

Rejuvenation of Smart Education in Countryside Areas

Sankari Subbiah^a, B.Kavitha^b, G.Shanmugha Priya^c, R.Ezhilarasi^d, Senthil Nayagam S^e

^{a,c,d}Department of Information Technology, Sri Sairam Engineering College, Chennai, India

^bElectronics and Communication Engineering, IRT Polytechnic College, Chennai

^eSTG Info Tech India LLP, Chennai, India

Corresponding author: ^a sankari2705@gmail.com, ^b sridhar.kavitha@gmail.com,
^e senthilnayagams@stgit.com

Abstract

Generally, a lot of methods to instil a detailed comprehension in a particular subject are accessible of offline learning or online learning. The proposed system help the learners, by clearing doubts on a particular subject through the help of a windows application which does not require a stable internet connection. The two advancements in the system are i) To know that if the user has understood the subject to detect the current emotions. ii) A conclusion is made on the current emotion and then to give more perception on the subject the recommendation system opts whether to present more videos or not for better clarification that can be done through the help of data analytics. The suggested videos will be at a more acceptable level than the first video. Thus, the proposed system will be entirely dependent of the current emotion of the user at the time of the first video being played for a certain duration of time. The system is an offline application so the people would be able to use it anywhere and anytime. There is also a feature of selecting the mode of language the user wants to get an elucidation upon with the medium of videos

Keywords: Offline learning, Emotion detection, Data analytics, Video

1. Introduction

In today's era, the growth of E-learning is vast developing. The process, techniques and the way the virtual Learning is used is very simple and efficient in nature. One would have a very easy access to the virtual Learning portal and gain as much knowledge as he/she can [1]. Virtual Learning is useful tool to learn latest technologies inside as well as outside classroom replacing traditional methods. People shall be able to learn courses and other programs as per our requirements through online mode. It will be very useful to learn such as internet distance education, computerized educational learning and many more [2]. It is not a type of material to is intended to deliver through CD or any other external devices. With this you can communicate with teachers or professors to students or learners who are keen to gain information on a defined subject [3]. However, you may be able to communicate electronically at the same time and occasionally the same was recorded earlier. When compared to the traditional methods of teaching, where the students and the professors would be there at one place and teach a particular subject the online mode of education doesn't require all to gather at one place. Instead the online mode of education has a facility of accessing the course contents anywhere and anytime at the user's comfort zone with focusing on more practical examples and real time applications to make understand a topic. Various kinds of assignments and guidance to the students are provided on a regular basis [4]. There is always a professor who will be looking your progress on the course but this professor turns out to be in a virtual

environment. But virtual Learning would be suitable for those people who have a self-discipline and organisation characteristics in himself/herself [5].

