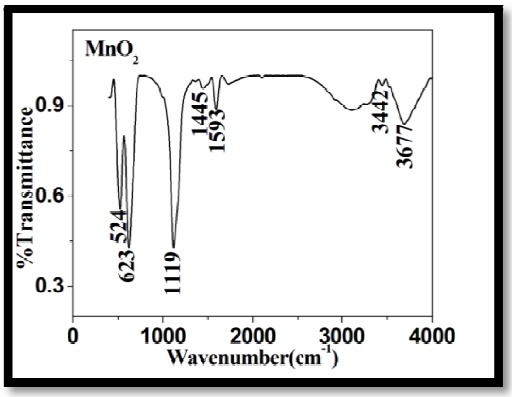

Fig.6: Fourier transform infrared spectrum of MnO_2 nanoparticles

The sample has absorption peaks at of 3677, 3442, 1593, 1445, 1119, 623 and 524 cm^{-1}. Absorption band observed at 623 cm^{-1} is associated with the coupling between Mn-Ostretching modes of tetrahedral A^- and octahedral B^- sites as expected from normal spinel structure. Thus, the FT-IR spectrum further confirms that the product is manganese dioxide. The peak at 1119 cm^{-1} is ascribed to the stretching vibration of C-N bond, C-H in plane bondand stretching vibration of C-O bond. The peak at 1593 cm^{-1} is ascribed to the stretching vibration of N-H bond of primary and secondary amine, alkyl C=C stretch. The peak at 3442 cm^{-1} is ascribed to the stretching vibration N-H bond and stretching vibration of O-H bond. The presence of these functional makes the synthesized manganese dioxide nanoparticles as effective antimicrobial agent.

Conclusion

In this work, metal oxide MnO_2 nanoparticles are successfully prepared by co-precipitation method followed by annealing at 400^oC. All characteristic studies such as XRD, RAMAN, FTIR, and UV-DRS confirmed the formation of MnO_2nanoparticles.The size and crystal structure of nanoparticle is studied using XRD. The MnO_2crystallite size with XRD peak assignments arecalculated. The crystal size of MnO_2 is found by Debye Scherrer's formulaas about 53 nm. It comes under the tetragonalsystem and have rutile structure. The sharp peak indicated the nanocrystalline structure.TheRaman spectrum is explained by itscorrespondingbands present position. There are three vibrational bands which assigned to birnessite type of MnO_2.UV-visible reflectance spectrum is used to find the band gap of MnO_2 nanoparticles. Band gap of MnO_2 nanoparticles is 2.16 eV which is suitable to supercapacitor application.FTIR spectra also validated the purity of MnO_2 nanoparticles. The result is plotted by wavenumber versus transmittance. The vibrational assignments are discussed with absorption bands that observed at 623 cm^{-1} is associated with the coupling between Mn-Ostretching modes of tetrahedral A^- and octahedral B^- sites as expected from normal spinel structure.

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தமிழில் வாழ்க்கை வரலாறு நோக்கும் போக்கும்

ஞா. ஜேனட் பெல்சியாள ப. அலிஸ்ராணி,
தமிழ்த்துறை,சாராள்தக்கர் கல்லூரி, திருநெல்வேலி – 627 007

முன்னுரை:

ஒருவரது வாழ்க்கை வரலாற்றைப் படிக்கும் போது அவரது வாழ்க்கை அனுபவங்கள் மற்றவர்களுக்குப் பாடமாக அமைகின்றது. உலகில் எங்குப் பிறந்தாலும் மனித நேயத்தை விரும்புகின்றவர்கள் அல்லது மாமேதைகளாக விரும்புகின்றவர்கள் எல்லோராலும் மதிக்கப் பெறுகின்றனர். பொதுவுடைமைக் கோட்பாட்டை உலகுக்குத் தந்து ஏற்றத் தாழ்வை நீக்கி, மனித நேயம் வளர்க்கத தம்மையே தியாகம் செய்த காரல்மார்க்ஸ் பற்றித் தமிழில் பல கட்டுரைகளும் சில நூல்களும் வந்திருக்கின்றன. வாழ்க்கை வரலாறு இலக்கியத்தைப் பற்றிய பதிவாக இவ்வாய்வு அமைகின்றது.

வாழ்க்கை வரலாற்று இலக்கியங்கள்

வாழ்க்கை வரலாற்று இலக்கியங்கள் இரண்டு வகையின அவை

1. சுய சரிதம்
2. வாழ்க்கை வரலாறு

என்பன

சுயசரிதம

சான்றோர் தங்களின் வாழ்க்கையைத் தாங்களே எழுதுதல் . இதனை சுய வரலாறு எனக் குறிப்பிடுவார்கள். சுய வரலாற்றில் உண்மையின் வெளிப்பாடு இருக்கின்றது. காந்தியடிகள் குஜராத்தியில் எழுதிய சுயசரிதம் "சத்திய சோதனை" என்று தமிழில் மொழி பெயர்க்கப்பட்டது. இந்த நூற்றாண்டில் தொடக்கத்தில் பாரதியார் கவிதையில் தம் சுயசரிதைச் சுருங்கிய முறையில் எழுதினார்.

வாழ்க்கை வரலாறு

எழுத்தாளர்கள் சான்றோர்கள் பெருமக்களை எழுதுவது இரண்டாவது வகையைச் சார்ந்தது. இவ்வாறு எழுதுவதற்கான சான்றுகள் படித்தவை, நேரடியாகப் அல்லது பிறரைப் பேட்டி கண்டவை என சான்றாரதாரங்கள் அமைகிறது. இதனை மிகைப்படுத்தி எழுதவும் வாய்ப்பு அமைகிறது.

மேலே நாட்டு இலக்கியங்களிலேயே பாஸ்வெல் என்பார் டாக்டர் ஜான்சனை பற்றி எழுதியிருக்கும் வாழ்க்கை வரலாற்று நூலே சிறப்புடையதாகும் . அது போன்று தமிழ்நாட்டிலும் வெவ்வேறு துறைகளிலும் தொண்டாற்றிய அறிஞர் பெருமக்கள் வாழ்க்கை வரலாறுகள் நூல் வடிவில் வெளிவருகின்றன.

தன் வரலாற்று இலக்கியங்கள்

ஒருவர் தன் வரலாற்றைத் தானே எழுதுவது தன் வரலாறு. தமிழில் மிகவும் புகழ்பெற்ற தன் வரலாறுகள்

1.	பாரதியார்	- சுயசரிதை (கவிதை நூல்)
2.	வ.உ. சிதம்பரம்	- சுயசரிதை
3.	திரு.வி.கலியாணசுந்தரம்	- வாழ்க்கைக் குறிப்புகள்
4.	உ.வே.சாமிநாத ஐயர்	- என் சரித்திரம்
5.	உ.வே.சாமிநாத ஐயர்	- நினைவு மஞ்சரி
6.	பம்பல் சம்பந்த முதலியார்	- என் சுயசரிதை
7.	நாமக்கல் கவிஞர்	- என் கதை
8.	ஏ.வி. மெய்யப்பன் செட்டியார்	- எனது வாழ்க்கை அனுபவங்கள்
9.	டி.எஸ். எஸ். ராஜன்	- நினைவு அலைகள்

10. கோவை ஐயா முத்து	-	எனது நினைவுகள்
11. டி.எஸ். சண்முகம்	-	எனது நாடக வாழ்க்கை
12. கலைஞர் கருணாநிதி	-	நெஞ்சுக்கு நீதி
13. எம்.ஜி. ஆர்	-	ஏன் பிறந்தேன்?
14. மா.பொ.சி.	-	எனது போராட்டம்
15. நெ.து.சுந்தரவடிவேலு	-	நினைவு அலைகள்
16. கண்ணதாசன்	-	வனவாசம் மனவாசம்
17. யோகி சந்தானந்த பாரதியார்	-	ஆத்மசோதனை
18. காளிமுத்து	-	என் இளமையிலே
19. சி.கே. சுப்பிரமணிய முதலியார்	-	ஒரு பித்தனின் சுயசரிதம்
20. மகாத்மா காந்தி	-	சத்திய சோதனை
21. நேரு	-	சுயசரிதை
22. வைரமுத்து	-	இதுவரை நான்

என்று பட்டியல் நீண்ட பட்டியலாக அமைகின்றது.

தன் வாழ்க்கை வரலாறாக அமைந்த நூலுள் மிகச் சிறந்தது உ.வே.சாமிநாத ஐயர் எழுதியுள்ள என் சரிதம் என்ற நூலாகும். திரு.வி.க-வின் "வாழ்க்கை குறிப்புகள்" பயனுடைய நூல் . அவர் காலத்தில் வாழ்ந்த பல துறை அறிஞர்கள் , சான்றோர்கள், தொண்டர்கள் , தலைவர்கள் அனைவரையும் எடுத்து தெரிவிக்கின்றது.

சாமிநாதய்யரின் "என் சரிதம்" தமிழகத்தில் அவர் வாழ்ந்த காலத்து இருந்த தமிழின் நிலையைப் பிரதிபலிப்பதாக அமைகின்றது. ஆசிரியர் வரலாற்றை விட இலக்கிய வரலாறாக அமைந்த தன் வரலாறு " என் சரித்திரம்" என்ற பனுவல் அமையும்.

நாமக்கல் கவிஞர் உரைநடையில் தம் வரலாற்றை " என் கதை" என்ற நூலாக்கினார்.

கண்ணதாசன் எழுதிய "வனவாசம்" புதினம் போலப் படிக்கத் தக்க நூலாகும். கலைஞர்.கருணாநிதியின் "நெஞ்சுக்கு நீதி" சுவையான வரலாற்று நூலாயிற்று.

இவ்வகையான நூல்களின் வழி அவர்களுடைய வாழ்க்கை வரலாறு மட்டுமல்ல உலக இந்திய , சமுதாய, அரசியல் வரலாறுகளையும் அறிய முடிகின்றன.

வாழ்க்கை வரலாற்று நூல்:

தமிழின் முதல் வாழ்க்கை வரலாற்று நூல் அச்சுதானந்த சுவாமிகளின் வரலாறு அமைகின்றது.

நூல்களும்	-	ஆசிரியர்களும்
1. அச்சுதானந்த சுவாமிகள்	-	சோமசுந்தர அடியவர்
2. மீனாட்சி சுந்தரம்பிள்ளை சரித்திரம்	-	உ.வே.சாமிநாத ஐயர்
3. வித்துவான் தியாகராச செட்டியார்	-	உ.வே. சாமிநாத ஐயர்
4. மறைமலையடிகள் வரலாறு	-	மறை திருநாவுக்கரசு
5. திரு.வி.க. வரலாறு	-	மு.வரதராசனார்
6. பெருந்தகை மு.வ	-	சி. பாலசுப்பிரமணியன்
7. சீர் மிகு சி.பா	-	சி.பா.சேரன்
8. வ.வே.சு.ஐயர் வரலாறு	-	சுத்தானந்த பாரதி
9.வ.வே.சு. ஐயர் வரலாறு	-	டி.எஸ்.எஸ். ராஜன்
10. பாரதியார் சரித்திரம்	-	வ. ராமசாமி
11. சித்திர பாரதி	-	ரா.வு. பத்மநாபன்
12. புதுமைப்பித்தன் வரலாறு	-	சிதம்பர ரகுநாதன்
13.ஏழைப்பங்காளன் லெனின்	-	அ.வே.நடராசன்
14. காமராசர் வரலாறு	-	மு. நமச்சிவாயம்
15. அண்ணாவின் பெருவாழ்வு	-	அ. மறைமலையான்
16. கண்ணதாசன் வரலாறு	-	கண்ணப்பன்
17. நான் கண்ட பெரியார்	-	கோவை ஐயா முத்து

18. ரசிகமணி டி.கே.சி	-	பாஸ்கரதொண்டைமான்
19. ஜீவாவின் வாழ்க்கை வரலாறு	-	கே.பால. தண்டாயுதம்
20. ஸ்ரீராமானுஜர்	-	பி.ஸ்ரீ. ஆச்சாரியா
21. பாரதிதாசன் வரலாறு	-	கிரு'ணமூர்த்தி
22. கவிராஜன் கதை	-	இரா. வைரமுத்து
23. அண்ணல் தங்கோ வரலாறு	-	அருட்செல்வன்

"கவிராஜன் கதை" புதுக் கவிதையில் எழுதப்பட்ட வாழ்க்கை வரலாற்று பனுவல் ஆகும். ஒரு கவிஞன் மற்றொரு கவிஞரின் வரலாற்றை எடுத்து கூறுகிறார்.

பாரதியாரின் வாழ்க்கை வரலாற்றை வ.ரா. சுவையாகத் தந்திருக்கின்றார். பத்மநாபனின் பாரதி வரலாறு தெளிவானது. பாராட்டத்தக்கதாக அமைகின்றது. தம் ஆசிரியர் மீனாட்சி சுந்தரம் பிள்ளையின் வாழ்க்கை வரலாற்றை டாக்டர். சாமிநாதய்யர் எழுதியுள்ளார். இது மிக சிறந்த இலக்கியமாக கருதப்படுகின்றது. புதுமைப்பித்தன் வாழ்க்கையை அவர் நண்பர் தொ.மு.சி.ரகுநாதன் எழுதியுள்ளார். அது உண்மையானது உயாந்த நிலையிலானது எனலாம்.

மேனாட்டினராகிய டால்ஸ்டாய், லெனின், பெர்னாட்'ா போன்றோர் வாழ்க்கை வரலாறுகள் மொழிபெயர்ப்பு நூல்களாக தமிழில் வந்துள்ளன.

புலவர் அரசு என்பவர் பல்வேறு தமிழ்ப் புலவர்கள் வரலாற்றினை பனுவலாக எழுதியுள்ளார். ம.பொ.சி. , வ.உ.சி வரலாற்றைக் கப்பலோட்டிய தமிழனாகவும் , கட்டபொம்முவின் வரலாற்றை "வீரபாண்டிய கட்டபொம்மனாகவும் உருவாக்கினார். " மருதிருவர்" வரலாற்றைத் தமிழ் பேராசிரியர் சஞ்சீவி வெளியிட்டுள்ளார்.

புலித் தேவன் வாழ்க்கை வரலாறு , புரட்சி எழுத்தாளர் தமிழ்வாணன் பனுவலாக வந்துள்ளது. சிலம்புச் செல்வர் . ம.பொ.சி எழுதிச் சாகித்திய அகாதெமியின் ஐயாயிரம் ரூபாய்ப் பரிசினைப் பெற்ற "வள்ளலார் கண்ட ஒருமைப்பாடு" குறிப்பிடத்தக்க நூலாகும்.

முடிவுரை

தமிழில் பிறர் வாழ்க்கை வரலாற்று நூல்கள் 1790க்கு மேல் உள்ளன. தம் வரலாற்று நூல்கள் 44க்கு மேல் உள்ளன. எந்தவொரு இலக்கிய படைப்பாளானாலும் எளிமையாக எழுதக்கூடிய இலக்கிய வடிவம் வாழ்க்கை வரலாறு இலக்கியம் எனில் மிகையாகாது. இளைஞர்கள் தன் வரலாற்று நூல்களைப் படிக்க வேண்டும். சாதனையாளர்களாக மாற விரும்புவோர்க்கு மிகவும் பயனுள்ள இலக்கிய வடிவம் வாழ்க்கை வரலாறு இலக்கிய வடிவம் ஆகும்.

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Data Mining with Big Data

Karthiga K*, Malini Sand Radha jeyalakshmi T**
Department of Computer Applications
Sri Sarada College for Women, Tirunelveli - 627 011
E-mail:* karthiga.thersa@gmail.com, **cutemalini19@gmail.com,
***drtradha.jl@gmail.com

Abstract: *Data mining computational process of discovering patterns in large data sets Big Data. Big data, it is the term for a collection of data sets so large and complex that it becomes difficult to process. Data has exponential growth, both structured and unstructured*

For example:

- *October 4th, 2012, the first presidential debate*
- *Flicker and its photos*

Big Data relates large-volume, complex, increasing data sets with multiple independent sources. With the rapid revolution of data, data storage and the networking collection capability, Big Data are now speedily expanding in all science and engineering domains. Big Data mining is the ability of extracting constructive information from huge streams of data or datasets, that due to its variability, volume, and velocity. Data mining includes exploring and analyzing big quantity of data to locate different molds for big data.

This paper introduces heterogeneous mixture learning, we study the tough issues in the Big Data revolution and also in the data-driven model.

