KG College of Arts and Science
Affiliated to Bharathiar University
Accredited by NAAC
ISO 9001:2015 Certified Institution
KGiSL Campus, Saravanampatti, Coimbatore-641007

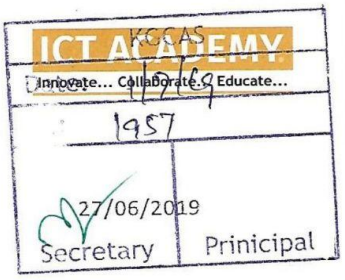
Criterion 3: Research, Innovation and Extension

Key Indicator 3.5 : Collaboration

Supporting Documents - Activity Report

Academic Year 2019-20

Skill Training Programme



To
The Principal,
K.G College of Arts & Science
365, Thudiyalur Road, Saravanampatti,
Coimbatore – 641035

Sub: "Employability Skill Training in Financial Literacy" - Reliance social initiative – Launch of training program – Reg.

Greetings from ICT Academy

Dear Sir/Mam,

We thank you very much for accepting our proposal for hosting the "Employability Skill Training in Financial Literacy".

We appreciate the participation of your college for hosting the "Employability Skill Training in Financial Literacy" - A social initiative of Reliance Home Finance and Reliance Money in association with ICT Academy.

As part of the way forward in launching the training for the beneficiaries the following process is to be followed:

1. The Host College information sheet is to be filled and sent back to us.
2. The Training Launch Form is to be filled and sent back to us.
3. The mobilization of the students is to be done - 40 in a batch. Students of B.Com, BBM, MBA , B.A, BSc (Students other than Computer Science Stream) and passed out students who are looking out for a job) .
4. As part of the mobilization we are happy to provide you with posters which can be displayed in the different departments to create awareness amongst the students.
5. The same poster can be circulated by social media to the passed out students to create an awareness and interested students can be admitted to the course.
6. All students interested are to log in to www.ictacademy.in/reliance and apply to get registered for the course. The student need to apply against the college name provided.
7. All the students applying for the course must compulsorily attend the training in full.
8. The College is to provide the list of students interested in doing the course in the Student Enrollment Sheet which is provided.

To IQAC

9. Once we receive the Student Enrollment Sheet and the Training Launch date, we will make arrangements for the Training Kit, Course Materials and the Trainer for conducting the training. We require the Enrollment Sheet before 7 to 10 days of launching the training.
10. During the training we would request the College in taking photographs and videos (of activities) and send it to us in a DVD after completion of the training program along with the Registration Form, Course Material acknowledgement from students & College, Attendance Sheet, Session Plan , Feedback forms, Training Completion Certificate and Testimonial.

    Please note: All the forms mentioned will be provided by ICT Academy.
11. ICT Academy will Provide with Rs. 20,000.00 (Rupees Twenty Thousand Only) towards facilitation of infrastructure and audio/visual rooms and conducting the training as given below :

    1. Rs. 15,000.00 (Rupees Twenty Five Thousand Only) towards the use of Infrastructure and audio/ visual room.
    2. Rs. 5,000.00 (Rupees Five Thousand Only) to the Co-Ordinator of the Training Program for organizing, monitoring and reporting of the Training Program. Invoice format will be shared at the end of the training program.

We together will make this Employability Skill Training a success. Looking forward to your co-operation and support.

We assure you of our best services at all times.

For further communication and expression of interest to be sent to **Ms. Kokila, Senior Project Co-ordinator, Mail ID: kokila@ictacademy.in , Contact No. 93848 00673.**

Thanking You,

Your's Truly,

For ICT Academy,

K.A. VIJAYAN
Deputy General Manager – Projects

Publications - SASA Publications

S.No.	Name of the Author	Title of the Paper	Plagiarism %
1	Ms.S.Vijaya, Ms.L.Padmavathy, Ms.P.Lavanya, Ms.T.Prabha	Teaching Learning Process Assessment based on Students Evaluation	18 %
2	Mrs. S.Gomathy	Study Skills and Reference Skills for English Language Students	7 %
3	Mr.P.Sureshkumar	Potential Areas for implementing Lean Six Sigma in Indian Higher Education Institution	9 %
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Ms.S.Vijaya

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Word count: 2334
Character count: 14294

Teaching Learning Process Assessment based on Students Evaluation

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Abstract:

In the past two decades, teaching in higher education has been risen in status and given much importance especially in improving Teaching Learning Methodology from the evaluation of Teachers done by students. Different parameters of teaching methods of faculties taken into accou and evaluated through students to find out best teaching methodology. As feedbacks are given from the consumer's point of view, most importantly students' evaluation reports provide faculties with important feedback.

Keywords: Teaching Learning, Evaluation, Higher Education, Students

Introduction:

Education is a very important issues regarding the development of a Country [1]. The main objective of higher education institutions is to present quality education to its students. One way to accomplish the higher level of quality in higher education scheme is by predicting students' academic performance and thereby taking early actions to improve students' performance and also the teaching quality. The relevant knowledge is hidden with the educational dataset and it is extractable during data mining techniques. This paper is planned to validate the capabilities of data ining techniques in the background of higher education by offering a data mining model. In this work, classification task is used to evaluate faculties' performance[2]. Evaluation of faculties performance have to be done based on students feedback. So that the exact area can be identified. That helps the lecturer to take necessary

actions like more attention of the students and also to improve their teaching methods. Finally that improves students'caliber and academic status. The application of data mining in the educational frame work is referred as Educational Data Mining [EDM]. Ferguson presents in [2] two drivers for this to arise: primarily, the volume of data that are composed of educational institutions have seriously improved; Secondary driver is helped tocollect data, still brought some clearing issues such as possible lack of motivation and difficulties for the educators to collect direct feedback, level of interest or even the understanding of the students. In this work, Data mining approaches are proposed to predict faculty performance. Prediction is done using Data mining algorithms. Prediction is carried out with academic records along with initial academic information.

Also, student evaluations help administrators and department chairs in validating the effectiveness of instruction.The discussions in this issue represent efforts to address a determined challenge facing in current higher education and how we develop assessments from evaluation from students that are informative, scalable, and can be accepted by the administrators and majority of experts in the field. Recognizing common approaches to valuation has not been met with unbridled enthusiasm and agreement.To compare the teaching methodology used by faculties and give sculpture to good teaching, ten parameters were taken and based on the point mentioned below feedbacks received from students.

1. Subject Knowledge 2. Preparation 3. Clarity and understandability4. Enthusiasm in teaching

5. Finding students' level and learning progress6. Availability 7. Quality of test and evaluation

8. Motivating students9. Students Consumerism10.Competent Teaching

Related Work:

Student Evaluation of Teaching (SET) is an important technique of faculties in higher education. All teachers can get knowledge and their course from various institutions, but their level of teaching is evaluated by the student's feedback. The SET (Gregory Ching, 2018) technique mainly consists of following three aspects.

1. Evaluation of Instructor.
2. The Teaching process.
3. Learning outcomes as perceived by the students.

Evaluating the instructor about their knowledge, method delivery and etc. should be updated by the students each and every day, and the content delivery is related to general activity and the teaching approaches. The instructor must satisfy student's expectation. Factors that affect SET ratings are

1. Physical appearance
2. Gender and Age
3. Ethnicity

Most commonly physically attractive teachers get higher ratings, and teachers whose age is less also get higher rates than seniors. If the faculty regularly watch and motivate their students, their levels will be enhanced and those persons can get higher ratings. Evaluating the

teaching process is more complex and complicated; there is no perfect tool available to accurately measure the classroom session.

He also suggests that developing SET is very important and necessary for each and every institution. Student evaluation of teacher effectiveness is categorized by the feedback written by them and also the students can and do make important contributions to the teaching-learning process. The important factor of student evaluation is for growth of faculty and their self-improvement. Additionally it will be considered for teacher's promotion, and salary decisions. The students who are sitting in the first bench can observe more than the students in other desk.

Assessment (Dylan Wiliam, 2013) is the bridge between teaching and learning. In learning there are 3 key processes

1. What is the position of the learner?
2. The steps for improving their skills
3. How to meet student expectation

The Formative Assessment mainly depends on learning intentions, eliciting evidence, feedback from students. According to this assessment the students are considered as learning resource for one another. So the classroom situation with instructors and students varies depends on the situation. Assessment may be either formative or summative, students play an important role in teaching-learning process.