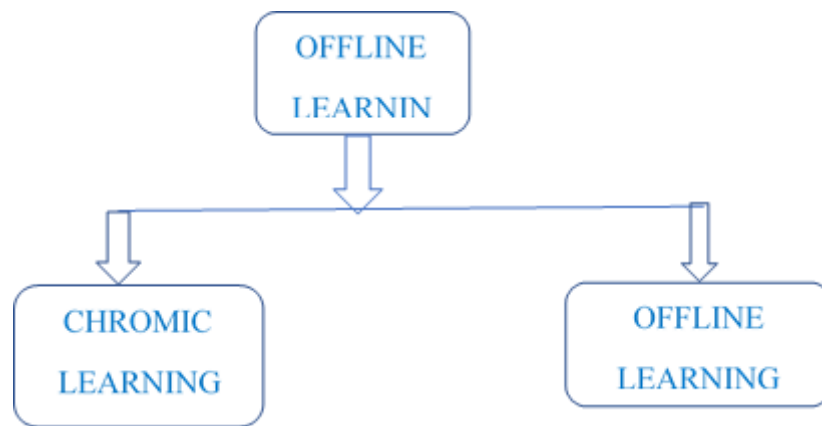


Figure 1 Types of Offline Learning

Fig 1 Illustrates, E-Learning in Offline mode (i.e.) without Internet connection. The two offline mode of learning is Chromic Learning and Achromic learning. Achromic method which mainly focuses on the concept that the courses or the subjects will not take place in a real time environment. The students or the learners will have the accessibility of contents, materials and assignments related to the subject and are required to be completed before a certain deadline specified by them. The doubt clearing sessions and other types of activities takes place through discussion boards, blogs etc. These types of method will be best suited for people or learners who will have the ability to finish the exercises at a particular time [6]. The second is chronic method which has the concept that unlike the asynchronous one this will have the ability to provide access to communicate the students or learners with the professors through the online medium itself. So, this method really helps the students to get engaged with the courses in a real time environment. The third and last category is the hybrid courses that is based on the concept that they form a combination of the previous two methods integrated into a single method. And also, the hybrid courses provide an additional feature to meet the students or learners and the professors in person during an end examination [7].

Some of the highlighted features of the virtual Learning methods are as follows. First of all, it is able to fulfil everyone's needs in a way that the people would be able to access the course anytime and anywhere at their comfort. Second is that the specific subject topic can be accessed any number of times to get really a clear picture of it. Third is that it maintains scalability and consistency features of the type of content they are providing on the requested subject by the user. Last but not the least is that the courses that are offered online will mostly be at a very affordable rate and it covers topics that a normal graduation or degree certificate doesn't cover. It is always synchronised with the latest trends and technologies.

So, therefore a conclusion is made for the virtual Learning. It provides an explanation that these types of techniques make the user be aware of current trends with lots of work on it. But in today's generation the online method of providing knowledge will not be accessible by everyone [8]. The rural people who have difficulty in satisfying their own basic needs would not be able to afford a stable internet connection which is required by these methods. So, a need for an offline application is demanding and such a system would effectively help the rural learners who has government aided laptops. Thus, it comes to the proposed system a windows application.

2. Related Works

There are various types of virtual Learning are available. They are Computer Managed Learning, Computer Assisted Instruction, Synchronous Online Learning, Asynchronous Online Learning, Fixed Online Learning, Adaptive Online Learning, Linear Online learning, interactive learning, individual online learning and collaborative online learning .Since employee want to adapt to a new technology and learn it. They are various types Online learning for organizations to obtain skills and knowledge. They are divided into three types: They are (i) Instance learning (ii) companies learning (iii) trained based learning. There is various Online learning platform are available. In this Learning Destination sites is a share website that offers courses from many different to student some Online learning platforms are Udemy , edX, courser. Next types is open source learning management system some Online learning platforms are edX , Moodle, Sakai etc. Next types are learning management ecosystems is a course authoring software, adaptive learning engines, assessment tools are integrated and provide solution to the learner. Next types are custom built learning platform is the full custom-built learning platform good example are HBX. The various Online learning platform are available that help

learner to get clear view for certain topics are: (i) udemy is an online learning platform it's help professional students and adults.it was developed in may 2010.It also used for business for gives knowledge about business related concept.(ii) LinkedIn learning: it provide learning about professional etc. Online learning is a learning through electronically. There is various e learning platform available such as quizzes, udemy, live or pre-recorded lecture content, video. The main objective of Online learning gives knowledge through internet only and materials are available is limited. The Online learning that are existed in various system that are follows: - **A SYSTEM FRAMEWORK FOR SMART CLASS SYSTEM TO BOOST EDUCATION AND MANAGEMENT:** - it was published in the year of 2016[9]. Smart Class system is an teaching and learning opportunities. It helps the student's learning subjects are interesting and fun smart class what exactly making the student's boring subject more interesting using digital learning technology and it is used for academic interest and performance with easy, practical and significant use of technology. Smart Class helps faculties to make sure that every student in the class is getting knowledge, by providing the wide range of learning patterns in the classroom and in lab sessions. It is also very helpful in managing student 's interest and engagement in learning within the classroom. The major limitation of this system lies in that it focuses on providing a clear view on a topic through the help of videos presented by the English professional's has a limitation that the system can only be used by a high-level IQ learner. The differently abled students or the students who have difficulty in learning will not be able to understand the teaching in an efficient way.

