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SENTIMENT ANALYSIS TO IMPROVE TEACHING AND LEARNING

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Abstract— **Today information sharing has become an integral part of our day-to-day life. We tend to give reviews of all the things from our day to day activities to college activities and teacher reviews. Thus, by using this vast amount of data we can apply machine learning on the data and understand the sentiment behind the information shared. By understanding the sentiments properly can help in increasing the productivity of teachers and students in an academic arena. So, in our project we are going to apply sentiment analysis on the data we get from teacher and academic feedback of students. By applying sentiment analysis on the student feedback, we will improve the teaching quality thus improving the teacher quality and increase the grade of a college or institution using machine learning. To achieve this, we will de- sign a system in combination of natural language processing, machine learning and cloud computing together. We will create a mobile application where student can place reviews or teacher feedbacks. To store these feedbacks, we will use Google Cloud. Then lexicon analysis will be applied on the data using OPEN-NLP natural language processing toolkit. The data after lexicon analysis will be used to create a training dataset with two classes positive and negative. The machine learning algorithm Support vector Machine (SVM) using the self-created training dataset to get the sentiment behind the feedback. Thus, our system will put the feedback in two categories positive and negative. So, by analysing the positive and negative we can concentrate on increasing the efficiency of teachers if needed. So, by using our system a college or institution can remove the drawbacks in teaching and increase the student and teacher relationship and interaction.**

Keywords— ***Mobile Application, Student Feedback, Machine Learning, Stop Words, Sentiment Analysis, OPEN-NLP, SVM.***

Introduction

Sentiment analysis (SA) is the process of identifying and classifying users opinions from a piece of text into different sentiments for example, positive, negative, or neutral or emotions such as happy, sad, angry, or disgusted to determine the user's attitude toward a particular subject or entity. SA plays an important role in many fields including education, where student feedback is essential to assess the effectiveness of learning technologies. So this kind of research can be used to create a feedback system to improve college ranking.

The main motivation of this paper is to:

- To improve teaching and learning quality in a college or institution.
- To apply sentiment analysis on a review given by students and recognize the emotions behind them in three classes mainly positive, negative and neutral. Apply technology in farm produce and sale thus improving the life of the vast farming community in the country.
    - A college grade can be improved by understanding the problems behind a teacher and student interaction and understanding.
    - The mobile application used to gather teacher feedback will be concentrated for a specific college or institution and fake feedbacks from others who are not part of the institution will be blocked.
    - So there arises a need to properly analyze and bridge the gap between the way a student learns and a teacher teaches.

I. LITERATURE SURVEY

This section describes the fundamentals of various sentiment analysis techniques that can be used in designing a new more reliable and secured student feedback system to access teachers feedback effectively. It helps in understanding various ideas put forward by various technical papers published by various authors and how they put forth a more accurate and concrete techniques. Some of the ideas with technique and drawbacks are mentioned below:

1. Paper: - Comparative Analysis of Feature Selection Algorithms for Computational Personality Prediction From Social Media.

   Year: - 2020.

   Author: - Ahmed Al Marouf , Md. Kamrul Hasan, and Hasan Mahmud.

   Technique: - Personality prediction using feature selection and machine learning algorithms such as SVM, Naive bayes etc.

   Drawback: This paper presents a valid approach for personality prediction but it is not applied it to other streams like emotion recognition behind the student feedback in a student and teacher perspective.

2. Paper: - Online Public Shaming on Twitter: Detection, Analysis, and Mitigation.

   Year: - 2019.

   Author: - Rajesh Basak, Shamik Sural , Niloy Ganguly, and Soumya K. Ghosh.

   Technique: - Online public shamming detection on twitter using feature extraction and machine learning algorithm SVM.

   Drawback: - This paper presents a valid approach for online public shamming classification but it is not applied it to other streams like emotion recognition behind the student feedback in a student and teacher perspective.

3. Paper: - A Sentiment Analysis System to Improve Teaching and Learning.

   Year: - 2017.