The feedback collected from the students which may be in hard copy or soft copy, is very important for instructor in place of their self-development. The feedback also helps the management for taking better decision in case of appraisal. In some institutions the question paper model differs, pass percentage also affect their systems.

To develop Assessments that are informative and scalable (Salazer, 2018) four questions are examined: Why? What? Who? And How?. The detailed descriptions of the questions are

Why we want assess?
What are all the things we required to assess?
Who is responsible for these assessments?
How to meet these assess?

Classroom situations are increasingly seen as a source of information to guide teacher development and 3 principle ideas are considered such as kind of work that is allotted, language chosen for communication, Time and available resources. To improve the quality of teaching and taking effective decisions (Thuy-van et al, 2015) two methods are suggested such as statistical and machine learning method.

Statistical method includes regression analysis and statistical tests for identifying the faculty performance whereas the machine learning includes decision trees for identifying the most important factor. The association rules can be used to find the relationship among the factors

For good teaching (Feldman, 1998) knowledge of the subject is sufficient. Teaching methodology may differs for every institution and the instructor must give their content very clearly and in understandable manner. Students will judge their instructor based on his/her enthusiasm. Instructors should deliver their points in student level, because in a classroom multiple level of students are gathered.

Students expect that their faculties are always available and ready to help them. While evaluating the students, instructors try to avoid partiality because it affects the students personally. On the other hand quality of examinations also affects the grading. If they do not satisfy the student's need, the students and their parents give only low ratings. But there is no perfect model to analyze the teacher's ability.

System Overview:

For this work dataset collected as a form of feedback from students. Feedback form is prepared with ten parameters 1. Subject Knowledge 2. Preparation 3. Clarity and understandability4. Enthusiasm in teaching5. Finding students' level and learning progress6. Availability 7. Quality of test and evaluation 8. Motivating students9. Students Consumerism10.Competent Teaching.

Based on the feedback score for the above mentioned parameters faculty feedback the dataset is framed with faculty name, subject and feedback (Very Good, Good, Neutral,Bad, and Very Bad). 500 feedbacks collected towards 50 faculty members from various departments.

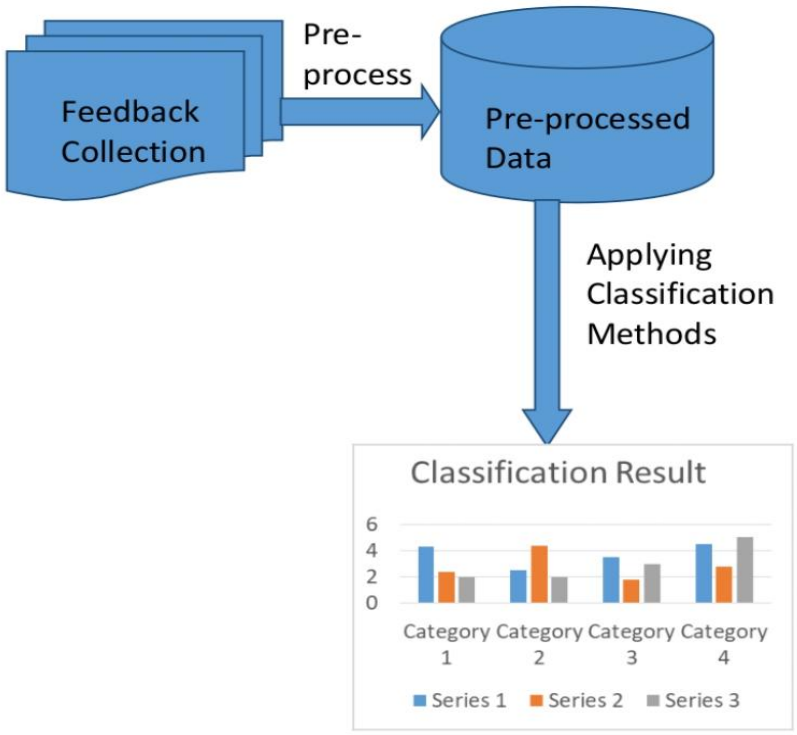


Fig1.1 System Overflow Diagram

Proposed Study:

- Neural networks, a beautiful biologically-inspired programming paradigm which enables a computer to learn from observational data
- Deep learning, a powerful set of techniques for learning in neural networks

General methodology (building the parts of our algorithm)

We will follow the Deep Learning methodology to build the model:

1. Define the model structure (such as number of input features)
2. Initialize parameters and define hyperparameters:
    - number of iterations
    - number of layers L in the neural network
    - size of the hidden layers
    - learning rate α
3. Loop for num_iterations:
    - Forward propagation (calculate current loss)
    - Compute cost function
    - Backward propagation (calculate current gradient)
    - Update parameters (using parameters, and grads from backprop)

4. Use trained parameters to predict labels.

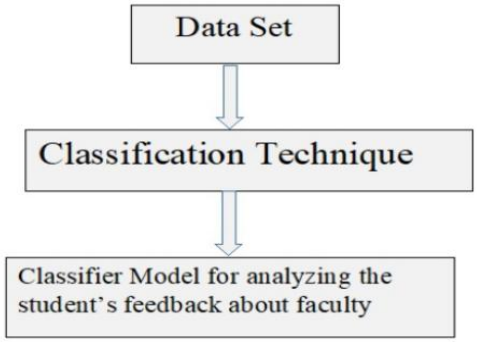
Experimental Results:

In order to see the impact of the individual benefit on the whole system, we conduct varies experiments based on the sample parameters on training data. Using that we selected a final model configuration based on test data.

Dataset:

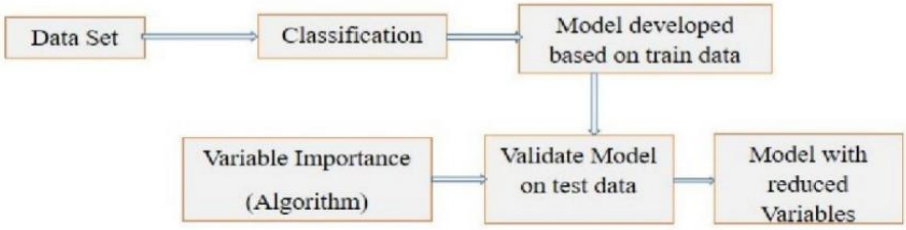
For making the assessment of Teaching Learning process among faculty members especially in higher education, feedback forms are given to students with various parameters discussed in the introduction section and collected. Based on the evaluation of students the scores and feedback given to the faculty members are taken as dataset.

Problem Characterization – Classification:



Framework:

Flow Chart:



Solution Conceptualization:

- Identify that if data is clean.
- Check for missing values.

Identifying variables influencing feedback and look for possible relationship between variables. Such as Correlation, Box plots, Scatter Plots, Chi_square test, etc.

Construct a model with reduced number of variables to classify the student's feedback to the faculties' performance.

- To Work with dataframes: import pandas as pd
- To perform numerical operations: import numpy as np
- To visualize the data: import seaborn as sns
- To partition the data: from sklearn.model_selection import train_test_split
- To import the library for logistic regression: from sklearn.linear_model import LogisticRegression
- To import the performance matrices – Accuracy Score and Confusion matrix:
- from sklearn.metrics import accuracy_score,confusion_matrix
- To import the data: data_feedback=pd.read_csv('feedback.csv')
- Create the copy of original data: data = data_feedback.copy()

Exploratory Data Analysis:

1. Getting to know the data
2. Data preprocessing (Missing values)
3. Cross tables and visualization

1. Getting Know the Data:

Print(data.info()) is used to find out the data types of variables used in the data set. Such as SNO, ROLL NO, FACULTYNAME, SUBJECT, FEEDBACK and etc.