THE STRUCTURE OF SMART SCHOOLS IN THE EDUCATIONAL SYSTEM: -it was published in the year of 2016[10]. the smart school is makes use of advanced technology and equipment in classrooms to give students better learning experience. the smart classroom normally used gadgets such as laptops, project to add a visual effect to learning and teaching screens. It is easy way of access to online information .it is an interactive learning and it is used for students who are absentees it is used to recorded and missing a class is not a big deal.it is an interactive teaching environment .The major limitation in this system is that it was designed specifically for the student who are pursuing Multi Media course. So, other types of learners will not be able to use the system

PROPER AND EFFICIENT TEACHING BY IMPLEMENTING SMART SCHOOLS:-it was published in the year 2018[11].Using ICT in education processes, simultaneously with the evolution of the educational approach in the world, has these schools are among key requirements of knowledge-based societies and they follow the approaches of developing knowledge and entrepreneur-ship skills of student. The major limitation in this system is that it aims to bring out the uniqueness of each student through the use of cultural disciplines practices. So, the main limitation lies in the lack of providing information other than their talent.

BIG DATA ANALYTICS FOR HIGHER EDUCATION IN THE CLOUD ERA:-Universities possess structured and unstructured data, generated from education and administrative processes and systems. The many universities face is effective way to harness this data, visualize it and then optimize it for its purposes of continuously delivering the education. Big data technologies need costly infrastructure and expertise for its life cycle management. Using Big data analytics in business sector for cost reduction and effectiveness. this cause effective way to use BDA in the education sector to understand the opportunities it provides to higher education[12]. Thus, we conclude it help only for higher education sector and business sector through internet. We provide education to student's who are live in rural where they are not able to use internet. they can ease way to use this proposed system.

3. PROPOSED SYSTEM

The proposed system provides an enhanced system of the Offline Learning with a facility to cross check whether the user distinctly recognizes the subject and also if the user doesn't find clearness the automatic recommendation system with videos on the same subject is initiated. In such a situation, a need for an offline application is in great demand. This system will surely help poor or rural people who have government laptops but can't afford to have a stable internet connection.

3.1 System model

There are three modules in this system. Keyword analysis (for user to type a word in search box), emotion detection (clarity on user understanding), recommendation system (till user satisfaction). Here we have used artificial superintelligence algorithm (for keyword analysis), support vector machines algorithm (emotion detection) and data analytics (recommendation system) to produce the phenomenal results in the detection of the activities of the human faces and their categorization.

In the figure 2, the keywords from various sources like Youtube, Google search or any other subject related keywords are collected and stored in the system. These are the keywords that are matched with the keyword that is typed by the user. Next, the windows application as a .exe file is given to the user who does not require any

storage space other than the exe file space. This windows application is installed in the user's system. Now the current emotions of the user are identified after the first video being played for certain period of time at a very standard level, a interpretation is made whether to give more related content based videos to the user or not through the use of support vector machines for emotion and data analytics for recommendation system. This system provides related videos to the same subject until the user gets understood by the materials provided and gives a proof of comprehension through emotions. The overall system architecture diagram represents a flow of how the modules work and how the modules flow from one module to another module finally giving the desired output to the user.

