

ARTIFICIAL INTELLIGENT APPROACH TO PREDICT THE STUDENT BEHAVIOUR AND PERFORMANCE

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Engineering degree in
Computer Science and Engineering

by

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHOOL OF COMPUTING

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade “A” by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this project report is the bonafide work of Avinash, Narayana (38110254,38110630) who carried out the project entitled
ARTIFICIAL INTELLIGENT APPROACH TO PREDICT STUDENT PERFORMANCE AND BEHAVIOUR under our supervision from November 2019 to April 2020.

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ABSTRACT

Nowadays predicting student performance becomes more efficient due to process the huge volume of data in educational databases. There are many analysis using this concept and area of implementation is still increasing larger different examples student marks, attendance, semester mark, grade points, placement, health, curriculum-activities etc. In recent trends the amount of data stored is developing rapidly. The main goal is to make a survey on "An intelligent approach to predict the student behavior and performance" To develop a model in order to predict student Behavior and performance. The student performance in education is very major role in educational environment .The stored database contains student information to improve student perspective and behavior. This paper show trends and types of analyze should be performed to improve education process. We predicted student details and generate a report to the faculty and parents. Based on the performance we give solutions to improve their performance. Predicting student performance becomes more challenging due to the large volume of data in educational databases. This paper also focuses on how the predicted the information can be used to identify the most important attributes selection in a student data. we could actually improve student achievement and success more in an efficient way using educational data mining techniques. It could bring the benefits and impacts to student, and academic institution.

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LIST OF ABBREVIATIONS

S.NO	ABBREVIATION	EXPANSION
1.	.dex	Dalvik Executable File
2.	DVM	Dalvik Virtual Machine
3.	ADT	Android Development Tool
4.	SDK	Software Development Kit
5.	.apk	Application Package File
6.	JRE	Java Runtime Environment
7.	Adb	Android Debug Bridge
8.	DDMS	Dalvik Debug Monitor Service

CHAPTER 1

INTRODUCTION

OUTLINE OF THE PROJECT

Significant improvement to improve student behaviour and Performance managed huge amount of student database has changed our educational system using Data mining techniques are the hottest topics or research areas in the field of Information Technology. Researchers are focusing these areas for better improvement. A simple example of data mining can be predicting student success as given in. In contrast to the above improvement, student details maintenance services are improving and accessing student are continually improving their services. Most of the them is trying to continuously improve student behaviour and performance by computerizing the education details, whole system are managed we going to predicted the student behavior and performance in future use. Managing whole details of student increasing regardless the improvement in the field of education. The objective of developing this project is to predict the student behavior and performance. Education is a vast and important subject, one that cannot be addressed adequately in this space. In recent years the amount of data stored in educational database is growing rapidly. The stored database contains hidden information about improvement of student's performance and behavior. The ability to predict the student performance in education is very important in educational environments. Student's academic performance in educational environment is based upon the psychological and environmental factor is predicted by different educational data mining techniques. Here by data mining techniques such as data classification and decision tree methods are used to evaluate the student performance. The analysis of performance can be done in several ways such as Overall Semester Marks, Practical Lab, Attendance, Paper Presentation, End Semester Marks ,mini project , strength and weakness etc., The information about the student and their behavior and performance are stored in a database . We can predicate and access their data for future use. The information about the student and their behavior and performance are stored in a database

.We can The information about the student and their behavior and performance are stored in a database .We can predicate and access their data for future use. The information about the student and their behavior and performance are stored in a database. We can predicate and access their data for future use. Collected each and every data of the student are analysis and generate the report . The collected details will be processed and published as report and the student and staff can access their details anywhere when they needed The scope of the project an intelligent approach to predict student performance and behavior is for computerizing the information. The software takes all the data of an student and is capable to provide easy and effective storage of information related to students.

OBJECTIVE

The main aim of this project is to improvise the student performance in classrooms based on some important factors. Education is an essential element for the betterment and progress of a country. It enables the people of a country civilized and well mannered. Now-a-days developing new methods to discover knowledge from educational database in order to analyse student's trends and behaviours towards education. To analyse the data from different dimensions categorize it and to summarize the relationships. It motivated us to work on student dataset analysis. The data collection, categorization and classification is being performed manually.

CHAPTER 2

LITERATURE SURVEY

In the year 2015, Krina Parmar et.,al.[10] have proposed that The performance of students in higher education in India is a turning point in the academics for all students for their brightest career. In today's generation the amount of data stored in educational database increasing at a great rate. These databases contain secret information for improvement of students' performance; these data can be located at different nodes in distributed system. Classification and prediction are among the major techniques in Data mining and widely used in various fields. In this paper classification techniques are used for prediction of student performance in distributed environment. Data mining methods are often implemented at many advance universities today for analyzing available data and extracting information and knowledge to support decision-making. While it is important to have models at local level, their results makes it difficult to extract knowledge that can be useful at the global level. Therefore, to support decision making at this area, it is important to generalize the information contained in those models, specific classifier method can be used to generalize these rules for global model.

In the paper in 2013 S Huang, et., al [5] presented that Predicting student academic performance has long been an important research topic in many academic disciplines. The present study is the first study that develops and compares four types of mathematical models to predict student academic performance in engineering dynamics – a high-enrollment, high-impact, and core course that many engineering undergraduates are required to take. The four types of mathematical models include the multiple linear regression model, the multilayer perception network model, the radial basis function network model, and the support vector machine model. The inputs (i.e., predictor variables) of the models include student's cumulative GPA, grades earned in four pre-requisite courses (statics, calculus I, calculus II, and physics), and scores on three dynamics mid-term exams (i.e., the exams given to students during the semester and before the final exam). The output of the models is students' scores on the dynamics final comprehensive exam. A total of 2907 data points were collected from 323 undergraduates in four semesters. Based on the four types of mathematical

models and six different combinations of predictor variables, a total of 24 predictive mathematical models were developed from the present study.

In the paper Osmanbegovic.E. et.,al [8] detailed that although data mining has been successfully implemented in the business world for some time now, its use in higher education is still relatively new, i.e. its use is intended for identification and extraction of new and potentially valuable knowledge from the data. Using data mining the aim was to develop a model which can derive the conclusion on students' academic success. Different methods and techniques of data mining were compared during the prediction of students' success, applying the data collected from the surveys conducted during the summer semester at the University of Tuzla, the Faculty of Economics, academic year 2010-2011, among first year students and the data taken during the enrollment. The success was evaluated with the passing grade at the exam. The impact of students' socio-demographic variables, achieved results from high school and from the entrance exam, and attitudes towards studying which can have an affect on success, were all investigated. In future investigations, with identifying and evaluating variables associated with process of studying, and with the sample increase, it would be possible to produce a model which would stand as a foundation for the development of decision in higher education.

In 2012, authors A. Banumathi et., al [3] described education is the backbone of all developing countries. Upgrading of the education system, upgrades the country to the world top ranking level. One of the major problems that the education system facing is predicting the behaviour of students from large database. This paper focus on upgrading Indian education system by using one of the techniques in Data mining namely clustering. Cluster analysis solves the given data into some meaningful groups. Normally the performances of the students can be classified into different patterns as normal, average and below average. In this paper we attempt to analyze student's data in different angle beyond the above indicated patterns through newly proposed UCAM (Unique clustering with Affinity Measures) clustering algorithm.

In 2016, authors Anoopkumar .M et., al[2] explored educational Data Mining (EDM) is an interdisciplinary ingenious research area that handles the development of methods to explore data arising in a scholastic fields. Computational approaches used by EDM is to examine scholastic data in order to

study educational questions. As a result, it provides intrinsic knowledge of teaching and learning process for effective education planning. This paper conducts a comprehensive study on the recent and relevant studies put through in this field to date. The study focuses on methods of analysing educational data to develop models for improving academic performances and improving institutional effectiveness. This paper accumulates and relegates literature, identifies consequential work and mediates it to computing educators and professional bodies. We identify research that gives well-fortified advise to amend edifying and invigorate the more impuissant segment students in the institution. The results of these studies give insight into techniques for ameliorating pedagogical process, presaging student performance, compare the precision of data mining algorithms, and demonstrate the maturity of open source implements.

Umesh Kumar Pandey et., al [9], in 2011 expressed that now a day's students have a large set of data having precious information hidden. Data mining technique can help to find this hidden information. In this paper, data mining techniques name Byes classification method is used on these data to help an institution. Institutions can find those students who are consistently perform well. This study will help to institution reduce the drop put ratio to a significant level and improve the performance level of the institution.

El-Halees,et.,al [4] said classification models described in this paper should help: teachers, students and business people, for early engaging with students who are likely to become excellent on a selected topic. Clustering students based on cognitive styles and their overall performance should enable better adaption of the learning materials with respect to their learning styles. The approach is tested using well-established data mining algorithms, and evaluated by several evaluation measures. Model building process included data preprocessing, parameter optimization and attribute selection steps, which enhanced the overall performance. Additionally we propose a Moodle module that allows automatic extraction of data needed for educational data mining analysis and deploys models developed in this study.

In the year author Khan et., al [6] said that the present study was conducted on 400 students (200 boys and 200 Girls) selected from senior secondary school of A.M.U., Aligarh-India, to establish the prognostic value of different measures of cognition, personality and demographic variables for success at higher secondary

level in science stream. The scores obtained on different variables were factor-analyzed to get a smaller number of meaningful variables or factors to establish the predictive validity of these predictors. Factors responsible for success in science stream were identified. The prognostic value of the predictors was compared for high achievers and low achievers in order to identify the factors which differentiate them.

Authors Al-Radaideh et.,al [1] in 2011 overviewed Student performance in university courses is of great concern to the higher education managements where several factors may affect the performance. This paper is an attempt to use the data mining processes, particularly classification, to help in enhancing the quality of the higher educational system by evaluating student data to study the main attributes that may affect the student performance in courses. For this purpose, the CRISP-DM framework for data mining is used for mining student related academic data. The classification rule generation process is based on the decision tree as a classification method where the generated rules are studied and evaluated. A system that facilitates the use of the generated rules is built which allows students to predict the final grade in a course under study.