2. Data Preproceesing:

Data.isnull() is used to find out the missing values.

```
data.isnull()
Out[11]:
SNO  ROLL NO  FACULTYNAME  SUBJECT   FD  VALUE  FEEDBACK
….. …. … … …
0   False   FalseFalseFalseFalseFalseFalseFalse …….
1   False   FalseFalseFalseFalseFalseFalseFalse …….
2   False   FalseFalseFalseFalseFalseFalseFalse …….
3   False   FalseFalseFalseFalseFalseFalseFalse …….
4   False   FalseFalseFalseFalseFalseFalseFalse …….
..   ...    ...      ...    ...   ...   ...      ...    ...
print('Feedback Columns with Null values:\n',data.isnull().sum())
('Feedback Columns with Null values:\n',
```

SNO	0
ROLL NO	0
FACULTYNAME	0
SUBJECT	0
FEEDBACK..etc	0

- Summary of numerical variables:
  summary_num=data.describe()
  print(summary_num)
- Summary of categorical variables:
  summary_cate=data.describe(include="O")
  print(summary_cate)

	ROLL NO	FACULTYNAME	SUBJECT	FEEDBACK	Etc..
Count	2160	2160	2160	2160	....
Unique	540	4	4	5	
Top	17ADA0001	FACULTY 4	Software Testing	good	....
Freq	4	180	60	1560	....

- Checking for unique values:
  print(np.unique(data['FACULTYNAME']))
  ['FACULTY1' "FACULTY2' "FACULTY3' "FACULTY4',….'FACULTY 14']

- Relationship between independent variables:
  Correlation=data2.corr()
  print(fb_abt_faculty)

	FACULTY NAME			
FEEDBACK	**FACULTY1**	**FACULTY2**	**FACULTY3**	**FACULTY4**
Very Good	0	0.333333	0.62963	0.037037
Good	0.033333	0.3	0.3	0.366667
Neutral	0.36	0.28	0.1	0.26
Bad	0.772727	0	0.045455	0.181818
Very Bad	0.8	0	0	0.2

The ten feedback parameters Subject Knowledge, Preparation, Clarity and understandability, Enthusiasm in teaching, Finding students' level and learning progress, Availability, Quality of test and evaluation, Motivating students, Students Consumerism and Competent Teaching are analyzed for teaching learning process assessment based on students evaluation.

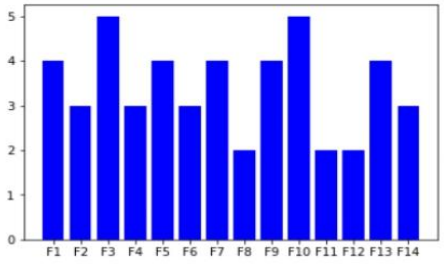
In this above table, we have shown the result of relationship between all the feedback parameters for the first four faculties. But we experimented this classification for all the faculties of one department.

Students' feedback value add an important component to the feedback set for the evaluation of effective teaching. Students' evaluation as:

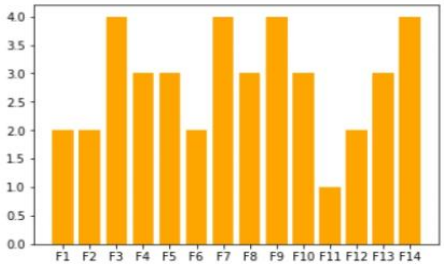
- Multidimensional
- Reliable
- Relatively acceptable against different indicators of effective teaching.
- Useful in improving teaching effectiveness.

Each student gave the feedback through the feedback parameters such as Subject Knowledge, Preparation, Clarity and understandability, Enthusiasm in teaching, Finding students' level and learning progress, Availability, Quality of test and evaluation, Motivating students, Students Consumerism and Competent Teaching. Using classification method in python, we processed the data set. Based on the students' feedback, the following visualization graphs are obtained for each parameters taken for evaluation. At the end of these graph representation, we noticed that faculty3 got the good response from the students. Similarly, we found that the essential improvement expected by student from the faculty. So, this experiment can help the faculty for their effective teaching. By these visualization of variety of feedback parameters, they can find out that student expectation from the faculty. Surely, this will lead to the best growth in the education method.

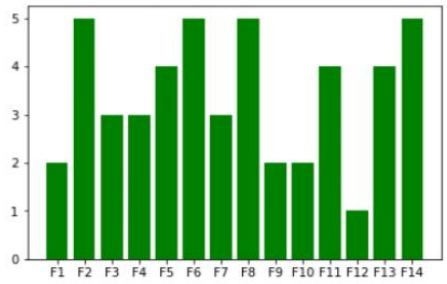
1. Based On Subject Knowledge:



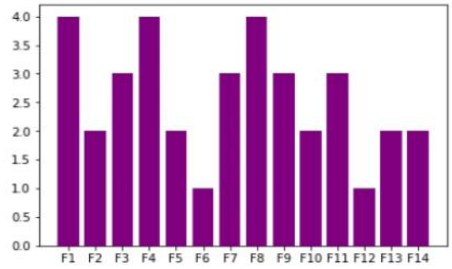
2. Based On Preparation:



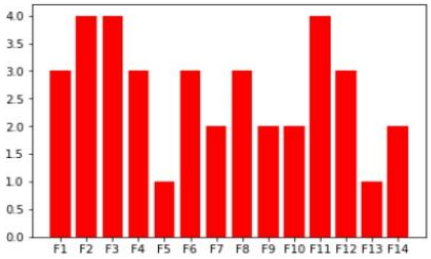
3. Based On Clarity And Understandability:



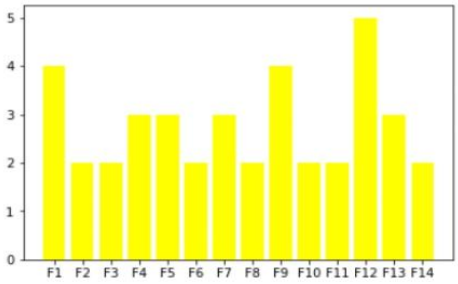
4.Feedback Based On Enthusiasm In Teaching:



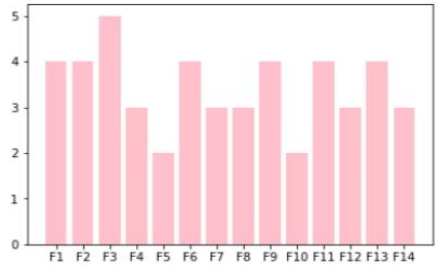
5. Feedback Based on Finding Student's Level and Learning Progress:



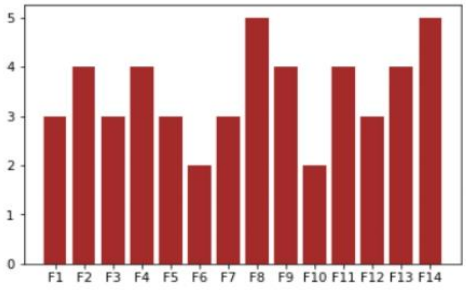
6. Feedback Based on Availability:



7. Feedback Based on Students Consumerism:

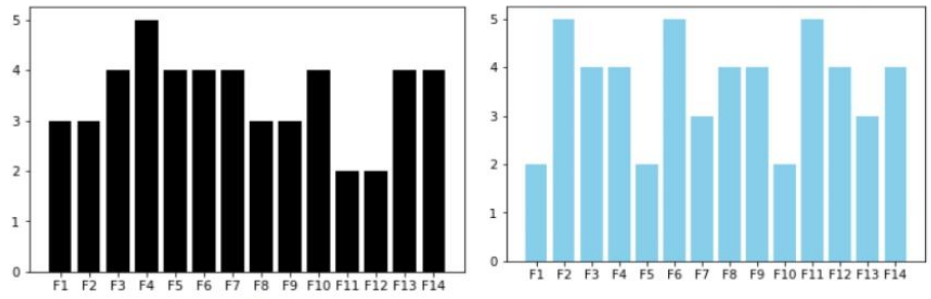


8. Feedback Based on Competent Teaching:



9. Feedback Based on Quality of Test and Evaluation:

10. Feedback Based on Motivating Students:



X-Axis: Faculty Name: F1=Faculty 1, F2=Faculty 2, F3=Faculty 3, F4=Faculty 4 and so on.
Y-Axis: Feedback About Subject Knowledge – Very Good=5, Good=4, Neutral=3, Bad=2, Very Bad=1

Conclusion:

The assessment of student accomplishment, or understanding the quality education methods is the basic to effective teaching. It attentions on students' feedback to strengthen the teaching and learning progress. Several deep learning techniques are used to analyses the collected students' feedback dataset. The student feedback dataset fragmented into two parts. Such as 30% for testingand 70% for training. Moreover accuracy is evaluated through confusion matrix using python language. Illustration of graphs and tables clearly shows that the students' observations on teaching methodology. Based on these graphs, the educational institutions can improve their effective learning environment.

