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 [ijircce@gmail.com](mailto:ijircce@gmail.com)

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# Performance Analysis on Student Feedback using Machine Learning Algorithms

Manoj Kumar B, Mohith K, Yeshwanth V, Sasikumar M

UG Student, Dept. of CSE, Jeppiaar Engineering College, Chennai, India

UG Student, Dept. of CSE, Jeppiaar Engineering College, Chennai, India

UG Student, Dept. of CSE, Jeppiaar Engineering College, Chennai, India

Assistant Professor, Dept. of CSE, Jeppiaar Engineering College, Chennai, India

**ABSTRACT:** Nowadays, educational Institutions are paying increasing attention to the views of Student's on the involvement in learning and teaching through reviews or feedbacks. Online Feedback analysis is a method for collecting feedbacks and processing it and then analyzing it by sentiment analysis and producing the report. The goal of the study was to develop an all in one system to serve both students and teachers. The system comprises of generation and analysis of student's feedback pages, summary, and a delivery of feedback report. The system is developed for all college students. The student has to give feedback which would be categorized into positive or negative. This online feedback system is the perfect place to find feedback evaluated according to the requirements and it is the efficient one to get feedback analysis of students and staffs.

It investigates opinion mining by means of supervised learning techniques to search out the emotion of the student input bolstered characterized choices of instructing and learning. The examination led includes the apparatus of a blend of AI and common language preparing systems on understudy input data accumulated from module investigation overview consequences of Jeppiaar Engineering College, Chennai. Additionally, to offer a grade by grade clarification of the technique of accomplishment of opinion mining on or after scholar remarks using the open source tool Python, the work additionally offers a comparative overall performance take a look remarks supported, extracted alternatives like examination, teaching and so on. The consequences are as compared to be trying to find out higher overall performance with relevance several evaluation standards designed for the various techniques.

**KEYWORDS:** Online Feedback Analysis, Opinion Mining.

## I. INTRODUCTION

The total of information that whichever organization within the humankind managing is huge. This "Big Data" is often characterizing by three V's i.e., volume, velocity, and selection. It is usually a lot of concerning of these three dimensions coming back along than considering any of them on an individual basis. The existence of enormous number of ordered records much like grades, conscription information, and development quotes likewise as unstructured in order like scholar opinions articulated via surveys, it will become time and useful source overwhelming to précis the facts by hand to gain information lead conclusions and alternatives.

Studying analytics can be discipline of information analytics to procedures, analyses, reviews and predicts facts regarding learners for the aim of optimizing coaching and studying. On the opposite side, it is essential to recognize the outline generated by means of the information like scholar feedback to correctly develop the overall routine of the established order and to form plans to reinforce institutions' coaching and mastering understanding. From among the numerous systems for aggregation pupil comments, surveys contain a vital position and most of the establishments commence surveys in several paperwork.



The focal point is on utilizing Opinion Mining approach for categorizing the student's feedback received all through component estimate survey that is accomplished each semester to understand comments of scholars in regards to several options of coaching and knowledge like module, teaching, assessments, and so forth. The mined and pre-processed datasets be subjected to several supervised opinion mining method like aid Vector gadget (SVM), Naive Bayes (NB), Artificial Neural Networks (NN) applied the usage of Python, the open supply device accessible for opinion mining. The proportional effectiveness of the algorithms in the selected utility circumstance is evaluated exploitation accuracy; take into account and accuracy measures. Accurateness is outlined because of the quantitative relation of entire classifications that place unit specifically to the entire style of knowledge set. Accuracy is that the quantitative relation of true positives toward the whole type of positives that vicinity unit foretold while keeping in mind is that the quantitative relation of actual positives by means of the complete positives inside the dataset.

## II.OVERVIEW

The paper spotlight on victimization Opinion Mining method for classifying the student's comments acquired during module evaluation survey. The mined and pre-processed datasets have been based to numerous supervised evaluations taking out rule like aid Vector Naïve Bayes (NB), Nearest Neighbour (KNN) and Neural Networks (NN) enforced.