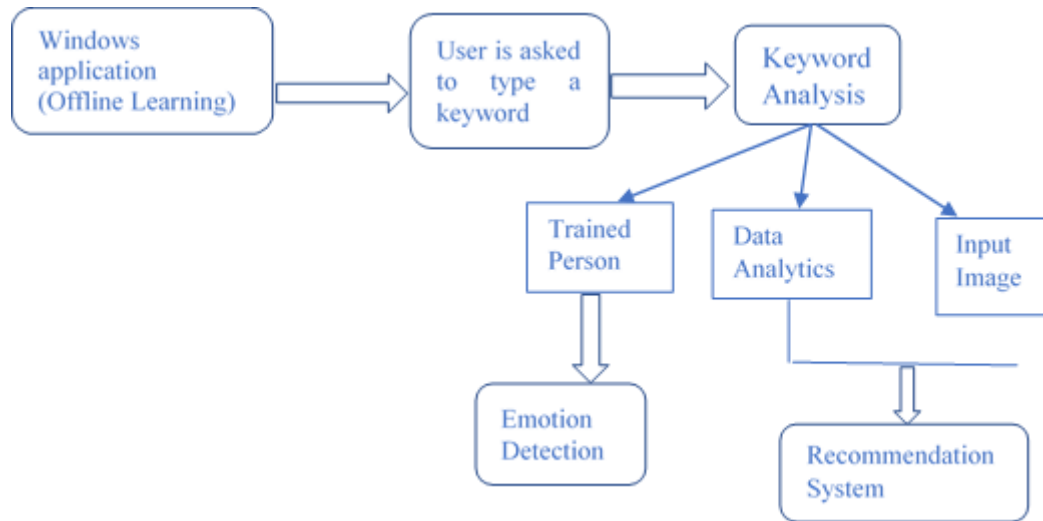


Figure 2 Proposed System Architecture

3.2 System description

Here the user types a particular keyword on which he/she has an ambiguity upon or want to get a clarity on. When the user clicks on find, the artificial superintelligence algorithm starts working wherein it searches for the typed keyword in the stored keyword. If both the keyword matches then the corresponding video gets played. If the keyword is not matched then the system through voice enabled feature tells the user that the “match of keyword is not found”. If the user doesn't know what are the keywords that are stored then he/she can use the help desk section and click on find the keys to get what are the keywords that are stored currently. The user can either make use of copy and paste facility to paste the keyword on the search box and get the corresponding video or the user can type the keywords that are related to the main keyword. For example, instead of diabetes the user can type sugar also. After playing the video for a particular duration of time, the camera starts to record the user's emotions through their system or laptop camera. The camera gets open for two times. First the camera gets open to recognize a human face. The voice enabled feature tells the user that his/her emotions are going to get observed. The second time the camera gets open to recognize the emotions of the user. The emotions of the user are compared against the emotions of the already trained users and comes to a conclusion and provides the emotions of the user. The recommendation system comes into action after recording the emotions of the user. After the emotions are stated, then the system decides whether to recommend more videos at a more understandable level or not. The system decides through data analytics.

This system for tracking the emotions of the user after providing a certain kind of explanation (in this a video based explanation) for a particular topic in the form of a windows application with two additional features of language based video explanation and automatic recommendation of more videos with a simple explanation on the same topic will be an essential component. the user does not need to type the keyword as same as that of stored keyword. The user can also type related keywords with case insensitive feature. The learners can understand the concepts easily and rapidly by visualizing videos rather than study the concepts on its own. Since, the system consists of related keywords rather than accurate words for searching concepts, will leads to decrease in the storage space. Thus, the system helps in decreasing the time and space complexity to a great extent and also helps the students or learners to gain knowledge irrespective of the status or location of the user he/she is in.

3.3 Keyword analysis module

Here the user types a particular keyword on which he/she has an ambiguity upon or want to get a clarity on. When the user clicks on find, the artificial superintelligence algorithm starts working wherein it searches for the

typed keyword in the stored keyword. If both the keyword matches then the corresponding video gets played. If the keyword is not matched then the system through voice enabled feature tells the user that the “match of keyword is not found”. If the user doesn’t know what are the keywords that are stored then he/she can use the help desk section and click on find the keys to get what are the keywords that are stored currently. The user can either make use of copy and paste facility to paste the keyword on the search box and get the corresponding video or the user can type the keywords that are related to the main keyword. For example, instead of diabetes the user can type sugar also. In this way the user can make use of this windows application to get a video-based explanation on any topic the user wants to get a clarity upon by typing the particular keyword on the search box and clicking on find. The videos are of short duration and only 3/4 of the video is played to check whether the user understands what the video is about.