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Ms.S.Gomathy

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Submission ID: 1261407039
File name: 10._ENGLISH_GOMATHY.docx (18.17K)
Word count: 1296
Character count: 6972

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Study Skills and Reference Skills for English Language Students

Abstract

The aim of this paper is to develop four cores of communication skills, Listening, Speaking, Reading and Writing among the learners. Each skill is important for a language learner. Listening and reading skills are considered 'Passive Skills', whereas speaking and writing are considered 'active skills'. The two important skills to develop writing skills are study skills and reference skills. A language teacher should provide opportunities for his/her students to develop their study skills and reference skills. This paper discusses the importance of these skills for the language learner.

Key Words: Skimming, scanning, intensive/extensive reading

Introduction:

"The word thesaurus means a treasure-house or treasure"

There are a number of instructional instruments that can be called essential aids in language learning and teaching; they are essential for reference purposes, locating, sorting and retrieving information, and study. Since the aim of teaching is teaching learners how to learn, there is a need for cultivating the skills of self-study among the learners. Unfortunately, not much attention is paid to this aspect in the classroom.

Study Skills:

Note-taking, note-making, summarizing and information transfer involving graphic and pictorial material, charts, tables, maps, etc., the use of the library for locating the sources of information; making summaries, etc., these are the 'survival-kits' or the 'tool-kits' that are necessary for successful and informed living in the competitive world of today.

Reference Skills:

While referring dictionaries, 'words' books and encyclopedia are important. **Dictionaries** are the most pedagogical and the learners' dictionaries nowadays give guidance for not only the pronunciation, spelling and meanings but also examples of usage with illustrations, variations in the British/American spelling, collocations, exceptions and a whole lot of information necessary to learn English. Learners must be taught how to use such dictionaries. For example, **Longman Dictionary of Contemporary English** gives picture illustrations for the entry 'bird'; pictures are given for sparrow, kingfisher, pigeon, woodpecker, crow, robin, etc. and the names of the parts like feather, wing, bill, etc., are shown for a bird; it also gives expressions like birdie. A person who gets up or arrives early will be successful', 'kill two birds with the same stone', etc, Learners may be trained to look up such dictionaries often so that their vocabulary gets expanded.

Longman Essential Activator is a word-bank that contains all essential information to help the learner to put ideas into words. For example, under the entry agree, one can find all necessary way of expressing agreement with 'Help Boxes' that give the most common mistakes when learning English; it also gives situation-based essential communication and essential grammar. There is also a workbook to go with the Activator. Reader's Digest Reverse Dictionary helps the reader to find the words on the tip of their tongue. **Macmillan Dictionary** for advanced learners comes with a CD-ROM; two similar but separate editions, one for the British variety and another for the American variety, are available. This dictionary is highly innovative and user friendly.

Other Basic Reference Books:

An encyclopedia is another useful source of information and knowledge. An encyclopedia is arranged in an alphabetical order by subject. On the spine of each volume the letters show the subject covered; for example, Volume I A-C covers all subjects, the first letters of whose titles are

between A and C. There can also be cross-references for certain subjects: e.g. 'see also' Vol. IV. There is also an index at the end of the last volume to help the users. There are also a number of abridged versions of dictionaries and encyclopedia in the market. The thesaurus is another useful book for reference purposes. A thesaurus is a converse dictionary in which, the idea being given, one can find the word or words and phrases by which the idea may be most aptly expressed. This arrangement is according to the meanings of words; it gives all synonyms in terms of meaning categories. For example, in the section on formation of ideas, we find all words related to intellect, absence of intellect, thought, idea, curiosity, incuriosity, attention, inattention, care, neglect, etc. Under intellect, we find all related words.

Listening and taking notes:

While you listen to lectures, follow these useful tips for taking down better notes:

1. Get ready before the lecture starts, with a pen/pencil and a notebook.
2. Listener entire attention should be on the lecture. It is better if listener knows the lecture topic before hand so that listener can tune their self to the content of the lecture. Even if listeners don't know it before hand, listener can get it in the first few minutes of the lecture if listeners are attentive.
3. Listener should focus on the essential points in the lecture. The jokes and fun should only be enjoyed and not taken seriously. The examples can be taken for understanding the topic. The main points should be noted down clearly.
4. Listener should be quick in taking notes and listener should follow an order while taking notes. It can be any order of listener choice but follow it consistently. It is better to number the headings, subheadings, subsections, etc., so that the sequence of argument is not lost. For example, see the following notes taken of the lecture on 'English in India'.
5. The best time for listener to take notes is when the speaker switches over from one point to another. Generally the speaker signals this switch over by using phrases such as 'the next point is' or 'let me now talk about the….', 'Let me move on to…..' 'Firstly, secondly, thirdly, etc.' this is only a suggestion and if you are able to take notes simultaneously when listener's listen to the lecture, please do it.

Reading and taking notes:

A student needs to read a lot in English and so the skill of making notes is of utmost importance to him/her. The following tips will be useful:

(i) Prepare yourself for making notes before readers start reading the books; keep a small notebook and a pen/pencil.

(ii) Read the content of the book and get some idea of the entire book. If necessary, read the preface or introduction.

(iii) Focusing on essential points is very important. Equally important is ignoring the non-essential one.

(iv) Use symbols, abbreviations or any other devices which reader find useful and make notes. Whatever system reader use, use it consistently

(v) As making notes is a leisurely activity, don't be in haste-reread the part which reader doesn't understand.

To make good notes, reader must proceed systematically; reader should also know for what purpose readers are making notes – just for the examinations, for future reference, or just for organizing reader's thoughts better and for drawing conclusions. Taking notes and making notes are applicable to all subjects but are never taught in schools and colleges. Since English is related closely to other subjects, the teacher of English must train students in these skills; these skills are a part of teaching comprehension and summarizing. There are several techniques that can be used for recording and preserving notes.

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Potential Areas for implementing Lean Six Sigma in Indian Higher Education Institution

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1. INTRODUCTION

Higher Education is inevitable process of society which producing a wonderful product called educated human being. In larger picture of universe the human kind evolved only because of education in the respective fields of matters according to their requirements. At present the higher education process is serving differently according to the geographical location. All the industries around the globe are working according to the customer requirements and to produce the product in quality at is best, finally the quality of product alone determining the present and future survival of manufacturers in the business. Respectively the higher education sector is in the position to address the quality in its all process to ensure error free service is reaching to its customer. In this study the detail view of higher education framework, process flow, primary and secondary stakeholders are clearly explored. Later in the study the importance of LSS in higher education is discussed.

2. OBJECTIVES OF THE STUDY

The adolescent people are the royal customers of higher education. It is the important duty of higher education institutions to transform them as well educated human being who is ready to serve the society and as well as to make an impact in their personal life. The higher education process and flow is encompasses of very huge variables, dependencies and protocols in it. The individual institution is constructed by three important factors which is shown in fig (1)

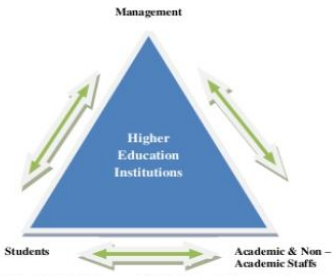

Fig (1) Trilogy of Higher Education

Management

The Management is important stake holder of individual higher education institutions who are pivotal for providing the entire platform for students and teachers to explore knowledge and education.

Academic and Non-Academic Staffs

Key players of the educational process are academic and non-academic staffs. The entire education system framework is constructed and executed by the both academic and non-academic staffs. Who are classified by hierarchical levels according to their achievements and expertise in their respective field work.