Keywords: *Big Data, Data mining, Heterogeneous mixture, Autonomous sources, Complex and evolving associations.*

Introduction

With the exponential development of data comes an ever-growing requirement to route and evaluate the so-called Big Data. Heavy performance computing structures have been devised to attend the needs for managing Big Data methods not only from an operation processing point of view but also from an analytics view [5]. The most important target of this paper is to offer the reader with a historical and complete view on the current style in the direction of huge performance computing architectures specially it transmit Data Mining and Analytics There are a series of readings discretely on Big Data (and its individuality), High presentation Computing for Massively Parallel Processing (MPP) databases, Analytics and algorithms for Big Data [3]. In-memory Databases, implementation of mechanism learning algorithms for Big Data proposals, the Analytics environments of the future, etc. though none gives a chronological and broad vision of all these split topics in a particular document. It is the author's first try to bring about as several of these topics mutually as probable and to describe an ideal analytic environment that is superior to the challenges of today's analytics requirement. Modern production trends advise that big data investigation is becoming necessary for involuntary.

Discovering of intelligence that is concerned in the repeatedly-occurring patterns and unseen rules. These may then be used efficiently as helpful information (such knowledge-inventing technology is usually referred to as data mining) [7]. For example, electricity demand is predicted by extracting the convention leading the values of a range of sensors such as thermometers and of electricity demand and deriving future demand predictions by applying such rules to the current sensor data. In this paper, we first discuss the difficulties of heterogeneous mixture data analysis [6]. Over fitting is the use of models and procedures that violate parsimony – it includes more terms that are necessary [12].

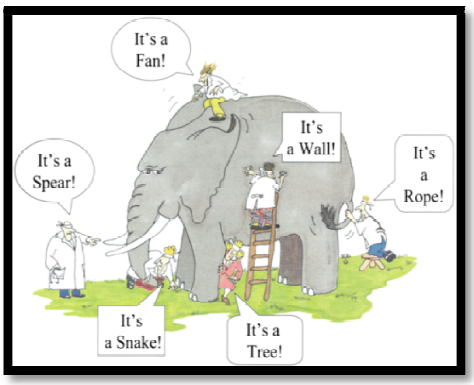
In short, the impossibility of per-forming exhaustive searches due to the huge number of data grouping candidates, which in reality symbolizes the essential difficulty of the analysis. Next, we are going to introduce heterogeneous mixture learning. This is the most advanced heterogeneous data analysis technology to be developed at NEC. It features the application of an advanced machine learning technology called the factorized asymptotic Bayesian inference, and we will focus mainly on the introduction of its fundamental concept. Finally, we introduce a demonstration experiment of electricity demand prediction for a building as an example of a suitable application of heterogeneous mixture learning. With the heterogeneous mixture learning technology, we have succeeded in improving the prediction Big Data skills are classified in three tasks

1. Data Analysis
2. Development
3. Big Data Infrastructure.

Software Development abilities can be auxiliary divided transversely domains such as Big Data- Database, Big Data- Development. Data Analysis includes two domains:

1. Data Mining Statistical Analysis and BI
2. Visualization Tools.

Characteristics of Big data



Heterogeneous, Autonomous, Complex, Evolving

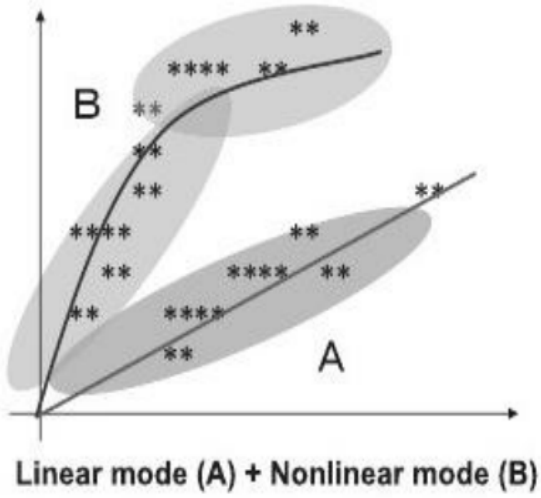
Big data starts with large volume, heterogeneous, autonomous sources with distributed and decentralized control, and seeks to explore complex and evolving relationships among data. These are characteristics of Big Data. This is theorem to model Big Data characteristics.

Huge Data with heterogeneous and diverse dimensionality and it represent huge volume of data

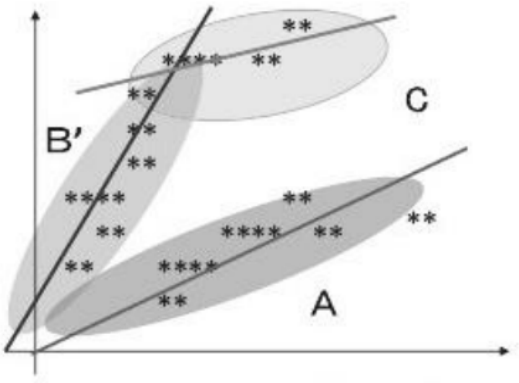
- Autonomous sources with distributed and decentralized control

It is the main characteristics of Big Data. It involves the Complex and evolving relationships.

The Most Advanced Data Mining of the Big Data period



Accuracy by 7.6 points (10.3% → 2.7%) compared to the previous prediction method without considering the heterogeneous mixture data, and by 2.1 points (4.8% → 2.7%) compared to the method that is dependent on data grouping by experts.



Linear mode x 3 (A, B', C)

One of the key points in the accurate analysis of heterogeneous mixture data is to break up the inherent heterogeneousmixtureproperties by arranging the data in groups having the same patterns or rules. However, since there are a huge number of possibilities sometimes infinite) for the data grouping options, it is in reality impossible to verify each and every candidate. The following three issues are of importance in arranging the data into severalgroups.

1. Number of groups (How much the data ismixed)
2. Method of grouping (How the data is grouped)
3. Appropriate choice of prediction model according to the properties of each group.

However, to determine the optimum data grouping method for data acquired from such a complex system is very difficult to achieve, even for experts.

Constraints are posed by a reduction in the prediction accuracy due to inappropriate grouping and by the huge amount flabor required for the trial and error procedures needed to find the optimum grouping method.

B. Data mining based on heterogeneous mixture learning

NEC has developed a new heterogeneous mixture learning technology for use in mining heterogeneous mixture data.

This technology is capable of the high speed optimization of the three issues related to data grouping or a sudden increase in prediction model combinations Below, we explain the differences between learningwith the previous techniques (such as the cross-validation or the Bayesian information criterion) and the heterogeneous mixture.

This makes it possible to find the optimum data grouping and prediction model by investigating models with high prediction accuracies without searching unpromising candidates [11]. The advancedsearch and optimization of the

heterogeneous mixture learning is backed by the latest machine learning theory calledfactorizedasymptotic Bayesian inference.

Big Data

Big data is classically described by the first three properties below occasionally referred to as the three but organizations require a fourth value to build big data job.

- **A. Volume:** massive information sets that are command of size bigger than data managed in habitual storage and analyticalresults. Imagine petabytes rather thanterabytes.
- **B. Variety:** complex, variable and Heterogeneous data, which are generated in formats as dissimilar as public media, e-mail, images ,video, blogs, and sensor data as well as shadow data‖ such as access journals and Web explore histories.
- **C. Velocity:** Data is generated as a stable with real-time queries for significant information to be present up on claim the information instead of batched.
- **D. Value:** consequential insights that transport predictive analytics for upcoming trends and patterns from bottomless,difficultanalysis based on graph algorithms, machine learning and statistical modeling. These analytics overtake the results of usual querying, reporting and business intelligence.

Data Mining for Big data

Data mining includes extracting and analyzing bulky amounts of data to discover models for big data. The methods came out of the grounds of artificial intelligence (AI) and statistics with a tad of databasemanagement [14].Data mining is used to summarize and simplify the data in a way that we can recognize and then permit us to gather things about specific cases based on the patterns normally; the objective of the data mining is either prediction or classification. In classification, the thought is to arrange data into sets.

For example,

A seller might be attracted in the features of those who answered versus who didn't answered to a advertising. There are two divisions. In prediction, the plan is to predict the rate of a continuous variable [1].

A. **Classification trees:** A famous data-mining system that is used to categorize a needy categorical variable based on sizeofone or many predictor variables [13]. The outcome is a tree with links and nodes between the nodes that can be interpret to form a rules to define the classification of trees.

B. **Logistic regression:** An algebraic technique that is a modification of standard regression but enlarges the idea to deal withsorting. It constructs a formula that predicts the possibility of the occurrence as a role of the independent variables.

C. **Neural networks:** A software algorithm that is molded after the matching architecture of animal minds. The network includes of output nodes, hidden layers and input nodes. Each unit is allocated a weight. Data is specified to the input node, and by a method of trial and error, the algorithm correct the weights until it reaches a definite stopping criteria[15]. Some groups have likened this to a black–box system.

D. **Clustering techniques like K-nearest neighbors:** A procedure that identifies class of related records. The K-nearestneighbor technique evaluates the distances between the points and record in the historical data. It then allocates this recordto the set of its nearest neighbor in a data group.

Conclusion

Big data is directed to continue rising during the next year and every data scientist will have to handle a large amount of dataevery year .This data will be more miscellaneous, bigger and faster. We discussed in this paper several insights about the subjects and what we think are the major concern and the core challenges for the future. Big Data is becoming the latest final border for precise data research and for business applications. Data mining with big data will assist us to discover facts that nobody has discovered before. The heterogeneous mixture learning technology is an advanced technology used in big data analysis.

In the above, we introduced difficulties that are inherent in heterogeneous mixture data analysis, the basic concept of heterogeneous mixture learning and the results of a demonstration experiment that deal with electricity demand predictions. As the big data analysis increases its importance, heterogeneous mixture data mining technology is also expected to play a significant role in the market.

The range of application of heterogeneous mixture learning will be expanded broader than ever in the future. To investigate Big Data, we have examined a number of challenges at the system levels, data and model.

To hold Big Data mining, high performance computing platforms are necessary, which enforce organized designs to set free .the complete power of the Big Data. By the data level, the independent information sources and the range of the data gathering environments, habitually result in data with complex conditions, such as missing unsure values.

The vital challenge is that a Big Data mining structure needs to consider complicated interaction between data sources, samples and models along with their developing changes with time and additional probable factors.

A system wants to be cautiously designed so that unstructured data can be connected through their composite relationships to form valuable patterns, and the development of data volumes and relationships should help patterns to guess the tendency and future.

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नवतिरुपतिः – लघुपरिचयः

Kasthuri P K
Department of Sanskrit
Sri Sarada College for Women, Tirunelveli 627 011.
Email Id : kasthurikeerthi16@gmail.com

ताम्रपर्णीतीरेअनेकेविष्णुभक्ताःजननंकुर्वन्तः,
आल्वारेषुनम्माल्वार्,आन्डाल्श्रीमन्नारायनमधिकृत्यपाशुरान्अरचयताम्।नवश्रेष्ठवैष्णवक्षेत्राणिताम्रपर्णी तीरेनवग्रहरूपेसन्ति।अतःतेनवतिरुपतिइतिख्याताः।१०८दिव्यक्षेत्रेषुनवतिरुपतिआलयाःचअन्तर्गताः।

श्रीवैकुण्ठंकल्लपिरान् - श्रीवैकुण्ठम्

अयंदेवालयःतूत्तुकुडिमण्डलेश्रीवैकुण्ठंनगरेताम्रपर्णीतीरेविद्यते।अयंआलयःनवतिरुपतिषुप्रथम स्थलम्।देवस्यनामश्रीवैकुण्ठनाथः, कल्लपिरान्वा; देव्याःनामःवैकुण्ठनायकी; तीर्थःताम्रपर्णीतीर्थः, भृगुतीर्थः, कलशतीर्थः,
आगमःपाञ्चरात्रम्।इदंक्षेत्रंतेन्कलैवैष्णवसंप्रदायमनुंसरति।कोमुखोनामअसुरःब्रह्मणःवेदाःअपाहरत्।ब्रह्मदे वःवैकुण्ठनाथंहृदयेस्थापयित्वाताम्रपर्णीतीरेतपःअकरोत्।कृपाकरःवैकुण्ठनाथःब्रह्मादेवस्यापेक्षांस्वीकृत्य कोमुखासुरवधमकरोत्।वैकुण्ठनाथेतिनामकरणेअत्रैवमहाविष्णुःअर्चावताररूपेस्थितवान्।

वैकुण्ठनाथस्यविमानस्यनामचन्द्रविमानम्।चैत्राश्विनमासौपैर्णमीदिने
सूर्यस्यकिराणाःवैकुण्ठनाथस्यपादयोरुपरिपतति।

विजायासनपेरुमाल्आलयः –नत्तम्

अयंआलयःतूत्तुकुडिमण्डलेनत्तंनगरेताम्रपर्णीतीरेविद्यते।देवस्यनामविजयासनः,
देव्याःनामःवरगुणमङ्गै, तीर्थःदेवपुष्करणी,
अग्नितीर्थः।इदंस्थलंनवतिरुप्पतिक्षेत्रेषुद्वितीयक्षेत्रमितिख्याता।पुरातनकालेसत्यवान्नामकोऽपिब्रह्मचारि न्ताम्रपर्णीतीर्थेस्नानंकरोतिस्म।तस्मिन्समयेकश्चित्मकरःधीवरं
दशतिस्म।धीवरःमरणानन्तरंस्वर्गवासंप्राप्तवान्।सत्यवान्स्वगुरुसमीपेवृत्तान्तमुक्त्वाअपृच्छत्यत्मत्स्यानां घातकःकथंस्वर्गंगन्तुंशक्यतेइति।तस्य
गुरुःअस्मिन्दिव्यक्षेत्रेमहिमाकारणेनैवसःस्वर्गप्राप्तिःप्राप्तवानितिप्राह।अस्यआलयस्यमूलवर्आसनेप्रत्यक्षा शिर्वादंकरोति।वैत्तमानिधिपेरुमाल्आलयः–
तिरुक्कोलुर्।अयंदेवालयःतूत्तुकुडिमण्डलेतिरुक्कोलुर्क्षेत्रेताम्रपर्णीतीरेअस्ति।देवस्यनामवैतमानिधिपेरुमाल्, देव्याःनामःकोलुर्वल्लीअम्बा, तीर्थः -कुबेरतीर्थः, ताम्रपर्णी, विमानम् - श्रीकरविमानम्।शिवभक्तःकुबेरःतपःकारणेनपार्वतीसमेतशिवदर्शनंप्राप्तवान्।तत्समयेपार्वतीदेव्याःदिव्यसौ न्दर्येमोहितवान्।अतःपार्वतीदेवीतस्यदर्शनशक्तिंऐश्वर्यंचनष्टंभवेत्इतिशापंअदात्।भीतःकुबेरःशिवस्यपाद योःपतित्वाशापविमोचनमार्गंप्रार्थितवान्।ताम्रपर्णीतीरेतिरुक्कोलूर्नामक्षेत्रेतस्यसर्वनिधिःवैत्तमानिधिनाम श्रीहरिःवर्तते।वैतमानिधिंप्रार्थयन्ऐश्वर्यंप्राप्तुंशक्यतेइतिपरमेश्वरःप्राह।अतःअस्मिन्क्षेत्रेकुबेरःवैत्तमानिधिं प्रार्थियन्शापविमोचनंप्राप्तवान्इतिस्थलपुराणम्।मधुरकविआल्वार्अस्मिन्क्षेत्रेजातः।

तिरुपुलियङ्कुडिकाय्चिनवेन्तपेरुमाल्आलयः

अयंआलयःतुत्तुकुडिमण्डलेतिरुपुलियङ्कुडिक्षेत्रेताम्रपर्णीतीरेअस्ति।देवस्यनामकाय्चिनवेन्तपेरुमाल्, देव्याःनामःमलर्मकळ्, तिरुमकळ्, तीर्थःवरुणनीरुतीतीर्थः, विमानम् - वत्चारविमानम्।पुरा, गरुडारूढःलक्ष्मीसमेतविष्णुःताम्रपर्ण्याःसौन्दर्यंदृष्ट्वातत्रैवअर्चावतारेरूपेलक्ष्म्यासहस्थितः।अतःकुपिता भूमादेवीपाताललोकंअगच्छत्।लोकरक्षणार्थंमहाविष्णुःपातालंगत्वाभूमादेव्याःकोपंशान्त्वायित्वाश्रीदेवी, भूदेवीसमेतकाय्चिनवेन्दपेरुमाल्इतिनामधृत्वाअर्चावतारेरूपेतिरुप्पुलियङ्कुडीक्षेत्रेसर्वजनानांअनुग्रहंक रोति।नम्माळवार्काय्चिनवेन्तपेरुमाल्प्रतिंगितंअरचयत्[१]।

आदिनाथाळ्वारालयः - आळ्वार्तिरुनगरी

अयंआलयःतूत्तुकुडिमण्डलेआळ्वार्तिरुनगरीक्षेत्रेताम्रपर्णीतीरेअस्ति।देवस्यनामपोलिन्दु–निन्ड्रपेरुमाल्, देव्याःनामःआदिनाथवल्ली, कुरुकूर्वल्ली, तीर्थः - ब्रह्मतीर्थः, विमानम् - गोविन्दविमानम्, स्थलवृक्षः - उरङ्गापुळिवृक्षः।अस्यक्षेत्रस्यअन्यनामानितन्पोरुनल्, आदिक्षेत्रःकुरुकाक्षेत्रःतिरुकुरुकूईत्यादि।