It is visible currently that there is a rise of expertise availableness, the alleged statistics deluge, controlled by accomplice inflated amount of electronic motion accomplished, and additionally the revolutionary pervasive attain of IT altogether gadgets. the number one of those developments is that the supposed open statistics association, distinguished by the manner that the complete method throughout European and also the united states, governments area unit more and more e-book their information repositories for humans to admittance and use it any other pattern issues the inconceivable amount of knowledge is formed handy by electorate through participatory sensing": commonplace play a practical 2020 6th International Conference on Advanced Computing & Communication Systems (ICACCS) 978-1-7281-5197-7/20/\$31.00 ©2020 IEEE 1161 Authorized licensed use limited to: James Cook University of Northern Queensland. Downloaded on June 02,2020 at 10:39:15 UTC from IEEE Xplore. Restrictions apply. position in booklet commentary and grumbling online, and increasingly more make use of novelty to report further in sequence.

The paper projected a web feedback system that is concerning automating the method of recording student's feedback. The projected system collects the feedback submitted by students and so classifies them as positive feedbacks or negative feedbacks victimization SVM classifier. Then, it generates a performance outline of a coach for the themes he or she schooled there in academic term employing a delimited account rule. In my view, the projected system may be helpful for the educational establishments and may additionally facilitate academics to know their teaching performance in an exceedingly summarized manner. This projected a web feedback system which might record the student's feedback and analyse the teacher's performance supported opinion mining victimization SVM classifier and so summarizes the teacher performance supported delimited outline rule i.e. count frequency of positive and negative reviews.

The work aims to dig deeper into the feedback information of an establishment. Presently the feedback information is employed to report solely the performance of the teacher. The paper proposes ways to research the feedback information victimization data processing techniques for a higher understanding of the college, course, and student. The format of feedback varies from establishment to establishment, thus there cannot be a general technique which will appropriate all. The feedback information from the scholars is analysed by victimization completely different data processing techniques. The feedback information is used for analysing all the parameters thought of for feedback which might facilitate management in creating policy choices in teaching-learning method. This Paper surveys all data processing technique that is applied for analysing feedback information.



### III.METHODOLOGY

#### 3.1 CLEANING OF TEXT

The first pre-processing step we'll do is transform all feedbacks into lower case. The punctuations are removed. We still have some words that we should remove, namely the stop words. Final step is to do stemming is to avoid repetitions of same word in different forms.

#### 3.2 BAG OF WORDS

A problem with modeling text is that it is messy, and techniques like machine learning algorithms prefer well defined fixed-length inputs and outputs. Machine learning algorithms cannot work with raw text directly; the text must be converted into numbers. Specifically, vectors of numbers. This is called feature extraction or feature encoding. A popular and simple method of feature extraction with text data is called the bag-of-words model of text.

A bag-of-words model, or Bow for short, is a way of extracting features from text for use in modeling, such as with machine learning algorithms. The approach is very simple and flexible, and can be used in a myriad of ways for extracting features from documents. A bag-of-words is a representation of text that describes the occurrence of words within a document. It involves two things: A vocabulary of known words. A measure of the presence of known words. It is called a "bag" of words, because any information about the order or structure of words in the document is discarded. The model is only concerned with whether known words occur in the document, not where in the document.

→ **BAG OF WORDS MODEL**

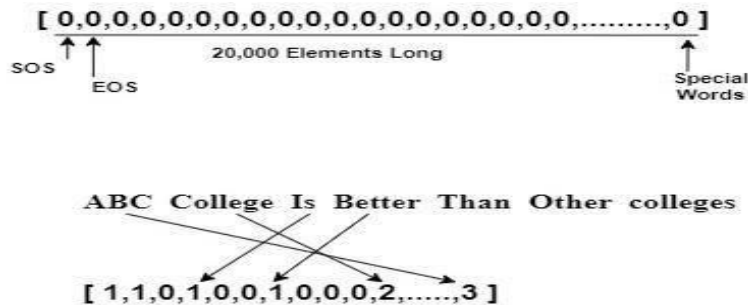


Fig 3.1

#### 3.3 SENTIMENT ANALYSIS

The Sentiment Analysis is an approach of using natural language processing, and text analysis for extracting and identifying the sentiment of a text into a positive or negative category. In-order to reach a binary decision, generally sentiment analysis is used.