Students

The real beneficiaries of the higher education system are students. Students have their own role and specifications according to their academic plan in the respective institutions. Students are integral part of all activities because all the parameters in the system either directly or indirectly revolve around them.

The overall layout of higher education working structure in an individual institution is classified into two layers in table (1)

Layer 1: Management Role & Responsibilities	Governing Council Students In-taking Process Infrastructure Fund Management Faculty & Staff Recruitment
Layer 2 : Academic & Non Academic Plan	Academic Plan Attendance Management Exam Management Non Academic Activities

Table (1) Classification of Higher Education Responsibilities

The role and responsibilities of management is very keen in higher education process, the forming of governing council first and foremost. Governing

council people regulate the process for getting the affiliation for required courses from the university under which they affiliated. People with the experience in council they will form all technical and non technical aspects of institutions along with proper team to track the process. Allocating course programs and admitting students to the program is next priority work of governing council. Constructing and allocating the required facilities for all the process inside the institution. Fund management is another rigorous work to allocate a separate team for streamline the process of in and out cash flow of organization which is very tedious process. Also finding the right path for getting funds from government is additional task. Recruiting the academic and non academic people for ensuring the smooth workflow of institution. Along with this tracking of this processes and ensuring the quality in all is the highly expected to fulfill customer requirements.

Other side of higher education process is planning of academic and non – academic activities which consist of huge number files, variables and dependencies among it. Without proper knowledge about all this process it very difficult to follow and execute in institution. The academic plan is consists of various variables like syllabus, course plan, lesson plan and actual plan. Allocating resources like teachers, time table, computer labs and tools among various courses without any clash among it. Maintaining the records of each individual student is another very important process, in that regard the attendance report maintenance is proof that a particular student attends the courses successful. Exam management is the process which gives a report that whether candidate acquired enough knowledge in respective subjects, if a candidate achieved all the required points as course plan then at the end of course candidate awarded the degree. In the plan of higher education apart from regular academic work, students are engaged several non academic programs like sports, cultural activities it is the role of respective department staffs to note and file all the achievements of student in the academic plan.

Above both layers of work required enormous files to track the process and it needs proper knowledgeable persons to handle it. For tracking all this workflow inside the institution existing quality standards such as ISO, NAAC and NBA is implemented according to their plans.

[1] Major Challenges in the higher education sector

1. Increasing tuition fees.
2. Huge enrolments in some institutions and decreasing enrolments in others.
3. Problems with student retention and low completion rates in respective area.
4. Increasing divergence between the availability of public funding and student numbers, there is gradual increase ratio of student enrolment in education and staff members reduced in respective courses.
5. In current economic era it is very difficult for universities to operate.
6. The invention of e-learning, distance programs and AI is huge threat for higher education.

[2]Some of major pitfalls which are affecting the teaching learning process

1. Lack of standards followed by individual groups inside the institution.
2. Missing processes in between the work flow.
3. Utilizing majority of time for examination, laboratory and presentations.
4. Progressive Absence of faculty and student in respective courses.
5. Impropriate syllabus coverage.
6. Lack of teamwork among faculties and students in their respective work.
7. Poor work transparency among the teaching faculty.
8. Poor management and tracking skills.
9. No clear plan among teacher and students.
10. Non availability of resources.
11. Excess meeting between students with mentor.
12. Not following institution standard and procedures in workflows.

By implanting and following several standards in routine work, even then the results of higher education in overall process are showing that quality is still lacking in it.

3. METHODOLOGY

Lean Six Sigma (LSS)

Several service sectors upgraded themselves in providing quality services to its customer. Higher education sector is still in progress of providing quality in all aspects of its business, this is because of involvement of large group of people from different venture to work in it to achieve a common goal.

[3]In 1970s Motorola come up with Six Sigma framework to improve their quality in products and it leads them to excellence in quality. Lean is method which has its history from Toyota production systems, it is formulated to eradicate the waste in progressive manner to achieve perfection in product which customer is expecting. In recent times the joined venture of six sigma and lean called as Lean Six Sigma which excelled in providing the quality output. This new quality approach overshadowed all the existing quality methods and it is widely implemented in various sectors. LSS follows DMAIC methodology in it.

[4]DMAIC consist of several important purposes in a project management context

Define: Define the Task, Scope of it and process to enhance.

Measure: To understand the existing state and streamlined to validate the measurement system.

Analyze: Analyze the root cause of problems and developing feasible processes.

Improve: Identify and developing projects to compete the future requirements.

Control: Measuring the results of various variables and inducing control plan which ensure proper guidance for future states.

[5] American Society for Quality advocate LSS for higher education because of the following exclusive benefits:

1. Largely it helps for all accreditation process for institution.
2. LSS serves as solving pattern for all kind of problem arousing in organization.
3. It elevates all process to exceed in quality.
4. LSS help to establish a quality standard inside a organization.
5. Makes process more transparent.
6. Collecting frequent feedback from internal and external customers.
7. Hugely helps to find and eradicate the hidden costs in processes.

Fig (2) LSS Model for Higher Education

[5] The LSS model for higher education is encompassed of seven steps in it fig (2). LSS readiness factor is ensuring the ready platform for executing LSS in processes. Finding the needs through proper leaders inside organization and developing methodology for implementing LSS. Transforming the importance and skill set to team members through proper sessions. The Team formation for running and tracking the LSS processes at various levels. Once the process initiated and executed, then review the obtain results and closing the process. Practically this LSS model yield good performance results in both academic and administrative process in higher education organization.

[5] Key potential areas to initiate LSS project in Higher Education

- Enhancing student exam pass percentage and increasing graduation rate.
- Improving student's placement ratio.
- Decreasing student's absenteeism in academic progress.
- Enriching the feedback environment.
- Quality improvement in research department and increasing publication of papers.
- Reducing the resource consumption by various departments in organization.
- Increasing quality in all form of facilities utilized by students.
- Improving the teaching and learning methodology.
- Increasing in effectiveness of accreditation process for achieving higher standards in quality.

Not all process qualified for implementing LSS strategy, it needs priority and other variables like scope, opportunity, demand of it. The most important care is need while executing LSS projects because of its high success yielding properties and also to ensure desired outcomes achieved.

[6] The solid proof for progressive growth of LSS implementation in higher education globally is given below table (2).

S. No.	Country	University / College Name
1.	USA	* Miami University * University of North Carolina * Gordon State College * University of Central Florida
2.	UK	* Kings College * Heriot Watt University
3.	GEORGIA	* Valdosta State University
4.	SINGAPORE	* National University of Singapore
5.	INDIA	* Sri Sathya Sai Institute of Higher Learning

Table (2) LSS implementation in Higher Education Globally.

[7] Challenges in introduction of LSS in higher education.

- Blending terminologies from manufacturing industry to higher education sector is very difficult.
- The process of achieving compactness is not clear among senior members in higher education institution.
- A lack of commitment and support among team members in organization.
- Lean initiative should not be viewed as quick fix for all problems.
- The culture of higher education sector is big challenge in implementing LSS.
- A poor mentality across the departments and faculties leads to poor communication across the institution.

Yet the advantages is huge by implementing LSS in higher education, still it is in progressive nature to attain its full efficiency. The mixed knowledge, culture barriers and lack of interest are main threats to implement LSS in higher education. But even then growing demand of quality expectation by customers is leading us to progress LSS in higher education.

4. CONCLUSION

Lean Six Sigma is the very effective methodology for ensuring quality in the respective field in which it is implemented. In this paper it is discussed detailed, about the different classification of higher education institution in both academic as well as non academic process. Major challenges and pitfalls of higher education are growing rapidly day by day. In the same time the quality improving strategies also found and implemented in different manufacturing industries. The popularity of methods like six sigma and lean got noticed in service sectors to improve the quality. Later, the combination of lean and six sigma produced a wonderful strategy which eradicates the most of barriers produced by existing quality methods.

In this paper the potential area are listed to implement LSS in higher education. Globally the awareness and importance of implementing LSS in education sector is quite progressive in nature. Equal to its advantages LSS is comes with difficult level to implement in education sector. The proper guidance and transformation of knowledge about LSS is need among members inside the organization to ensure it is effectiveness. A LSS model is discussed in this paper to implement in higher education. The future research work is on finding several high priority processes in higher education and implementing LSS methodology in it to understand the quality betterment.