   Author: - - Sujata Rani and Parteek Kumar.

   Technique: - Sentiment analysis using machine learning.

   Drawback: - This paper presents a valid approach for sentiment analysis to improve teching and learning but it not mention properly which algorithms are used and how they are defined.

II. METHODOLOGY

This section will study the mathematical conditions to be used for designing a mobile application using cloud. These are explained as follows:

A. Mathematical Model:

A.1. Set Theory Applied to the Project

1. Data Preprocessing: -

Set(D)={D0, D1, D2, D3, D4}

D0 ∈ D = Get student feedback on teachers for preprocessing.

D1 ∈ D = Remove stop words.

D2 ∈ D = Perform Lexicon Analysis using OPEN-NLP.

D3 ∈ D = Extract features.

D4 ∈ D = View results.

2. Machine Learning :-

Set(M)={M0, M1 ,M2, M3, M4, D4}

M0 ∈ M = Fetch preprocessed feedback.

M1 ∈ M = Create training dataset with two classes positive and negative.

M2 ∈ M = Create testing dataset using feedback.

M3 ∈ M = Train SVM algorithm.

M4 ∈ M = Apply SVM classification to get prediction.

D4 ∈ M = View results.

B. Probability, NP-Hard and NP-Complete

So, by studying the sets as defined above we come to notice that a element D4 is common in both modules and used in coordination in both sets which can be placed as

$x \in D \cap M$ i f $x \in D$ and $x \in M$

Thus, the probability of intersection of element in both modules can be given as

$P(D \cap M) = P(D) + P(M)$

So, intersection of common element can be shown as

$D \cap M = \{D4\}$

The conditional probability of both modules using the same element can be shown as

$P(D|M) = P(D \cap M)\ P(M)$

Thus, we conclude that our project "Sentiment Analysis to Improve Teaching and Learning" success and failure will depend upon the internet as our student feedback data is stored on cloud, i.e., if the internet connection is not good or not present the feedbacks will not be fetched and the project won't work, thus this is a case of failure, so our project supports NP-Hard and not NP-Complete.

III. PROPOSED SYSTEM

Support Vector Machine (SVM) :-

- Doing study on sentiment analysis to improve teaching and learning we come conclude to use SVM(Support Vector Machine) as our machine learning algorithm.
- It can be explained as, in machine learning, support vector machines (SVMs, also support vector networks are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis.
- Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting).
- An SVM model is a representation of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible.
- New examples are then mapped into that same space and predicted to belong to a category based on which side of the gap they fall.