Artificial Super intelligence Algorithm for Keyword Analysis

The artificial super intelligence algorithm is used for the keyword analysis module which is used to recognize whether the typed keyword matches the stored keyword and if it matches then it plays the corresponding video at a very standard level in the medium of English. Generally, there are three main classes of artificial intelligence namely – artificial narrow intelligence (ANI) which behaves like a normal AI but for a specific thing (e.g. playing chess with a computer). Second is artificial general intelligence (AGI) which is when the AI could be able to perform all types of functions. We consider an AI to be an AGI if it behaves like a normal human. Third and last category is the artificial super intelligence (ASI) is when the AI would be able to perform activities that are beyond the level of a normal human can do. So, to train any AI system, we would require a large set of data and if the AI need to perform very well on all situational activities and with a greater efficiency and accuracy, we would need a larger, cleaned and well processed datasets. Therefore, this factor becomes a large blockage for a developing AI. The main working of the artificial super intelligence algorithm in the proposed system would be as follows.

First the user is asked to type a keyword on which he/she want to get a better understanding or a doubt upon on the search box provided in the offline windows application which will be provided as a .exe extension file. Now, if the user doesn’t know what keywords are actually stored in the system which can be accessible of, he/she can use the helpdesk section and on this the user can click on the “find keys” button to get access to the stored keywords in the system. Then, after this if the typed keyword and the already stored keyword matches then a voice enabled feature tells that the keyword is recorded and the corresponding video gets played. If the typed keyword and the already stored keyword doesn’t match then the voice enabled feature tells that the keyword is not found. This type of functionality is carried out by the artificial super intelligence algorithm. The user is not asked to type exactly the stored keyword he/she can also type the reference keywords to the main keyword then also the corresponding video gets played.

Algorithm for Keyword Analysis:

- 1.Start windows application.
- 2.A Search Box and a Help desk option.
- 3.Type the keyword on search box is given as input
- 4.If want to know stored keyword click on HelpDesk.
- 5.When keyword is typed, keyword analysis starts.
- 6.If keyword is found, then the desired video will play as output
 - 6.1: Voice enabled feature confirms the keyword on the application
 - 6.2: The first standard video for the corresponding keyword starts playing.
- 7.Else,
 - 7.1: Voice enabled feature confirms that keyword not found.
- 8.Process stops
- 9.End of keyword analysis

3.4 Emotion Detection

After playing the video for a particular duration of time, the camera starts to record the user’s emotions through their system or laptop camera. The camera gets open for two times. First the camera gets open to

recognize a human face. The voice enabled feature tells the user that his/her emotions are going to get observed. The second time the camera gets open to recognize the emotions of the user. The emotions of the user are compared against the emotions of the already trained users and comes to a conclusion and provides the emotions of the user. The emotions of the user are analyzed through Histogram of Oriented Gradient features.

Support Vector Machines for Emotion Detection

Normally a support vector machines is a form of supervised learning model whose main function resides on making use of the classification algorithms exclusively for problems involving two group. The SVM algorithm is mainly based on the idea of training for either of these two-group classification problem with the help of the labelled training data specified for them. After having perfectly performed this training the SVM can now be used to categorize any set of new examples from the real world.

Imagine that we would want to access a new space,

$$z=x^2+y^2$$

where (x,y) are coordinates

z is the new space

Now, the dot product may look like:

$$a.b=xa . xb + ya .yb + za + zb$$

where (xa,ya) are the coordinates of one position in the space

(xb,yb) are the coordinates of other position in the space

This dot product is mainly called as the kernel function. When SVM is compared to other classification algorithms it provides high speed and better performance with only a certain number of samples that would be required.

The support vector machine algorithm works in this system in such a way that it captures the different positions of the eyes, nose and mouth by using a number of dots and correctly identifies its position and gives a particular value for each position of these three parts of a human face. The values are between zero and one. After the first video that is requested by the user is played for a certain duration of time the current emotions of the user are recognized. The camera gets on for two times. First the camera gets on to capture a proper face of the user that is present in front of the camera. The second time the camera gets on to capture the current emotions of the user to analyze whether the first video provides some kind of satisfaction to the user. So, the current emotions of the user is matched with the already trained emotions. After a conclusion on the current emotion of the user is made the system goes to the next step that is recommendation system. The training is provided by two different people and each 30 different emotions. The matching of already trained emotion and the current emotion is done by the support vector machine.

