**PROJECT REPORT**

**On**

**TEACHER REVIEW SYSTEM**

Submitted to Rajasthan Technical University

in partial fulfillment of the requirement for the award of the degree of

**B.TECH.**

**in**

**COMPUTER ENGINEERING**

**Submitted By**

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at



**POORNIMA INSTITUTE OF ENGINEERING & TECHNOLOGY, JAIPUR**

**Rajasthan Technical University, KOTA**

**APRIL, 2018**

**CERTIFICATE**

This is to be certified that the project entitled “ Teacher,s Review System ” has been submitted for the Bachelor of Computer Science and Engineering, Poornima Institute Of Engineering & Technology, Jaipur during the academic year 2018-2019 is a bonafide piece of project work carried out by “ **-----------& ----------------**” towards the partial fulfillment for the award of the Degree (B.Tech.) under the guidance of “**Mr.-------------------**” and supervision and no part of thereof has been submitted by them for any degree or diploma.

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(Assistant Professor) (Professor)

**CANDIDATE’S DECLARATION**

We, **Rahul Gupta** **(PIET15CE083), Ravina Rewar (PIET15CE089) & Saijal Agarwal (PIET15CE095)** B.Tech (Semester- VIII) of “**Poornima Institute Of Engineering & Technology, Jaipur”** hereby declare that the Project Report entitled **“Teachers Review System ”** is an original work and data provided in the study is authentic to the best of our knowledge.This report has not been submitted to any other Institute for the award of any other degree.

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| **Place:Jaipur** |  |
| **Date:24/10/18** |  |

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**ABSTRACT**

With thousands of learners watching the same online lecture videos, analyzing video watching patterns provides a unique opportunity to understand how students learn with

videos. In the context of learning through educational videos, the material chosen for a given topic must not only be relevant but also engaging to the consumer—ensuring better understanding and retention of content. This paper focuses on the speaking style of instructors, which is an important aspect driving student engagement. Recent studies have shown the importance of using online videos along with textual material in educational instruction, especially for better content retention and improved concept understanding. A key question is how to select videos to maximize student engagement, particularly when there are multiple possible videos on the same topic. We use crowdsourcing to explore speaking style dimensions in online educational videos, and identify six broad dimensions: liveliness, speaking rate, pleasantness, clarity, formality and confidence. We then propose techniques based solely on acoustic features for automatically identifying a subset of the dimensions.

**KEYWORDS:**

Educational videos, engagement, speaking styles, engagement recognition

**CHAPTER 1**

**INTRODUCTION TO PROJECT**

Nowadays, there are lots of video lectures available on Youtube on any specific topic we search and to decide which video to watch we rely on comments, reviews, likes and dislikes from people on that video, which may be biased. And if we talk about classroom teaching and we need to determine that the specific teacher is good or not, we have to rely on students’ feedback, which may also be biased as the student may not tell the truth or may not be interested in the subject. But if we can define a set of standards for judging a teacher and can train a system with those standards to classify whether the teacher or the video lecture is appropriate or not.

We have proposed to create a model that can review a teacher. There are various factors on which we can judge a teacher. We surveyed from various students, and collected all possible factors that can contribute in reviewing the teacher. We have classified those factors broadly into the following two categories:

1. Visual

· Body Language: Hand movements about wrist, elbow and shoulders. Upper body movement about waist.

· Walk

· Facing board to facing class ratio (in terms of time duration)

· Diagrams to Text ratio on board

· Clarity on board (Nice handwriting and illustrations)

· How often using content/material

2. Audio

· Interactive lecture: How often teacher is asking questions and students asking doubts (use of what/why/how/when like words)(2-way communication)

· Clarity in voice

· Explanation with analogies/Practical explanation: How often using out of the topic words or words related to physical world or surrounding environment.

· Using specific words like “for example”, “lets take an example”, “visualise”, “imagine”, “jot down”, etc.

· How often using bookish language or definitions to make note or dictating something to make students note (Teaching to Dictating ratio).

· Level of uniformity or link of concepts throughout the lecture (seems impossible and not practical but trying to find a way)

So, these all are the factors on the basis of which we will train our system. There may be many more other factors also, which we can add in our system to make it more precise.

Now, we are using the term ‘train’ our system frequently, so it must be clear by now, that we actually want to use Supervised Learning to train our model. So, training is the essential part in supervised learning. And as we know that in training data, there are Features and Labels. So, the features in our case are actually factors we defined above, which are contributing in judging the teacher, and the label is basically the output we want from the system, that the specific teacher is “good” or “bad”, but during training we will have to provide the labels manually.

In this way we will train our system using Supervised Learning. And we will be able to use that trained model to review faculties which are not labelled already, and the results will be unbiased.

**CHAPTER 2**

**PRODUCT BACKLOG**

1. **PRODUCT Backlog**

The product backlog in [Scrum](https://www.mountaingoatsoftware.com/agile/scrum) is a prioritized features list, containing short descriptions of all functionality desired in the product. The Product Owner creates, maintains, and regularly re-orders the Product Backlog. The Product Owner uses the Product Backlog to adapt to emerging requirements, customer feedback, and market changes.

It's not necessary to start a project with a lengthy, upfront effort to document all requirements. The Scrum product backlog is then allowed to grow and change as more is learned about the product and its customers.

In our project we have divided product backlog into four sprint backlogs. In first sprint backlog we firstly identified all possible aspects that can affect the quality of teaching then we tried to find a suitable method for the automatic labelling of video lectures to derive formula for the automatic labelling of a video. We also consider the comments for the automatic labelling of videos.

In second sprint backlog we analyze the complexities of the features. We studied the research papers and various concepts related to project to gain more understanding about it.Then we select the best subset of feature and discard the irrelevant features.

In sprint third sprint backlog we have to select best feature subset on the basis of their performance in cross validation.After that we have to determine the best way to make training dataset to train our model using Feed-Forward Neural Networks.And finally we have to check the performance of trained model on the unseen data.