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AN ANALYSIS AND ADAPTIVE PREDICTION OF CONSUMER ATTRITION RATE USING FUZZY COGNITIVE MAP (CARM)

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***Abstract*— Consumer retention is a major challenge faced in today's day to day business. Identifying approaches to predict consumer attrition or retention at an early rate is a major research work which is demandable among industry members and survey shows that business intelligence is always challenging research. This work CARM adopts consistent set of consumer data over varying time period over metrics such as accuracy of prediction and Consumer Life Time (CLV) to analyze on reasons behind attrition rate. CARM uses Fuzzy Cognitive Map as a modelling tool to determine on prediction of attrition over time period. Proposed approach is compared with traditional approaches such as Genetic algorithm, Fuzzy K-means and ANN whose performance shows that CARM shows an improved prediction accuracy of attrition rate (%) and at an early time (MSECS). FCM is well adaptable to prediction compared to traditional approaches due to its early susceptibility to optimality condition.**

Keywords*— *Consumer Attrition rate, Fuzzy Cognitive Map, Business Intelligence

I. INTRODUCTION

To understand the psychological behavior of consumer and relate their analysis of buying pattern over a specific time period. Predicting consumer's intention of interest over a specific product is to be considered as major determinant of achieving prediction outcome for consumer attrition based on perception of a business carried out. The primary aim of this survey and analysis is to suggest on factors of consumer satisfaction and understand the factors evolving a CRM project using an adaptive fuzzy cognitive map system (FCM) which has its relational mapping over consumer and their related consumption datasets. The phenomenon of consumer retention depends on consumer attrition.

Attrition rate can be understood as number of consumers missed out based on consumer loss out or by product. Consumer Attrition discusses on considered as number of consumers missed out over number of consumer observed during start of analysis period. Prediction Accuracy Rate is expressed as percentage (%) of all products/consumers observed on specific time period.

To suggest on deterministic consumer attrition analysis and support on detailed survey exploration on consumer based service level quality the demand for cognitive approach of service provisioning over product purchase and its relationship of consumer CRM outcome obtained on basis of fuzzy multi-criteria decision making (FMCDM) combined with traditional computational genetic algorithm based learning approach and support over ANFIS approach.

The primary objective of this work relies on;

(a) Early prediction of consumer attrition rate over specific market based channels. Analysis of consumer attrition over variable product demand under multiple time instant poses enormous research challenges an edge.

(b) analysis or prediction of consumer attrition over a product demand under specific conditions and multi-variate situations of consumer.

Consumer attrition rate relates to benefits offered over transactional marketing. Relationship marketing offers cheaper approaches to suggest on retaining an existing consumer instead of approaching another new consumer, as well supports on providing higher value to priority based regular consumption consumers. CARM is proposed as a model for early prediction of consumer attrition approach, which adopts fuzzy cognitive mapping using demand for product in market over consumer details. This approach suggest on mechanisms for early prediction of consumer attrition over variable product utilization. CARM considers clustering approaches over defined analytical methods which work towards improving the predictive ratio towards market demand and understanding commodity market cost.

Proposed model suggests on identification of features of commodity and market analysis required for accomplishment of consistent product growth metrics over period of time. Understanding the product growth metrics, product behavioral aspects and effective utilization rate over distributed consumer data obtained from different market malls as data set is considered for analysis. Fuzzy Cognitive Mapping approach supports on variable product consumption obtained from consumers. This research work focuses on various models to create and design on product consumption rate of consumers and mechanism to predict on consumption rate. CARM detects on ratio of commodity distribution, product consumption rate, suggesting on consumers seasonal changes in utilization or consumers support on product. CARM also focuses on unexpected attrition rate which may attribute to unexpected societal conflicts, issues related to market based price fluctuation and uncertainties of socio-demographic aspects, which remain as need for optimality metrics to determine the consumer detection rate against a market producer to sell commodities or produce at an optimal price.

Research work fulfils the following objectives

(a) Need for designing an optimal early prediction of consumer retention / attrition rate and understanding the commodity demand in market.

(b) The need to suggest a decision support system based on commodity variable inputs, which adapts towards market based demand trend sets of selling the commodities.

This paper is arranged is follows : Section-1 introduces the need for customer attrition, challenges behind prediction of attrition, adoption of fuzzy cognitive map towards detection and data analytics. Research gaps and analysis is discussed in section-2, which suggests on aspects behind business intelligence, and need for computational approaches towards prediction. Section-3 introduces on FCM and its role in prediction of consumer retention or attrition analysis. Section-4 elaborates on CARM algorithm and its design factors towards optimization and prediction of consumer retention. The dataset and its experimental test bed is discussed in Section-5, while section-6 concludes on outcome of CARM.

II. REVIEW WORK

Researches in the field of business intelligence had taken a major leap towards adopting technological updates in day to day business activities. The success of running a business firm primarily does not just depend on various methods of executing the business, but to determine how beneficially the business trends produce profits when compared to business offices. The technological key required to support an effective business office lies in data mining and computational methods where the data transacted is being stored for analysis and used for daily business.

III. ROLE OF FUZZY COGNITIVE MAP IN CONSUMER RETENTION ANALYSIS (CARM)

Computational models and its application on understanding the consumer's approaches of their purchase behavior, suggests implementation of multiple various classification algorithms being suggested with the purpose of accurately predicting the probability of a consumer attrition or defection. The predictive attrition models are then commonly selected based on accuracy related performance measures such as the area under the ROC curve (AUC).

Consumers analytic metrics such as Consumer lifetime value (CLV), lifecycle of a consumer, effective product utilization rate, cost involved towards acquiring a new consumer, cost of retaining a consumer, product utilization rate and related consumer metrics play a primary role in early analysis. Though computational models do support on analytics of consumer and product utilization rate, the demand for a challengeable approach of early prediction of consumer attrition towards understanding the product is current valuable research.

Computational modelling approaches in relation to consumer optimization algorithms such as ANN, Bee Hive optimization which define on understanding the product requirement based on consumer's interest and market demand.

IV. APPROACH (CARM)

To support in consistent business development and growth, with focus on the need for economic stability of a firm, understanding the consumer profile and product life cycle helps in business as consumer relation management. To adapt to new technological aspects as well to leverage the benefits of existing consumer and product information the support of data mining technology should be implemented. Data and analytics technology primarily helps to analyze the trends of businesses by discovering hidden patterns of business sales and consumer information. These patterns help in understanding the purchasing behavior of their key consumers as well identifying their interest towards buying a product. Various case studies had been applied in consumer volatile industries such as telecom, network, consumer market analysis, banking sectors, health insurance. Most of the examples include detection of people's usage of credit card or debit card for purchase of electronic goods or materials. Data mining primarily helps in critical data analysis such as insurance claim fraud detection, predict probable changes in financial markets, and so on.

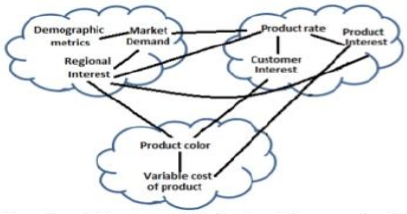

Fig-1: Clustering of Consumer and Product based features using CARM

To understand, analyze and utilize on properties which are required for determining the functionality of consumer retention rate over specific duration, data analytical approaches along with an intelligent computational procedures support towards improving the business according to the change in environment of growth.

Multiple computational procedures such as Swarm Intelligence algorithms, Genetic Modelling Algorithms, Neuro Fuzzy Logic procedures can also be adopted. The outcome is predicted towards analysis of consumer attrition, with support for consumer retention models at an early time such that the business organization manages its assets beneficially.

V. ALGORITHM (CARM)

CARM algorithm adopts multiple clusters of consumer interest, product details, product utilization rate, intensity of purchase, demand for product, product recommended rate as variable consumers' criteria defined as objective function Xi.