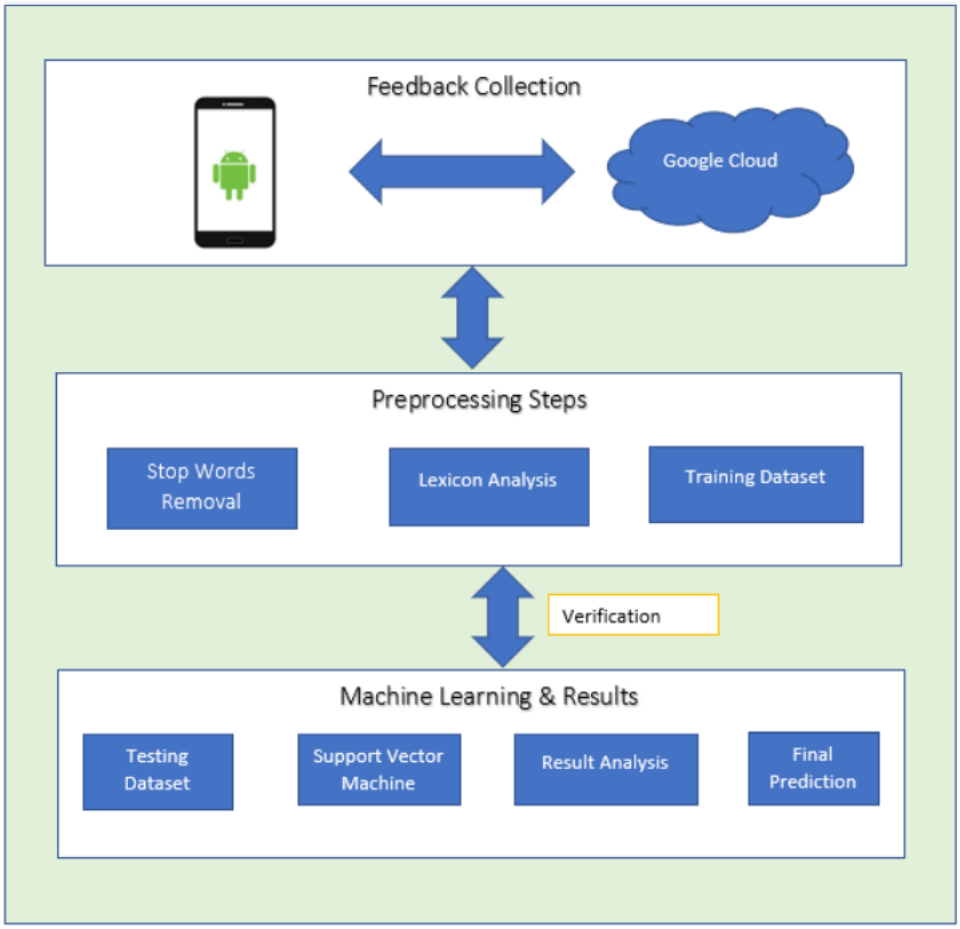


Fig.1.System Architecture Diagram.

Results :-

- Outcomes :- The final outcome of the project is the classification of student feedback using SVM in in 2 classes positive and negative.