Natural Language Processing (or NLP) is applying Machine Learning models to text and language. Teaching machines to understand what is said in spoken and written word is the focus of Natural Language Processing. You can also use NLP on a text review to predict if the review is a good one or a bad one. Speaking of classification algorithms, most of NLP algorithms are classification models, and they include Logistic Regression, Naive Bayes, CART which is a model based on decision trees, Maximum Entropy again related to Decision Trees, Hidden Markov Models which are models based on Markov processes.

### 3.4 MACHINE LEARNING MODELS

The Preprocessed data is trained with the following machine learning models

#### Classical models:

1. Naïve Bayes model
2. Support vector machine (SVM) model
3. Decision tree model

#### Deep learning model:

Artificial neural network (ANN) model

### 3.5 PERFORMANCE CALCULATION

The final feedback predictions are calculated using one of the four algorithms by comparing them and choosing the best using the following metrics.

Performance metrics for choosing the best:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

$$\text{Precision} = \frac{TP}{TP + FP}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

TP = # True Positives, TN = # True Negatives, FP = # False Positives,

FN = # False Negatives

## IV. EXPERIMENTAL RESULTS

The efficient algorithm is chosen based on the performance metrics and the report is generated.

### RESULT ANALYSIS TABLE

Algorithms / Models	Accuracy Score	Precision Score	Result Score
Naïve Bayes	0.865	1.0	0.8
SVM	0.97	0.96	1.0
Decision Tree	0.99	0.99	0.99
ANN	0.99	0.99	0.99

The result of the algorithm is obtained in the table,

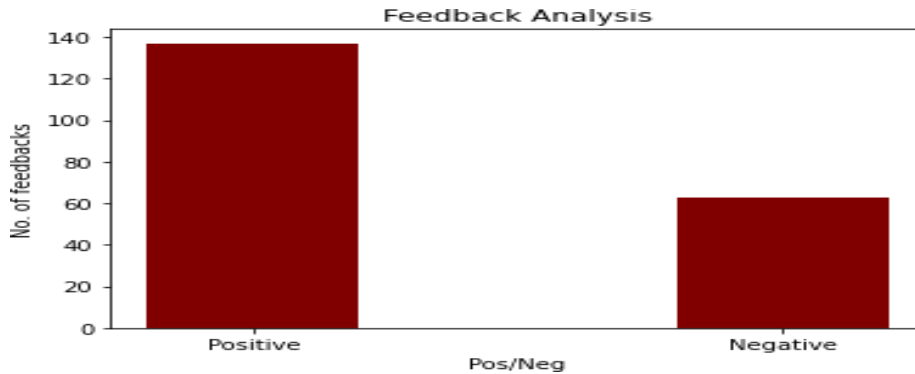


Fig 4.1

## V. CONCLUSION AND FUTURE WORK

Sentence level sentiment mining become accustomed removes the remarked normal alternatives and evaluation words from the contribution dataset. A Student Feedback Mining System is work to inquire about points and their slants as of understudy produced criticism. This strategy will be useful to improve student knowledge and educator's process for conveyance. Automating the student's feedback may give several advantages together with saving price, time and creating economical report generation, etc. the utilization of opining mining will facilitate in summarizing the feedback report effectively and evaluating school performance in the type of a summarized read might be helpful for the establishments.

The opinion mining is that the method of insights taking out that be procured to look into assessments of students for any examination. For the length of this, the conclusion mining at the coed remarks created through reviews abuse managed gadget becoming acquainted with calculations upheld through Python. Several opinion mining systems are audited and referred to. Our results proved that the engineered Neural Networks algorithmic regular hit others as far as accuracy.

In the future assessment, we resolve in broad absolute conclusion mining of student feedback gathered from web-based life and moreover to investigate however the coed sentiment changes misuse various socioeconomics like age sex, etc. We have a propensity to in addition look forward to improve the effecting of conclusion mining system. The affordable opinion mining method resolve be arranged and consequences will be dissected as far as different parameters. We measure expecting to build up the arranged framework which would encourage organizations by assessing our framework and would without a doubt benefit the instructional exercise foundations. The arranged framework might be stretched out to various zones like amassing inputs for workshops and short-run courses.

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