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **AS A/AN** | **I WANT** | **SO THAT** |
| 1. | Developer | To identify all possible aspects that can affect the quality of teaching | I can use them as features in my model. |
| 2. | Developer | To find a suitable method for the automatic labelling of video lectures | I don't have to manually label the videos. |
| 3. | Developer | To derive a formula for the automatic labelling of a video | I can just put some values in it and get the label. |
| 4. | Developer | To consider comments also to contribute in the automatic labelling of video. | I can generate more accurate formula. |
| 6. | Developer | To analyse the complexities of features. | I can get to know more about the features. |
| 7. | Developer | To do study of research papers and various concepts | I can gain more understanding about the features. |
| 8. | Developer | To select best subset of features. | I can discard highly correlated features. |
| 9. | Developer | To discard the irrelevent features on the basis of their correlation with the corresponding labels. | I can discard the features which are not affecting the labels. |
| 10. | Developer | To do best feature subset selection on the basis of their performance in cross validation. | I can work with minimal set of relevant features. |
| 11. | Developer | To determine the best way to make training dataset. | I can create my dataset, |
| 12. | Developer | To train my model using Feed-Forward Neural Networks. | I can train my model. |
| 13. | eLearner | See the rating of a lecture | I can learn more efficiently |
| 14. | eLearner | See the list of video lecures of a topic in decreasing order of rating | I don't have to waste my time in searching appropriate video lectures |
| 15. | eLearner | Determine whether the lecture is interesting or not | I get to know whether I have to watch or skip it. |
| 16. | eLearner | See the real time script of video lecture | I can determine whether that lecture is appropriate for my learning or not |
| 17. | eLearner | See the one-line review of a video lecture | I can determine the body language of teacher in the video |
| 18. | eLearner | See the one-line review of a video lecture | I can determine the speaking style of teacher in the video |
| 19. | eLearner | See the one-line review of a video lecture | I may know whether the lecture is theoritical or practical |
| 20. | eLearner | See the one-line review of a video lecture | I may know whether the teacher in the video is energetic or not |
| 21. | eLearner | See the one-line review of a video lecture | I may know the keypoints covered in the lecture |
| 22. | Student | See the score of a teacher | I can determine how well he knows the subject |
| 23. | Student | See the review of a teacher | How much he is serious for our results |
| 24. | Student | See the review of a teacher | I can rely on his words |
| 25. | Student | See the review of a teacher | I can determine how impactful his problem solving method for our examination is. |
| 26. | Student | See the review of a teacher | I can request the replacement of a faculty |
| 27. | Student | See the review of a teacher | I can determine how much helpful and supportive he is |
| 28. | Student | See the review of a teacher | I may know how much affinity he.she has towards us |
| 29. | Student | See the review of a teacher | I may know whether he/she is concerned more about our understanding or just his teaching |
| 30. | Student | See the review of a teacher | I may know whether he/she is implementation oriented or just syllabus oriented |
| 31. | Student | See the review of a teacher | I can determine whether he/she will be able to help in executing our ideas |
| 32. | Student | See the review of a teacher | I may know whether he/she will treat us regardless of our scores or not |
| 33. | Student | See the review of a teacher | I may know whether he/she will allow discussions in the class or not |
| 34. | Student | See the review of a teacher | I can determine whether he/she will clear my doubts or not |
| 35. | Student | See the review of a teacher | I may know whether he/she will help us to achieve our goals or not |
| 36. | Student | See the review of a teacher | I may know whether he/she will be available for us or not when we need him |
| 37. | Student | See the review of a teacher | I may know whether he/she teaches from the books or from experience |
| 38. | HOD | See the review of a teacher | I can classify the teachers in good, average or poor |
| 39. | HOD | See the review of a teacher | I can determine how much to pay him/her |
| 40. | HOD | See the review of a teacher | I can judge a teacher |
| 41. | HOD | See the review of a teacher | I can decide which subject should be alotted to a teacher |
| 42. | HOD | See the review of a teacher | I can determine whether a teacher is appropriate for a subject or not. |
| 43. | HOD | See the review of a teacher | I can determine whether a teacher is appropriate for the department or not |
| 44. | HOD | See the review of a teacher | I don't have to rely on sudents' feedback |
| 45. | HOD | See the review of a teacher | I can suggest a teacher where the improvement is required |
| 46. | HOD | See the review of a teacher | I can determine whether he/she will be able to engage the class or not |
| 47. | HOD | See the review of a teacher | I can estimate how much teaching experience he/she has |
| 48. | HOD | See the review of a teacher | I can estimate how much industry experience he/she has |
| 49. | HOD | See the review of a teacher | I can determine whether he/she plans his lectures or not |
| 50. | HOD | See the review of a teacher | I can determine whether he/she is guide student's about competetive exams or not |
| 51. | HOD | See the review of a teacher | I may know whether his teaching can make a difference |
| 52. | HOD | See the review of a teacher | I may know whether he/she can inspire the students or not |
| 53. | HOD | See the review of a teacher | I can determine how much effective his teaching methods are |
| 54. | HOD | See the review of a teacher | I may know whether he/she can induce enthusiasm in the class or not |
| 55. | HOD | See the review of a teacher | I may know whether he/she can motivate the students to study more or not |
| 56. | HOD | See the review of a teacher | I can determine how much he/she is relating the subject to practical life |
| 57. | HOD | See the review of a teacher | I can determine his presentation skills |
| 58. | HOD | See the review of a teacher | I can determine his communication skills |
| 59. | Teacher | See the review of myself | I can determine my teaching skills |
| 60. | Teacher | See the review of myself | I may know how much clear I am |
| 61. | Teacher | See the review of myself | I can determine how much explanatory I am |
| 62. | Teacher | See the review of myself | I can determine level of my knowledge |
| 63. | Teacher | See the review of myself | I can determine how much organized I am |
| 64. | Teacher | See the review of myself | I can determine how much stimulating to students I am |
| 65. | Teacher | See the review of myself | I can determine which subject best suits me |
| 66. | Teacher | See the review of myself | I can improve my teaching methodologies |

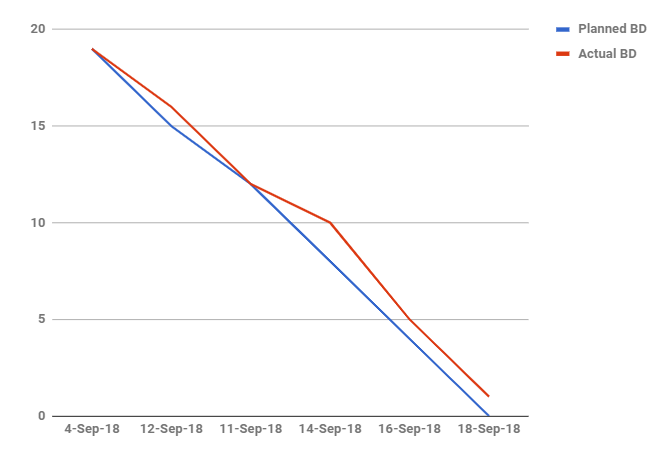
1. **Sprint Backlog-1**

In first sprint Backlog we have collected mixture of videos included good, bad and averages quality of lectures.After watching the videos we have observed many factors that are useful to train a model to analyse the video.After collecting all the features we have to divide them into two parts Audio part and Visual part.Along with these features we have also Determine the external numerical aspects of a video.These aspects are likes and dislikes of the video and no. of views and date of publication and as well as the no of subscribers on a video as a variable.After considering all the aspects and features now we have to derive formulae for automatic labelling of the video.For automatic labelling we can also consider the contribution of comments.We can use comment scraper to download comments from youtube videos.