In the year 2011 authors Dr. Varun Kumar et.,al [7] described the information flow in education field was relatively simple and the application of technology was limited. However, as we progress into a more integrated world where technology has become an integral part of the business processes, the process of transfer of information has become more complicated. Today, one of the biggest challenges that educational institutions face is the explosive growth of educational data and to use this data to improve the quality of managerial decisions. Data mining techniques are analytical tools that can be used to extract meaningful knowledge from large data sets. This paper addresses the applications of data mining in educational institution to extract useful information from the huge data sets.

CHAPTER 3

AIM AND SCOPE OF PRESENT INVESTIGATION

SCOPE OF THE PROJECT

The main scope of this include:

- Integration of multimodal sensing, emotion recognition, deep learning, high-performance GPU computing, and feedback systems
- Quantification of important human variables in a smart classroom, such as crowd scores and behavioral cues
- Demonstration and verification of our proposed system design with a template smart classroom.
- Bridging the gap between engineering and education with an education theory-based system design.
- Review of the state-of-the-art technologies and proposal of future directions for AI-enabled smart classrooms.

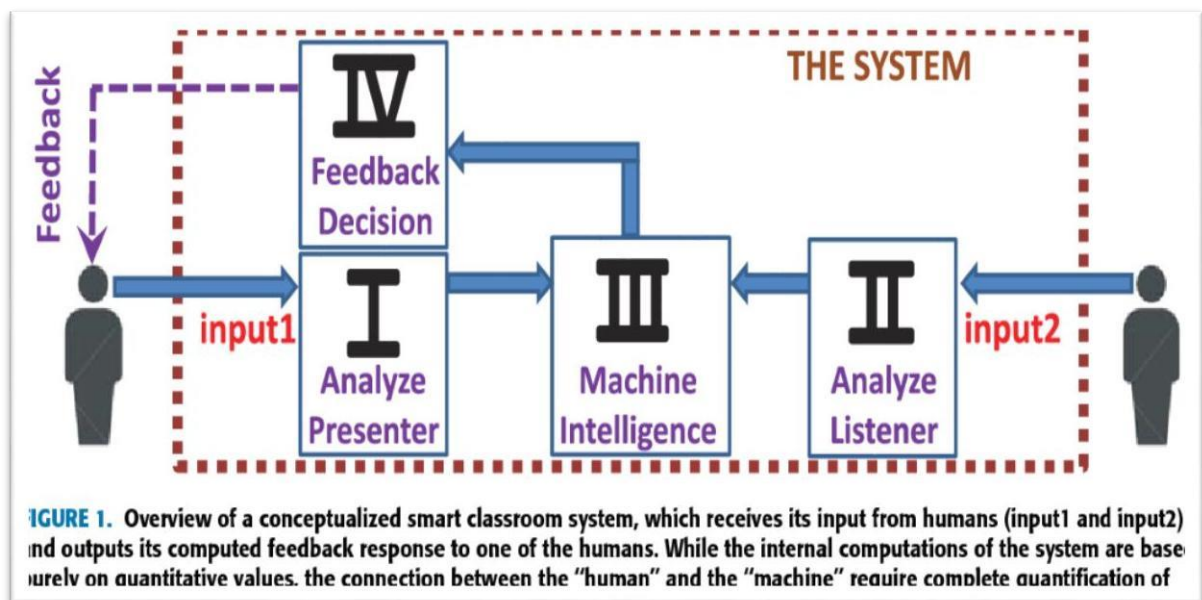


Fig 3.1 : Overview of a conceptualized smart classroom system

We introduce our proposed system design in detail. In the following three sections, we survey the state-of-the-art in technologies that are necessary to realize this

system. It also studies the techniques that allow the quantification of potentially-subjective human-based metrics such as crowd scores. Section IV investigates the techniques that can quantify non-verbal human communication metrics, such as human emotions, facial expressions, and general body language, as well as voice-related metrics. Section V elaborates on techniques that enable the required high-intensity computations in real-time. In Section VI, we develop a detailed algorithmic / computational infrastructure for our proposed system and provide a feasibility evaluation in Section VII. We point out the open challenges and outline directions for future research in Section VIII. We provide concluding remarks in Section IX.

AIM OF THE PROJECT

The described application requires a totally new system design paradigm, it depicts that whichever receives its inputs from two human sources –which are potentially subjective and outputs its feedback to one of them. Such a design introduces four significant research challenges:

- (a) while both of the inputs into the system are received from humans, a purely-quantitative basis must be established for both of them to allow them to be used in machine learning algorithms that only work with well-defined quantitative data. Therefore, a “box” must exist in the system that turns potentially subjective presenter input, as well as the listener input into pure quantitative values
- (b) a machine intelligence platform must be designed that is capable of “learning” the relation- ship between these quantified inputs; while existing research investigates Multimodal Learning Analytics (MLA).
- (c) Another machine learning platform must be designed to learn each presenter’s available cognitive resources to tailor the timings and modalities of the feedback to individual presenters, thereby personalizing the machine-generated feedback.
- (d) Finally, the entire system must be capable of operating in real-time, to allow the presenter to make changes during the presentation

CHAPTER 4

SYSTEM DESIGN & METHODOLOGY

EXISTING SYSTEM

We base our suggested system components on existing research in affect sensing, deep learning-based emotion recognition, and real-time mobile-cloud computing. We provide a comprehensive study of these technologies and determine the computational requirements of a system that incorporates these technologies. Based on these requirements, we provide a feasibility study of the system. Although the state-of-the-art research in most of the components we propose in our system are advanced enough to realize the system, the main challenge lies in the

- (i) Integration of these technologies into a holistic system design.
- (ii) Their algorithmic adaptation to allow real-time execution
- (iii) Quantification of valid educational variables for use in algorithms.

PROPOSED SYSTEM

We propose a system design in which a presenter's raw audio and video data are captured during a presentation and transmitted to the cloud. A set of multi modal sensing behavior recognition algorithms in the *Analysis Engine* convert this raw information into processed audio and visual feature vectors to quantify the behavioral cues of the presenter such as *vocal expressions*, *facial movements*, and *body gestures*. The same video stream is also used to compute the presenter's cognitive load using techniques that correlate pupil dilations or other facial expressions to the cognitive load. The *Crowd Annotation Engine* (turns the votes of the crowd (who are either *expert* or *peer* listeners) into robust and practical quantitative metrics (such as the proposed Crowd Score Vector. The *Deep Learning Engine* learns what type of behavioral patterns such as open hand gestures quantified by the and vectors— result in the highest crowd scores. The *Feedback Engine* makes real-time suggestions to the presenter during a presentation, using either a haptic glove and visual feedback by a monitor screen

in front of the presenter, by taking into account the cognitive load of the presenter. These suggestions allow the presenter to adjust his/her body language, voice intonation, or hand gestures to improve the presentation.

SYSTEM ARCHITECTURE

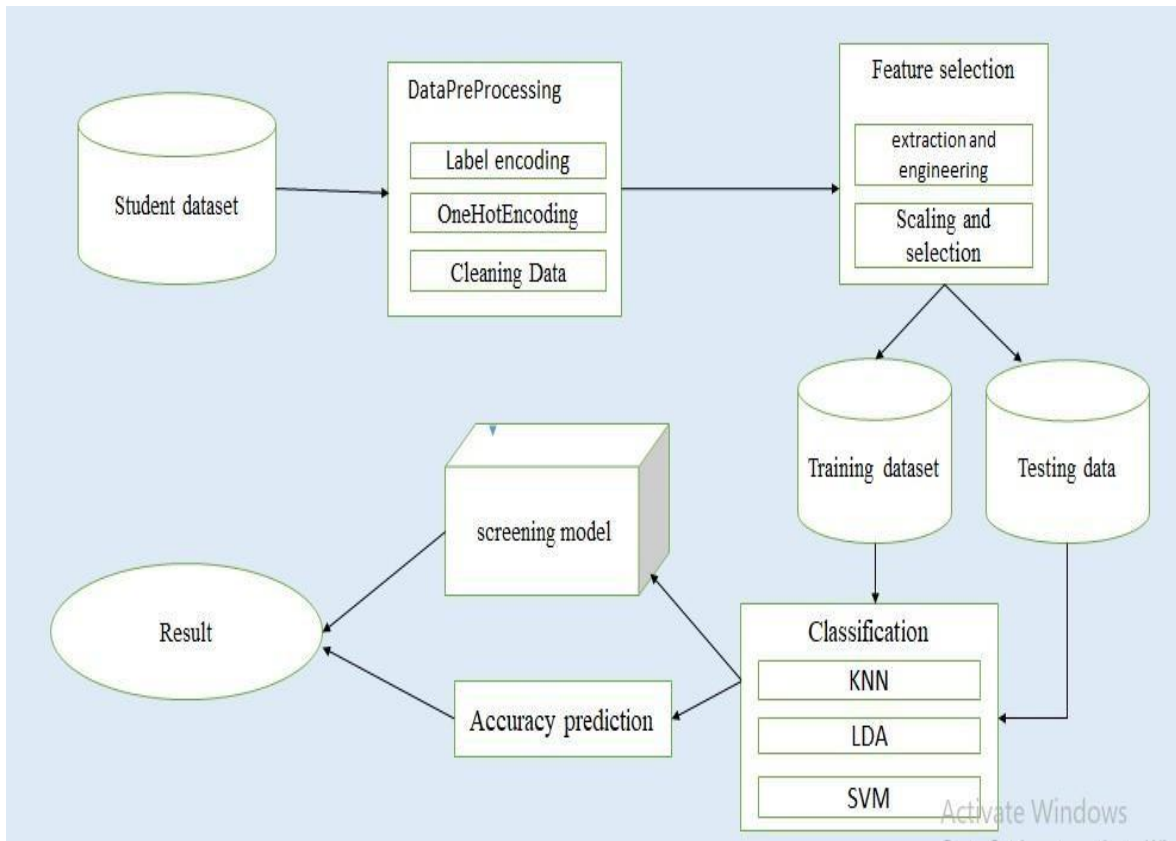


FIG 4.1 SYSTEM ARCHITECTURE

Our proposed work to realize the system in Fig 4.1 relies on two hypotheses we propose:

- H1: It is possible to quantify the presenter and listener input despite their subjective nature
- H2: It is possible for machine intelligence to learn the relationship between the presenter behavior and its resulting effect on the presentation quality in Training Mode and convey this information to the presenter.