मकरनेडुङ्कुळैक्कादरालयः - तेन्तिरुप्पेरै

अयंदेवालयःतुत्तुकुडिमण्डलेतिन्तिरुप्पेरैक्षेत्रेताम्रपर्णीतीरेअस्ति।देवस्यनाममकरनेडुङ्कुळैक्कादर्, देव्याःनामःकुळैक्कादवल्ली, स्थलवृक्षः - मकिळवृक्षः, तीर्थः - शुक्रपुष्करणी, शङ्कुतीर्थः, विमानम् - भद्रविमानम्।पुरातनकालेश्रीदेवीतस्याःपतिःमहाविष्णुःभूदेव्याःअधिकप्रेम्णास्तीतिदुःखितवती।तत्समयेदुर्वासमहर्षिःभूदेवयाःअश्वद्धाशुश्रूषयाकुपित्वाशापंदत्तवान्।दुःखिताभूदेवीअस्मिन्क्षेत्रेआगत्यतपःअकरोत्। आश्वयैणभूमादेवीताम्रपर्णीनद्यांपश्चमिदिनेमकरकुण्डलानिप्राप्तवती।सःस्नेहेनतांपतिंप्रार्थयन्प्रार्थयन्मकरकुण्डलंसमर्पणमकरोत्।अतःअस्मिन्क्षेत्रस्यनाथःमकरनेडुङ्कुळैक्कादईतिज्ञातः।

श्रीनिवासपेरूमालयः– तिरुकुळन्दै

अयंदेवालयःतूत्तुकुडिमण्डलेतिरुकुळन्दैक्षेत्रेताम्रपर्णीतीरेअस्ति।देवस्यनामवेङ्कटनाथः, देव्याःनामःकमलावती, कुळन्दैवल्ली, तीर्थःताम्रपर्णी, आगमःवैकानसागमः।अयंआलयःतेन्कलैसंप्रदायमनुसरति।अस्यआलयस्यदेवःहिमालयपर्वतंगरुडवाहनेगत्वाकमपिअसुरंवधंकृतवान्।देवःअसुरस्यउपरिनर्तनंकृतवान्अतःतस्यनामःमायकुत्तन्।

श्रीनिवासालयःइरट्टैतिरुपतितिरुतोलैविल्लिमङ्गलम्

अयंदेवालयःतूत्तुकुडिमण्डलेतिरुतोलैविल्लिमङ्गलनगरेताम्रपर्णीतीरेअस्ति।देवस्यनामश्रीनिवासः; देव्याःनामःअलमेलुमङ्गै; तीर्थःआगमःवैकानसागमः; अयंआलयःतेन्कलैसंप्रदायमनुसरति।कश्चित्महर्षिःअस्यक्षेत्रेस्यअधःधनुभागान्पश्यति।भागात्स्त्रीयुवकौउद्भूयमोक्षंप्राप्तवन्तौ।कुबेरस्यशापेनतेधनुर्भागमिवपरिवर्तनंअभवताम्।अतःस्थलस्यनामतोलैविलिमङ्गल

म्। इदंस्थलंआधिकृत्यप्रतिनम्माल्वार्एकादशपासुराःअरचयत्। अश्विनिकुमाराःअस्यआलयस्यदेवंरक्तकमलं अर्पयित्वापूजांकृतवन्तौ।

अरविन्दालोचनालयःइरट्टैतिरुपतितिरुतोलैविल्लिमङ्गलम्

अयंआलयःतूत्तुकुडिमण्डलेतिरुतोलैविल्लिमङ्गलनगरेताम्रपर्णीतीरेअस्ति। देवस्यनामअरवीन्दलोचनन्; देव्याःनामःकरुन्दान्कन्नि, तीर्थःताम्रपर्णी, आगमःवैकानसागमः।वीभीतकन्इतिनाम्नःकाश्चित्मुनिःअस्मिन्तीर्थेस्नानंकृत्वारोगनिवृतिप्राप्तवान्। नम्माळवार्अरविन्दलोचनपेरुमाल्आधिकृत्यकीर्तनंअरचयत्।

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Financial Awareness of Account Holder Under Banking Sector

Maria Bharathi* A and Muthulakshmi R**
Department of Commerce
Sri Sarada College for Women, Tirunelveli 627 011
Email Id:.**muthlakshmisarada@gmail.com

Abstract: *Providing banking and other financial service to the common man at lower cost is necessary to develop the economic. Major barrier for financial inclusion is lack of awareness about financial services. When the people know about the financial products available and when they are able to evaluate the merits and demerits of each their specific needs they are in a better position to decide what they want and feel empowered in a meaningfully way. When financial inclusion programmes started as a policy response for exclusion, the contents of the programme touched upon some basic issues such as access through an account, creation of awareness, and use of various banking products so that the excluded persons acquire the skill sets to manage money wisely and improve their financial well being. The special study measure the role of financial literary in economic development. For this study 150 respondents are selected by random sampling method. With help of interview schedule, the researcher collected the primary data. The researcher used frequency test for analyzing the data.*

Keywords: *financial literary - financial inclusion*

Introduction

Financial literacy is the ability to understand finance. More specifically it refers to the set of skills and knowledge that allows an individual to make formed and effective decisions through understanding of finances. Growth has to be more inclusive, and for this, finance has to be more inclusive (Lagarde, 2014). Inclusive finance is all about removing barriers in the process of getting access to financial services. Generally, access to the financial system starts with opening a bank account. The focus of financial literacy is primarily on the individual who usually has limited resources and skills to appreciate the complexities of financial dealings with financial intermediaries on matters relating to personal finance on a day to day basis. Financial literacy would help the people to take effective actions to improve overall well-being and avoid financial distress. The study also identifies the economic development of socially suffered community peoples.

Literature Review

Review of Literature is essential for every research to carry out the investigation successfully. Hence, the present study is based on the following reviews.

Better awareness about products available through formal financial system within a country is an important pre-requisite for financial inclusion (Atkinson& Messy, 2013).

According to Organization for Economic Cooperation and Development (OECD), financial literacy refers to attributes like knowledge, skills, attitude, awareness on financial matters, and behaviors which help an individual to take informed and sound

financial decisions, which will lead to his/her financial well being. Financial literacy is about managing one's own finance to achieve financial well being. Financial literacy refers to the capability of individuals to manage their finance more effectively (Kiliyanni & Sivaraman, 2016).

Arockia Jerold, V(2008) in his technical paper on "Financial inclusion and literacy in India" had explained about the elements of financial inclusion, history of financial inclusion, measurement of financial exclusion, difficulties in promoting inclusive banking, strategies and approach towards financial inclusion, International experience in promoting financial inclusion, RBIs policy on financial inclusion, IT solution for financial inclusion, Role of government in promoting financial inclusion[1].

Objectives of the study

- To analyze the level of financial literacy among scheduled communities in Sathankulam Taluk.
- To offer suitable suggestions based on the findings of the study.

Methodology

This study is an empirical research based on surrey method. The primary data were collected from respondents with the help of interview schedule. The interview schedule was constructed by the researcher to collect information about financial literacy by visiting people in Sathankulam Taluk from 150 respondents hone been selected by convenience sampling method.

Measurement of financial literacy

Financial literacy differs from individual to individual. Financial literacy does not purely dependent on educational literacy. Further financial literacy is a qualitative variable. Hence, literacy cannot be measured in absolute from. In order to quality financial literacy, scaling technique has been employed. Scaling technique systematically converts the level of financial literacy of each individual respondent into its equivalent quantitative term. Financial literacy comprises of different elements. Hence to measure financial literacy of an individual in terms of different elements have been financially measured and then they are summed up together to get the final total financial literacy of an individual. Different elements of financial literacy identified by the researcher are:

- Financial literacy on investments.
- Financial literacy on borrowing.
- Financial literacy on debt management.
- Financial literacy on debit and credit cards.
- Financial literacy on capital Market.
- Financial literacy on insurance services.
- Financial literacy on postal services.
- Financial literacy on financial service.

From the above measurement, researcher has classified the schedule communities under two heads namely financially Literates and Illiterates.

Elements of Financial Literacy

Table-1 title of the table/table size – economy of space

S.No	Element	No. of Questions included
1	Investments	13
2	Borrowings	10
3	Debt Management	3
4	Debit Management	9
5	Capital Market	5
6	Insurance Service	3
7	Postal Services	3
8	Other Financial Services	4
	Total	**50**

Each questions included in the above eight elements carry one score. Altogether in eight elements of financial literacy, there are 50 questions. A scheduled community people with high financial literacy and answered positively for all 50 questions can get a maximum of 50 scores; and scheduled community people with low financial literacy can get a minimum score of zero. Thus the level of financial literacy among scheduled community people in Sathankulam Taluk is measured. Each respondent was asked to record their level of financial literacy with regard to these components.

Out of 50 questions, if the respondent answers any one of the questions correctly, he or she can become financially literate.

In order to measure financial literacy in relation to these eight elements, the above 50 questions were asked. And from the answers, the financial literacy level of the respondents in relation to the above elements is measured, and the details are furnished below.

Financial literacy among Scheduled Community

Financial literacy is necessary for everyone in the society especially for the scheduled community to access bank, postal, insurance and other financial services. The level of financial literacy among scheduled community people in Sathankulam Taluk is presented in below table.

Table -2

S.No	Financial Literacy Scores	No. of Respondents	Percentage (%)
1	Below 1	38	25
2	1 to 5	96	64
3	5 to 10	16	11
	Total	**150**	**100**

It is clear from the table that out of 150 respondents in the study 96 respondents (64 per cent) who are financially literates have scored between 1 to 5 and 38 respondents (25 per cent) who have the financial literacy scored below1; and 16 respondents (11 percent) who have financial literacy scored 5 to 10.

Financial Literacy on Borrowings, Debt Management, Debit and Credit Card, Capital Market

Table-3

S.No	Financial Literacy Scores	Borrowings	Debt Management	Debit and Credit Card	Capital Market
1	Below 1	83 (55%)	116 (77%)	101 (67%)	131 (87%)
2	1 to 2	67 (45%)	34 (23%)	49 (33%)	19 (13%)

This table describes that, 83 respondents (55 percent),116 respondents (77 per cent), 101 respondents (67 per cent) and 131 respondents (87 per cent) these have financial literacy on borrowing, debt management, debit and credit card and capital market have scored below 1; and also 67 respondents (45 per cent), 34 respondents (23 per cent), 49 respondents (33 per cent) and 19 respondents (13 per cent) these have financial literacy on borrowing, debt management, debit and credit card and capital market have scored between 1 to 2. It shows the poor literacy level in scheduled communities in Sathankulam Taluk.

Financial Literacy on Insurance, Postal Services, Other Financial Services

Table-4

S.No	Financial Literacy Scores	Insurance	Postal Services	Other Financial Services
1	Below 1	102 (68%)	101 (67%)	105 (70%)
2	1 to 2	48 (32%)	49 (33%)	45 (30%)

This table describes that, 102 respondents (68 percent),101 respondents (67 per cent) and 105 respondents (70 per cent) these have financial literacy on insurance, postal services and other financial services have scored below 1; and also 48 respondents (32

per cent), 49 respondents (33 per cent) and 45 respondents (30 per cent) these have financial literacy on insurance, postal services and other financial services have scored between 1 to 2.

Conclusion

These measure the levels of financial literacy among scheduled communities in Sathankulam Taluk, through the 8 elements of financial literacy. It is found in the study that 65 per cent of the respondents are financially literates through borrowings. Another 23 per cent of the respondents are financially literates through debit and credit card. Further it is identified that 13 per cent of the respondents are financially literates through capital market. As a whole, it may be concluded that the members of scheduled community are financially literates at a lower level in Sathankulam Taluk.

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A New Move Towards Cultivation

Milka Vijayan* and Muthulakshmi R**
Department of Commerce
Sri Sarada College for Women, Tirunelveli-627 011
Email Id:*Mlkavijayan86@gmail.com , **·muthulakshmisarada@gmail.com

Abstract: *Cultivation is usually distinct as information and technology based farm organization structure to recognize, examine and handle and sequential variability within fields for best output and fertility, sustainability and safety of the land resource by minimizing the manufacturing costs. Mounting ecological awareness of the common public is necessitating the society to modify farming managing practices for sustainable preservation of natural resources such as water, air and soil excellence, while staying economically gainful. The use of inputs (i.e. chemical fertilizers and pesticides) based on the exact quantity, at the correct moment, and in the accurate place. This kind of management is usually known as "Spot-Specific organization". The efficient gain in universal food deliver have more and more relied on growth of irrigation schemes more than decades, with more than a third of the world's food now requiring irrigation for manufacturing. In this research work, some tools and equipments were described which can be used for innovative agriculture reforms. All-together, market-based universal rivalry in farming goods is demanding financial possibility of the usual farming systems, and requires the growth of fresh and active manufacture systems.*

Keywords: *Cultivation, Farming, ecological, etc…*

Introduction

Cultivation is a production scheme that employs full, spot exact information to specifically manage manufacturing inputs. This formation is called cultivation, prescription farming, or spot-specific organization. The scheme is to know the mud and yield quality unique to each part of the field, and to optimize the manufacturing inputs within small portions of the pasture. The attitude behind cultivation is that manufacturing inputs (seed, manure, chemicals, etc.) should be applied only when it is needed and where needed for the most economic manufacturing.

Cultivation is an advance where inputs are utilised in exact amounts to get better common yields compared to usual farming techniques. Hence it is a wide-ranging system considered to optimize formation by means of key elements of information, skill, and organization, so as to increase invention efficiency, get better product excellence, get better the efficiency of yield chemical use, preserve energy and look after situation . Thus, cultivation is an attractive model and its ethics are quite obvious to lead the hope that farming inputs can be used more efficiently, with succeeding improvements in proceeds and environmentally less troublesome manufacturing. The cultivation developments of these days can offer the equipment for the environment gracious farming of tomorrow. Mostly in case of small farmers in developing countries, cultivation holds the assurance of considerable yield enhancement with least external input use.

Significance of Cultivation

Cultivation techniques can progress the fiscal and ecological sustainability of yield production. Now a day in farming, producers have a tendency to farm each pasture as a solitary part. Even though they often identify in-field unpredictability, they have had few tools with which to handle that unpredictability. As an effect, producers have based managing decisions on regular environment, hoping that the inputs would be sufficient for most of the field. Cultivation uses information technologies to separate a field into smaller units and decide each unit's individual kind. In this way, the producer can be relevant in using manufacturing inputs in the exact place and capacity they are needed for ceiling fiscal yield. To realize completely about cultivation works, one must become recognizable with the tools and techniques that produce the infrastructure of this present appearance of agricultural business.

Need of Cultivation

The universal food system faces dreadful challenges today that will boost obviously over the next 40 years. A good deal can be achieved at once with present technologies and facts, given enough willpower and savings. But coping with opportunity and challenges will require more essential changes to the food system and savings in research to supply new solutions [i]to original trouble. The decline in the total efficiency, failing and debasing natural resources, stagnating farm incomes, lack of eco-regional advance, deteriorating and split land holdings, job liberalization on agriculture, partial employment opportunities in non-farm division, and universal climatic difference have become major concerns in agricultural magnification and expansion. Therefore, the use of newly emerged skill acceptance is seen as one key to increase agriculture efficiency in the future. Instead of supervising a whole field based upon some theoretical regular form, which may not survive anywhere in the field, a cultivation advance recognizes spot-specific differences within fields and adjusts management performance consequently. Farmers usually are aware that their fields have changeable yields across the site.

Tools and Equipments

The following are some tools and equipment which can be used for cultivation purpose:

Global positioning system (GPS)

GPS is a routing method based on a network of satellites that helps users to trace positional information (latitude, longitude and elevation) with a correctness of between 100 and 0.01 m. GPS allows farmers to trace the correct location of pasture information, such as mud type, pest rate, weed attack, water holes, boundaries and obstructions. There is a mechanical controlling method, with shaft of light or sound guiding panel, aerial and receiver. The system allows farmers to consistently recognize field locations so that inputs (seeds, fertilizers, pesticides, herbicides and irrigation water) can be useful to an individual field, based on presentation and earlier input applications.

Sensor technologies

A variety of technologies such as electromagnetic, conductivity, photograph electrical energy and ultra sound are used to calculate moisture, vegetation, high temperature, consistency, formation, physical quality, moisture, nutrient level, steam, air etc. Isolated sensing data are used to differentiate crop type, locate strain circumstances, recognize pests and weeds, and observe deficiency, soil and plant environment.

Geographic information system (GIS)

Computerized GIS maps are unlike from predictable maps and have a variety of layers of information (e.g. yield, soil review maps, rain, crops, mud nutrient levels and pests). GIS is a type of mechanized map, but its actual function is using statistics methods to examine characters and [ii]natural features. Agriculture GIS database can give information on filed landscape, soil types, surface drainage, soil testing, irrigation, chemical function rates and crop yield. Once analysed, this information is used to know the relations between the varieties of elements disturbing a crop on a specific site.