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **USER STORY** | **TASKS** | **STATUS** |
| 1. | As a developer I want to identify all possible aspects that can affect the quality of teaching | Collecting a mixture of good, bad and average quality lecture videos from youtube.  Watching the videos and observing the factors that can determine quality of the lecture.  Selecting the features that can be used to make our model.  Categorizing the features into Audio and Visual parts. | C  C  C  C |
| 2. | As a developer I want to find a suitable method for the automatic labelling of video lectures. | Determining the external numerical aspects of a video.  Considering the likes and dislikes on a video as variables  Considering the no of views and date of publication of a video as variables.  Considering the no of subscribers on a video as variable.  Figuring out a method to evaluate score of a video using above variables. | C  C  C  C  C |
| 3. | As a developer I want to derive a formula for the automatic labelling of a video. | Trying (likes/dislikes) as the the formula.  Trying (likes-dislikes)/(no. of views) as the formula.  Trying (likes-dislikes)/(time since published) as the formula.  Trying (likes-dislikes+no. of views)/(time since published) as the formula.  Trying ((likes-dislikes)/(views)+(subscribers))/(time since published) as the formula. | C  C  C  C  C |
| 4. | As a developer I want to consider comments also to contribute in the automatic labelling of video. | Finding out the way to scrape the comments from a youtube video.  Using comment scraper to download comments from youtube video as excel file.  Considering sentimental analysis to extract sentiments from the comments of a video.  ((likes-dislikes)/(views)+(subscribers))/(time since published)+(sentimental\_value) as new formula.  Analysing comments and aborting the idea of sentiment analysis on comments. | C  C  C  C  C |

**Spring Backlog 01 burn down chart**

|  |  |  |
| --- | --- | --- |
| **Date** | **Planned BD** | **Actual BD** |
| 4-Sep-18 | 19 | 19 |
| 12-Sep-18 | 15 | 16 |
| 11-Sep-18 | 12 | 12 |
| 14-Sep-18 | 8 | 10 |
| 16-Sep-18 | 4 | 5 |
| 18-Sep-18 | 0 | 1 |

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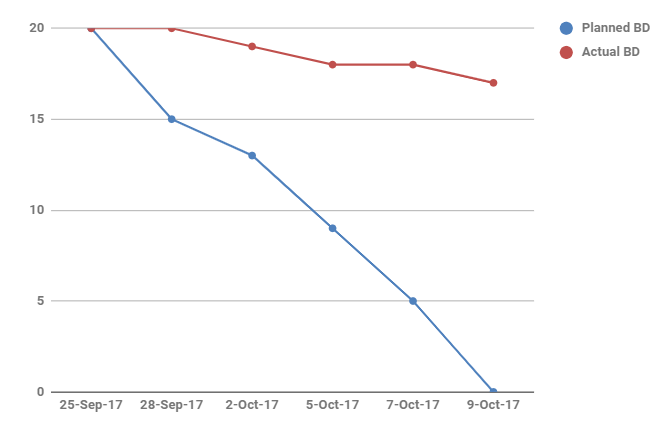
Days

1. ,**Sprint Backlog-2**In second sprint backlog we analyze the complexities of the features. As well as we also determine whether the features are numerically represented or not that is the features are discrete or continuous. We have also determined the ways to extract simple and complex features.We studied the research papers and various concepts related to project to gain more understanding about it.We also studied about the correlation between engagement of student and learning as well as the ways for automatic labelling of data.Calculating the correlation between all the possible pairs of features and we also discarded the features which are numerical in nature and still under study.Some of the features are also discarded after deciding a threshold level. Then we select the best subset of feature and discard the irrelevant features.

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **USER STORY** | **TASKS** | **STATUS** |
| 1. | As a developer I want to analyse the complexities of features. | Sort the features according to their level of complexities.  Determining the discrete and continous features.  Determining whether the features can be numerically represented.  Determining the ways to extract simple features.  Determining the ways to extract complex features. | C  P  P  P  NS |
| 2. | As a developer I want to do study of research papers and various concepts to gain more understanding about features. | Learning computer vision to find ways to extract visual features.  Reading a paper "Impact of speaking styles on Engagement and Learning"  Studying the correlation between Engagement of students and Learning.  Studying the ways for the automatic labelling of data.  Reading a paper "Recognition of student engagement from facial expression" | P    C  C  P  P |
| 3. | As a developer I want to select best subset of features. | Discarding the complex features which are still under study..  Discarding the features which are not numerical in nature..  Calculating correlation between all possible pairs of features.  Specifying a threshold to discard the highly correlated features.  Discarding the features with correlation above the threshold level. | NS    NS  NS  NS    NS |
| 4. | As a developer I want to discard the irrelevant features on the basis of their correlation with the corresponding labels. | Calculating correlation of each feature with the label.  Analysing the correlation values for each feature.  Specifying a threshold to define the level of correlation.  Discarding the features with correlation below threshold level.  Selecting the optimum set of features with high level of correlation. | NS  NS  NS  NS  NS |

**Spring Backlog 02 burn down chart**

|  |  |  |
| --- | --- | --- |
| **Date** | **Planned BD** | **Actual BD** |
| 25-Sep-17 | 20 | 20 |
| 28-Sep-17 | 15 | 20 |
| 2-Oct-17 | 13 | 19 |
| 5-Oct-17 | 9 | 18 |
| 7-Oct-17 | 5 | 18 |
| 9-Oct-17 | 0 | 17 |

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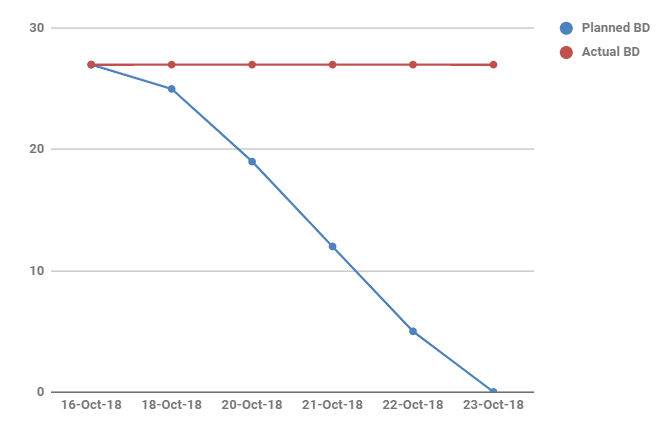
Days

1. **Sprint Backlog-3**In third sprint backlog we selected any suitable attribute subset selection method and any basic classification algorithm.Cross validate all the possible subsets using the algorithm chosen and record their performance.After this we analysed the performance of each subset and selected the subset which perform the best during corss-validation.Now we have to determine the best way to make training dataset for this we have to collect the best videos on popular topics.From that video we have to extract a suitable clip which is having valuable points. determined the no of videos per topic and also determined the suitable no of clips per video.Now we have taken a neural network and determine the no of neurons in input layer and output layer and also determine the no of hidden layers.Along with this we also determined the activation function for the neurons as well as suitable batch-size for learning.We also determined the no of epochs for learning and finally applying mini-batch gradient descent algorithm to train the model.Now it is time for check the performance of trained model on unseen data.Select the new dataset that are not used for training and apply the new dataset to the trained neural network.Tested each expected output against the actual label given and determined the accuracy of the model.