UML DIAGRAM

UML is simply another graphical representation of a common semantic model. UML provides a comprehensive notation for the full lifecycle of object-oriented development.

4.4.1 ADVANTAGES

- To represent complete systems (instead of only the software portion) using object oriented concepts
 - To establish an explicit coupling between concepts and executable code
 - To take into account the scaling factors that are inherent to complex and critical systems
 - To creating a modeling language usable by both humans and machines
- UML defines several models for representing systems
- The class model captures the static structure

Use case diagram

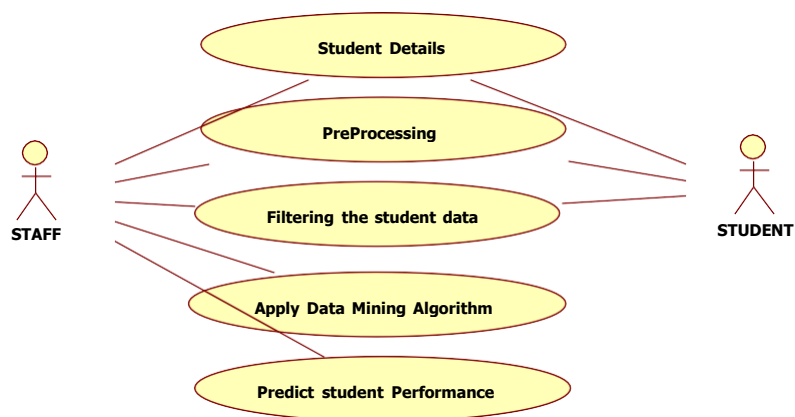


FIG: 4.2 USE CASE DIAGRAM

Sequence Diagram

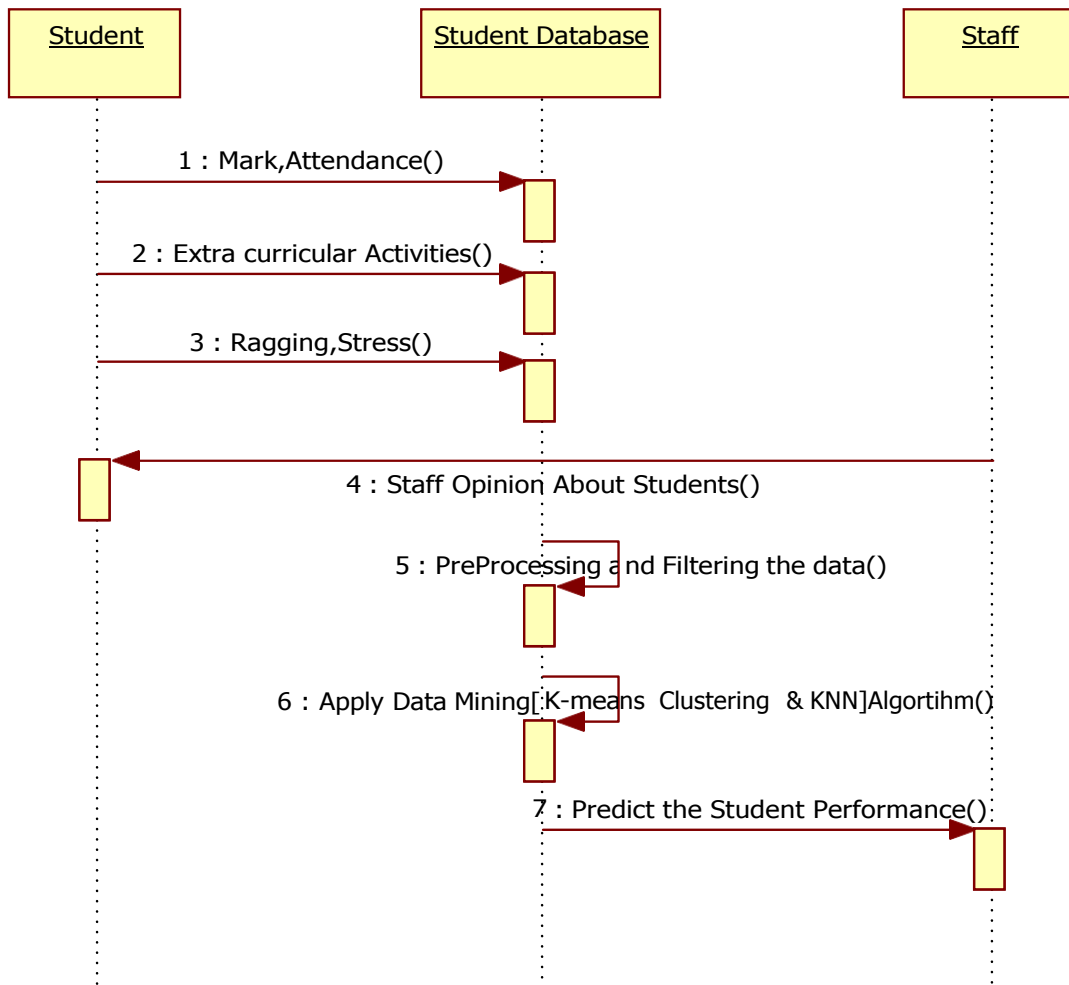


FIG: 4.3 SEQUENCE DIAGRAM

Collaboration Diagram

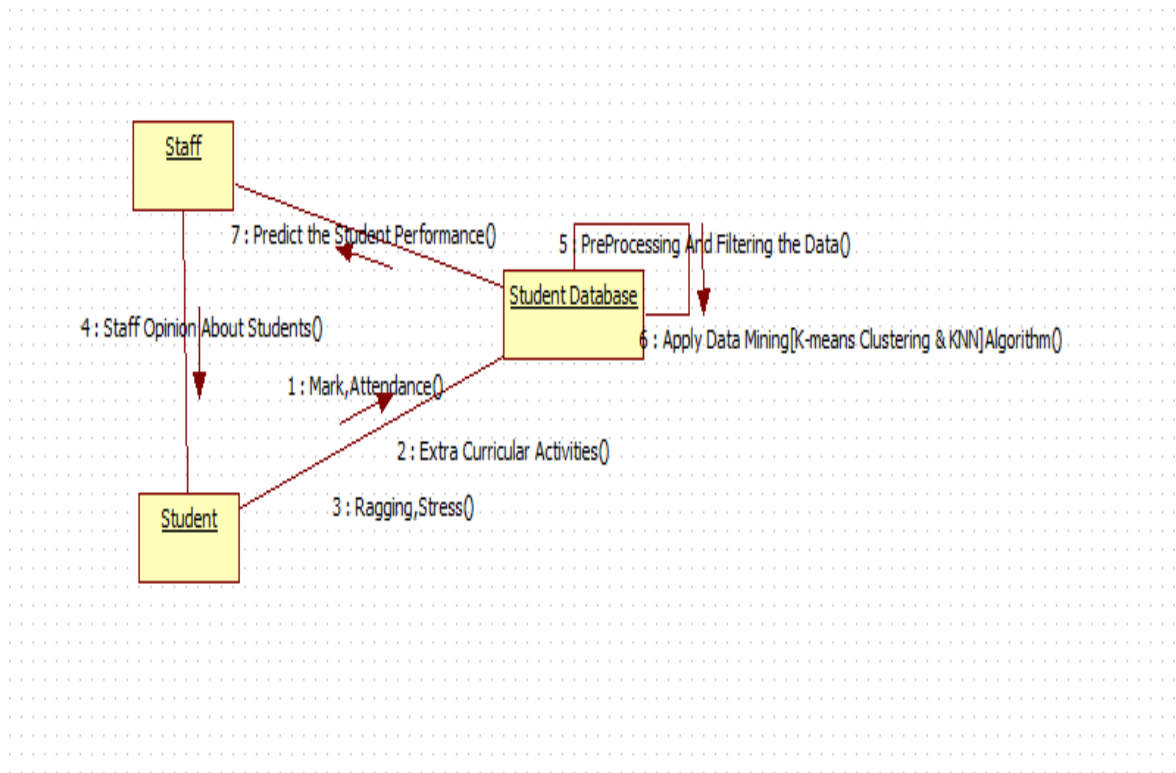


FIG 4.4 COLLABORATION DIAGRAM

SYSTEM ANALYSIS

We introduce our proposed system design in detail. In the following three sections, we survey the state-of-the-art in technologies that are necessary to realize this system: It studies the techniques that allow the quantification of potentially-subjective human-based metrics such as crowd scores. It investigates the techniques that can quantify non-verbal human communication metrics, such as human emotions, facial expressions, and general body language, as well as voice-related metrics. Then elaborates on techniques that enable the required high-intensity computations in real-time..We develop a detailed algorithmic/computational infrastructure for our proposed system and provide a feasibility.We point out the open challenges and outline directions for future research. A smart classroom is housed at SUNY Albany. Each classroom is currently equipped with several cameras on the wall and wireless microphones at the podium, as well as an observation room. Each observation room includes a rack with necessary hardware to receive and record audio and video data, as well as a one-way mirror behind which researchers and educators can observe the

teacher, presenter, or the class- room non-intrusively. This audio/video information can be used to analyze affective, cognitive, verbal, and non-verbal cues of the presenter. The classroom consists of two components:

- (i) A *pre-processing* component inside the observation room to perform the necessary initial computations.
- (ii) a *massively-parallel computing* component at the data center to implement all high-intensity computations.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

- System - Pentium-IV
- Speed - 2.4GHZ
- Hard disk - 40GB
- Monitor - 15VGA color
- RAM - 512MB.