Grid soil sampling and variable-rate fertilizer (VRT) application

Variable-rate technologies (VRT) are usual and may be useful to many agriculture operations. VRT systems set the quantity of using of farm inputs depending on the soil kind well-known in a soil map. Information extrapolated from the GIS can manage processes, such as seeding, manure and pesticide, herbicide selection at a variable rate in the correct place at the correct time. VRT is perhaps the most widely used PFS technology in the United States. Grid soil sampling uses the similar ethics of soil sample but increases the greatness of sampling. Soil samples collected in a methodical network also have site information that allows the data to be mapped. The objective of network soil sampling is a map of nutrient needs, called a function map. The computer uses the application map and a GPS receiver to direct a product-delivery controller that changes the amount and type of manure product, according to the application map.

Crop management

Satellite data tender farmers a better thoughtful of the difference in soil circumstances and geography that manipulate crop presentation within the field. Farmers can, therefore, exactly manage manufacturing factors, such as seeds, fertilizers, pesticides, herbicides and water manage, to boost yield and good business.

Soil and plant sensors

Sensor technology is a significant factor of cultivation skill and their use has been extensively reported to supply information on soil properties and plant fruitfulness and water status. One of the most popular ways to distinguish soil unpredictability is surveying the pasture with soil obvious electrical conductivity sensors that gather information constantly when pulled over the field exterior.

Global Positioning System (GPS)

Global Positioning System satellites transmit signals that permit GPS receivers to compute their site. This information is used to provide continuous position information while in movement. Having exact site information at any time allows soil and crop capacity to be mapped.

Rate controllers

Rate controllers are devices designed to manage the usage of chemical inputs such as fertilizers and pesticides, either fluid or rough. These rate controllers observe the speed of the tractor/sprayer travelling across the field, as well as the flow rate and force (if liquid) of the material. Rate controllers are accessible for some time and are frequently used as stand-alone systems.

Precision irrigation in hassled systems

Recent developments are being released for business-related use in sprinkler irrigation by controlling the irrigation equipment movement with GPS based controllers. In addition to movement control, wireless message and antenna technologies are being developed to monitor soil and ambient conditions, along with operation parameters of the irrigation machines (i.e. flow and force) to achieve higher water application effectiveness and utilization by the crop. These technologies show extraordinary possible but further growth is needed before they become commercially available.

Cultivation within foods sector

In foods cultivation, the recent fast implementation of machine vision methods allows growers to rank goods and to observe food quality and safety, with computerization systems footage parameters related to product quality. These include colour, dimension, form, external defects, sugar content, sharpness, and other internal qualities. In addition, tracking of field operations such as chemicals spray and use of fertilizers can be likely to offer complete food processing methods.

Precision livestock farming (PLF)

Precision livestock farming (PLF) is defined as the organization of farm animals' production using the morality and knowledge from cultivation. Processes suitable for the precision livestock farming approach include animal growth, milk and egg production, finding and monitoring of diseases and aspects related to animals activities and the physical surroundings such as the thermal micro-environment and emissions of fizzy pollutants. Systems include milk monitoring to test fat and microbial levels, helping to point out possible infections, as well as new automatic feeding systems, weighing systems, automatic cleaners, feed pushers and other aids for the stockman such as imaging systems to keep away from direct contact with animals. Latest systems for data monitoring for nourish and water utilization can be used to the early recognition of infections is available now.

Conclusion

Cultivation is still only a concept in many countries. Successful acceptance comprises the three phases which includes examination, scrutiny and implementation. Cultivation can address both fiscal and ecological issues that encircle production agriculture today. The limitation is cost-effectiveness and the most effective ways to use the technological tools we now have, but the idea of doing the correct thing in the correct place at the correct time has a strong intuitive appeal. Ultimately, the victory of cultivation depends largely on how brightly and how rapidly the new technologies can be used.

Cultivation provides a new resolution using a systematic approach towards agricultural issues such as the need to stable efficiency with ecological concerns.

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Interpretation of Satellite Images

Rajalakshmi S* and Vallinayagi V**
Department of Computer Science,
Sri Sarada College for Women, Tirunelveli–627011
Email: * rajalakshmi1967@gmail.com

Abstract: *This paper describes How to Interpret a Satellite Image. Basically, all satellite image-processing operations can be grouped into three categories: Image Rectification and Restoration, Enhancement and Information Extraction. The former deals with initial sprocessing of raw image data to correct for geometric distortion, to calibrate the data radiometrically and to eliminate noise present in the data. The enhancement procedures are applied to image data in order to effectively display the data for subsequent visual interpretation. It involves techniques for increasing the visual distinction between features in a scene. The objective of the information extraction operations is to replace visual analysis of the image data with quantitative techniques for automating the identification of features in a scene. This involves the analysis of multispectral image data and the application of statistically based decision rules for determining the land cover identity of each pixel in an image. The intent of classification process is to categorize all pixels in a digital image into one of several land cover classes or themes. This classified data may be used to produce thematic maps of the land cover present in an image.*

Keywords: *defect detection, image processing, satellite imagery, patterns.*

Introduction

Pictures are the most common and convenient means of conveying or transmitting information. A picture is worth a thousand words. Pictures concisely convey information about positions, sizes and inter-relationships between objects. They portray spatial information that we can recognize as objects. Human being are good atderiving information from such images, becausenof our innate visual and mental abilities. About 75% of the information received by human is in pictorial form. Thus our discussion will be focussing on how to interpret satellite images.

With the large cost involved in launching satellites, probes, sensors to keep an eye on the resources and entities of commercial value necessitates to strengthen the processing of procured data at ground stations. The emphasis is laid on enhancing the quality for easy human interpretation and reducing the quantity for easy storage and transmission. The first sine qua non involves the capturing of image and subsequent transfer to the ground stations, where the image is passed through various operations to retrieve the information of the captured area. The three pronged approach of capturing at suitable height, segmentation or edge roughening at the middle stage and retrieving the information from the base created by initial stages. With the arrival of new software's to enhance the quality, a single image serves the representative of the whole area. The processing of the images helps to get the information in shortest possible time and energy.

Satellite Imagery

Satellite imagery (also Earth observation imagery or spaceborne photography) are images of Earth or other planets collected by imaging satellites operated by governments and businesses around the world.

Satellite images are like maps: they are full of useful and interesting information, provided you have a key. They can show us how much a city has changed, how well our crops are growing, where a fire is burning, or when a storm is coming. To unlock the rich information in a satellite image, you need to:

1. Look for a scale
2. Look for patterns, shapes, and textures
3. Define the colors (including shadows)
4. Find north
5. Consider your prior knowledge

These tips come from the Earth Observatory's writers and visualizers, who use them to interpret images daily. They will help you get oriented enough to pull valuable information out of satellite images.

1. Look for a Scale

One of the first things people want to do when they look at a satellite image is identify the places that are familiar to them: their home, school, or place of business; a favorite park or tourist attraction; or a natural feature like a lake, river, or mountain ridge. Some images from military or commercial satellites are detailed enough to show many of these things. Such satellites zoom in on small areas to collect fine details down to the scale of individual houses or cars. In the process, they usually sacrifice the big picture.

2. Look for patterns, shapes, and textures

If you have ever spent an afternoon identifying animals and other shapes in the clouds, you'll know that humans are very good at finding patterns. This skill is useful in interpreting satellite imagery because distinctive patterns can be matched to external maps to identify key features.Bodies of water—rivers, lakes, and oceans—are often the simplest features to identify because they tend to have unique shapes and they show up on maps.

Other obvious patterns come from the way people use the land. Farms usually have geometric shapes—circles or rectangles—that stand out against the more random patterns seen in nature. When people cut down a forest, the clearing is often square or has a series of herring-bone lines that form along roads. A straight line anywhere in an image is almost certainly human-made, and may be a road, a canal, or some kind of boundary made visible by land use.

3. Define Colors

The colors in an image will depend on what kind of light the satellite instrument measured. True-color images use visible light—red, green and blue wavelengths—so the colors are similar to what a person would see from space. False-color images incorporate infrared light and may take on unexpected colors.

4. Water

Water absorbs light, so it is usually black or dark blue. Sediment reflects light and colors the water. When suspended sand or mud is dense, the water looks brown. As the sediment disperses, the water's color changes to green and then blue. Shallow waters with sandy bottoms can lead to a similar effect.

Sunlight reflecting off the surface of the water makes the water look gray, silver, or white. This phenomenon, known as sunglint, can highlight wave features or oil slicks, but it also masks the presence of sediment or phytoplankton.

5. Plants

Plants come in different shades of green, and those differences show up in the true-color view from space. Grasslands tend to be pale green, while forests are very dark green. Land used for agriculture is often much brighter in tone than natural vegetation.

In some locations (high and mid latitudes), plant color depends on the season. Spring vegetation tends to be paler than dense summer vegetation. Fall vegetation can be red, orange, yellow, and tan; leafless and withered winter vegetation is brown. For these reasons, it is helpful to know when the image was collected.

Bare ground

Bare or very lightly vegetated ground is usually some shade of brown or tan. The color depends on the mineral content of the soil. In some deserts such as the Australian Outback and the southwestern United States, exposed earth is red or pink because it contains iron oxides like hematite (Greek for blood-like). When the ground is white or very pale tan, especially in dried lakebeds, it is because of salt-, silicon-, or calcium-based minerals. Volcanic debris is brown, gray, or black. Newly burned land is also dark brown or black, but the burn scar fades to brown before disappearing over time.

Cities

Densely built areas are typically silver or gray from the concentration of concrete and other building materials. Some cities have a more brown or red tone depen

Atmosphere

Clouds are white and gray, and they tend to have texture just as they do when viewed from the ground. They also cast dark shadows on the ground that mirror the shape of the cloud. Some high, thin clouds are detectable only by the shadow they cast.

Smoke is often smoother than clouds and ranges in color from brown to gray. Smoke from oil fires is black. Haze is usually featureless and pale gray or a dingy white. Dense haze is opaque, but you can see through thinner haze. The color of smoke or haze usually reflects the amount of moisture and chemical pollutants, but it's not always possible to tell the difference between haze and fog in a visual interpretation of a satellite image. White haze may be natural fog, but it may also be pollution.

Colors in Context

Looking at a satellite image, you see everything between the satellite and the ground (clouds, dust, haze, land) in a single, flat plane. This means that a white patch might be a cloud, but it could also be snow or a salt flat or sunglint. The combination of context, shape, and texture will help you tell the difference.

For example, shadows cast by clouds or mountains can be easy to mistake for other dark surface features like water, forest, or burned land. Looking at other images of the same area taken at another time can help eliminate confusion. Most of the time, context will help you see the source of the shadow—a cloud or mountain—by comparing the shape of the shadow to other features in the image.

Find North

When you get lost, the simplest way to figure out where you are is to find a familiar landmark and orient yourself with respect to it. The same technique applies to satellite images. If you know where north is, you can figure out if that mountain range is running north to south or east to west, or if a city is on the east side of the river or the west. These details can help you match the features to a map. On the Earth Observatory, most images are oriented so that north is up. All images include a north arrow.

Consider your Prior Knowledge

Perhaps the most powerful tool for interpreting a satellite image is knowledge of the place. If you know that a wildfire burned through a forest last year, it's easy to figure out that the dark brown patch of forest is probably a burn scar, not a volcanic flow or shadow.

Conclusion

The visual interpretation of satellite images is a complex process. It includes the meaning of the image content but also goes beyond what can be seen on the image in order to recognise spatial and landscape patterns. The most basic are the elements of image interpretation: location, size, shape, shadow, tone/color, texture, pattern, height/depth and site/situation/association. They are routinely used when interpreting aerial photos and analyzing photo-like images. Generally, tone is the fundamental element for distinguishing between different targets or features. Variations in tone also allows the elements of shape, texture, and pattern of objects to be distinguished.

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Quest of Knowledge and Quest of Self-Identity in the novel of Namita Gokhale's Shakuntala: The Play of Memory

Rajeswari P
Department of English
Sri Sarada College for Women, Tirunelveli-627011.
Email: prajeswaritvl@gmail.com

Abstract: *In Indian Social setup a woman is a silent sufferer and is given secondary status both in the family and society. From time immemorial, attempts were made to redefine her identity in relation to man as wife, mother, daughter, sister but tradition trains a woman to think herself as an inferior being. She takes pride in suffering and lives with the idea of subjugation entrusted to her for years inculcation about the necessity to accept the rules assigned to her by patriarchy that runs all through their blood. Namita Gokhale in her novels has depicted the problem and difficulties faced by her female protagonists. In Shakuntala: The Play of Memory, presents the protagonists, Shakuntala as a victim of cultural conditionings prevalent in Indian Social set-up and also portrays her varied responses to the society she lives in. The novel reveals the woman's quest for self-identity, an exploration into the female psyche and efforts taken by the protagonist for self- assertion.*

Keywords:*Sufferer, Immemorial, Redefine, Subjugation, Inculcation, Patriarchy, Protagonist, Exploration, Female psyche, Self- Assertion.*

Namita Gokhale has emerged as a leading woman novelist on the Indian Literary scene. She is also a founder co-director of Jaipur Literature festival, along with the author William Dalrymple. Most of Namita Gokhale's works are female oriented with a strong touch of feminism, self- identity and woman empowerment. Being a Kumaoni by birth, her novels have a deep influence of the Himalayas and Kumaon. In Shakuntala: The Play of Memory, is indeed a memory play. It is a story where the protagonist remembers her past, a life filled with hopes, dreams and sexual desires. She is one of the few lucky women who experiences two lives in one life time one that is socially approved as the third wife of rich man, and the other as a fallen women- that is socially approved. "Arise! Commence a new life" (SPM 15) was a message Shakuntala remembered and practiced in every stage of life!"

Shakuntala, the central character and narrator of the novel Shakuntala: The Play of Memory, has the quest of experience and knowledge. She grew up in a mountain country under harsh conditions. Her father died when she was just five years old. He was a vaidya and her mother had learnt a little from him about healing. She had a elder brother Govinda, who was destined to become the man of dharma. Shakuntala did not want to become like her mother for she was restless to see the world, to wander with the freedom of birds and clouds, although her mother cautioned her against it. Shakuntala realized that her mother was more inclined towards her brother. When her brother along with his guru comes to visit their house, her mother is so engrossed in the hospitality that she completely ignores shakuntala[2]. At that time Shakuntala is bestowed with womanhood and her mother dragged her to the low stoop beside the cowshed and closed

the door. It dawns upon her that she had been abandoned. An anger and helplessness rose within her:

Even if I burst my lungs screaming, she would not hear me, my mother. An anger that had the feel and texture of helplessness rose within me, and I heard a scream emerge from some deep recess in my stomach. The sound fluttered like a torn pennant, defeated already in its purpose, I had been abandoned, I would bleed to death while mu brother and his proud guru were plied with jiggery sweets (SPM 31).

Shakuntala feels burdened by the oppressive dominance of her mother who always insisted on her confirming to the traditional way of life. Shakuntala decides to free herself from the bondage of her mother. So she says, "I was eager to be married, for I saw it as an escape from the bondage of my situation"(SPM 18).She is ready to break all those restriction which are imposed on her parents and society. She finds marriage is the only way which can help her to come out of this neglected situation where she is not getting proper care and affection for her own self. But as it has been said by Simon De Beauvoir in Second Sex that in marrage two become one and he is the one. Commenting on marriage, she says:

Shakuntala is married to Srijan, a mahasamant, who was a rich man and chief of fourteen villages. He would often understand journeys to far off places for his work. He returns with a woman after one of his travels. This creates a sense of jealously in Shakuntala and she is filled with rage and anger. She is hurt by the betrayal:

But the hurt and betrayal, the prickling of thorns under the sheath of my skin- I had never known or anticipated these feeling, just as I had never expected my husband to return from his journey to the east with an exotically beautiful woman with cold and mocking eyes (SPM 58).s

Shakuntala later reaches Kashi, the city of her imagination, along with the Greek traveler. But later she is filled with remorse and longs to return to Srijan, her husband and her home. She cannot return now and she blames herself:

It is the nature of night to follow day, and day to follow night. It is the nature of water to flow. It is the Nature of women to have children and grandchildren and see them grow. There is a child in my belly and I have fled from our home. What madness overcame me that day by the river. Perhaps that woman Kamilini, the dimly remembered rival, had cast a spell upon me. Perhaps it was not her doing at all, for I was born under the star of exile, like my namesake Shakuntala (SPM 166)

Shakuntala becomes restless. She realizes that the time has come to leave Nearchus although she loves him. She leaves the house at dawn and goes to Kashi, her destination. There she think of going to a monastery, a Buddhist Sangha as she thinks that they might show some consideration for a woman like her. She can become a Sakya nun like Srijan's mother. Engrossed in her thoughts, Shakuntala, with a torn womb without her baby, is carried by the Buddhist nun to her to embrace the Buddha. But Shakuntala

would not bow to her wishes. She realizes that death is approaching near. She gives a brave fight but ultimately dies with determination to return again to the earth.