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **USER STORY** | **TASKS** | **STATUS** |
| 1. | As a developer I want to do best feature subset selection on the basis of their performance in cross validation. | Selecting any basic classification algorithm.  Selecting any suitable attribute subset selection method.  Cross validate all the possible subsets using the algorithm chosen and record their performance.  Analysing the performance of each subset.  Selecting the subset which performed best during cross-validation. | NS  NS    NS    NS    NS |
| 2. | As a developer I want to determine the best way to make training dataset | Selecting the popular topics on which to collect the video lectures.  Determining the duration of clips to be extracted from the video.  Determining the suitable points in the video from where to extract clips.  Determining the no of suitable no of clips per video  Determining the no of videos per topic that should be used.  Determining the no of instructors per topic that  should be considered.  Determining the suitable length of training set required | NS    NS    NS    NS  NS  NS |
| 3. | As a developer I want to train my model using Feed-Forward Neural Networks. | Determining no of neurons in the input layer for the neural network  Determining no of neurons in the output layer for the neural network  Determining suitable no of hidden layers.  Determining suitable no of neurons in each hidden layer.  Determine the suitable activation function for the neurons.  Determining suitable batch-size for learning  Determining suitable no of epochs for learning  Determinig suitable learning rate for learning.  Finally applying mini-batch gradient descent algorithm to train the model.  Saving the parameters learned after training. | NS    NS    NS    NS    NS  NS  NS  NS  NS  NS |
| 4. | As a developer I want to check the performance of my trained model on the unseen data.. | Select the new dataset that was not used for training.  Applying the new dataset at the input layer of the trained neural-net.  Feed-forward each data point and evaluate the expected output.  Test each expected output against the actual label given.  Determining the accuracy of the model. | NS  NS    NS    NS    NS |

**Spring backlog 3 Burnt Down chart**

|  |  |  |
| --- | --- | --- |
| **Date** | **Planned BD** | **Actual BD** |
| 16-Oct-18 | 27 | 27 |
| 18-Oct-18 | 25 | 27 |
| 20-Oct-18 | 19 | 27 |
| 21-Oct-18 | 12 | 27 |
| 22-Oct-18 | 5 | 27 |
| 23-Oct-18 | 0 | 27 |

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Days

1. **Sprint Backlog-4**

In sprint backlog four we checked the performance of teachers in the video on the behalf of student,HOD and eLearner.With the help of Elearner we can check the rating of the video and also we can get whether the video is interesting or not,there are many features on behalf of that we can decide how was the lecture like speaking style,body language,quality of lecture and energy.

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **AS A/AN** | **I WANT** | **SO THAT** |
| 1 | eLearner | See the rating of a lecture | I can learn more efficiently |
| 2 | eLearner | See the list of video lectures of a topic in decreasing order of rating | I don't have to waste my time in searching appropriate video lectures |
| 3 | eLearner | Determine whether the lecture is interesting or not | I get to know whether I have to watch or skip it. |
| 4 | eLearner | See the real time script of video lecture | I can determine whether that lecture is appropriate for my learning or not |
| 5 | eLearner | See the one-line review of a video lecture | I can determine the body language of teacher in the video |
| 6 | eLearner | See the one-line review of a video lecture | I can determine the speaking style of teacher in the video |
| 7 | eLearner | See the one-line review of a video lecture | I may know whether the lecture is theoitical or practical |
| 8 | eLearner | See the one-line review of a video lecture | I may know whether the teacher in the video is energetic or not |
| 9 | eLearner | See the one-line review of a video lecture | I may know the key points covered in the lecture |
| 10 | Student | See the score of a teacher | I can determine how well he knows the subject |
| 11 | Student | See the review of a teacher | How much he is serious for our results |
| 12 | Student | See the review of a teacher | I can rely on his words |
| 13 | Student | See the review of a teacher | I can determine how impactful his problem solving method for our examination is. |
| 14 | Student | See the review of a teacher | I can request the replacement of a faculty |
| 15 | Student | See the review of a teacher | I can determine how much helpful and supportive he is |
| 16 | Student | See the review of a teacher | I may know how much affinity he.she has towards us |
| 17 | Student | See the review of a teacher | I may know whether he/she is concerned more about our understanding or just his teaching |
| 18 | Student | See the review of a teacher | I may know whether he/she is implementation oriented or just syllabus oriented |
| 19 | Student | See the review of a teacher | I can determine whether he/she will be able to help in executing our ideas |
| 20 | Student | See the review of a teacher | I may know whether he/she will treat us regardless of our scores or not |
| 21 | Student | See the review of a teacher | I may know whether he/she will allow discussions in the class or not |
| 22 | Student | See the review of a teacher | I can determine whether he/she will clear my doubts or not |
| 23 | Student | See the review of a teacher | I may know whether he/she will help us to achieve our goals or not |
| 24 | Student | See the review of a teacher | I may know whether he/she will be available for us or not when we need him |
| 25 | Student | See the review of a teacher | I may know whether he/she teaches from the books or from experience |
| 26 | HOD | See the review of a teacher | I can classify the teachers in good, average or poor |
| 27 | HOD | See the review of a teacher | I can determine how much to pay him/her |
| 28 | HOD | See the review of a teacher | I can judge a teacher |
| 29 | HOD | See the review of a teacher | I can decide which subject should be alotted to a teacher |
| 30 | HOD | See the review of a teacher | I can determine whether a teacher is appropriate for a subject or not. |
| 31 | HOD | See the review of a teacher | I can determine whether a teacher is appropriate for the department or not |
| 32 | HOD | See the review of a teacher | I don't have to rely on sudents' feedback |
| 33 | HOD | See the review of a teacher | I can suggest a teacher where the improvement is required |
| 34 | HOD | See the review of a teacher | I can determine whether he/she will be able to engage the class or not |
| 35 | HOD | See the review of a teacher | I can estimate how much teaching experience he/she has |
| 36 | HOD | See the review of a teacher | I can estimate how much industry experience he/she has |
| 37 | HOD | See the review of a teacher | I can determine whether he/she plans his lectures or not |
| 38 | HOD | See the review of a teacher | I can determine whether he/she is guide student's about competetive exams or not |
| 39 | HOD | See the review of a teacher | I may know whether his teaching can make a difference |
| 40 | HOD | See the review of a teacher | I may know whether he/she can inspire the students or not |
| 41 | HOD | See the review of a teacher | I can determine how much effective his teaching methods are |
| 42 | HOD | See the review of a teacher | I may know whether he/she can induce enthusiasm in the class or not |
| 43 | HOD | See the review of a teacher | I may know whether he/she can motivate the students to study more or not |
| 44 | HOD | See the review of a teacher | I can determine how much he/she is relating the subject to practical life |
| 45 | HOD | See the review of a teacher | I can determine his presentation skills |
| 46 | HOD | See the review of a teacher | I can determine his communication skills |
| 47 | Teacher | See the review of myself | I can determine my teaching skills |
| 48 | Teacher | See the review of myself | I may know how much clear I am |
| 49 | Teacher | See the review of myself | I can determine how much explanatory I am |
| 50 | Teacher | See the review of myself | I can determine level of my knowledge |
| 51 | Teacher | See the review of myself | I can determine how much organized I am |
| 52 | Teacher | See the review of myself | I can determine how much stimulating to students I am |
| 53 | Teacher | See the review of myself | I can determine which subject best suits me |
| 54 | Teacher | See the review of myself | I can improve my teaching methodologies |

**CHAPTER 3**

**TECHNOLOGY APPLIED AND PROJECT MANAGEMENT**

**· Computer Vision**

Humans use their eyes and their brains to see and visually sense the world around them. Computer vision is the science that aims to give a similar, if not better, capability to a machine or computer.