SOFTWARE REQUIREMENTS:

- Operating System - Windows XP
- Coding language - Python
- IDE - Visual studio 2013
- Database - SQL Server

FEEDBACK FEATURES

To predict the student information for future use and monitor each and every activities of student this project is very useful for all colleges to managed the student information easily and view the details this generated the statistical report and described the overall performance. Institution is to provide the best quality education to its students and to improve their behavior. Prediction of student

academic performance is helps to teachers to predict about student success and failure in examination. The prediction model acts like a warning system to identify potential weak students, so that the teachers can take an appropriate action towards them. Otherwise, they can give proper advices to prevent failure in the examinations. Predict the student performance and help them to improve their performance.

DATA SELECTION	TYPE	POSSIBLE VALUES
Attendance	Attendance in one Semester	Excellent, Good, Average, Poor
Assignment	Work given by the Teacher	Good, Poor
GPA	Grade point average of each student	Good, Poor
Sessional mark	Percentage of marks obtained in internal exam	Excellent, Good, Average, Poor, Fail
Final grade	Percentage of marks obtained in current semester exam.	Excellent, Good, Average, Poor, Fail

FIG: 4.5 FEATURES

ARTIFICIAL INTELLIGENCE IN SCHOOL

An Effective education sector has the ability to transform a country through development of human resources and increased productivity. In the context of emerging countries particularly, levels of education and literacy of the population play an important role in development and overall transition to an advanced economy. In India, the importance of a developed education sector is amplified by a large youth population. Estimates indicate that currently over half the population of the country is below the age of 25. As the adoption of digital means of gathering data increases, it is important that these methods are effectively leveraged to deliver improved education and teaching. The adoption of technology in education is improving, though not at the pace required. It is estimated that schools globally spent nearly USD160 billion on education technology, or ‘EdTech’, in 2016, and forecast spending to grow 17% annually through 2020. Private investment in educational technology, broadly defined as the use of computers or other technology to enhance teaching, grew 32% annually from 2011 through 2015,

rising to USD4.5 billion globally. Adoption of new technologies is still lacking, however, often attributed to unwillingness of teachers and students to adopt technology. School education in India has seen substantial progress in recent decades, with efforts at both the Central and State levels, and substantive gains in enrolment have been achieved – Gross Enrolment Ratio (GER) is 97% at elementary level and 80% at secondary level, as per recent figures. However, low retention rates and poor learning outcomes mar the impact of gains in enrolment.

OVERVIEW OF THE ALGORITHM

4.9.1 SUPPORT VECTOR MACHINE(SVM)

Support vector machines (SVM) are an optimal margin classifier in machine learning. It is also used extensively in many studies that related to audio emotion recognition. It can have a very good classification performance compared to other classifiers especially for limited training data .SVM theoretical background can be found in MATLAB toolbox implementing SVM is freely available. A polynomial kernel is investigated in this work.

Algorithm : Linear Regression Classification (LRC)

1. Let there be N number of distinguished classes with p_i number of training images from the i th class, $i = 1, 2, \dots, N$. Each grayscale training image is of an order $a \times b$.
2. Each gallery image is downsampled to an order $c \times d$ and transformed to a vector through column concatenation such that $(m) u_i \in R^{a \times b} \rightarrow (m) w_i \in R^{q \times 1}$, where $q = cd$, $cd \ll ab$.
3. Each image vector is normalized so that the maximum pixel value is 1. Using the concept that patterns from the same class lie on a linear subspace [4], we develop a class specific model X_i by stacking the q -dimensional image vectors,

$$X_i = [(1) w_i (2) w_i \dots (p_i) w_i] \in R^{q \times p_i}, i =$$

Decision is made in favor of the class with the minimum distance $d_i(y)$.

The objective of the support vector machine algorithm is to find a hyperplane in an N-dimensional space(N — the number of features) that distinctly classifies the data points. To separate the two classes of data points, there are many possible

hyperplanes that could be chosen. Our objective is to find a plane that has the maximum margin, i.e the maximum distance between data points of both classes. Maximizing the margin distance provides some reinforcement so that future data points can be classified with more confidence.

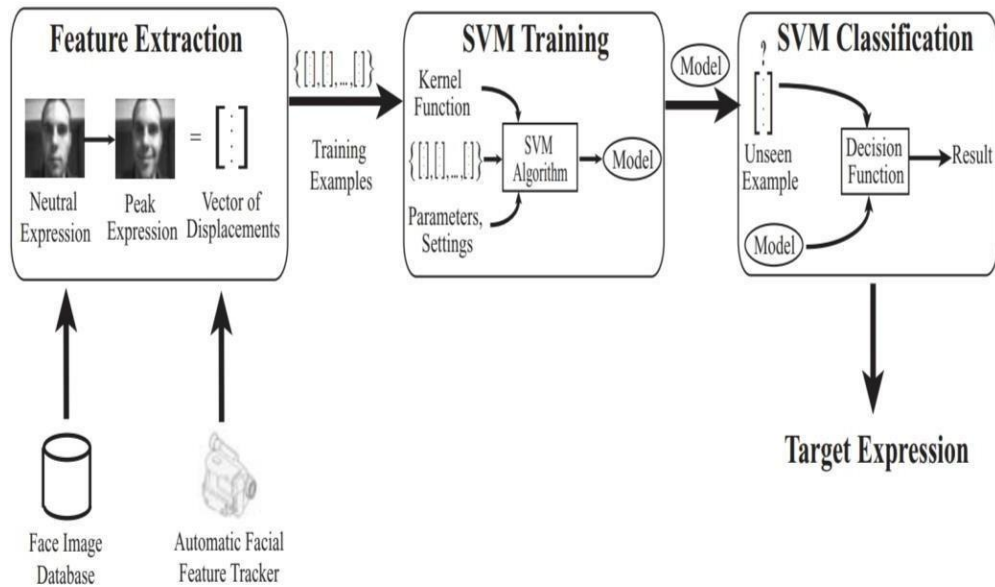


FIG 4.6 STAGES OF AUTOMATED EXPRESSION RECOGNITION APPROACH

MODULES USED:

- Feature Extraction
- Emotion expression classification
- Current emotion detection system
- Facial Expression Recognition

FEATURE EXTRACTION

Face is detected using Haar detection accuracy (95%) in real algorithm while extracting features accommodate small head movements of the subject along with making it work in real-time environment. We extra points using Active Shape Model (ASM) recognition, using pair-wise action point distances our algorithm generates facial feature vector consisting of $(77 \times 77) / 2$ -77 features per video

frame, avoiding self and redundant distances. The first frame in the video is assumed as neutral frame. Subjectivity is eliminated by taking ratio of feature distance in a frame with the feature distance of the same feature in the neutral frame. For facial gesture recognition (nodding), only nose-tip point serves as a feature for our algorithm.

EMOTION EXPRESSION CLASSIFICATION

The main differences of classifier selection and design are whether time information is used. The classification method without using temporal information can be called spatial domain method. Artificial neural network is a typical spatial method. The whole image is used as input of neural network or by image processing, such as image Gabor filtering, or through the feature representation of image processing, such as PCA and ICA . Due to the use of feature vector space method, the general classification method can be used as a spatial method. Used principal component analysis for facial expression recognition. Used support vector machine (SVM) as the classifier.

CURRENT EMOTION DETECTION SYSTEM

Provided emotion detection that indicates the need for a desired direction of the facial image. Faces have been used to extract the origin of facial emotional characteristics. A method of filtering and edge detection for feature extraction has been proposed. Then, the processed image has been used to identify some optimal parameters by Genetic Algorithm (GA). A new fitness function for extracting eye parameters by GA has been proposed. Because the emotion detection algorithm can be used as an expert system for continuous processing of the available data, the proposed method of emotion estimation is considered to be suitable for the personalized face. From the obtained training data set, the back-propagation neural network is used to identify the emotion of the person

FACIAL EXPRESSION RECOGNITION

Through our literature review we find that SVM (non-linear kernel) outperforms in

real time environment. Thus, we apply SVM for facial expression recognition by feeding the set of reduced feature (1463). With this approach we are able to recognize only three facial expressions, viz, neutral, yawning and smiling. The sleep expression is miss-classified as neutral as there are no overlapping features for these expressions. To take care of this problem we use ensemble method, in which we are building three distinct classifiers trained with:

- (i) The neutral and sleeping expression frames
- (ii) Neutral, smiling and yawning expression frames and Sleeping and yawning expression frames. As a part of testing phase, a test frame is first fed to the first classifier. If it is identified as neutral, then it is fed to the second classifier for further prediction. Otherwise, it is fed to the third classifier for identification of expression. This ensemble approach helps us in achieving better accuracy.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 PIE CHART PRESENTATION