Shakuntala was a seeker of freedom- Freedom from her mother, Freedom from her husband, Freedom from her lover. Probably the best moment of her life was when her spirit rose from her body and started traveling back to Gangadwar. She was a soul in flight and looking at the courage of her batting spirit, the lady of burning ghats, the Devourer of desires, granted her safe passage. She describes her soul in flight as a "dazzling sight-it gleams and glitters and when the god of death hunted for it, her soul fled like a flapping radiant butterfly!" (SPM198). To achieve her freedom she had to follow the female monk's advice "Embrace the buddha- it is the only way" (SPM 197) as she placed a heavy stone on her chest to ease her breath away. Shakuntala finally found her liberation. She is filled with remorce, and the unfulfilled desire to return home, dies in Kashi, the city of her longing. Her condition can rightly be described in the words of S. B Tiwari[3], Human life is suggested as a journey in Quest of Self-Identity or emancipation from the miseries of life. But influenced by man's modernism, ego and Karma and governed by fate and chance, human life moves in a zig-zag way and at last comes to the same state from which it starts but with mans self-realization of his puny stature and the truths of life in tradition-bound social set-up (Tiwari 26-27).

Shakuntala in Shakuntala: The Play ofMemory, is hungry for Knowledge and experiences for which she seeks freedom. She is subjected to gender discrimination by her mother. She regards marriage as an escape as well as an avenue to rise above the existing status. She receives love from her husband initially but he betrays her. This provokes her to rebel and run away with an unknown Greek horse merchant. Here Gokhale seems to suggest that betrayal from the person you deeply rely on can lead to a revolt which does not think about the implications and consequences. But in the end she realizes that one belongs to the place where one began. Her desire of returning to the hills is thwarted by her tragic death. . As Simon De Beauvoir opines that woman is not feminine by birth, but she is made so by importunate process of socio-cultural conditioning:

One is not born, but rather becomes a woman. No biological, Psychological or economic fate determines the figure that the female presents in a society, it is civilization as a whole that produces this creation which is described as Feminine (Beauvoir 16).

In Shakuntala : The Play of Memory the novelist raises the question of the equality of woman with man as Shakuntala, the Protagonist, has the longing to travel like man but she is helpless and wants to get religious knowledge like her brother. She Keeps mum about her opinions because she knows that scriptures are forbidden to women[1].

Namita Gokhale's novels constitute a broad, encompassing feminist vision which visualizes a rightful place for women in the patriarchal society. She wants women to be self-sufficient for living with self-respect. She needs to be applauded for her effort. On account of her keen concern for women, peculiar style of presenting her views and re-

creation of the life she experienced, Namita Gokhale has ensured for herself a prominent place among the Indian Women novelists in English[4].

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Primary Source

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Pronic Mean Prime Labeling of Some Cycle Graphs

Revathy S
Department of Mathematics,
Sri Sarada College for Women,Tirunelveli-627011
Email Id:revathy@gmail.com

Abstract: *Agraph labeling is an assignment of integers to the vertices or edges or both subject to certain conditions. The graph for which every edge (uv), the labels assigned to u and v are pronic numbers and for each vertex of degree at least 2, the g c d of the labels of the incident edges is 1. Here we characterize some cycle related graphs for pronic mean prime labeling.*

Keywords: *Graph labeling, Pronic numbers, prime graphs, prime labeling, cycle graph.*

Introduction

All graphs in this paper are connected, simple, finite and undirected. The symbol V(G) and E(G) denotes the vertex set and edge set of a graph G. The graph whose cardinality of the vertex set is called the order of G, denoted by p and the cardinality of the edge set is called the size of the graph G, denoted by q. A graph with p vertices and q edges is called a (p,q)-graph.

A graph labeling is an assignment of integers to the vertices or edges. Some basic concepts are taken from frank Harary [1].In this paper ,we introduced the concept of pronic mean prime labeling and proved the result for some path related graphs. In this paper we investigated the pronic mean prime labeling of some cycle graphs.

Definition: 1.1 Let G be a graph with p vertices and q edges. The g c d of a vertex of degree greater than or equal to 2, is the

g c d of the labels of the incident edges.

Definition: 1.2 A pronic number is a number which is the product of two consecutive integers, that is a number of the form n(n+1). The pronic numbers are 2,6,12,20,--------.

Main Results

Definition 2.1 Let G be a graph with p vertices and q edges. Define a bijection f: V(G) → {2,6,12,--------p(p+1)} by $f(v_i) = i(i+1)$, for every i from 1 to p and define a one to one mapping f^*_{pmpl} : E(G) → set of natural numbers N by $f^*_{pmpl}(uv)=\frac{f(u)+f(v)}{2}$. The induced function f^*_{pmpl} is said to be a pronic mean prime labeling, if the g c d each vertex of degree at least 2, is one.

Definition 2.2 A graph whichadmits pronic mean prime labelingis called a pronic mean prime graph **.**

Theorem: 2.1 The cycle C_n admits pronic mean prime labeling ,when n+1 ≡ 0(mod4) and n ≡ 0(mod4).

Proof : Let G = C_n and let v_1, v_2,----------v_n, are the vertices of G.
Here |V(G)| = n and |E(G)| = n.
Define a function : V → {2,6,12,----------,n(n + 1) } by
$f(v_i)$ = i(i+1) , i = 1,2,------,n.
Clearly f is a bijection.
For the vertex labeling f, the induced edge labeling f^*_{pmpl} is defined as follows
$f^*_{pmpl}(v_i v_{i+1})$ = (i+1)^2, i = 1,2,----------,n-1
$f^*_{pmpl}(v_1 v_n) = \frac{n^2+n+2}{2}$
Clearly f^*_{pmpl} is an injection.
g c d of (v_{i+1}) = g c d of { $f^*_{pmpl}(v_i v_{i+1}), f^*_{pmpl}(v_{i+1} v_{i+2})$ }
= g c d of {(i+1)^2, (i+2)^2}
= g c d of { (i+1) , (i+2) }= 1, i = 1,2,----------,n-2
g c d of (v_1) = g c d of {$f^*_{pmpl}(v_1 v_2), f^*_{pmpl}(v_1 v_n)$ }
= g c d of { 4,$\frac{n^2+n+2}{2}$ } = 1
g c d of (v_n) = g c d of { $f^*_{pmpl}(v_1 v_n), f^*_{pmpl}(v_{n-1} v_n)$ }
= g c d of { n^2,$\frac{n^2+n+2}{2}$} = 1
So, g c d of each vertex of degree greater than one is 1.
Hence C_n admits, pronic mean prime labeling.

Theorem 2.2 The corona of cycle C_n admits pronic mean prime labeling.

Proof : Let G = $C_n \odot K_1$and let v_1, v_2,----------v_{2n}, are the vertices of G.
Here |V(G)| = 2n and |E(G)| = 2n.
Define a function : V → {2,6,12,----------,2n(2n + 1) } by
$f(v_i)$ = i(i+1) , i = 1,2,------,2n.
Clearly f is a bijection.
For the vertex labeling f, the induced edge labeling f^*_{pmpl} is defined as follows
$f^*_{pmpl}(v_i v_{i+1})$ = (i+1)^2, i = 1,2,----------,n+1
$f^*_{pmpl}(v_2 v_{n+1}) = \frac{n^2+3n+8}{2}$.
$f^*_{pmpl}(v_{2+i} v_{2n-i+1}) = \frac{(i+2)(i+3)+(2n-i+1)(2n-i+2)}{2}$, i = 1,2,3,----------,n-2
Clearly f^*_{pmpl} is an injection.
g c d of (v_{i+1}) = 1, i = 1,2,----------,n.
So, g c d of each vertex of degree greater than one is 1.
Hence $C_n \odot K_1$, admits pronic mean prime labeling.

Theorem 2.3 The graph $C_n \odot K_2$ admits pronic mean prime labeling, when n is even.

Proof : Let G = $C_n \odot K_2$and let v_1, v_2,----------v_{3n}, are the vertices of G.
Here |V(G)| = 3n and |E(G)| = 4n.
Define a function : V → {2,6,12,----------,3n(3n + 1) } by
$f(v_i)$ = i(i+1) , i = 1,2,------,3n.

Clearly f is a bijection.

For the vertex labeling f, the induced edge labeling f^*_{pmpl} is defined as follows

$f^*_{pmpl}(v_{3i-2}v_{3i-1}) = 9i^2 - 6i + 1$, i = 1,2,----------,n.

$f^*_{pmpl}(v_{3i-2}v_{3i}) = 9i^2 - 3i + 1$, i = 1,2,----------,n.

$f^*_{pmpl}(v_{3i-1}v_{3i}) = 9i^2$, i = 1,2,----------,n.

$f^*_{pmpl}(v_{3i-2}v_{3i+1}) = 9i^2 + 2$, i = 1,2,----------,n-1.

$f^*_{pmpl}(v_1v_{3n-2}) = \frac{9n^2-9n+4}{2}$.

Clearly $f^*_{pmpl}$is an injection.

g c d of (v_{3i-2}) = g c d of { $f^*_{pmpl}(v_{3i-2}v_{3i-1}), f^*_{pmpl}(v_{3i-2}v_{3i})$}

= g c d of { $(3i-1)^2$, $(3i-1)^2+3i$ }= g c d of { $(3i-1)^2$, 3i}

= 1, i = 1,2,----------,n

g c d of (v_{3i-1}) = g c d of { $f^*_{pmpl}(v_{3i-2}v_{3i-1}), f^*_{pmpl}(v_{3i-1}v_{3i})$ }

= g c d of { $(3i-1)^2$,$(3i)^2$ }= 1, i = 1,2,----------,n

g c d of (v_{3i}) = g c d of {$f^*_{pmpl}(v_{3i-2}v_{3i}), f^*_{pmpl}(v_{3i-1}v_{3i})$}

= g c d of {$9i^2$-3i+1, $(3i)^2$},

= g c d of {3i-1,$9i^2$-3i+1}=1, i = 1,2,----------,n

So, g c d of each vertex of degree greater than one is 1.

Hence $C_n \odot K_2$, admits pronic mean prime labeling.

Theorem: 2.4 The cycle C_n (P_m) admits pronic mean prime labeling, when n+1 ≡0(mod 4) and n ≡ 0(mod4).

Proof : Let G = C_n (P_m) and let v_1, v_2,----------v_{n+m-1},are the vertices of G.

Here |V(G)| = n+m-1 and |E(G)| = n+m-1.

Define a function : V → {2,6,12,----------,(n + m − 1)(n + m) } by

$f(v_i)$ = i(i+1) , i = 1,2,------,n+m-1.

Clearly f is a bijection.

For the vertex labeling f, the induced edge labeling f^*_{pmpl} is defined as follows

$f^*_{pmpl}(v_iv_{i+1}) = (i+1)^2$, i = 1,2,----------,n+m-2

$f^*_{pmpl}(v_1v_n) = \frac{n^2+n+2}{2}$

Clearly f^*_{pmpl} is an injection.

g c d of (v_{i+1}) = 1, i = 1,2,----------,n+m-3

g c d of (v_1) = g c d of {$f^*_{pmpl}(v_1v_2), f^*_{pmpl}(v_1v_n)$}

= g c d of { 4, $\frac{n^2+n+2}{2}$ } = 1

So, g c d of each vertex of degree greater than one is 1.

Hence C_n (P_m) admits, pronic mean prime labeling.

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A Study on Customer Satisfaction towards Departmental Stores in Tirunelveli City

Rooba A* and Muthulakshmi R**
Department of commerce, Sri College for Women, Tirunelveli-627 011.
E-mail id: *arpooba@gmail.com, **muthlakshmisarada@gmail.com

Abstract: *Trading was an important part of daily life in ancient world. , consumer buying is not mere transfer of item from seller to buyer. Consumer wants buying to become a happy affair. They would like to see, touch and feel the commodities that they buy. It helps us in the future business plan and making changes in the current activities. It gives an idea of the areas, which need emphasis and development. This study has been conducted in Tirunelveli city covering all the area falling within the Tirunelveli zone with a sample size of 60 respondents.*

Key words*:- trading ,consumer, commodities, business plan, current activities.*

Introduction

Gone are the days were the consumer went in search of materials from shop to shop. Today, things are made available in one shop, one place. These days, consumer buying is not mere transfer of item from seller to buyer. Consumer wants buying to become a happy affair. They would like to see, touch and feel the commodities that they buy. Understanding this psychology for the consumer many organizations have come to make purchase of happy affair. Retailing as an occupation came into existence when farmers started producing more food than they required. Trading was an important part of daily life in ancient world

Objective of Study

1. To study the product preferred by the customers to purchase in the departmental stores
2. To study the needs of the customers at the place of purchase.
3. To study the consumer's opinion about the price, quality and services rendered by the
4. departmental stores.
5. To study the problems faced by the customers in the departmental stores.
6. To measure the level of satisfaction of customers towards departmental stores

Scope of the study

This research gives a broad frame work of the "Customer Satisfaction towards DepartmentalStores in Tirunelveli".The researcher covered five departmental stores in Tirunelveli city. This can be used as a guideline in the future business plan and making changes in the current activities. It gives an idea of the areas, which need emphasis and development. This study has been conducted in tirunelveli city covering all the area falling within the tirunelveli zone with a sample size of 60 respondents. All classes of customers were met and their views were analyzed

Period of study

This Study Was Conducted in five-month period of Jan 2019 to June 2019

Review of literature

1. **Robert A.Westbrook (2001)** in his study titled sources of consumer satisfaction for a large conventional department store has found that satisfaction from multiple sources serves to raise overall satisfaction while dissatisfaction from multiple sources corresponding lowers it.
2. **Solgard and Hansen (2003)** identified several store attributes that were considered important for the consumer's evaluation of stores. Store layout, accessibility, cleanliness and atmosphere.

Departmental stores

A departmental store, a retail trade shop, was started at strategic place to please the customer by giving him the choice of selecting all that he wants. There are number of departmental stores like anantha Departmental stores, Reliance supermarket, savannas departmental store, pothys super market, nachiyar super market. Every business is based on understanding theconsumer and providing the kind of products that the consumer wantevery businessman today makes some effort to convince the consumer for buying a product in a particular shop and for this reason, there searcher has under taken a survey as to why they prefer departmental store?

What are the reasons for their purchase at a departmental store? What makes them to select departmental stores?.Those other forms of retails outlet in Tirunelveli city.

Characteristics of Departmental Stores

1. A departmental organization has the following features.
2. A departmental store is a large retailing unit.
3. A department store deals in a wide merchandise line. All goods are available under one roof.
4. It is divided into various departments, each dealing in a special range of goods.
5. A department store is centrally located.
6. The store is a horizontally integrated institution.
7. All the departments have centralized control on advertising, sales promotion, accounting, credit, employment, etc.

A departmental store is a large-scale retail organisation having a number of departments under one roof. Each department specialises in one particular kind of trade. All these departments are centrally organised and are under one united management and control.

Advantages

(i) Shopping convenience:

A departmental store enables the customers to purchase all their requirement under one roof and the customers need not go from one shop to another for making purchases. This provides great convenience to the customers and also saves their time and labour.

(ii) Wide Choice:

The departmental store keeps a large variety of products and hence offers an opportunity to the customers to select goods of their liking from a large stock of goods of different qualities, brands, designs, colours, styles, etc.

(iii) Economies of large scale:

Departmental stores, being large-scale establishments, enjoy all the economies and benefits of large-scale organisations. This reduces their costs and increases the profits.

Disadvantages

A departmental store suffers from the following disadvantages:

(i) Distance:

As the departmental stores are generally located in the central places, people living at a distance cannot take advantage of the departmental stores.

(ii) High Cost of Operation:

The cost of doing business is very high in case of departmental stores as they have to pay high rents, salaries to staff and spend much on various facilities provided to the customers.

(iii) Higher Prices:

Due to high costs of operation and establishment, the prices of commodities in departmental stores are comparatively high. Thus, only the rich people can afford to take advantage of the departmental stores.

Methodology

Primary data:

Primary data was collected from the respondents through systematically prepared questionnaire through structured interview methods.

Secondary data:

The main source of information for secondary data was collected from old records and the websites books, journals, newspaper etc.

Analysis and Interpretation

Table-1: Socio economic profile

Gender	No of Respondent	Percentage
Male	136	45
Female	164	55
Total	300	100
Age wise	No of Respondent	Percentage
Below 20 years	66	22
21-30years	71	24
31-40 years	86	
Above 40 years	77	26
Total	300	100
Monthly income	No of Respondent	Percentage
Up to Rs 5000	23	8
Rs 50000-10000	56	19
Rs 10000-15000	89	30
Above Rs 15000	132	44
Total	300	100
Educational qualification	No of Respondent	Percentage
Hsc	10	13
UG degree/Diploma	15	19
Post Graduate	20	25
Professionals	25	31
Total	80	100

Source: Primary data

Table 1 shows that out of 300 respondents 55 percentage of the respondents are female, 31 percentages of the respondents are under Above 31-45 years, 44 percentage of the respondents are under monthly income of Above Rs 15000, 39 percentage of the respondents are post graduate.