Algorithm for Emotion Detection

1. Start the windows Application. Input for the Emotion Detection algorithm is Video selection based on the keyword analysis
2. After the keyword analysis first video plays for 1:30 mins
3. After 1;30 mins emotion detection process starts.
- 4.The camera starts two times.
 - 4.1: First it detects the proper face in front of the system.
 - 4.2: Second the emotion detection starts with the previously stored values in the offline application.
- 5.Second time the camera starts to recognize the emotions by
 - 5,1: Comparing the values of stored emotions and the current emotions.
 - 5.2: Range of values for stored emotions.
 - 5.2.1: If current emotion \geq 0.61 and current emotion $<$ 0.72 then
System displays “Detected emotion is Happy”
 - 5.2.2: If current emotion \geq 0.56 and current emotion $<$ 0.61 then

System displays “Detected emotion is Sad”

5.2.3: If current emotion \geq 0.48 and current emotion $<$ 0.56 then

System displays “Detected emotion is Sleep”

5.2.4: If current emotion \geq 0.52 and current emotion $<$ 0.48 then

System displays “Detected emotion is Half Sleep”

5.2.5: If current emotion \geq 0.29 and current emotion $<$ 0.52 then

System displays “Detected emotion is Stare”

6. The emotion detection concludes with any of these emotions as an output for this algorithm

7. Stop the process.

8. End of Emotion Detection.

3.5 Recommendation System

The recommendation system comes into action after recording the emotions of the user. After the emotions are stated, then the system decides whether to recommend more videos at a more understandable level or not. The system decides through data analytics. The emotions and the videos are presented as a input to the MongoDB (data analytics tool). If the emotion of the user is happy the system comes to a conclusion that the user gets understood by the topic through video-based explanation by the first video itself. If the emotion of the user is other than happy like sad, staring etc. then the system comes to a conclusion that the user is not satisfied by the first video and that he/she needs a clearer view on the topic so the system automatically plays the second video of the same topic. This second video is at a more understandable level with more examples and less theory. Until the user finds satisfaction the video gets played for the same topic Data analytics – MongoDB.

Technically, the data Analytics is defined as the science of recognizing and analyzing the unprocessed data mainly to give a conclusion about the type of information that it holds. There are a large number of techniques and processes of data analytics that have been automated into algorithms that would be simply used to process any kind of unprocessed data. There are four types of Data analytics namely – descriptive analysis, diagnostic analysis, predictive analysis and prescriptive analysis. MongoDB is generally a cross platform document-based database program. It is classified as a type of NOSQL type of database program the MongoDB uses a feature of JSON like document schema. So, the MongoDB account is created to store the different emotion of the trained user and the corresponding videos for each of the respective keywords. Then the required packages used for analysis purpose is installed in the Matlab working space where the main project resides. Then the recommendation system works to give a conclusion to whether recommend more videos for the same subject for the user or not. This is where the data analytics tool MongoDB works in proposed system.

4. Experimental Setup And Results

The proposed system first starts with installation of the .exe extension file which will be provided to the users. The user has just to right click on the exe file and click on install give necessary permissions and then press ok. Finally, the windows offline application will be accessible to the user’s system. Now the user has to double click on the application so that the application starts working. For the first time this may take a few minutes to setup all the necessary files. After the application gets opened the application consists of a search box on which the user needs to type a particular keyword on which he wants to get his/her doubts cleared. If the user is not aware what are the keywords that are already stored, he/she can make use of the help desk section and click on find keys. The stored keywords will be displayed. The user has the option of either typing the same keyword or the related keywords to the main keywords. For each main keyword, there are five related keywords. Then after typing a particular keyword the corresponding video at the standard level of English medium will be played. After playing the video for a certain period of time, the emotion detection takes place. After analyzing the current emotions of the user, the system makes a decision to whether give more videos on the same subject or not through recommendation system.