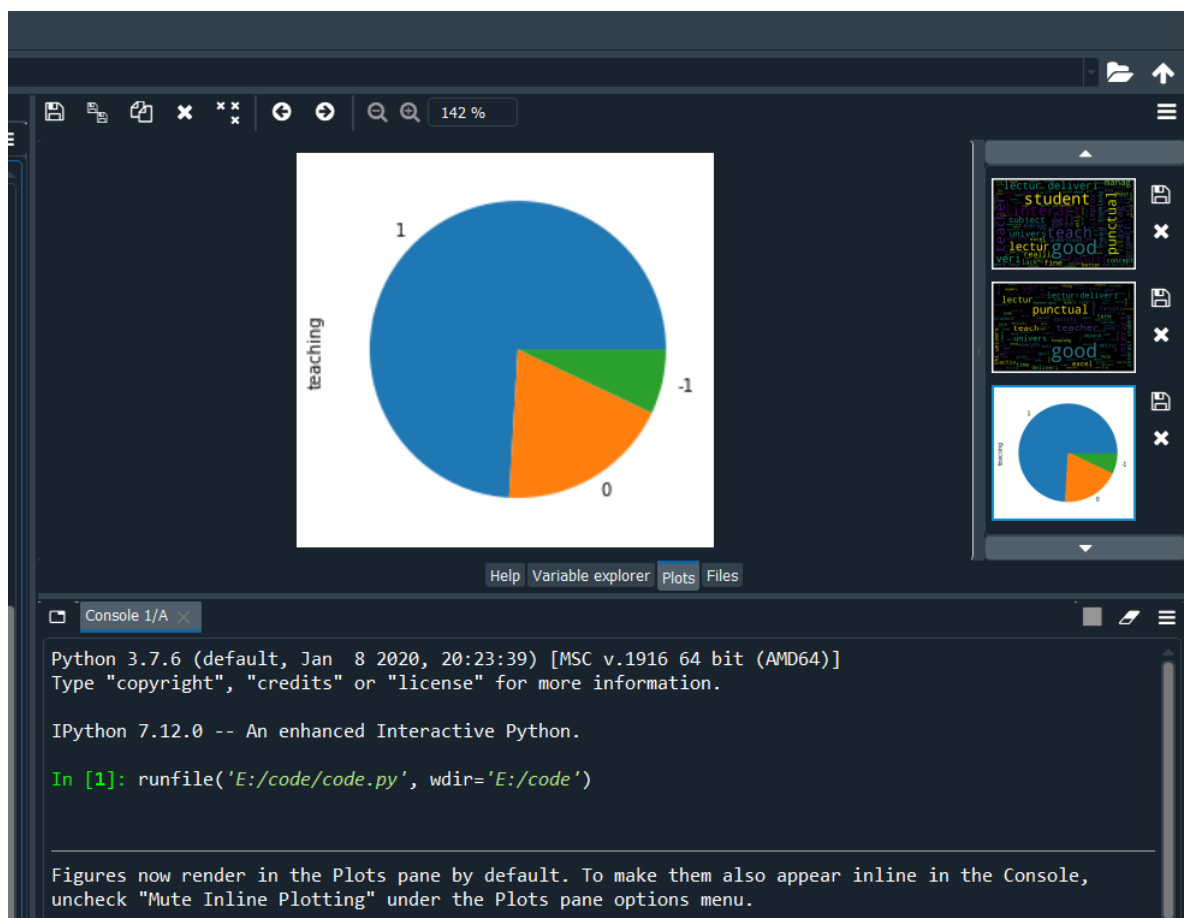


Fig: 5.1 PIE CHART PRESENTATION



Fig: 5.2 NEGATIVE FEEDBACK

In this module, the student data set which specifies all the feedbacks of students is taken in a single lot, and thereby giving the set of feedback in a single pie chart presentation.

The students facial expressions are captured in the webcam in real time, and all this is shown and simultaneously taken in feedback sheet. These are then classified using NLP and positive and negative feedbacks are taken separately.



Due to the use of feature vector space method, the general classification method can be used as a spatial method. We have used principal component analysis for facial expression recognition. Used support vector machine (SVM) as the classifier.

CHAPTER 6

CONCLUSION AND FUTURE WORK

Throughout this paper, we outlined the technical and operational components of a future emotionally conscious AI smart classroom that provides automated real-time input to a presenter during a presentation through two modalities of an Open Learner Model to improve the efficacy of the presentation, the self-regulation and metacognitive awareness of the presenter, and their verbal and non-verbal knowledge communication skills prominent innovations, hypotheses and scientific studies in the engineering and training fields. The device uses state-of - the-art algorithms, such as deep learning, high-performance GPU computing, multimodal sensing, and emotion recognition, which analyze audio and visual information from multimodal presenters to extract the presenter's body language, intonation, and hand gesture information. At the same time, the machine gets scores from crowd listeners. As there are many approaches that are used for data classification, the Naïve Bayesian Classifier and Weighted Naïve Bayesian Classifier are used here. Information's like Attendance, Class test, Seminar and Assignment marks were collected from the student's previous database, to predict the performance at the end of the semester. This study will help to the students and the teachers to improve the division of the student. This study will also work to identify those students which needed special attention to reduce fail ration and taking appropriate action for the next semester examination. This can help the students improve in their academics, which eventually leads to a good performance in their end examinations. By this the suicide rates of students will also get reduced.

PUBLICATION

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Appendices

A. SOURCE CODE

a. Emotions code

```
import cv2

import numpy as np
from keras.models import load_model
from statistics import mode
from utils.datasets import get_labels
from utils.inference import detect_faces
from utils.inference import draw_text
from utils.inference import draw_bounding_box
from utils.inference import apply_offsets
from utils.inference import load_detection_model
from utils.preprocessor import preprocess_input

USE_WEBCAM = True # If false, loads video file source

# parameters for loading data and images
emotion_model_path = './models/emotion_model.hdf5'
emotion_labels = get_labels('fer2013')

# hyper-parameters for bounding boxes shape
frame_window = 10
emotion_offsets = (20, 40)

# loading models
face_cascade =
cv2.CascadeClassifier('./models/haarcascade_frontalface_default.xml')
emotion_classifier = load_model(emotion_model_path)
```

```

# getting input model shapes for inference
emotion_target_size = emotion_classifier.input_shape[1:3]

# starting lists for calculating modes
emotion_window = []

# starting video streaming

cv2.namedWindow('window_frame')
video_capture = cv2.VideoCapture(0)

```

b. Feedback Code

```

import re
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import string
import nltk
import warnings
warnings.filterwarnings("ignore", category=DeprecationWarning)

train = pd.read_csv('E:\\code\\finalDataset.csv')
test = pd.read_csv('E:\\code\\finalDataset.csv')

train.head()
combi = train.append(test, ignore_index=True)

```

```

def remove_pattern(input_txt, pattern):
    r = re.findall(pattern, input_txt)
    for i in r:
        input_txt = re.sub(i, "", input_txt)

    return input_txt

# remove twitter handles (@user)
combi['teach'] = np.vectorize(remove_pattern)(combi['teaching_feedback'],
"@[w]*")

# remove special characters, numbers, punctuations
combi['teach'] = combi['teach'].str.replace("[^a-zA-Z#]", " ")

combi['teach'] = combi['teach'].apply(lambda x: ' '.join([w for w in x.split() if
len(w)>3]))

combi.head()

tokenized_tweet = combi['teach'].apply(lambda x: x.split())
tokenized_tweet.head()

from nltk.stem.porter import *
stemmer = PorterStemmer()

tokenized_tweet = tokenized_tweet.apply(lambda x: [stemmer.stem(i) for i in x]) #
stemming
tokenized_tweet.head()

for i in range(len(tokenized_tweet)):
    tokenized_tweet[i] = ' '.join(tokenized_tweet[i])