Chi-Square Analysis

Gender of the respondents and and their buying place of products

$H_0$1 –There is no significant association between gender of the respondents and their buying place of products.

Table 2

	Level of buying place of product					Total
	Departmental stores		**Nearest shops**	**Sales representatives**	**Exhibition**	
Gender	Male	51	52	16	17	136
	Female	35	83	35	11	164
Total	86		135	51	28	80
	Chi-Square Tests					
	Value		Df		Asymp. Sig. (2-sided)	
Pearson Chi-Square	14.957		3		0.002	

The value of chi-square is 14.957 (d.f = 3) and associated significant value is 0.002(which is greater than 0.05). Therefore, the null hypothesis is not rejected. Hence it is concluded that there is no significant association between gender of the respondents and their frequency level of normally buy products.so it can be concluded that respondents'frequency level of buying product is not varying according to gender wise.

From the above cross table clearly explained that male and female respondents' frequently level of normally buy products is not same

Findings

The findings of the present revealed the following

- 55 percentageof respondents are female.
- The majority of the respondents were laid on Rs 15000 monthly incomes.
- The majority of the respondents are under the age group of Above 31-4025 years.
- The majority of the respondents are post graduate.
- There is significant association between gender of the respondents and their level of buying products.

Suggestion

- The products should have variety of brands so that it can also by the middle class people.
- The workers should have more training to provide service to the customers.
- Facilities to avoid crowding on festival seasons should be made and additional sales people and additional staff in the billing and cash section may be provided to avoid customer's dissatisfaction.
- Innovative and attractive gifts and improved counter service may be provided to the customers.
- Bulk purchase may be rewarded.

Conclusion

"CUSTEMER IS OUR BOSS" is the principle of departmental stores. Each and every product are available in the departmental stores at low price. These factors lead the management to be success oriented. Form "pin to perfume" customer can purchase anything and everything in the entire super stores. This study helps to learn more about the people those who prefer super market should also encourage retail traders to overcome their business barriers. The management at regular intervals take steps to improve customer satisfaction towards departmental stores which accelerates future growth of the company. As a leading super market showroom departmental stores has to face severe competition from its rivals and retain in the market and so sustainable growth, the customer satisfaction is the major view point to bear in mind.

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Vehicle Detection in Surveillance Video using Segmentation Techniques

Santhiya S* and Ratha Jeyalakshmi T**
Department of Computer Applications
Sri Sarada College for Women,Tirunelveli-627011
Email Id:*santhiya962@gmail.com, **drtadha.jl@gmail.com.

Extended Abstract

Vehicle detection applications play an important role for civilian and military applications such as in highway traffic surveillance control. Vehicle detection process on road is used for vehicle tracking, counts, and average speed of each individual vehicle. The proposed method is an automatic vehicle detection system for aerial surveillance. The aerial surveillance video taken for the input of automatic vehicle detection.The videos taken from various surveillance cameras. The distances between image sets using the distances between SPD manifolds [1]. Anomaly detection is one of themost challenging and long standing problems in computervision [2].

Then the input video split into the frames. Non vehicle region cover most parts of the image frame. Histogram equalization is used to remove the background construct histogram for each frame it group the closed intensity values and set threshold value. Using this threshold value remove the background. Extract the vehicle features such as edge the features value calculated for each frame. Edge detection canny edge detection algorithm used to detect the edges. It detects the edge easily and accurately. The moment preserving method applies to the canny edge detection algorithm. An automatic vehicle detection system for aerial surveillance has been described in this project. Local features refer to a pattern or distinct structure found in an image, such as a point, edge, or small image patch. Local features of the vehicle are considered for detecting and classifying the vehicle. For edge detection, moment preserving method has been applied to adjust the thresholds of the canny edge detector automatically, which increases the adaptability and the accuracy for detection in various aerial images.It should be noted that detection invideos is more difficult than in other data since it involves detection methods and also requires video processingas well [3]. Design is more effective and efficient than region based. Experimental results are obtained on a wide variety of aerial videos. The results demonstrate flexibility and good generalization abilities of the proposed method on a challenging data set with aerial surveillance images taken at different heights and under different camera angles. Today, Road traffic video surveillance becomes the centre of several concerns. It presents an important way for analysis of road traffic in highways. Road traffic video surveillance can help to resolve many problems which can influence road safety. This paper presents a real-time management and control system which serve to analyze road traffic using a stationary camera.

The proposed system can measure the quantity and characteristics of traffic in real time based on three modules, segmentation, classification and vehicle counting. Our

contribution consists of developing a feature-based counting system for vehicle detection and recognition under the conditions which present a challenge in recent systems, such as occlusions, and illumination conditions. Our method can perform vehicle detection and classification by eliminating the influence of many factors on system efficiency. The obtained results show that the system proposed in this paper provides a counting rate higher than that of some existing methods. The neural network has been recognized as a promising technique for anomaly detection because the intrusion detector should ideally recognize not only previously observed attacks but also future unseen attacks [4]. The application of video surveillance techniques in road traffic analysis can assure good results compared to traditional systems. Based on surveillance cameras, video surveillance systems can be a valuable tool to manage all tasks related to road traffic. Based on the information which may be collected using these systems, vehicle counting and tracking in real time becomes less complicated and more efficient. The contribution to solve the problems presented previously was our motive to design a video surveillance system of road traffic. Based on a stationary camera on the road, our real time system can generate a set of information about vehicles flow which crosses the road. The produced results will be useful to take necessary security measures to ensure circulation fluidity. The performance of a real-time system is related to its capacity to detect vehicles and recognize their types as well as its robustness. CNN model has been recognized that it gives better results [5]. Consequently, we have established a set of techniques designed to increase vehicle detection and recognition accuracy. The developed method in this paper starts with a segmentation module of frames coming from the camera. This module is based on background subtraction as a first step, followed by filtering techniques to reduce segmentation noise. In the second module, we extract a set of characteristics related to the shape of moving objects in order to characterize and classify these objects.

Keywords: surveillance,automatic vehicle detection, algorithm, tracking, fluidity.

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A Study On Cyber Security Cyber Risk Management In Bank And Insurance

Supriya P* , MilkaVijayan ** and Muthulakshmi R***
Department of Commerce
Sri Sarada College for Women,Tirunelveli-627 011
Email Id: *supriyasp39@gmail.com, **milkavijayan86@gmail.com,
***muthulakshmisarada@gmail.com

Abstract: *Security vulnerabilities available in cyber security systems lead to virtual in addition to physical damages to financial systems which in turn cause national –and individual –level security issues. Today's world is being shaped by digital technology, and cyber pressure to inform constitutes a significant risk factor for businesses. This study explores the cyber security risks the banking system may encounter. The status of banking system with respect to cyber security risks and the current risks are assessed and presented along with possible solutions. This study analyzes e-payment systems such as online banking and e-trade /the use of debit/credit cards with respect to national cyber security risks. On the other hand, cyber risk insurance, an emerging tool for cyber risk management, was analyzed in detail.*

Keywords*: Cyber Risk Management, Cyber Insurance, Cyber crime, threats, etc…*

Introduction

Many nations introduce radical solutions against cyber attacks and make investments in such solutions. All the nations prefer to protect their critical infrastructure of cyber security on all the level. Many cyber security specialists stated that it is not possible to adopt an effective defense and counteracting security regimen without collaboration with the stakeholders from the private sector, as the state services are backed by a number of private service providers and telecommunication companies. Cyber risk is a type of risk which includes any unexpected technical failure of the IT infrastructure of a business or any cyber attract targeting such infrastructure which leads to possible finance losses

Objectives

- To study the Covering different aspects of risk assessment.
- To study the Identifying keys for effective risk management.
- To provide necessary suggestions.

Review of literature

Cyber risk can be defined as the risk of incurring in financial, reputational and market share losses in relation to the use of information and communication technology (ICT) Mukhopadhyay et al., 2013.Therefore, cyber risk is considered as an operational, reputational and strategic risk that has three fundamental characteristics: vulnerability, threat and damage.Furthermore it cannot be completely managed and eliminated because of the speed of change of the surrounding environment, globalization and IT caonnections (CIS Sapienza, 2015).This kind of risk should be managed throughout the

organization, enhancing data and information sharing, in addition to knowledge sharing, but also globally because cyber risk is a systemic risk, with no territorial and physical boundaries.

Cyber Risk Management

The escalating nature of cyber threats worldwide means cyber risk management is essential to help safeguard your company. Adopt a robust cyber risk management strategy to reduce your risk and determine whether you should invest in paying cyber insurance premiums.

Cyber Insurance

Technology, social media and dealings over the Internet play key roles in how most organizations conduct business and reach out to future customers today. Those vehicles also serve as gateways to cyber attacks. Whether launched by run-of-the-mill hackers, criminals, insiders or even nation states, cyber attacks are likely to occur and can cause reasonable to severe losses for organizations large and small. As part of a risk management plan, organizations on a regular basis must decide which risks to avoid, accept, control or transfer. Risk plays an important role in cyber insurance.

Methodology

1. **Primary Data:** Primary data are collected from 100 respondents through systematically prepared questionnaire.
2. **Secondary Data:** The secondary data and literature for the study purpose were collected from the number of reference books, journals and website.

Analysis and Data Interpretation:

Table-1: Socio-Economic profile

Gender	No of Respondents	Percentage
Male	45	45
Female	55	55
Total	100	100
Age	No of Respondents	Percentage
Below 30 years	22	22
31- 40 years	25	25
41- 50 years	35	35
Above 50 years	18	18
Total	100	100
Education	No of Respondents	Percentage
S.S.L.C	10	10
HSC	18	18
UG	34	34
PG	38	38
Total	100	100

Monthly income	No of Respondents	Percentage
Below Rs. 5000	20	20
Rs. 5000- Rs. 10000	22	22
Rs. 10000- Rs.15000	28	28
Above Rs. 15000	30	30
Total	100	100

Source: Primary data

The above table shows that 40 percent of the respondents are male and 60 percent of the respondents are female.

The above table shows that 22% of respondents are come under the age group of below 30 years, 25% of respondents are come under the age group of below 31-40 years, 35% of respondents are come under the age group of below 41-50 years, and 18% of respondents are come under the category of above 50 years.

The above table shows that 10% of respondents are come under the category of S.S.L.C, 18% of respondents are come under the category of HSC, 34% of respondents are come under the category of UG and 38% of respondents are come under the category of PG.

The above table shows that 20% of respondents are come under the category of below Rs.5000, 22% of respondents are come under the category of Rs.5000- Rs.10000, 28% of respondents are come under the category of Rs.10000- Rs.15000, and 30% of respondents are come under the category of above Rs.15000.

Table-2: Parameters / Indicators of Risk Analysis

Factor	Total	Wgt/Avg	Rank
Risk Limit	658	43.8	V
Training	660	44	IV
Cyber Insurance	690	46	III
Risk Monitoring	694	46.2	II
Technology	707	47	I

Source: Primary data

From the above table, it shows that first rank for Technology, following that Risk Monitoring, Cyber Insurance, Training, Risk Limit, finally got second, third, fourth, fifth ranks respectively.

Table -3

		Level of awareness			**Total**
		Good	**Excellent**	**Bad**	
Gender	Male	20	15	10	45
	Female	25	18	12	55
Total		45	33	22	**100**
Chi-Square Tests					
		Value	Df	Asymp. Sig. (2-sided)	
Pearson Chi-Square		5.382[a]	2	1.027	

Interpretation

The value of chi- square is 5.382 (d f = 2) and associated significant value is 16.63 (which is greater than 0.05). Therefore, the null hypothesis is accepted. Hence there is significance association between gender of the respondents and their importance of facing challenges to select Small scale business. So it can be concluded that respondents' so it can be inferred that Gender plays an important wise, from the above cross table clearly explained role in economic and employment growth.

Cases of Damage

Security Vulnerability: The firewall of a hotel chain was breached by hackers and a total amount of US$10 million in damages was caused due to stolen card info of 600,000 guests.

Hacking: The stock value of the largest processor of Master card and Visa had dropped by 12% in four days due to the hacking and stolen card info of 1.5 million users.

Theft: An international bank has lost the credit card data of 46,000 customers after a cyber attack and faced a fine of GBP 27.5 million.

System Breakdown Attack: An airliner was not able to process any request for six hours, the fights were delayed and the airliner faced losses due to failed ticketing as a result of an attack targeting its security network.

Finding

- Majority of 55Percentage of the respondents are female.
- Almost 35Percentage of the respondents are between the age group of 41-50 Years
- Majority of 38Percentage of the respondents are qualified with PG
- Majority of30Percentage of the respondents are earning income between Above RS.15000
- Technology ranked First in parameter/ indicators of risk analysis.
- There is no significant relationship between income of the respondents and area of the Gender and Level of Awareness.
- Majority of the recorded growth in public sector was highly positive 22.59 in 2009 in insurance policies.

Suggestions

Protection from reputational risk-while a monetary claim can be awarded for an information security breach, the damage done to an organization's brand cannot be repaired as easily or transferred to an insurance carrier.

The removal of risk –Insurance, whether Cyber or otherwise, provides the organization with the opportunity to transfer, not remove, risk.

A replacement for an information security program – Strong security controls and a comprehensive information security program are prerequisites for purchasing cyber insurance.

Conclusion

Cyber risk has become a main risk for all the works which are been done through internet of things. Cyber risk shares may features with other operational risks but is considered fast-evolving and more influential risk in the future. Like other risks, risk craving for cyber risk is useful for setting the high-level risk acceptance. However, it needs sophisticated modeling that can leverage both limited experience data and subject matter expertise in a consistent way. Proactive measures such as technology investment, training risk monitoring and cyber insurance are important to control cyber risk exposure and keep pace with the development of new cyber risks. Banks are starting to focus more on building customer loyalty, offering new products to their clients, and to take a bigger share in their customer's financial portfolio. Such an expansion brings with it the increased number of cyber attacks. Although such digital investments allow for new strategic possibili-49Cyber Risk Management in Bank sties, it may also bear new cyber risks for those corporations with relatively poor experience in dealing with the difficulties of a multichannel environment. Nevertheless, it is possible that these difficulties will shift as the bankers adopt big data and advanced analytics applications.

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A Study on the Influence of Leadership Styles and Employees Performance In Tirunelveli District

Supriya P* and Muthulakshmi R**
Department of Commerce
Sri Sarada College for Women, Tirunelveli 627 011
Email Id: * supriyasp39@gmail.com, **muthulakshmisarada@gmail.com

Abstract: *In this global competitive environment, effective leadership style is necessary to reduce the attrition rate. From the effective leadership styles only it is possible to achieve organizational goal productively. Leadership styles affect on the employee performance and productivity. This paper summarizes and analyzes the available literature of leadership styles and effect different components of feature of work life. This study examines the impact of leadership style on employee's performance in an organization. It went ahead in ascertaining the relationship between employee's performance and productivity, which is the hallmark of the organization goals and objectives. The leadership style is the manner of providing direction, implementing strategies and attractive individuals towards the attainment of the desired objectives. Leadership styles are replicated in attitudes and behaviours but these in turn are the outcome of complex interactions between the way individuals think and feel. The researchers highlighted diverse approaches/ styles to leadership that are based on different assumptions and theories. As the time passed, the analysts have worked out to evolve various models, theories and assumptions concerning the leadership styles. The crux of their research was to elaborate the effectiveness of leadership in the reorganization including the establishment of authority, inducing sense of responsibility, streamlining and addressing the employees' issues in the context of already prevailing situation. Resultantly, among many others, two styles of leadership became much prominent namely transformational and transactional leadership. These two styles have been analyzed in the different socioeconomic and academic sectors with their distinct advantages. Presently, these two styles are worked out in the different situation depending upon the nature and context.*

Keywords*: Leadership styles, productivity,transactional Leadership styles, Process of Great Leadership.*

Introduction

An effective leader influences followers in a desired manner to achieve desired goals. Different leadership styles may affect organizational effectiveness or performance. Transformational leadership is a stronger predictor of both job satisfaction and overall sat isfaction. In the study it was concluded that organizational performance is influenced by a competitive and innovative culture. Organizational Culture is influenced by leadership style and consequently, leadership style affects organizational performance. The research work is designed to study the Impact of Leadership Style on Employee's performance in an Organization. For any organization to achieve its set objectives and goals there must be a 'high relationship between the (management) leaders and employees. However, for productivity to be reality in an organization there should be high employee's performance which solely depends on leadership style[2].