Computer vision is concerned with the automatic extraction, analysis and understanding of useful information from a single image or a sequence of images. It involves the development of a theoretical and algorithmic basis to achieve automatic visual understanding.

The applications of computer vision are numerous and include:

* agriculture
* augmented reality
* autonomous vehicles
* biometrics
* character recognition
* forensics
* industrial quality inspection
* face recognition
* gesture analysis
* geoscience
* image restoration
* medical image analysis
* pollution monitoring
* process control
* remote sensing
* robotics
* security and surveillance
* transport

**· Image and Video processing**

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them.

It is among rapidly growing technologies today, with its applications in various aspects of a business. Image Processing forms core research area within engineering and computer science disciplines too.

*Image processing basically includes the following three steps*.

· Importing the image with optical scanner or by digital photography.

· Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.

· Output is the last stage in which result can be altered image or report that is based on image analysis.

Purpose of Image processing

The purpose of image processing is divided into 5 groups. They are:

1. Visualization - Observe the objects that are not visible.

2. Image sharpening and restoration - To create a better image.

3. Image retrieval - Seek for the image of interest.

4. Measurement of pattern – Measures various objects in an image.

5. Image Recognition – Distinguish the objects in an image

**· NLP (Natural Language Processing) using RNNs (Recurrent Neural Networks)**

Natural Language Processing (NLP) refers to AI method of communicating with an intelligent systems using a natural language such as English.

Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc.

The field of NLP involves making computers to perform useful tasks with the natural languages humans use. The input and output of an NLP system can be −

* Speech
* Written Text

## Components of NLP

There are two components of NLP as given −

### Natural Language Understanding (NLU)

Understanding involves the following tasks −

* Mapping the given input in natural language into useful representations.
* Analyzing different aspects of the language.

**· Neural Networks and CNNs (Convolutional Neural Networks)**

*Artificial neural networks* (*ANNs*) are statistical models directly inspired by, and partially modeled on biological neural networks. They are capable of modeling and processing nonlinear relationships between inputs and outputs in parallel. The related algorithms are part of the broader field of machine learning, and can be used in many applications as discussed.

Artificial neural networks are characterized by containing *adaptive weights* along paths between neurons that can be tuned by a *learning algorithm* that *learns* from observed data in order to improve the model. In addition to the learning algorithm itself, one must choose an appropriate *cost function*.

The cost function is what’s used to *learn* the optimal solution to the problem being solved. This involves determining the best values for all of the tunable model parameters, with neuron path adaptive weights being the primary target, along with algorithm tuning parameters such as the *learning rate*. It’s usually done through *optimization* techniques such as *gradient descent* or *stochastic gradient descent*.

These optimization techniques basically try to make the ANN solution be as close as possible to the optimal solution, which when successful means that the ANN is able to solve the intended problem with high performance.

Architecturally, an artificial neural network is modeled using layers of *artificial neurons*, or computational units able to receive input and apply an activation function along with a threshold to determine if messages are passed along.

In a simple model, the first layer is the *input* layer, followed by one *hidden* layer, and lastly by an *output* layer. Each layer can contain one or more neurons.

**· Python**

Python is an [interpreted](https://en.wikipedia.org/wiki/Interpreted_language) [high-level programming language](https://en.wikipedia.org/wiki/High-level_programming_language) for [general-purpose programming](https://en.wikipedia.org/wiki/General-purpose_programming_language). Created by [Guido van Rossum](https://en.wikipedia.org/wiki/Guido_van_Rossum) and first released in 1991, Python has a design philosophy that emphasizes [code readability](https://en.wikipedia.org/wiki/Code_readability), notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.In July 2018, Van Rossum stepped down as the leader in the language community after 30 years.

Python features a [dynamic type](https://en.wikipedia.org/wiki/Dynamic_type) system and automatic [memory management](https://en.wikipedia.org/wiki/Memory_management). It supports multiple [programming paradigms](https://en.wikipedia.org/wiki/Programming_paradigm), including [object-oriented](https://en.wikipedia.org/wiki/Object-oriented_programming), [imperative](https://en.wikipedia.org/wiki/Imperative_programming), [functional](https://en.wikipedia.org/wiki/Functional_programming) and [procedural](https://en.wikipedia.org/wiki/Procedural_programming), and has a large and comprehensive [standard library](https://en.wikipedia.org/wiki/Standard_library).

Python interpreters are available for many [operating systems](https://en.wikipedia.org/wiki/Operating_system). [CPython](https://en.wikipedia.org/wiki/CPython), the [reference implementation](https://en.wikipedia.org/wiki/Reference_implementation) of Python, is [open source](https://en.wikipedia.org/wiki/Open_source) software and has a community-based development model, as do nearly all of Python's other implementations. Python and CPython are managed by the non-profit Python Software Foundation.

**· Various libraries like pandas, openCV, TensorFlow, etc.**

**Project management :**

Project management is the application of processes, methods, knowledge, skills and experience to achieve the project objectives. General. A project is a unique, transient endeavor, undertaken to achieve planned objectives, which could be defined in terms of outputs, outcomes or benefits.

Project management is the practise of initiating, planning, executing, controlling, and closing the [work](https://en.wikipedia.org/wiki/Work_(project_management)) of a [team](https://en.wikipedia.org/wiki/Project_team) to achieve specific goals and meet specific success criteria at the specified time. A [project](https://en.wikipedia.org/wiki/Project) is a temporary endeavor designed to produce a unique product, service or result with a defined beginning and end undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value. The temporary nature of projects stands in contrast with [business as usual](https://en.wikipedia.org/wiki/Business_operations), which are repetitive, permanent, or semi-permanent functional activities to produce products or services. In practice, the [management](https://en.wikipedia.org/wiki/Management) of such distinct production approaches requires the development of distinct technical skills and management strategies.

**Software project management**

Software project management is the art and science of planning and leading software projects. It is a sub-discipline of [project management](https://en.wikipedia.org/wiki/Project_management) in which [software](https://en.wikipedia.org/wiki/Software) projects are planned, implemented, monitored and controlled.

The job pattern of an IT company engaged in software development can be seen split in two parts:

* Software Creation
* Software Project Management

A project is well-defined task, which is a collection of several operations done in order to achieve a goal (for example, software development and delivery). A Project can be characterized as:

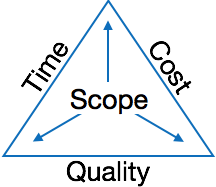
* Every project may have a unique and distinct goal.
* Project is not routine activity or day-to-day operations.
* Project comes with a start time and end time.
* Project ends when its goal is achieved hence it is a temporary phase in the lifetime of an organization.
* Project needs adequate resources in terms of time, manpower, finance, material and knowledge-bank.

**Software Project**

A Software Project is the complete procedure of software development from requirement gathering to testing and maintenance, carried out according to the execution methodologies, in a specified period of time to achieve intended software product.