Objective Function Xi = (C,P, ξ,α,σ) // Calculate fitness of each consumer's search criteria

Step 1: Initialize consumer population Ck (k=1,2…y) and product demand Pi (i=1,2,...x),where x,y are relative variables of Ck and Pi

Step 2: // define slack variables
Pb: consumer's product buying pattern
Co: Observed Consumer's attrition events
ξ: prediction of nearest consumer's attrition pattern
α: frequency of consumer attrition rate
Cw: worst vector observed - consumer attrition

Step 3:
Create Ca; // list of products and their repeated buying behavior

```
Step 4:
    for i = 0...(nrow -1) do
      for j = 0 …(rcol-1) do
        Gk[i][j] ← Cb    // variable product change in cost
    Initialize (Ca, Cb)
    for each Cb do
      Create Co, where ∀ Co ⊂ Ca
      Create Cw, where ∀ Cw ⊂ Cb
    end-for
Step 5:
 for i = 0 …(nrow-1) do
 for j = 0 ...(ncol -1) do
    if (Cp (Ca,Cb) < Gk[i][j]) AND (Cw != NULL ) then   //
check until all wolf are checked
    begin  // Check on the fitness of consumer attrition data
      Xi ' ∈  ( Xi¹, Xi², …. Xiⁿ }
      Gk[i][j] ←Xi '
    end
    Cw ← Ca - Co // negative instances of consumer
    update regarded as Retention
end-for 'i'
end-for 'j'
```

Algorithm takes in all possible valuable inputs between consumer and their relationship with a product. Any feasible relationship can provide a positive inference towards buying the product and as well instances to move away from buying product which is to be referred as RENTENTION aspect or attrition issue. Algorithm takes consumer inputs as 'Ca' gathered at each interval of time and measures its event. 'Cb' suggests on consumer category and positive instances of product buying attitude and 'Cw' suggests on negative instances and their aspects of deferring away from product.

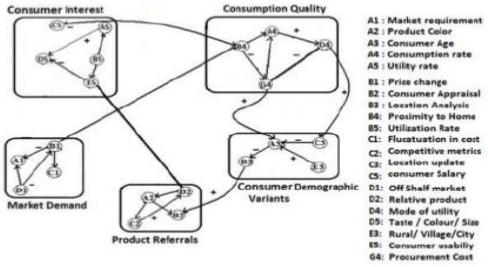

Fig-2: FCM mapping over customer, product relationship and its relation in referral

Fig-2 discusses on the aspect of applying consumer retention based on product demand and its establishment with quality of consumption. To establish a relation between consumers' interest and product selling pattern Fuzzy Cognitive Map helps to create a effective relationship between the metrics and behavior. The weightage assigned over the metrics suggest on the intensity of data and its priority of assignment between consumer and product. FCM works by clustering the relationship existing between consumer and product, using multiple objects as components shown as A1, A2….An, B1, B2..Bn, C1…. (Fig-2).

Each component establishes its relationship with another component such that its relation supports in a positive or adverse way is analyzed. The relation B1 shows a positive relation to C1, which is related to price change and its impact on consumer. Relation B1 shows a negative impact over A1 as shown in Fig-1, such impacts being positive or negative gains momentum to finally suggest on causes for Consumer Retention and their impacts.

VI. EXPERIMENTAL ANALYSIS

Consumer data being gathered from regular consumers of different products from Jan 2016 to April 2019 is used for analysis in this research work. The dataset is pre-processed to check on data quality and adopting to research requirements.

CARM adopts the following analytic experimental metrics:

a) Experiment execution period: 360 secs
b) Number of consumers active: 210
c) Number of consumer observations: 167
d) Number of consumer usage periods associated with contractual active period: 14 months

CARM algorithm takes in to consideration all active consumers who are engaged in retail shopping process observed over more than 3 years of analysis. This work considers regular consumer dataset collected from a retail store over period of 2016 to 2019 which possess around 12730 records for 1117 products variable over cost as a differential parameter as shown in Table-1.

Attribute density	183
No of Records	1052
Missing Values	31%
No of Consumers	623
No of products	35
No of Categorical Attributes	43
Analytical period	Jan 2016 to April 2019

TABLE 1: Dataset Property

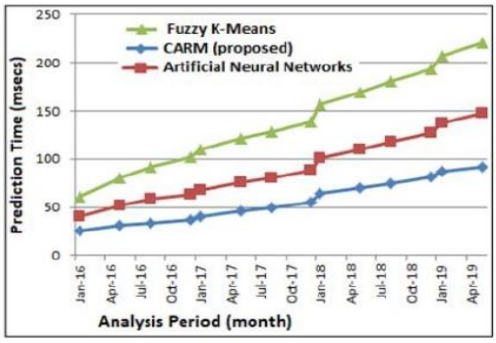

Fig-3: Observed Prediction Time over analysed time period

Fig-3 shows the observed consumer retention rate observed using CARM which involves the consumer life time value (CLV) as major parameter for analysis. The percentage of observed attrition rate on forecast analyzed from CARM shows an average variable rate of 26.73% of attrition rate in comparison to Fuzzy K-Means clustering approach, whose average rate is 32.29% of high fluctuation rate compared over ANN which demonstrates average rate of 34.81%.

CARM shows an early prediction rate of 90msecs for analytical period , while Artificial Neural network suggests 138msecs and 208 msecs are suggested by Fuzzy K-Means.

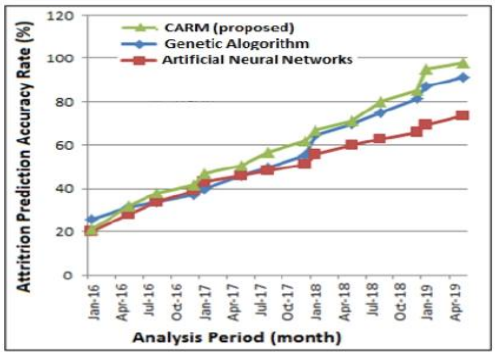

Fig-4: Observed Attrition / Retention Prediction rate

Fig-4 shows the consumer attrition prediction rate or retention rate which is highly influential on consumer fluctuating price of product over varying time period. Analytical period from Jan 2016 to April 2019.

To understand on accuracy of Attrition rate or retention rate of consumer over period of time, the dataset is compared with Genetic approach and Artificial Neural Networks. Performance of proposed CARM is optimally improved as 68.25% in comparison to ANN whose performance is 54.09% and Genetic algorithm as 62.77%. On an average performance of CARM it can be suggested that it outperforms on early prediction with well adaptation to frequent changes in prediction of consumer attrition rate.

VII. CONCLUSION

Challenges in consumer attrition is always felt as a major research in field of Business Intelligence. Predicting consumer attrition at an early time support towards retaining the consumer as well minimizes cost involved in getting a new consumer. Understanding the consumer changing interests and adapting to efficiency towards carrying out regular business is discussed in this research work. The dataset is gathered from consumer over varying time period such that their change profile and variable interests are analyzed. CARM is proposed approach which uses Fuzzy Cognitive Map to analyze and suggest on consumer attrition based on their buying behavior. CARM shows an improved early prediction rate of 92 msecs compared to other approaches.

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Name of the Department	Biotechnology
Name of the department Association / Club	Biovision
Activity	**Guest Lecture**
Date of the activity	19.10.2021
Title of the activity	**"Bio- Entrepreneurship"**
Objective	Bio-entrepreneurship is the process of creating value from life science innovation. Bio-entrepreneurship helps solve global problems by turning basic scientific knowledge into innovative and sustainable solutions for society. The major objective of this guest lecture is to emphasize the opportunities in bio-entrepreneurship.
Resource Person	Dr.D.Sudhakaran, General Manager Golden Jubilee Biotech Park for Women, Chennai
Total no. of beneficiaries	75
Outcome / Report	The participants understood the importance of Bio-entrepreneurship and were able to identify the new opportunities in the field of Biosciences.