Objectives of the Study

- To study the Pursuing a Common Goal
- To study the Organizational Cohesiveness
- To study the Motivating Employees

Review of Literature

Leadership is a social influence process in which the leader seeks the voluntary participation of subordinates in an effort to reach organization goals. A leader can be defined as a person who delegates or influencing others to act so as to carry out specified objectives[3]. Today's organizations need effective leaders who understand the complexities of the rapidly changing global environment. If the task is highly structured and the leader has good relationship with the employees, effectiveness will be high on the part of the employees. The study further revealed that democratic leaders take great care to involve all members of the team in discussion and can work with a small but highly motivated team.

Leadership Styles

Leadership style is defined as the manner and approach of providing direction, implementing plans and motivating people. Leadership styles vary with personality and situational need. Understanding the different types of leadership is a necessary first step in leadership development. Each of the leadership styles has an impact on reforming and/or creating an organisational culture[4].

Productivity

"Leadership Style has a direct influence on employee morale. Autocratic leaders that do not seek input from employees tend to alienate their staff and diminish the employee feeling of involvement.[5].. A manager that involves employees in the company's operations builds morale and improves **Productivity".**

Transactional Leadership Styles

Transactional leadership pre lies more about "trades" between the leader and follower by which followers are compensated for meeting specific goals or performance criteria. The transactional leader will first validate the relationship between performance and reward and then exchange it for an appropriate response that encourages subordinates to improve performance.

The Process of Great Leadership

The road to great leadership (Kouzes & Posner, 1987)[1] that is common to successful leaders:

- **Challenge the process** - First, find a process that you believe needs to be improved the most.

- **Inspire a shared vision** - Next, share your vision in words that can be understood by your followers.
- **Enable others to act** - Give them the tools and methods to solve the problem.
- **Model the way** - When the process gets tough, get your hands dirty. A boss tells others what to do; a leader shows that it can be done.
- **Encourage the heart** - Share the glory with your followers' hearts, while keeping the pains within your own.

Methodology

This section describes the methodology which includes collection of data, construction of questionnaire and framework of analysis.

Collection of Data

Primary Data: The study mainly based upon the primary data. Interview schedule method is used to collected the data from the respondents of sample 150 respondents have been appended in the research report.

Secondary Data: The secondary data and literature for the study purpose were collected from the number of reference books, journals and internet.

Analysis and Interpretation of Data

Table-1: Socio-Economic profile

Gender	**No of Respondents**	**Percentage**
Male	80	53
Female	70	47
Total	150	100
Age	**No of Respondents**	**Percentage**
Below 30 years	47	31
31- 40 years	51	34
41- 50 years	34	23
Above 50 years	18	12
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HSC	48	32
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No Of Work Year	**No of Respondents**	**Percentage**
Less than 1 year	50	33
1year - 2years	43	29
2years - 3years	35	23
More than 3years	22	15
Total	150	100

Source: Primary data

The above table shows that 53 percent of the respondents are male and 47 percent of the respondents are female.

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Table-2: Parameters / Indicators of Analysis

Factor	Total	Wgt/Avg	Rank
Directive	585	39	II
Supportive	571	38	III
Awareness	549	36.6	VI
Training	559	37.6	IV
Goal oriented	557	37.1	V
participative	601	40	I

Source: Primary data collected from factor.

Ranks reveal that majority of the respondent. The first rank for participative, following that Directive, Supportive, Training, Goal oriented, Awareness, finally got second, third, fourth, fifth, six ranks respectively.

Findings/Results

A leader's singular job is to get results. But even with all the leadership training programs and "expert" advice available, effective leadership still eludes many people and organizations. *Democratic leaders* build consensus through participation. *Pacesetting leaders* expect excellence and self-direction. The research indicates that leaders who get the best results don't rely on just one leadership style; they use most of the styles in any given week. He maintains that which practice leaders can switch among leadership styles to produce powerful results, thus turning the art of leadership into a science.

Suggestions and Recommendations

Leadership style is often developed over time, through trial and error. There is more than one style of leading, and some of these styles are more effective than others. Regardless of the style of leadership you use, there's forever room for strengthening and

improving your role as a leader. "The ability to adjust leadership styles can be developed." This ability to refine your leadership style is essential to establishing yourself as someone who leads with confidence and authority.

Conclusion

Though, the situational leadership stays to emphasis mostly upon the leader, it creates the significance of the focus into group dynamic. These styles of leadership were telling others what to do (autocratic), incorporating others in conceptualizing, planning and implementation (democratic) and giving complete freedom of action with little or no direction to others (laissez-faire). The servant leader focuses on the needs of the follower and helps them to become more autonomous freer and knowledgeable". For good work, positive hold up could be exchanged, merit pay for promotions, increased performance and cooperation for collegiality. . As per Bass, transformational leader, "attempts to induce followers to reorder their needs by transcending self-interests and strive for higher order needs".

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Examination of Mood State during Morning and Evening Session among School Going Children-A Case Study

Uma Kamalavathi* M and Sethu S**
Sri Sarada College Physical Education, Salem 636 016
Email Id:* mduma@gmail.com

Abstract: *The purpose of the study was to compare the mood state of school children between morning and evening session. To achieve the purpose of the study 50 school children were selected randomly as subject from Sri Kanchi Matriculation School, Tiruchendur. The age of the subject were ranged from 12-14 years. The mood state factors such as anger, depression, confusion, fatigue and tension were selected as dependent variable for this study and it was measured by Brunel mood state scale developed by Brunel, Mcnair, Lorry & Droppleman (1992). The static group comparison design was used for this study all the subjects were tested on selected psychological variables the data pertaining to variables in this study were examined by using dependent't' test the level of significance was fixed at .05 level of confidence for all the cases. It was concluded that, there was a significant difference among school children between morning and evening session on selected mood state factors such as anger, depression, confusion, fatigue and tension. However, school children having better mood state in the evening session when compared to morning session.*

Keywords: *fatigue,depression,psychological variables,confidence,tension*

Introduction

A mood is an emotional state. Moods differ from emotions, feelings or affects in that they are less specific, less intense, and less likely to be triggered by a particular stimulus or event. Moods generally have either a positive or negative valence. In other words, people typically speak of being in a good mood or a bad mood. Mood also differs from temperament or personality traits which are even longer lasting. Nevertheless, personality traits such as optimism and neuroticism predispose certain types of moods (Clark, L. A., & Watson, D. 1988).

Dimensions of children's psychological and emotional well-being to represent their mental health, both positive and negative indicators of mental health are examined, including locus of control, scholastic competence, and depression. Locus of control has been defined as the perception of a connection between one's actions and their consequences. People who believe that an outcome is largely contingent upon their own behaviour are seen as having a more internal locus of control, whereas those who believe that luck, fate, chance or powerful others largely determine an outcome are considered to be more external. Scholastic competence refers to the beliefs a child has concerning their abilities to do well in school (Eiesnberg, N., Guthrie, I. K., Fabes, R. A., Reiser, M., Murphy, B., Holgren, R., & Losoya, S. 1997).

Depression has been related to poor overall functioning, and interpersonal and behavioural problems Indicators of mental health are also associated with each other, for example, depressed individuals tend to have lower levels of internal locus of control and

competence. Studies have rarely examined school effects on children's mental health. A few studies report significant school-level effects for children's mental health, including depression, locus of control, self-esteem and general well-being. However, few, if any, studies examine key features of the school environment that explain variation in children's mental health (Kutash, 2007).

Statement of the Problem

The purpose of the study was to compare the mood state of school children between morning and evening session.

Methodology

To achieve the purpose of the study 50 school children were selected randomly as subject from Sri Kanchi Matriculation School, Tiruchendur. The age of the subject were ranged from 12-14 years. The mood state factors such as anger, depression, confusion, fatigue and tension were selected as dependent variable for this study and it was measured by Brunel mood state scale developed by Brunel, Mcnair, Lorry & Droppleman (1992). The static group comparison design was used for this study all the subjects were tested on selected psychological variables the data pertaining to variables in this study were examined by using dependent't' test the level of significance was fixed at .05 level of confidence for all the cases.

Results and Discussion

The analysis of dependent't' test on the data obtained for selected mood state factors of school children between morning and evening have been analyzed and presented in the table.

Table – I: Summary of Mean and Dependent 'T' Test of School Children between Morning and Evening Session on Selected Mood State Factors

Variables	Test	Number	Mean	Standard Deviation	't' value
Anger	Morning	**50**	6.74	3.686	2.451*
	Evening	**50**	5.42	4.554	
Depression	Morning	**50**	5.52	3.234	2.023*
	Evening	**50**	5.02	3.717	
Confusion	Morning	**50**	6.32	3.878	2.284*
	Evening	**50**	4.84	3.460	
	Morning	**50**	6.16	3.171	
Fatigue	Evening	**50**	5.22	3.710	2.486*
	Morning	**50**	6.06	3.418	
Tension	Evening	**50**	5.54	3.133	2.199*

*Significant at .05 level. The table required for significant at 0.05 level for "t" test with df 49 is 2.021

The result of the study indicated that, there was a significant difference among school children between morning and evening session on all selected mood factors such as anger, depression, confusion, fatigue and tension. However, school children having better mood state in evening session when compared to morning session.

The result of this study is in accordance with the many of the following research findings.

Larson, R., Csikszentmihalyi, M., & Graef, R. (1980) noted that the children having a vague and non-uniformed or lack a description of mood before going to school.

The past and current research on Ingersoll, B., Meyer, K., & Becker, M. W. 2011., Jouriles, E. N., & Thompson, S. M. 1993., Kenealy, P. M. 1997., delineate mood by using the various defining characteristics of the emotional/mood states for their criteria.

Mendenhall (2007) & Owens et al (2000) studied the identification of twelve factors of mood state: aggression, anxiety, surgency, elation, concentration, fatigue, vigor or activation, social affection, sadness, skepticism, egoism and nonchalance. The items used in these are appropriate for the assessment of childhood mood states, and all these shown poor state during the school hours, but due to their complexity and vocabulary level, are not appropriate for measurements on elementary school children.

It is inferred from the above literatures and from the results of the present study, it is concluded that, due to the pressurized situation during the school hours, children having better mood state in evening session when compared to morning session.

Conclusion

There was a significant difference among school children between morning and evening session on selected mood state factors such as anger, depression, confusion, fatigue and tension.

School children having better mood state in the evening session when compared to morning session.

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Intuitionistic Fuzzy Prime Bi-ideal of a BCK-Algebra

Velammal@Sindhu E
Department of Mathematics,
Sri Sarada College for Women, Tirunelveli-627 011
Email Id:sindhuvel95@gmail.com

Abstract: *With the concept of intuitionistic fuzzification of prime ideals of a BCK-Algebra we defined intuitionistic fuzzy bi-ideals of a BCK-Algebra and investigate some of the properties.*

Keywords: *BCK-Algebra, Intuitionistic Fuzzy Ideal, Intuitionistic Fuzzy Bi-ideal, Intuitionistic Fuzzy Prime Bi-ideal.*

Introduction

The concept of fuzzy sets was defined by Zadeh[5].These ideas have been applied to other algebraic structures such as semigroup, group, ring, etc. The idea of " Intuitionistic Fuzzy Set" was introduced by Atanassov[1], as generalization of the notion of fuzzy set.

In 1966, Imai and Iseki introduced two classes of abstract algebras, BCK-Algebras and BCI-Algebras[1],[2]. In 1995, Jun applied the concept of fuzzy set to BCK-Algebras and also he get some interesting results. In this paper, with the notion of intuitionistic fuzzy Prime ideals of BCK- Algebras, we establish intuitionistic fuzzy prime Bi-ideal of a BCK-Algebra and investigate some of the properties.

Definition 1 Let X be a set and x be an arbitrary element of X. Then a fuzzy subset of X is a map $\mu : X \to [0,1]$ (or) a set of ordered pairs $\{(x,\mu(x))/x \in X\}$ where $\mu(x)$ is the grade (or) degree of membership of x in X which takes values in a totally ordered set M .

Note 1 (1) The family of fuzzy subsets of X is denoted by I^X. (2) If M = {0, 1} then a fuzzy subset becomes an ordinary subset (or) non- fuzzy subset. X is called the ground set of the fuzzy subsets.

Definition 2 (1) Support of $\mu = \{x \in X/\mu(x) > 0\}$ (2) height of $\mu = \sup_{x \in X} \mu(x)$ μ is said to be normal if height of $\mu = 1$.Otherwise μ is called a subnormal fuzzy subset.(3) The cross over points of $\mu = \{x/\mu(x) = \frac{1}{2}\}$

Definition 3 Let X be any non-empty set.A partial order relation (por) in X is $\leq \subset X \times X$ such that for all x, y, z $\in$ Z we have,

(1) $x \leq x$ (reflexive) (2) $x \leq y$ and $y \leq x \Rightarrow x = y$ (anti-symmetric) (3) $x \leq y$ and $y \leq z \Rightarrow x \leq z$ (transitive)

A non-empty set X with a partial order relation defined on it is called a partially ordered set.

Example 4 (1) Let X be the set of all positive integers and $x \leq y$ mean that x divides y.(2) Let X be the set of all real number and $x \leq y$ mean that x is less than or equal to y in the usual sense.

Definition 5 Let X be a set and L be a lattice. An L-fuzzy subset of X is characterized by a mapping $\mu : X \rightarrow L$ and thus it can be represented by$\{(x, \mu(x))/x \in X\}$.In particular if M = [0, 1] then we get fuzzy subsets.

Definition 6 A fuzzy subset μ in a BCK-Algebra X is called fuzzy bi-ideal if :(i)$\mu_A(0) \geq \mu_A(x)$(ii)$\mu_A(x * y) \geq \min\{\mu_A(x * y * z), \mu_A(z)\}$ for all $x, y, z \in X$.

Definition 7 An IFS, $A = (X, \mu_A, \lambda_A)$ in X is an intuitionistic fuzzy sub- algebra of X if it satisfies :(i)$\mu_A(x * y) \geq \min\{\mu_A(x), \mu_A(y)\}$ (ii)$\lambda_A(x * y) \leq \max\{\lambda_A(x), \lambda_A(y)\}$ for all $x, y \in X$. Proposition 8 Every intuitionistic fuzzy sub-algebra $A = (\mu_A, \lambda_B)$ of X satisfies the inequalities $\mu_A(0) \geq \mu_A(x)$ and $\lambda_A(0) \leq \lambda_A(x)$ for all $x \in X$. Definition 9 An IF $A = (X, \mu_A, \lambda_A)$ in X is an intuitionistic fuzzy ideal of X if it satisfies:(i)$\mu_A(0) \geq \mu_A(x)$ and $\lambda_A(0) \leq \lambda_A(x)$,$\mu_A(x) \geq \min\{\mu_A(x * y), \mu_A(y)\}$, $\lambda_A(x) \leq \max\{\lambda_A(x * y), \lambda_A(y)\}$ for all $x, y \in X$.

Definition 10 An IF $A = (X, \mu_A, \lambda_A)$ in X is an intuitionistic fuzzy bi-ideal of X if it satisfies:(i)$\mu_A(0) \geq \mu_A(x)$ and $\lambda_A(0) \leq \lambda_A(x)$ (ii) $\mu_A(x * y) \geq \min\{\mu_A(x * y * z), \mu_A(z)\}\lambda_A(x * y) \leq \max\{\lambda_A(x * y * z), \lambda_A(z)\}$ for all $x, y \in X$.

Example 11 Consider a BCK-Algebra X = {0, x, y, z} with the following Cayley table.

*	0	x	Y	Z
0	0	0	0	0
x	x	0	0	X
y	y	x	0	Y
z	z	z	Z	0

Define an IFS,$A = (X, \mu_A, \lambda_A)$ in X as follows:$\mu_A(0) = \mu_A(x) = 0.6$, $\mu_A(y) = 0.2$, $\mu_A(z) = 0.4$,$\lambda_A(0) = \lambda_A(x) = 0.5$, $\lambda_A(y) = 0.3$, $\lambda_A(z) = 0.2$.Then by routine calculation $A = (X, \mu_A, \lambda_A)$ is an intuitionistic fuzzy bi-ideal of X.

Definition 12 By a BCK-Algebra we mean a non-empty set X with a binary operation $*$ and a constant 0 satisfying the following conditions:

(i) $((x * y) * (x * z) * (z * y)) = 0$

(ii) $(x*(x*y))*y=0$

(iii) $x * x=0$

(iv) $x * y = 0$ and $y * x = 0$ imply that $x = y$ for all $x, y, z \in X$.

Definition 13 A partial ordering " $\leq$ " on X can be defined by $x \leq y$ iff $x * y = 0$.

Definition 14 A non-empty subset S of a BCK-Algebra X is called a sub- algebra of X if $x * y \in S$ whenever x, $y \in S$.

Definition 15 A non-empty subset I of a BCK-algebra X is called an ideal of X if it satisfies:(i)$0 \in$,(ii)$x * y \in I$ and $y \in I$ imply that $x \in I$ for all x, $y \in X$.