1.Keyword analysis

In the Keyword analysis module as shown in the Figure 4, offline learners can select their desired video by typing either keywords or related keywords in the search box.

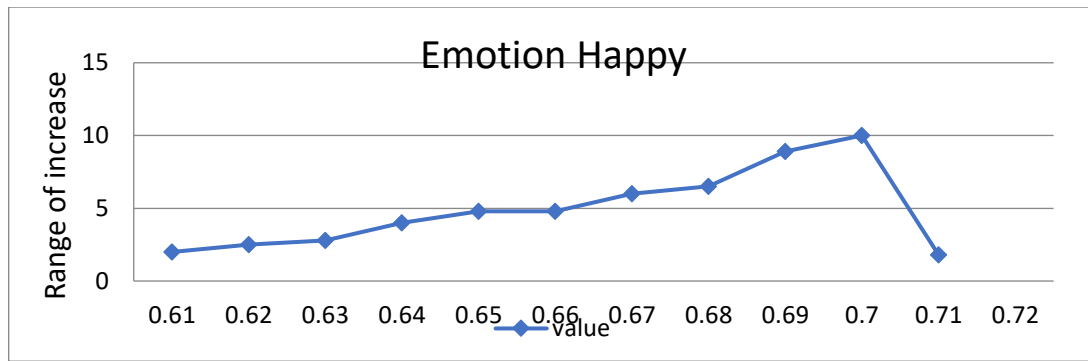


Figure 7(a) Range of Happy Emotion

Range of happy emotion values ranges from 0.61 to 0.71 as shown in the Figure 7(a).

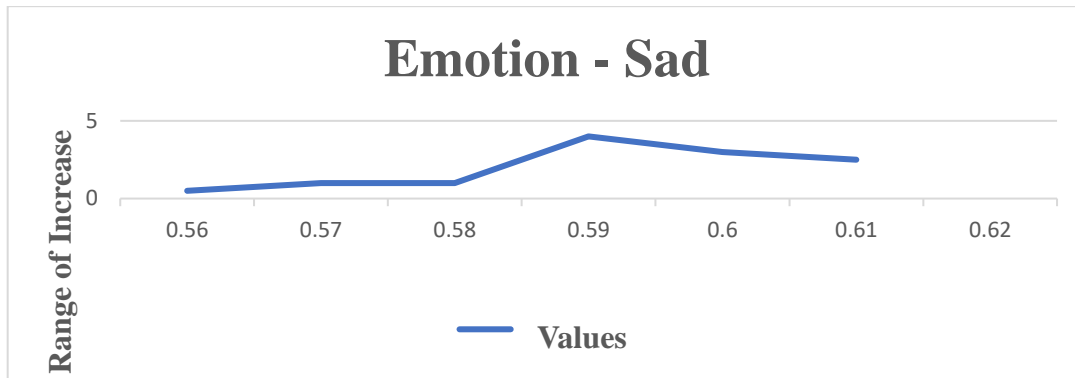


Figure 7(b) Range of Sad Emotion

Range of Sad emotion values ranges from 0.56 to 0.61 as shown in the Figure 7(b).

5. Conclusion And Future Prospects

It is very clear that innovation in technology provide everywhere and bringing new opportunities for schools, colleges and education institutions. It offers personalized learning environment which suits to individual’s learning style. smart class and smart school help to increases the learning abilities. It also used for alternative learning method to teach the different IQ level students and there must be technological strategy for schools, classes and entire learning atmosphere. It provides flexible learning style is proposed by system architecture such way it adaptable to student’s learning styles. The application does not need a stable internet connection to work. It is provided as a .exe file which is installed on the user computer so that he/she can use it anywhere anytime at the comfort of the user. The present system that we are going to design is first step towards the E learning is future work may be provide augmented reality or virtual reality to visualize the learning process so that the students would be more focused on how particular process or mechanism work. Another future work may be provide more concentrated on providing emotion detection each and every second of the video played for analysing of the emotions. Another work may be providing more hand on training or more real time examples for better understanding on the particular subject topic or particular subject concept it will help in future more for better understanding the particular topic.

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