KG COLLEGE OF ARTS AND SCIENCE, COIMBATORE
DEPARTMENT OF BIOTECHNOLOGY

GUEST LECTURE

Date: 19.10.2021 **Venue: Google meet**
Time: 3.00 pm

AGENDA

3.00 pm	-	**Prayer Song**
3.05 pm	–	**Welcome Address** Dr.B.Sangeetha Head of the Department Department of Biotechnology KG College of Arts and Science
3.15 pm	-	**Presidential Address** Dr.J.Rathinamala Principal KG College of Arts and Science
3.25 pm	-	**Guest introduction** Dr.D.Shalini Assistant Professor Department of Biotechnology KG College of Arts and Science
3.30 pm	-	**Dr.D.Sudhakaran** General Manager Golden Jubilee Biotech Park for Women Chennai
4.15 pm	-	**Discussion**
4.25 pm	-	**Vote of thanks** Dr. S. Jayashree Associate Professor Department of Biotechnology KG College of Arts and Science

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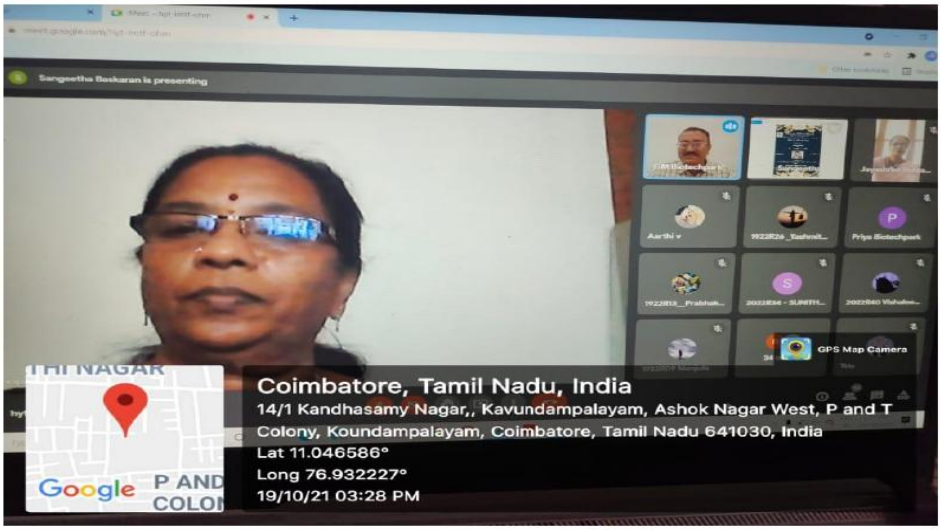
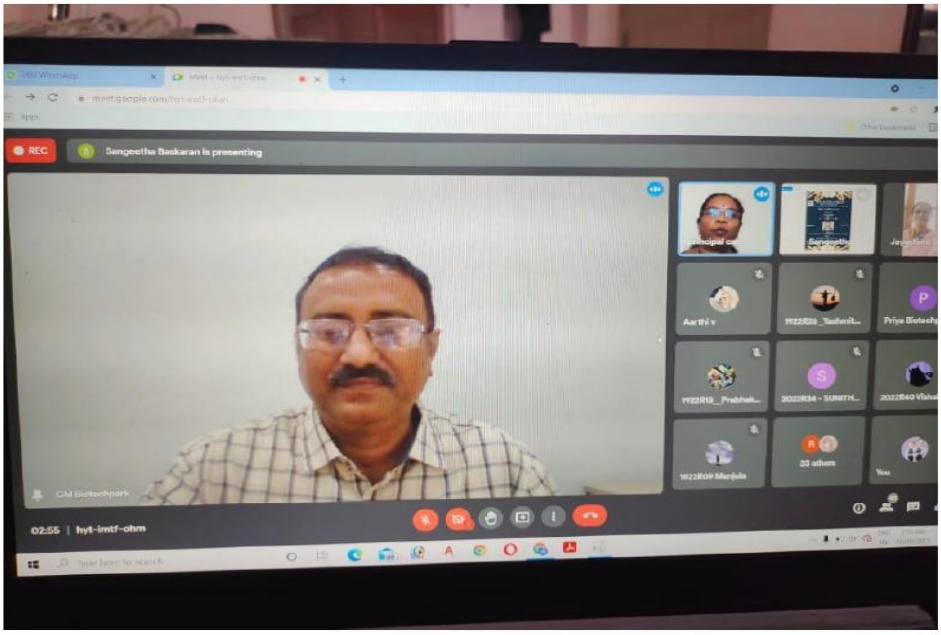
Guest Lecture on "Bio-entrepreneurship"





Dr.D. Sudhakaran, delivers his lecture through Google meet.

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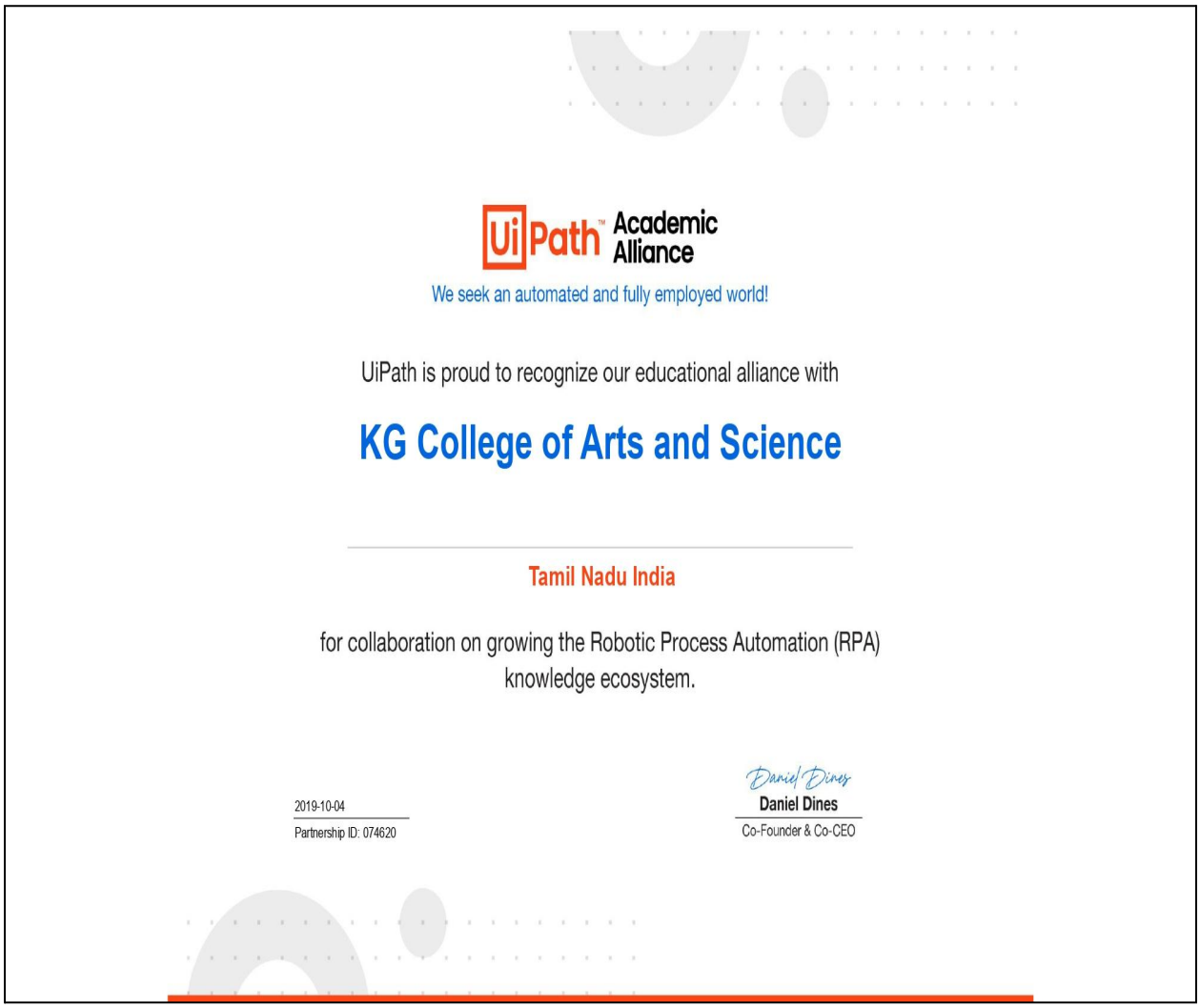

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