**Need of software project management**

Software is said to be an intangible product. Software development is a kind of all new stream in world business and there’s very little experience in building software products. Most software products are tailor made to fit client’s requirements. The most important is that the underlying technology changes and advances so frequently and rapidly that experience of one product may not be applied to the other one. All such business and environmental constraints bring risk in software development hence it is essential to manage software projects efficiently.



The image above shows triple constraints for software projects. It is an essential part of software organization to deliver quality product, keeping the cost within client’s budget constrain and deliver the project as per scheduled. There are several factors, both internal and external, which may impact this triple constrain triangle. Any of three factor can severely impact the other two.

Therefore, software project management is essential to incorporate user requirements along with budget and time constraints.

**Software Project Manager**

A software project manager is a person who undertakes the responsibility of executing the software project. Software project manager is thoroughly aware of all the phases of SDLC that the software would go through. Project manager may never directly involve in producing the end product but he controls and manages the activities involved in production.

A project manager closely monitors the development process, prepares and executes various plans, arranges necessary and adequate resources, maintains communication among all team members in order to address issues of cost, budget, resources, time, quality and customer satisfaction.

Let us see few responsibilities that a project manager shoulders -

**Managing People**

* Act as project leader
* Liaison with stakeholders
* Managing human resources
* Setting up reporting hierarchy etc.

**Managing Project**

* Defining and setting up project scope
* Managing project management activities
* Monitoring progress and performance
* Risk analysis at every phase
* Take necessary step to avoid or come out of problems
* Act as project spokesperson

**Software Management Activities**

Software project management comprises of a number of activities, which contains planning of project, deciding scope of software product, estimation of cost in various terms, scheduling of tasks and events, and resource management. Project management activities may include:

* **Project Planning**
* **Scope Management**
* **Project Estimation**

**Project Planning**

Software project planning is task, which is performed before the production of software actually starts. It is there for the software production but involves no concrete activity that has any direction connection with software production; rather it is a set of multiple processes, which facilitates software production. Project planning may include the following:

**Scope Management**

It defines the scope of project; this includes all the activities, process need to be done in order to make a deliverable software product. Scope management is essential because it creates boundaries of the project by clearly defining what would be done in the project and what would not be done. This makes project to contain limited and quantifiable tasks, which can easily be documented and in turn avoids cost and time overrun.

During Project Scope management, it is necessary to -

* Define the scope
* Decide its verification and control
* Divide the project into various smaller parts for ease of management.
* Verify the scope
* Control the scope by incorporating changes to the scope

**Project Estimation**

For an effective management accurate estimation of various measures is a must. With correct estimation managers can manage and control the project more efficiently and effectively.

Project estimation may involve the following:

* **Software size estimation**

Software size may be estimated either in terms of KLOC (Kilo Line of Code) or by calculating number of function points in the software. Lines of code depend upon coding practices and Function points vary according to the user or software requirement.

* **Effort estimation**

The managers estimate efforts in terms of personnel requirement and man-hour required to produce the software. For effort estimation software size should be known. This can either be derived by managers’ experience, organization’s historical data or software size can be converted into efforts by using some standard formulae.

* **Time estimation**

Once size and efforts are estimated, the time required to produce the software can be estimated. An effort required is segregated into sub categories as per the requirement specifications and interdependency of various components of software. Software tasks are divided into smaller tasks, activities or events by Work Breakthrough Structure (WBS). The tasks are scheduled on day-to-day basis or in calendar months.

The sum of time required to complete all tasks in hours or days is the total time invested to complete the project.

* **Cost estimation**

This might be considered as the most difficult of all because it depends on more elements than any of the previous ones. For estimating project cost, it is required to consider -

* + Size of software
  + Software quality
  + Hardware
  + Additional software or tools, licenses etc.
  + Skilled personnel with task-specific skills
  + Travel involved
  + Communication
  + Training and support

**Project Estimation Techniques**

We discussed various parameters involving project estimation such as size, effort, time and cost.Project manager can estimate the listed factors using two broadly recognized techniques

**Decomposition Technique**

This technique assumes the software as a product of various compositions.

There are two main models -

* **Line of Code** Estimation is done on behalf of number of line of codes in the software product.
* **Function Points** Estimation is done on behalf of number of function points in the software product.

**Empirical Estimation Technique**

This technique uses empirically derived formulae to make estimation.These formulae are based on LOC or FPs.

* **Putnam Model**

This model is made by Lawrence H. Putnam, which is based on Norden’s frequency distribution (Rayleigh curve). Putnam model maps time and efforts required with software size.

* **COCOMO**

COCOMO stands for COnstructiveCOstMOdel, developed by Barry W. Boehm. It divides the software product into three categories of software: organic, semi-detached and embedded.

**Project Scheduling**

Project Scheduling in a project refers to roadmap of all activities to be done with specified order and within time slot allotted to each activity. Project managers tend to define various tasks, and project milestones and they arrange them keeping various factors in mind. They look for tasks lie in critical path in the schedule, which are necessary to complete in specific manner and strictly within the time allocated. Arrangement of tasks which lies out of critical path are less likely to impact over all schedule of the project.

For scheduling a project, it is necessary to -

* Break down the project tasks into smaller, manageable form
* Find out various tasks and correlate them
* Estimate time frame required for each task
* Divide time into work-units
* Assign adequate number of work-units for each task
* Calculate total time required for the project from start to finish

**Resource management**

All elements used to develop a software product may be assumed as resource for that project. This may include human resource, productive tools and software libraries.

The resources are available in limited quantity and stay in the organization as a pool of assets. The shortage of resources hampers the development of project and it can lag behind the schedule. Allocating extra resources increases development cost in the end. It is therefore necessary to estimate and allocate adequate resources for the project.

Resource management includes -

* Defining proper organization project by creating a project team and allocating responsibilities to each team member
* Determining resources required at a particular stage and their availability
* Manage Resources by generating resource request when they are required and de-allocating them when they are no more needed.

**Project Risk Management**

Risk management involves all activities pertaining to identification, analysing and making provision for predictable and non-predictable risks in the project. Risk may include the following:

* Experienced staff leaving the project and new staff coming in.
* Change in organizational management.
* Requirement change or misinterpreting requirement.
* Under-estimation of required time and resources.
* Technological changes, environmental changes, business competition.

**Risk Management Process**

There are following activities involved in risk management process:

* **Identification -** Make note of all possible risks, which may occur in the project.
* **Categorize -** Categorize known risks into high, medium and low risk intensity as per their possible impact on the project.
* **Manage -** Analyze the probability of occurrence of risks at various phases. Make plan to avoid or face risks. Attempt to minimize their side-effects.
* **Monitor -** Closely monitor the potential risks and their early symptoms. Also monitor the effects of steps taken to mitigate or avoid them.

**Project Execution & Monitoring**

In this phase, the tasks described in project plans are executed according to their schedules.

Execution needs monitoring in order to check whether everything is going according to the plan. Monitoring is observing to check the probability of risk and taking measures to address the risk or report the status of various tasks.