```

B. SCREENSHOTS

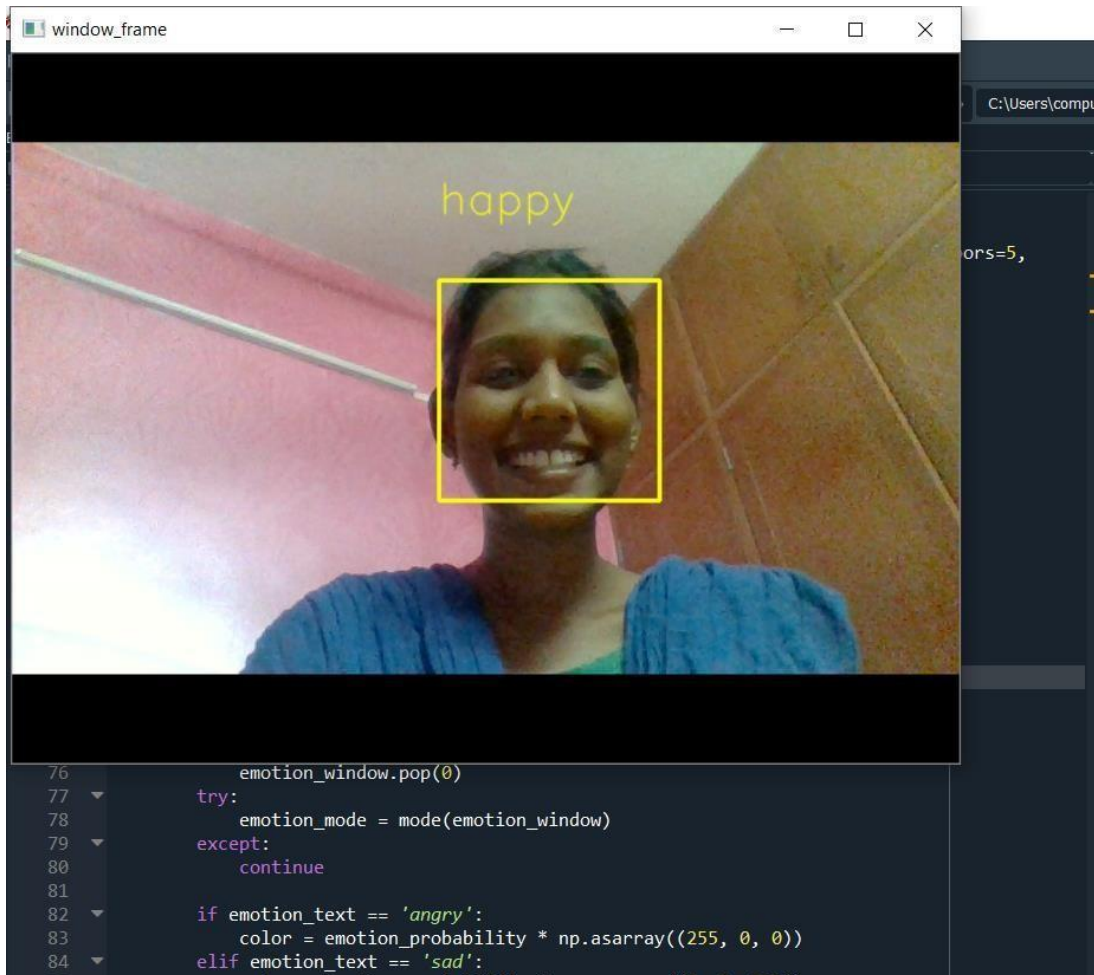


Fig:Emotion: Happy

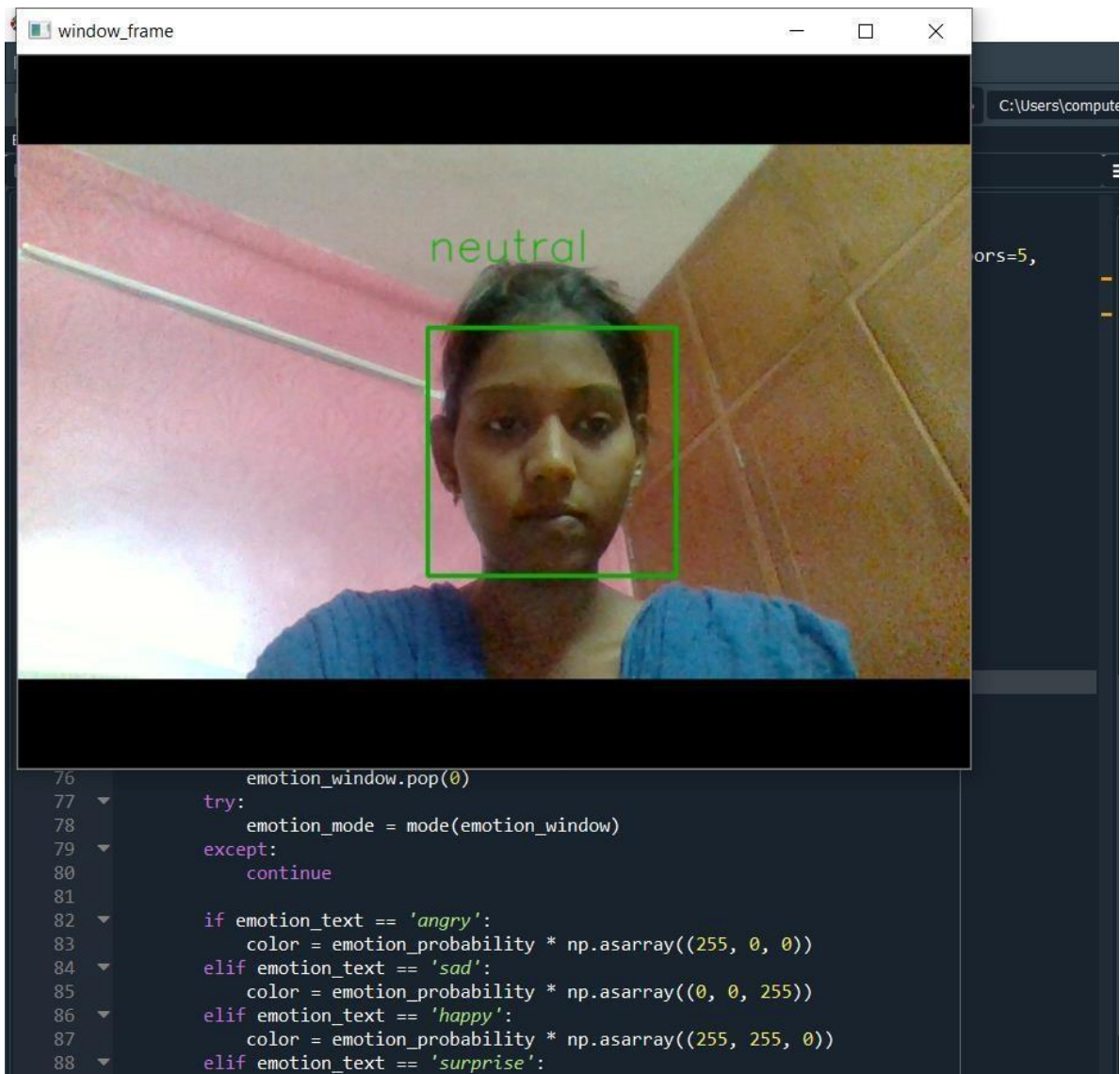


Fig: Emotion : Neutral

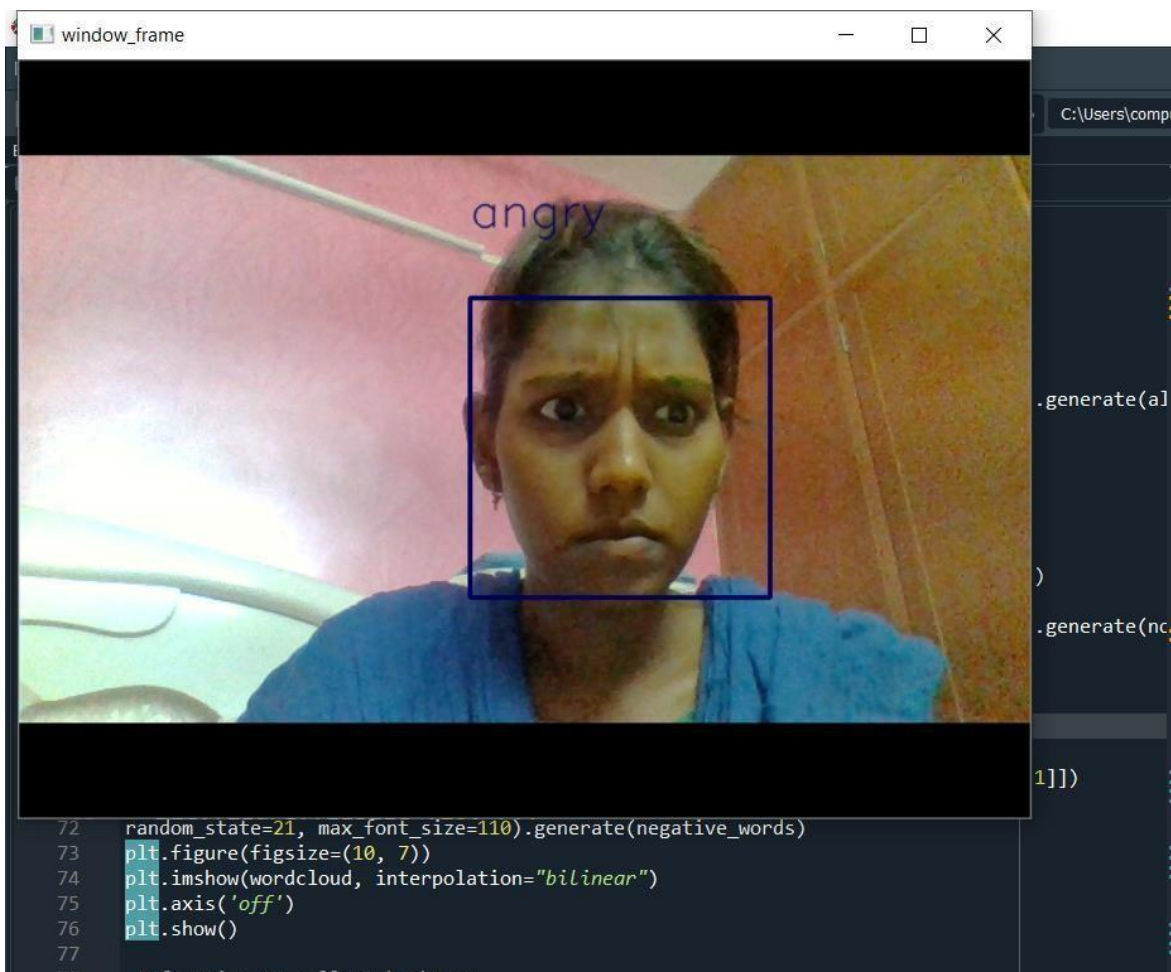


Fig: Emotion: Angry

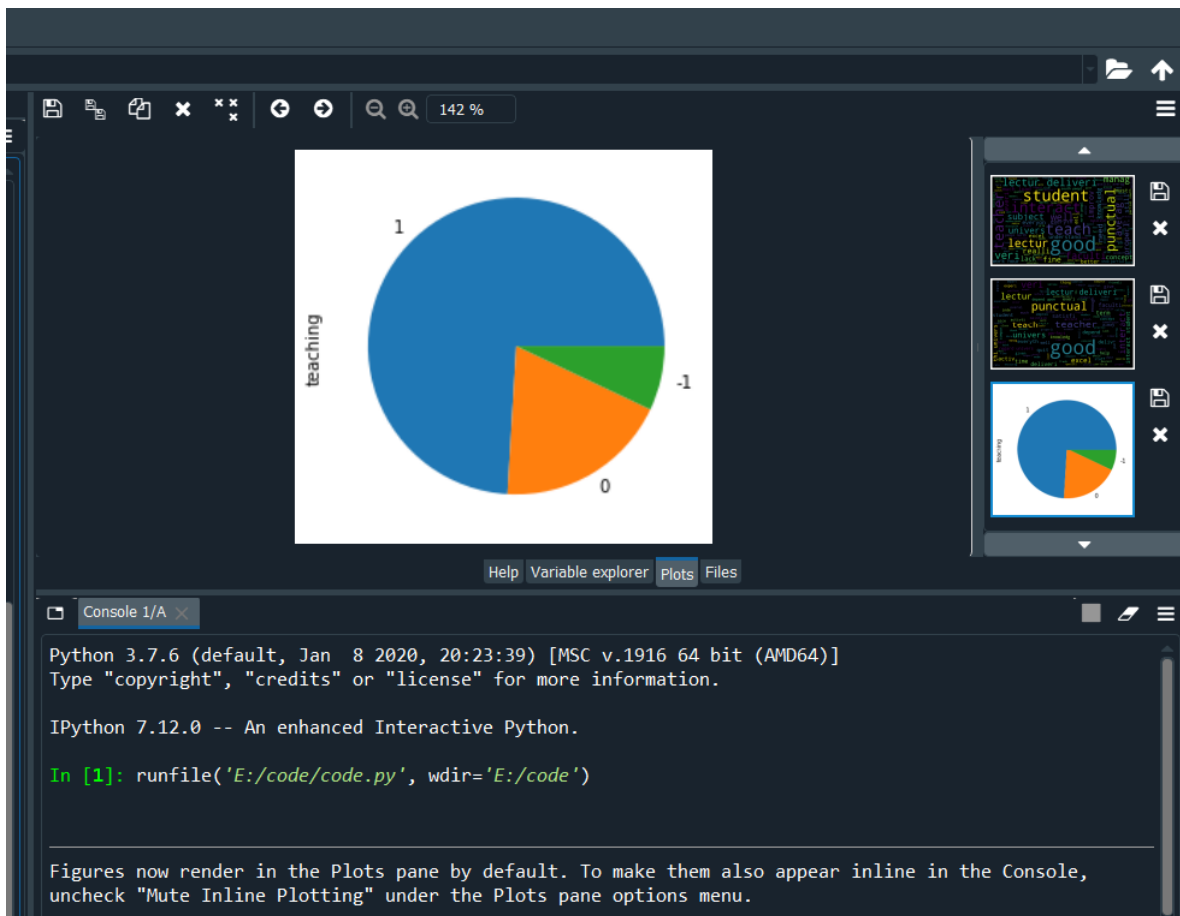


Fig: Pie Chart Presentation

finalDataset.csv - Microsoft Excel																		
teaching																		
1	teaching	teaching_f	coursecon	coursecon	examinati	Examinati	labwork	labwork	library_fac	library_fa	extracurric	extracurricular						
2	0	teacher ar	0	content of	1	examinati	-1	not satisf	0	library faci	1	extracurricular activities are excellent and provides best platform to students.						
3	1	Good	-1	Not good	1	Good	1	Good	-1	Not good	1	Good						
4	1	Excellent i	1	All courses	1	Exam pat	1	Lab work i	1	Library fac	1	Extra curricular activities also help students to divert their mind from their study for some time. University plays an important role in thi						
5	1	Good	-1	Content of	-1	Again the i	1	Good	0	Its the bes	-1	Complete wastage of time. Again this opinion is strictly personal and may not coincide with others.						
6	1	teachers g	1	content of	1	examinati	1	practical w	1	library has	1	extracurricular activities increases mental and physical abilities						
7	1	Yes	1	Yes	1	Yes	1	Yes	1	Yes	1	Yes						
8	1	good and i	1	Good	1	Good	1	Good	1	Hardworki	0	No views						
9	1	It is good	-1	This seme	1	I like the q	1	Everything	0	I am satisf	0	No idea about the extracurricular activities.						
10	1	Good	-1	Needs son	1	Good	1	Good	-1	Its require	1	Good it provides a great platform						
11	1	Good	-1	Needs son	1	Good	1	Good	-1	Its require	1	Good it provides a great platform						
12	1	It's good v	0	Knowledge	1	This univer	-1	Lab and pr	1	Good	1	While coming to extracurriculum activities it's better than any other university which I had come around.						
13	1	Good	0	Knowledge	1	Great	-1	Not upto t	1	Good	1	Awesome						
14	1	way of tea	1	course cor	1	exam pat	-1	lab improv	1	good libra	1	ok						
15	0	University	-1	Content of	0	Pattern an	0	Sometime	1	Library fac	1	This university is no1 in terms of extracurricular activities and in encouraging students to participate at their comfort levels.						
16	1	Good	1	Good	1	Good	1	Good	1	Hardworki	1	Good						
17	1	Good	1	Very good	1	Excellent	1	Good	1	Good	1	Good						
18	1	As compar	-1	Material o	1	Good	1	Practical w	1	Excellent	1	Great job						
19	1	Good	-1	sometime	1	Good	1	Good	1	Good	1	excellent						
20	1	Lectures h	1	Easily avai	1	Good mar	1	Practical a	1	Good	1	Its give various opportunities and exposure						
21	0	Talk about	1	The mater	0	Exam pat	-1	The evalu	0	Again som	0	This is really a good thing that events happen in our university regularly but they must be announced early so that every student can pre						
22	1	University	1	The course	1	Descent.	1	Good.	1	Descent.	1	Good.						
23	1	Good	1	Good	1	Excellect	1	Good	1	Good	1	Good						
24	1	Good	1	Good	1	Excellect	1	Good	1	Good	1	Good						
25	1	lecturer ar	1	content of	1	exam pat	1	well and g	1	library is v	1	extracurricular activities held in university are necessary it provides student a platform where they can improve and groom them.						
26	1	Good	-1	Needs son	1	Good	1	Good	-1	Its require	1	Good it provides a great platform						
27	1	Good	1	Good	0	Average	0	Average	1	They are d	1	Good						
28	0	Punctualit	-1	Teachers z	1	It is statisf	-1	3 hours pr	-1	Well... all t	1	They are really very interesting. All the students enjoys alot and get a chance to showcase there talent						
29	1	Good	1	Good	1	Good	1	Good	1	Good	1	Good						
30	1	nice	1	good	-1	not so goc	1	ok ok	-1	all books a	1	Awesome						
31	-1	lecture del	1	every thing	1	all good	-1	practicle n	-1	the system	1	Its good for refreshment						
32	1	It's good	1	It's answar	-1	Not that	1	It's good	-1	Sometime	1	It's						

Fig : Final Data Set

C. PAPER WORK

ARTIFICIAL INTELLIGENT APPROACH TO PREDICT THE STUDENT BEHAVIOUR AND PERFORMANCE

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ABSTRACT:- Predicting student performance still turns out to be progressively productive due to the procedure of the gigantic volume of information in educational databases. Numerous evaluations use this concept and the field of use is still growing student marks, attendance, semester score, grade emphasis, structure, well-being, educational program activities, and so on. The measure of the information put away in late trends is growing rapidly.. The principle objective is to make an overview on "An astute way to deal with anticipate the student conduct and performance" To build up a model so as to foresee student Behavior and performance. The student performance in training is exceptionally significant job in instructive condition .The put away database contains student data to improve student point of view and conduct. This paper show patterns and sorts of break down ought to be performed to improve training process. We anticipated student subtleties and produce a report to the personnel and guardians. In view of the exhibition we offer answers for improve their presentation. Given the huge volume of information in instructive repositories, predicting student performance turns out to be all the more challenging. This paper additionally centers around how the anticipated the data can be utilized to distinguish the most significant characteristics determination in an student information. we could really improve student accomplishment and achievement more in an effective manner utilizing instructive information mining procedures. It could carry the advantages and effects to student, teachers and scholastic establishments.