Definition 16 By a fuzzy set μ in a non-empty set X we mean a function $\mu : X \rightarrow [0, 1]$.

Definition 17 A fuzzy set μ in a BCK-Algebra X is called a fuzzy sub-algebra of X if $\mu(x * y) \geq \min\{\mu(x), \mu(y)\}$ for all $x,y \in X$.

Definition 18 [3] A fuzzy set μ in a BCK-Algebra X is called a fuzzy ideal of X if (i) $\mu(0) \geq \mu(x)$ for all $x \in X$,(ii)$\mu(x) \geq \min\{\mu(x * y),\mu(y)\}$ for all $x,y \in X$.

Definition 19 An intuitionistic fuzzy set(briefly, IFS) A non-empty set X is an object having the form $A = \{(x, \alpha_A(x), \beta_A(x))/x \in X\}$ where the functions $\alpha_A : X \rightarrow [0, 1]$ and $\beta_A : X \rightarrow [0, 1]$ denote the degree of membership and the degree of non-membership, respectively ,and $0 \leq \alpha_A(x) + \beta_A(x) \leq 1$ for all $x \in X$.An intuitionistic fuzzy set $A = \{(x, \alpha_A(x),\beta_A(x))/x \in X\}$ in X can be identified to an ordered pair (α_A,β_A) in $I^X \times I^X$. For the sake of simplicity, we shall use the symbol $A = (\alpha_A, \beta_A)$ for the IFS $A = \{(x, \alpha_A(x), \beta_A(x))/x \in X\}$.

Definition 20 A BCK-Algebra is said to be commutative if it satisfies the identity $x * (x * y) = y * (y * x)$.

Definition 21 A mapping $f : X \rightarrow Y$ of a BCK-Algebras is called a homomorphism if $f(x * y) = f(x) * f(y)$ for all x, $y \in X$.

1. Prime ideal

Definition 22 An ideal I of a BCK-Algebra $(x, *, 0)$ is called closed ideal, if $0 * x \in I$, for all $x \in I$.

Definition 23 An ideal of commutative BCK-Algebras X is said to be prime if $x \wedge y \in I$ implies $x \in I$ or $y \in I$.

Definition 24 A fuzzy ideal μ of commutative algebra X is called anti fuzzy prime ideal of X, if $\mu(x \wedge y) \geq \min\{\mu(x),\mu(y)\}$

for all $x,y \in X$.

2. Intuitionistic Fuzzy Prime Ideal

Definition 25[4] An IFS, A = (X, μ_A, λ_A) in X is an intuitionistic fuzzy sub- algebra of X if it satisfies :

(i) $\mu_A(x * y) \geq \min\{\mu_A(x), \mu_A(y)\}$

(ii) $\lambda_A(x * y) \leq \max\{\lambda_A(x), \lambda_A(y)\}$ for all $x, y \in X$.

Definition 26 [4] An IF A = (X, μ_A, λ_A) in X is an intuitionistic fuzzy ideal of X if it satisfies:

(i) $\mu_A(0) \geq \mu_A(x)$ and $\lambda_A(0) \leq \lambda_A(x)$

(ii) $\mu_A(x) \geq \min\{\mu_A(x * y), \mu_A(y)\}$.

(iii) (iii) $\lambda_A(x) \leq \max\{\lambda_A(x * y), \lambda_A(y)\}$ for all $x, y \in X$.

Definition 27[4] An intuitionistic fuzzy ideal A = (X, μ_A,λ_A) of BCK-Algebra X is called an intuitionistic fuzzy closed ideal of X,if it satisfies the following axiom:

(i) $\mu_A(0 * x) \geq \mu_A(x)$

(ii) $\lambda_A(0 * x) \leq \lambda_A(x)$ for all $x \in X$.

Theorem 28 Every intuitionistic fuzzy ideal of BCK-Algebra X is intuitionistic fuzzy sub-algebra of BCK-Algebra X.

Theorem 29 A non empty Subset I of BCK-Algebra X is an ideal of a BCK- Algebra X iff $\widetilde{P} = (X_P, X_P)$ is an intuitionistic fuzzy ideal.

Remark 30 Every prime ideal of commutative BCK-Algebra X is an ideal of X.

Definition 31 An intuitionistic fuzzy ideal A = (X, μ_A, λ_A)of BCK-Algebra X is called an intuitionistic fuzzy prime ideal of X, if it satisfies the following axiom:(i)$\mu(x \wedge y) \leq \max\{\mu(x), \mu(y)\}(ii)\lambda(x \wedge y) \geq \min\{\mu(x), \mu(y)\}$ for all x, y ∈ X.

Example 32 Let X = {0, x, y, z} with Cayley table as follows :

*	0	x	y	Z
0	0	0	0	0
x	x	0	0	X
y	y	x	0	Y
z	z	z	z	0

It is easy to verify that (X,∗,0) is commutative BCK-Algebra. Define an IFS A = (X, μ_A, λ_A) as : $\mu_A(0) = 1$, $\mu_A(x) = 0.9$, $\mu_A(y) = 0.5$, $\mu_A(z) = 0$ and $\lambda_A(0) = 0$, $\mu_A(x) = 0.1$, $\mu_A(y) = 0.5$, $\mu_A(z) = 1$.By routine calculation A = (X, μ_A, λ_A) is an intuitionistic fuzzy prime ideal of X.

Definition 33 Let A = (X, μ_A, λ_A) be an intuitionistic fuzzy set of a BCK- Algebra X. Then for s, t ∈ [0, 1],the set U (μ_A, t) = {x ∈ X/μ_A(x) ≥ t} is called upper t-level cut of μ_A and the set L(λ_A, s) = {x ∈ X/λ_A(x) ≤ s} is called lower s-level cut of λ_A.

3. Intuitionistic Fuzzy Prime Bi-ideal

Definition 34 An Intuitionistic Fuzzy Bi-ideal A = (X, μ_A, λ_A) of BCK- Algebra X is called an intuitionistic fuzzy prime bi-ideal of X if (1)$\mu_A(x \wedge y \wedge z) \leq \max\{\mu_A(x), \mu_A(z)\}$ (2)$\lambda_A(x \wedge y \wedge z) \geq \min\{\lambda_A(x), \lambda_A(z)\}$

Theorem 36 If A = (X, μ_A, λ_A) is an intuitionistic fuzzy prime bi-ideal of a commutative BCK-Algebra X,then the sets J = {x ∈ X/μ_A(x) = μ_A(0)} and K = {x ∈ X/λ_A(x) = λ_A(0)}.

Corollary 37 If A = (X, μ_A, λ_A) is an intuitionistic fuzzy prime bi-ideal of a commutative BCK-Algebra X,then the sets P_1 = {x ∈ X/μ_A(x) = 0} and P_2 = {x ∈ X/λ_A(x) = 0} are either empty (or) prime ideals of X.

Theorem 38 If A = (X, μ_A, λ_A) is an intuitionistic fuzzy prime bi-ideal of a commutative BCK-Algebra X,then the sets I = {x ∈ X/μ_A(x) = 1} and I = {x ∈ X/λ_A(x) = 1} are either empty (or) prime ideals of X.

Theorem 39 Every intuitionistic fuzzy prime ideal of a commutative BCK- Algebra X is an intuitionistic fuzzy ideal of commutative BCK-Algebra X.

Theorem 40 Let A = (X, μ_A, λ_A) be an intuitionistic fuzzy set of a commu- tative BCK-Algebra X.Then A = (X, μ_A, λ_A) is an intuitionistic fuzzy prime bi-ideal of X iff μ_A and $\lambda^c{}_A$ are fuzzy prime bi-ideals of X,where $\lambda^c{}_A = 1-\lambda_A$.

Proof. Let A = (X, μ_A, λ_A) be an intuitionistic fuzzy set of a commutative BCK-Algebra X.

Then A = (X, μ_A, λ_A) is an intuitionistic fuzzy bi-ideal which implies μ_A and $\lambda^c{}_A$ are fuzzy bi-ideals of X.

Let for any x, y ∈ X. Then $\mu_A((x \wedge y \wedge z) \leq \max\{\mu_A(x), \mu_A(z)\} \geq \min\{\lambda_A(x), \lambda_A(z)\} \leq \max\{\mu_A(x), \mu_A(z)\}$

$1 - \mu_A((x \wedge y \wedge z) \leq 1 - \min\{\mu_A(x), \mu_A(z)\}$, $\mu^c{}_A((x \wedge y \wedge z) \leq \max\{1 - \mu_A(x), 1 - \mu_A(z)\} \leq \max\{\mu^c{}_A(x), \mu^c{}_A(z)\}$

Hence μ_A and $\lambda^c{}_A$ are fuzzy prime bi-ideals of X.Conversely, the coverse part is easy to verify.

Theorem 41 Let A = (X, μ_A, λ_A) be an intuitionistic fuzzy set of a commutative BCK-Algebra X. Then,

$A = (X, \mu_A, \lambda_A)$ is an intuitionistic fuzzy prime bi-ideal of X iff λ_A and $\mu^c{}_A$ are fuzzy prime bi-ideals of X, where $\mu^c{}_A = 1-\mu_A$.

Proof. Let $A = (X, \mu_A, \lambda_A)$ be an intuitionistic fuzzy set of a commutative BCK-Algebra X.

Then $A = (X, \mu_A, \lambda_A)$ is an intuitionistic fuzzy bi-ideal which implies λ_A and$\mu^c{}_A$ are fuzzy bi-ideals of X.

Let for any x, y ∈ X. Then $\mu_A((x \wedge y \wedge z) \leq \max\{\mu_A(x), \mu_A(z)\} \geq \min\{\lambda_A(x),\lambda_A(z)\}$

$1 - \lambda_A(x \wedge y \wedge z) \geq 1 - \max\{\lambda_A(x), \lambda_A(z)\}$, $\lambda^c{}_A(x \wedge y \wedge z) \geq \min\{1-\lambda_A(x), 1 - \lambda_A(z)\}$ $\lambda^c{}_A(x \wedge y \wedge z)$

$1 - \lambda_A(x \wedge y \wedge z) \geq \min\{\lambda^c{}_A(x),\lambda^c{}_A(z)\}$Hence λ_A and $\mu^c{}_A$ are fuzzy prime bi-ideals of X.

Conversely, the coverse part is easy to verify.

Theorem 42 Let $A = (X, \mu_A, \lambda_A)$ be an intuitionistic fuzzy set of a commutative BCK-Algebra X. Then,

$A = (X, \mu_A, \mu^c{}_A)$ is an intuitionistic fuzzy prime bi-ideal of X,where $\mu^c{}_A = 1 - \mu_A$.

Proof. Let $A = (X, \mu_A, \lambda_A)$ be an intuitionistic fuzzy set of a commutative BCK-Algebra X.$A = (X, \mu_A, \lambda_A)$ is an intuitionistic fuzzy ideal of X. $A = (X, \mu_A, \mu^c{}_A)$ is an intuitionistic fuzzy ideal of X. For any x, y ∈ X,then $\mu_A((x \wedge y \wedge z) \leq \max\{\mu_A(x), \mu_A(z)\} \geq \min\{\mu_A(x), \mu_A(z)\}$, $1 - \mu_A(x \wedge y \wedge z) \geq 1 - \max\{\mu_A(x), \mu_A(z)\}$ implies

$\mu^c{}_A(x \wedge y \wedge z) \geq \min\{1 - \mu_A(x), 1 - \mu_A(z)\} \geq \min\{\mu^c{}_A(x), \mu^c{}_A(z)\}$.Hence $A = (X, \mu_A, \mu^c{}_A)$ is an intuitionistic fuzzy prime bi-ideal of a commutative BCK-Algebra X.

Theorem 43 Let $A = (X, \mu_A, \lambda_A)$ be an intuitionistic fuzzy set of a commu- tative BCK-Algebra X. Then

$A = (X, \mu_A, \mu^c{}_A)$ is an intuitionistic fuzzy prime bi-ideal of X, where $\lambda^c{}_A = 1 - \lambda_A$.

Proof: Let $A = (X, \mu_A, \lambda_A)$ be an intuitionistic fuzzy set of a commutative BCK-Algebra X. $A = (X, \mu_A, \lambda_A)$ is an intuitionistic fuzzy ideal of X. $A = (X, \lambda_A, \lambda^c{}_A)$ is an intuitionistic fuzzy ideal of X. For any x, y ∈ X,then $\mu_A((x \wedge y \wedge z) \leq \max\{\mu_A(x), \mu_A(z)\}$. N ow, $\lambda_A(x \wedge y \wedge z) \geq \min\{\lambda_A(x), \lambda_A(z)\} \geq \min\{\lambda_A(x), \lambda_A(z)\}$

$1 - \lambda_A(x \wedge y \wedge z) \geq 1 - \min\{\lambda_A(x), \lambda_A(z)\}$ $\lambda^c{}_A(x \wedge y \wedge z) \geq \max\{1-\lambda_A(x), 1 -\lambda_A(z)\} \geq \max\{\lambda^c{}_A(x),\lambda^c{}_A(z)\}$Hence $A = (X, \mu_A, \mu^c{}_A)$ is an intuitionistic fuzzy prime bi-ideal of a commutative BCK-Algebra X.

Remark 44 Let $A = (X, \mu_A, \lambda_A)$ be an intuitionistic fuzzy set of a commutative BCK-Algebra X.Then $A = (X, \mu_A, \lambda_A)$ is an intuitionistic fuzzy prime bi-ideal of a

commutative BCK-Algebra X iff A = (X, μ_A, $\mu^c{}_A$) and A = (X, λ_A, $\lambda^c{}_A$) are an intuitionistic fuzzy prime bi-ideals of X.

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Automated Recognition of Diseases in Leaf Image using Segmentation Techniques

Venkadeswari T* and Ratha Jeyalakshmi T
Department of Computer Applications,
Sri Sarada College for Women, Tirunelveli-627 011
Email Id: *venkataswari.t@gmail.com, **drtradha.jl@gmail.com

Extended Abstract

Agriculture is the science and art of cultivating plants and livestock.Agriculture Was The Key Development In The Rise Of Sedentary Human Civilization, Whereby Farming of Domesticated Species Created Food Surpluses That Enabled People To Live In Cities. Agricultural productivity is something on which economy highly depends. Crop cultivation plays a necessary function in the agricultural field. Presently, the loss of food is mainly due to infected crops, which reduce the manufacture rate. Plant diseases have curved into a problem as it can cause chief reduction in both quality and quantity of agricultural products.

Automatic detection of plant diseases is a critical research topic as it may prove benefits in monitoring large fields of crops, and thus automatically discover the symptoms of diseases as soon as they appear on plant leaves. At present applications in agriculture require automatic process to interpret and analyze the observed information and make effective decision to control the spread of disease and losses. These applications require various kinds of images and pictures as a source of information in the form of digital signal for interpretation and analysis of disease infected crops to recognize and take corrective actions to diagnosis.

The image processing techniques are digitized to get the information from the Images. In this proposed work, clustering and segmentation methods are used. Mango leaves are used in this work. Totally 255 images are taken for both training and testing. The processes require careful diagnosis and timely handling to protect the crops from heavy loses [1]. The RGB image is converted into the HIS model for segmenting. Boundary detection and spot detection helps to find the infected part of the leaf [5]. Firstly, the ground truth image is created with the help of k-mean clustering with three clusters. *k*-means clustering is a method of vector quantization, originally from signal processing, that is popular for cluster analysis in data mining. *k*-means clustering aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster.It finds a partition in which objects within each cluster are as close to each other as possible, and as far from objects in other clusters as possible [3].

Then, train the ground truth image with the Convolutional Neural Network. In deep learning, a convolutional neural network (CNN, or ConvNet) is a class of deep neural networks, most commonly applied to analyzing visual imagery. CNNs are regularized versions of multilayer perceptrons. Multilayer perceptrons usually mean

fully connected networks, that is, each neuron in one layer is connected to all neurons in the next layer. The "fully-connectedness" of these networks makes them prone to overfitting data. Typical ways of regularization include adding some form of magnitude measurement of weights to the loss function. However, CNNs take a different approach towards regularization: they take advantage of the hierarchical pattern in data and assemble more complex patterns using smaller and simpler patterns. The test image is predicted using CNN. A convolutional neural network consists of an input and an output layer, as well as multiple hidden layers. CNNs, like neural networks, are made up of neurons with learnable weights and biases. The testing features sets are used to verify the accuracy of the trained NN model [4]. Each neuron receives several inputs, takes a weighted sum over them, pass it through an activation function and responds with an output. Image processing is the technique which is used for measuring affected area of disease to determine the difference in the color of the affected area. [2].

The performance has been analyzed based on the diseased part of leaf. At last the existing FCM is compared with CNN. In this, CNN gives better results than FCM clustering. In future, it may be further developed to a mobile application that helps the farmer to easily identify the disease at earlier stage.

Key words: Domesticated Species, plant diseases, symptoms, convolutional, application

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