These measures include -

* **Activity Monitoring -** All activities scheduled within some task can be monitored on day-to-day basis. When all activities in a task are completed, it is considered as complete.
* **Status Reports -** The reports contain status of activities and tasks completed within a given time frame, generally a week. Status can be marked as finished, pending or work-in-progress etc.
* **Milestones Checklist -** Every project is divided into multiple phases where major tasks are performed (milestones) based on the phases of SDLC. This milestone checklist is prepared once every few weeks and reports the status of milestones.

**Project Communication Management**

Effective communication plays vital role in the success of a project. It bridges gaps between client and the organization, among the team members as well as other stake holders in the project such as hardware suppliers.

Communication can be oral or written. Communication management process may have the following steps:

* **Planning** - This step includes the identifications of all the stakeholders in the project and the mode of communication among them. It also considers if any additional communication facilities are required.
* **Sharing** - After determining various aspects of planning, manager focuses on sharing correct information with the correct person on correct time. This keeps every one involved the project up to date with project progress and its status.
* **Feedback** - Project managers use various measures and feedback mechanism and create status and performance reports. This mechanism ensures that input from various stakeholders is coming to the project manager as their feedback.
* **Closure** - At the end of each major event, end of a phase of SDLC or end of the project itself, administrative closure is formally announced to update every stakeholder by sending email, by distributing a hardcopy of document or by other mean of effective communication.

After closure, the team moves to next phase or project.

**Configuration Management**

Configuration management is a process of tracking and controlling the changes in software in terms of the requirements, design, functions and development of the product.

IEEE defines it as “the process of identifying and defining the items in the system, controlling the change of these items throughout their life cycle, recording and reporting the status of items and change requests, and verifying the completeness and correctness of items”.

Generally, once the SRS is finalized there is less chance of requirement of changes from user. If they occur, the changes are addressed only with prior approval of higher management, as there is a possibility of cost and time overrun.

**Project management Tools:**

Project management required tools to manage the work , time and resources. At present many of the software are available for project management. Some of the popular software tools are as follows.

### 01. [Trello](http://send.getapp.com/aff_c?offer_id=677&aff_id=1371)

Trello is an project management tool, instead this app is a free visual way to to glance at the entire project with a single view. With Trello you can organise cards, these cards can be your thoughts, conversations and to-do lists and be placed on a board for everyone to collaborate on.

### 02. [Basecamp](http://send.getapp.com/aff_c?offer_id=637&aff_id=1371)

Basecamp is the granddaddy of project management apps. Basecamp is considered the leading project management tool around. It boost a simple and easy to use interface to collaborate with your team and client. It allows you to create multiple projects and setup discussions, write to-do lists, manage files, create and share documents, and organise dates for scheduling.

### 03. [Teamwork Projects](http://send.getapp.com/aff_c?offer_id=947&aff_id=1371)

Teamwork Projects is the ultimate productivity tool to manage projects with your team. Teamwork allows you to keep all your projects, tasks and files all in one place and easily collaborate with a team. Teamwork helps you to visualise the entire project through a marked calendar and gantt chart and setup reporting. Teamwork supports file management with Google Drive, Box.com and Dropbox. As well as integration with leading apps such as third party accounting software and customer support apps.

### 04. [Resource Guru](https://resourceguruapp.com/)

Billed as the "simple way to schedule people, equipment and other resources", Resource Guru is a streamlined resource scheduling and leave management tool that’s designed to keep your projects on track. You can plan your team's workloads, receive daily booking reminders, report on KPIs, and more. Apple, Saatchi & Saatchi and Deloitte are among some of the cloud-based team calendar’s heavyweight customers.

### 05. [ActiveCollab](http://send.getapp.com/aff_c?offer_id=949&aff_id=1371)

ActiveCollab recently released its new version 5.0. The new revamped app is now more powerful and focused project management tool. It offers team collaborating features, task management, time tracking and importing expenses. One of the biggest asset of ActiveCollab is it offers invoicing features. You are able to track payments and expenses and have invoices paid directly within ActiveCollab with PayPal, and other credit card payments.

### 06. [Zoho Projects](http://send.appdoubler.com/aff_c?offer_id=101&aff_id=1371)

Zoho offers a wide range of business software including Projects. Zoho Projects is an proficient tool to project plan and project coordinator from start to finish. It boost all the features you need for project management with some advance features including reporting, integration with Google Apps and Dropbox, bug tracking, setup Wiki Pages to build a repository of information, forums and more.

### 07. [Jira](http://send.getapp.com/aff_c?offer_id=281&aff_id=1371)

Jira is specifically targeted for software development teams. Jira offers abilities to raise issues and bugs. Jira makes it real easy to track bugs and see which issues are still outstanding and how much time was spent on each task. Jira offer other products including Confluence a document collaboration tool, and HipChat a team chat and video and file sharing platform and other products.

### 08. [Asana](http://send.getapp.com/aff_c?offer_id=587&aff_id=1371)

Asana is the easiest way for teams to track their work so everyone knows who's doing what, by when. With tasks, projects, conversations and dashboards, Asana keeps your work organized, and teammates accountable so you can move work forward faster. Asana also lets you keep track of your work wherever you are with mobile apps for both iOS and Android.

### 09. [Podio](http://send.getapp.com/aff_c?offer_id=951&aff_id=1371)

Podio is a ever growing tool to organise and communication tool for any business. Podio allows you to personalise this platform to fit your business needs. Besides being able to communicate with a team, setup task management, use as a file storage system, like a traditional project management app, Podio can be an internal intranet for all your colleagues and departments to interact.

### 10. [Freedcamp](https://freedcamp.com/)

Whatever your project may be, either setting up an event, a web project or organising a wedding, Freedcamp helps you organise and plan effectively. Freedcamp has an organised dashboard to view the entire project at a glance. You can easily setup tasks, use sticky notes to visually setup tasks and organise them into the calendar. Freedcamp provides advance add-ons for high level business use including CRM, invoicing, issue tracking and setting up wiki pages.

### 11. [Wrike](http://send.getapp.com/aff_c?offer_id=239&aff_id=1371)

Wrike is advance application to help you work smarter. By making sure you are always staying on track and ensure you have the adequate resources to finish on time and on budget.Setting up tasks, engage your team and integrate with your business tools including Google Apps, Microsoft Excel, Dropbox and many more is so easy with Wrike.

**PO and Their Relevance to project**

**PO1: Engineering knowledge:**Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

In this project creation process engineering knowledge of the software engineering and Electronics engineering have been applied. we have used software engineering , HTML,xml, java , android , java script , php , j2ee, data base , oracle , my sql , mango and other programming language and database to the project. We have applied all above engineering subjects in our projects.

**PO2: Problem analysis:**Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

In our projects we have identified an problem , once verified by the client we have worked to identify the solution using all of our theoretical and practical knowledge.

**PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage:**Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

In the project development we have applied Integrated Development Environment IDE for the rapid development of the code, used web server for the software development.

**PO6: The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

In 1961 , the Conference of Engineering Societies of Western Europe and the United States of America defined "professional engineer" as follows.