1 INTRODUCTION

Significant improvement to improve student conduct and Performance oversaw enormous measure of student database has changed our instructive framework utilizing Data mining systems are the most sweltering points or research territories in the field of Information Technology. Scientists are centering these regions for better improvement. A straightforward case of information mining can be foreseeing student accomplishment as yielded. As opposed to the above progress, student subtleties upkeep administrations are improving and getting to student are consistently improving their administrations. A large portion of the them is attempting to consistently improve student conduct and performance by automating the instruction subtleties, entire framework are overseen we going to anticipated the student conduct and performance in future use. overseeing entire subtleties of student expanding in any case the improvement in the field of instruction. The target of building up this task is to anticipate the student conduct and performance. Instruction is a huge and significant subject, one that can't be tended to enough right now. As of late the measure of information put away in instructive database is developing quickly. The put away database contains shrouded data about progress of student's exhibition and conduct. The capacity to anticipate the student performance in training is significant in instructive situations. Student's scholastic performance in instructive condition depends on the mental and ecological factor is anticipated by various instructive information mining methods. For example, information order and selection tree techniques are used here by information mining strategies to evaluate the student performance. Quality review should be possible in a few different ways, such as Overall Semester Marks, Practical Lab, Attendance, Paper Presentation, End Semester Marks, smaller than usual undertakings, consistency and deficiencies, etc. The data about the student and their conduct and performance are put away in a database .we can predicate and access their information for sometime later. The data about the student and their conduct and performance are put away in a database. We can The data about the student and their conduct and performance are put away in a database .we can predicate and access their information for sometime later. The data about the student and their conduct and performance are put away in a database. we can predicate and access their information for

sometime later. Gathered every single information of the student are examination and produce the report . The gathered subtleties will be handled and distributed as report and the student and staff can get to their subtleties anyplace when they required The extent of the venture an insightful way to deal with anticipate student performance and conduct is for automating the data. The product takes all the information of an student and is skilled to give simple and successful stockpiling of data identified with understudies. Student performance forecast is going most exceedingly terrible in our current instructive systems. In the event that the exhibitions of understudies are anticipated well ahead of time, at that point it can upkeep or improve the nature of instruction by foreseeing student' subject interests, student level exercises, and helps with improving their exhibitions in school's colleges and instructive foundations. grouping dropout focuses should likewise be possible by this [4].By methods for machine learning procedures alongside EDM, constant assessment system is rehearsed by a few foundations today. These plans are useful in improving the student's exhibition. Profiting the standard understudies is the prime saying of consistent assessment systems. Preprocessing pipelines and information changes is the result of the exertion in vital spreading out of machine learning calculations. They contribute in information portrayal to accommodate dynamic machine learning, and center the downsides of current learning calculations [1]. Study discoveries on some Deep learning applications that can be applied in various fields like Image Processing, Natural Language Processing, and Object location were found [8]. So as to anticipate understudies' presentation, information disclosure is recommended here to mine principles from the dataset of Systems of Learning Managements. Profound learning and information mining systems are utilized here. Profound Learning classifier-MLP and different classifiers like KNN, Naïve Bayes are utilized in our examination work. A model is developed by applying the classifiers on our information. 10-overlay Cross Validation is practiced. Parameters like Accuracy, Specificity, Sensitivity, Kappa-measurement and ROC bend are considered for assessing the Classifiers.

2 RELATED WORK

A few overviews and articles can be contained in the rational research on

EDM. A few creators have provided a broad outline of the subject. This paper will focus on the exam which identifies with this investigation. In the accompanying, I give a few strategies and speculations that help with the exploration.

3 EXISTING SYSTEM

We base our proposed framework segments on existing examination in influence detecting, profound learning-based feeling acknowledgment, and ongoing portable distributed computing. We give a far reaching investigation of these innovations and decide the computational necessities of a framework that fuses these advances. In view of these necessities, we give an attainability investigation of the framework. In spite of the fact that the best in class explore in the vast majority of the segments we propose in our framework are propelled enough to understand the framework, the primary test lies in the

- (I) combination of these advancements into an all encompassing framework structure
- (II) their algorithmic adjustment to permit constant performance, and
- (III) measurement of legitimate instructive factors for use in calculations.

4 PROPOSED SYSTEM

In the proposed framework, The gathered subtleties will be handled and distributed as report and the student and staff can get to their subtleties anyplace when they required. Gathered every single information of the student and examination at that point create the report .shrewd way to deal with anticipate student performance and conduct is for mechanizing the data. The product takes all the information of an student and is proficient to give simple and viable stockpiling of data identified with understudies. The gathered subtleties will be handled and distributed as report and the student and staff can get to their subtleties anyplace when they required. Gathered every single information of the student and investigation at that point produce the report. The administrator , staff

, student every one of them is given a client id and secret phrase. The administrator is permitted with a component to transfer recordings caught in the study hall. From the video, pictures of understudies are pre-handled. Upon pre-preparing, the student conduct is anticipated. The staff and student are permitted to give criticism on student conduct and performance. The advantages of the proposed system include

- To improve the Students' presentation and conduct.
- As an inspiration to student
- To direct the every single student for additional improvement
- To improve student performance discover their advantage and screen the full subtleties of specific student database are refreshed.
- Taking the overview what are the viewpoints taken to improve an student performance.

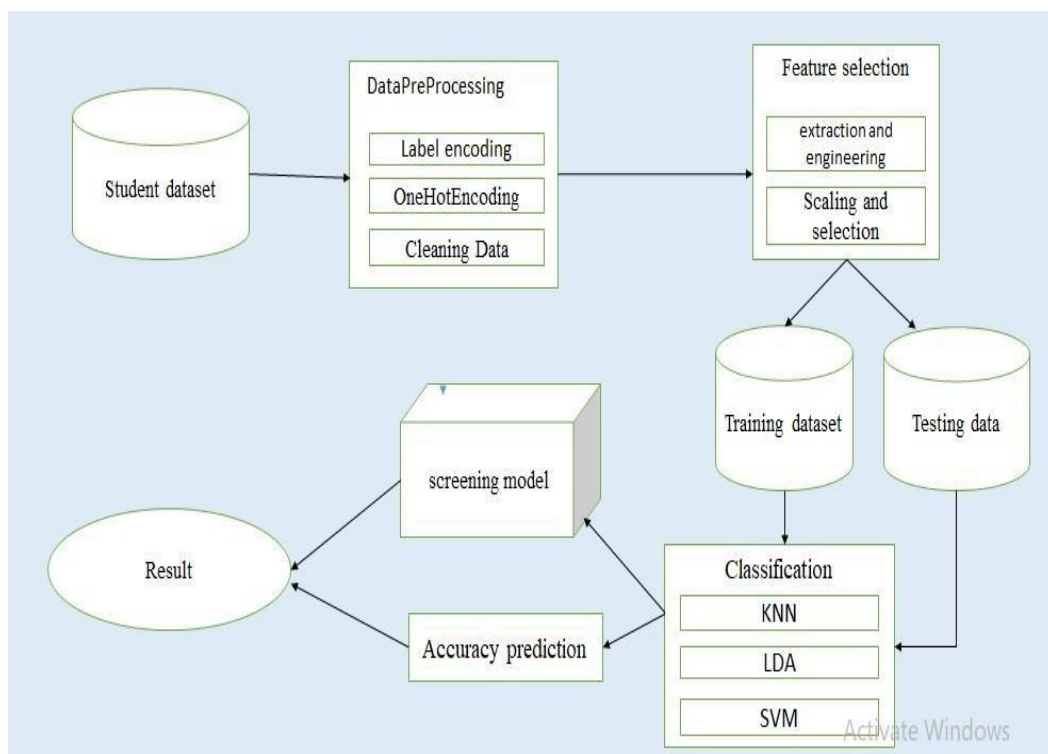


FIG 1 OVERVIEW OF THE PROPOSED SYSTEM

The main aim of this project is to improvise the student performance in classrooms based on some important factors. Education is an essential element for the betterment and progress of a country. It enables the people of a country civilized

and well mannered. Now-a-days developing new methods to discover knowledge from educational database in order to analyse student's trends and behaviours towards education. To analyse the data from different dimensions categorize it and to summarize the relationships. It motivated us to work on student dataset analysis. The data collection, categorization and classification is being performed manually.

5 MODULE DESCRIPTION

FACE EXTRACTION: Face is detected using Haar detection accuracy (95%) in real algorithm while extracting features accommodate small head movements of the subject along with making it work in real-time environment. We extract points using Active Shape Model (ASM) recognition, using pair-wise action point distances our algorithm generates facial feature vector consisting of $(77 \times 77) / 2 = 77$ features per video frame, avoiding self and redundant distances. The first frame in the video is assumed as neutral frame. Subjectivity is eliminated by taking ratio of feature distance in a frame with the feature distance of the same feature in the neutral frame. For facial gesture recognition (nodding), only nose-tip point serves as a feature for our algorithm.

EMOTION EXPRESSION CLASSIFICATION: The main differences of classifier selection and design are whether time information is used. The classification method without using temporal information can be called spatial domain method. Artificial neural network is a typical spatial method. The whole image is used as input of neural network or by image processing, such as image Gabor filtering, or through the feature representation of image processing, such as PCA and ICA. Due to the use of feature vector space method, the general classification method can be used as a spatial method. Used principal component analysis for facial expression recognition.

CURRENT EMOTION DETECTION SYSTEM: Provided emotion detection that indicates the need for a desired direction of the facial image. Faces have been used to extract the origin of facial emotional characteristics. A method of filtering

and edge detection for feature extraction has been proposed. Then, the processed image has been used to identify some optimal parameters by Genetic Algorithm (GA). A new fitness function for extracting eye parameters by GA has been proposed. Because the emotion detection algorithm can be used as an expert system for continuous processing of the available data, the proposed method of emotion estimation is considered to be suitable for the personalized face. From the obtained training data set, the back-propagation neural network is used to identify the emotion of the person.

FACIAL EXPRESSION RECOGNITION : Through our literature review we find that SVM (non-linear kernel) outperforms in real time environment. Thus, we apply SVM for facial expression recognition by feeding the set of reduced feature (1463). With this approach we are able to recognize only three facial expressions, viz, neutral, yawning and smiling. The sleep expression is miss-classified as neutral as there are no overlapping features for these expressions. To take care of this problem we use ensemble method, in which we are building three distinct classifiers trained with:

- (i) The neutral and sleeping expression frames
- (ii) Neutral, smiling and yawning expression frames

Sleeping and yawning expression frames. As a part of testing phase, a test frame is first fed to the first classifier. If it is identified as neutral, then it is fed to the second classifier for further prediction. Otherwise, it is fed to the third classifier for identification of expression. This ensemble approach helps us in achieving better accuracy.

6 CONCLUSION

Right now, characterization task is utilized on student database to foresee the understudies division based on past database. The target of building up this venture is to anticipate the student conduct and performance . Foreseeing understudies performance is generally valuable to support the instructors and students have in any case improving their learning and educating process. The administration of the student subtleties will be especially simpler, productive and

less tedious. It will be simple for the workforce and student to get to the records and reports are present in the framework, the student and staff can have a different login id, at that point login and see the subtleties of student performance and conduct and create the measurable report, we see the student upgrades effectively and screen semester marks, grade focuses, lab work, reasonable imprint, little venture, extra-curricular/co-curricular exercises, task marks, arrangement subtleties, quality and shortcoming and so forth. We had the option to accomplish adequate consequences of foreseeing understudies' exhibition on a specific undertaking. The grouping models worked right now be utilized for anticipating and following understudies' presentation and giving legitimate mediations and direction through the learning procedure. Throughout this paper, we outlined the technical and operational components of a future emotionally conscious AI smart classroom that provides automated real-time input to a presenter during a presentation through two modalities of an Open Learner Model to improve the efficacy of the presentation, the self-regulation and metacognitive awareness of the presenter, and their verbal and non-verbal knowledge communication skills prominent innovations, hypotheses and scientific studies in the engineering and training fields. The device uses state-of-the-art algorithms, such as deep learning, high-performance GPU computing, multimodal sensing, and emotion recognition, which analyze audio and visual information from multimodal presenters to extract the presenter's body language, intonation, and hand gesture information. At the same time, the machine gets scores from crowd listeners. As there are many approaches that are used for data classification, the Naïve Bayesian Classifier and Weighted Naïve Bayesian Classifier are used here. Information's like Attendance, Class test, Seminar and Assignment marks were collected from the student's previous database, to predict the performance at the end of the semester. This study will help to the students and the teachers to improve the division of the student. This study will also work to identify those students which needed special attention to reduce fail ration and taking appropriate action for the next semester examination.