A professional engineer is competent by virtue of his/her fundamental education and training to apply the scientific method and outlook to the analysis and solution of engineering problems. He/she is able to assume personal responsibility for the development and application of engineering science and knowledge, notably in research, design, construction, manufacturing, superintending, managing and in the education of the engineer. His/her work is predominantly intellectual and varied and not of a routine mental or physical character. It requires the exercise of original thought and judgement and the ability to supervise the technical and administrative work of others. His/her education will have been such as to make him/her capable of closely and continuously following progress in his/her branch of engineering science by consulting newly published works on a worldwide basis, assimilating such information and applying it independently. He/she is thus placed in a position to make contributions to the development of engineering science or its applications. His/her education and training will have been such that he/she will have acquired a broad and general appreciation of the engineering sciences as well as thorough insight into the special features of his/her own branch. In due time he/she will be able to give authoritative technical advice and to assume responsibility for the direction of important tasks in his/her branch.

**PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Sustainability is the ability to continue a defined behavior indefinitely. Sometimes environmental, social and economic are termed to be the three pillars of sustainability.

**PO8: Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

The ethics of engineers and the fundamental principles for Engineers are as follows.

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

I. using their knowledge and skill for the enhancement of human welfare;

II.being honest and impartial, and servicing with fidelity the public, their employers and clients;

III. Striving to increase the competence and prestige of the engineering profession; and

IV. Supporting the professional and technical societies of their disciplines.   
  
  
**PO9. Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.  
  
  
To work successful in team a team member must have following capabilities.

**1. The Ability to Listen**

it is important to listen to one another's ideas. Too often in a business setting, you have a group of people simply waiting for their turn to speak, not paying one iota of attention to the persons on their left or right. So it is a good teamwork skill to have the ability to listen

**2. Check Your Ego**

This isn't saying abandon your ego all together, because that isn't healthy. But leaving your ego at the door temporarily is a very important team work skill. The reason this is so essential is because there is always someone better than you at something, no matter how brilliant you are.

**3. Critique**

By critique, I mean constructive criticism. Be able to give others constructive criticism and be able to listen to others critique your ideas and work. There shouldn't be any offense taken to constructive criticism. You all want to succeed, and this is a vital step in doing so.

**4. Delegation**

The mentality must be applied to teamwork. Delegate roles to those who do them best.

**5. Show Respect**

If you and another person happen to be paired up and can't stand each other, you can still put that aside for a couple of hours, treat each other civilly, and complete the tasks at hand. You may even overcome the dislike toward one another.

**6. Be Helpful**

This is simple.If one of your teammates does not understand an idea, discussion, or task that is being completed, take the necessary time to explain it to them and work with them. There are no weak links when everyone helps one another. Some take longer to learn than others, but that doesn't mean that they are of less intelligence. If in a meeting someone asks a question because they don't understand, don't frown at them. Just answer the questions patiently and concisely.

**7. Question One Another**

If someone brings up a topic of discussion and a solution to this topic, question them. Respectfully question, don't badger. Rather, ask them how it will work, why it will work over the long-run, and how everyone else can implement the idea.

**8. Participation**

Have the entire team encourage shy people to engage in the topics of discussion. Don't demand it, but make them realize that you really want to hear their ideas.

**9. Rational Debate**

Bad ideas are bad for teams. Spirited, friendly, rational debate is where facts come forward, ideas are born, and quality rises to the top.

**10. Set The Right Environment**

Try to make the space in which your team is assembled as comfortable, relaxing, and inviting as possible. You do not want your team to be tense and with frayed nerves.

**PO 10: Communication:**Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:**Demonstrate knowledge and understanding of the engineering management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Project management is the application of processes, methods, knowledge, skills and experience to achieve the project objectives. In general project is a unique, transient endeavour, undertaken to achieve planned objectives, which could be defined in terms of outputs, outcomes or benefits.

**PO12: Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Life Long Learning means is the provision or use of both formal and informal learning opportunities throughout people's lives in order to foster the continuous development and improvement of the knowledge and skills needed for employment and personal fulfillment

**CHAPTER 4**

**PROJECT IMPLEMENTATION**

( Each Spring Backlog of 13-17 Pages total Chapter Size 50-70 pages)

1. Sprint Backlog-1  
     
   ( ***Project Design , Algo ,Database Design , ERD , Project Code ( Sample code only Limited to Max of 2-3 Page if needed , Project Screen Shots*** )
2. Sprint Backlog-2

( ***Project Design , Algo ,Database Design , ERD , Project Code ( Sample code only Limited to Max of 2-3 Page if needed , Project Screen Shots***

1. Sprint Backlog-3

( ***Project Design , Algo ,Database Design , ERD , Project Code ( Sample code only Limited to Max of 2-3 Page if needed , Project Screen Shots*** )

1. Sprint Backlog-4  
     
   ( ***Project Design , Algo ,Database Design , ERD , Project Code ( Sample code only Limited to Max of 2-3 Page if needed , Project Screen Shots*** )

**CHAPTER 5**

**CONCLUSION**

Teacher Review System is aimed at automating the process of feedbacking the teacher unbiasedly. It will take any video lecture as input and provide the score of the teacher as output (1-10). The system is basically a trained model trained using Supervised Learning. There are various features used for training which are broadly audio and visual features of the lecture. It will judge every aspect of the teacher, like body language, tone of speaking, words

used, etc. and will review the quality of his/her teaching.

Increasing student engagement has emerged as a key challenge for teachers, researchers, and educational institutions. Many of the current tools used to measure engagement – such as self-reports, teacher introspective evaluations, and checklists – are cumbersome, lack the temporal resolution needed to understand the interplay between engagement and learning, and in some cases capture student compliance rather than engagement.

We experimented with multiple approaches for human observers to assess student engagement. Our results suggest that machine learning methods could be used to develop real-time automatic engagement detector with comparable accuracy to that of human observers. We showed that both human and automatic engagement judgments correlate with task performance. We failed to find significant correlations between perceived engagement and learning. The temporal resolution of the technology could help understand when and why students get disengaged, and perhaps to take action before it is too late. Web based teachers could obtain real-time statistics of the level of engagement of their students across the globe. Educational videos could be improved based on the aggregate engagement signals provided by the viewers. Such signals would indicate not only whether a video induces high or low engagement, but most importantly, which parts of the videos do so. Our work underlines the importance of focusing on long-term field studies in real-life classroom environments. Collecting data in such environments is critical to train more reliable and

ecologically valid engagement recognition systems. More importantly, sustained, long-term studies in actual classrooms are needed to gain a better understanding of the

interplay between engagement and learning in real life.

Utilization Of Outcome (Future Scope)

* To improve education standards in government schools.
* Promote outcome based and practical learning.
* Eliminate purely syllabus oriented teaching.
* YouTube academic videos filter.
* Unbiased Automated Teacher Reviewer.

**ANNEXURES**

References

Research Paper ( if Presented and approved for publication)

DST Document presented for grants.

CV

**Instructions**

For Chapter Heading

Font: Times New Roman

Font Size: 14, Bold

Alignment: Center

Line Spacing 1.5

For Paragraph Heading

Font: Times New Roman

Font Size: 12, Bold

Alignment: Left

Line Spacing 1.5

For paragraph

Font: Times New Roman

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Line Spacing 1.5

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