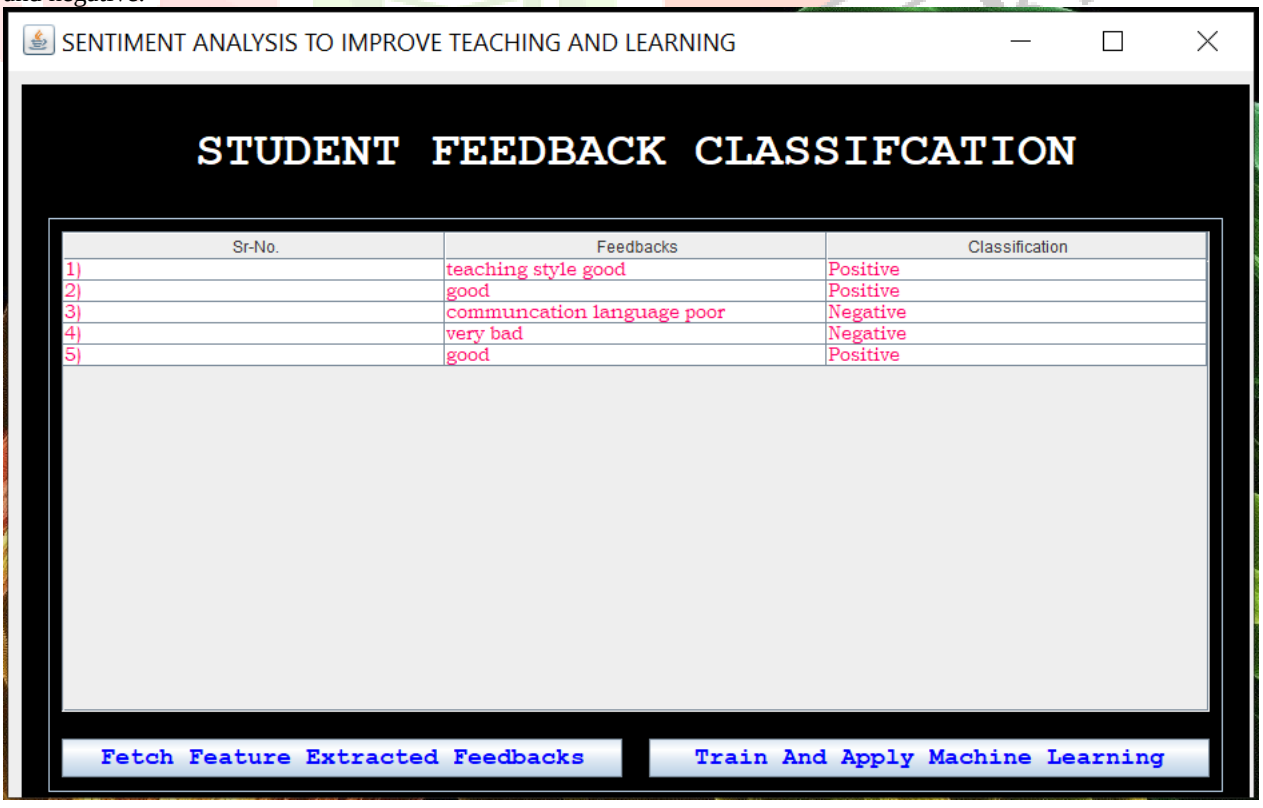
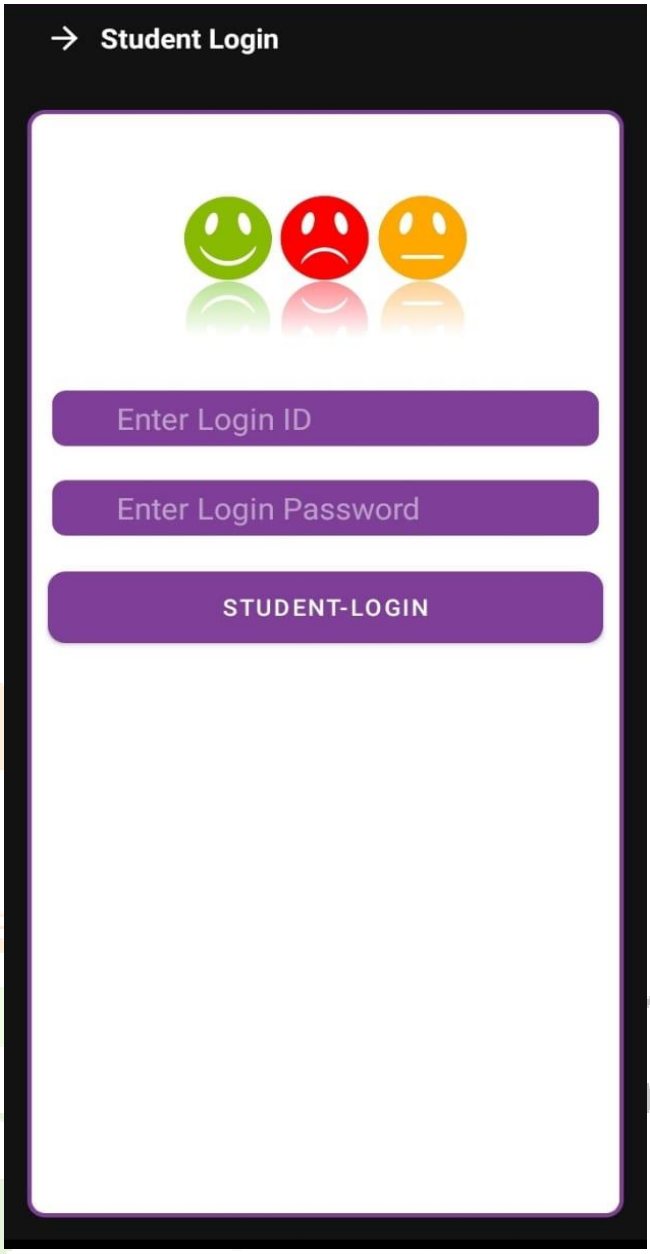


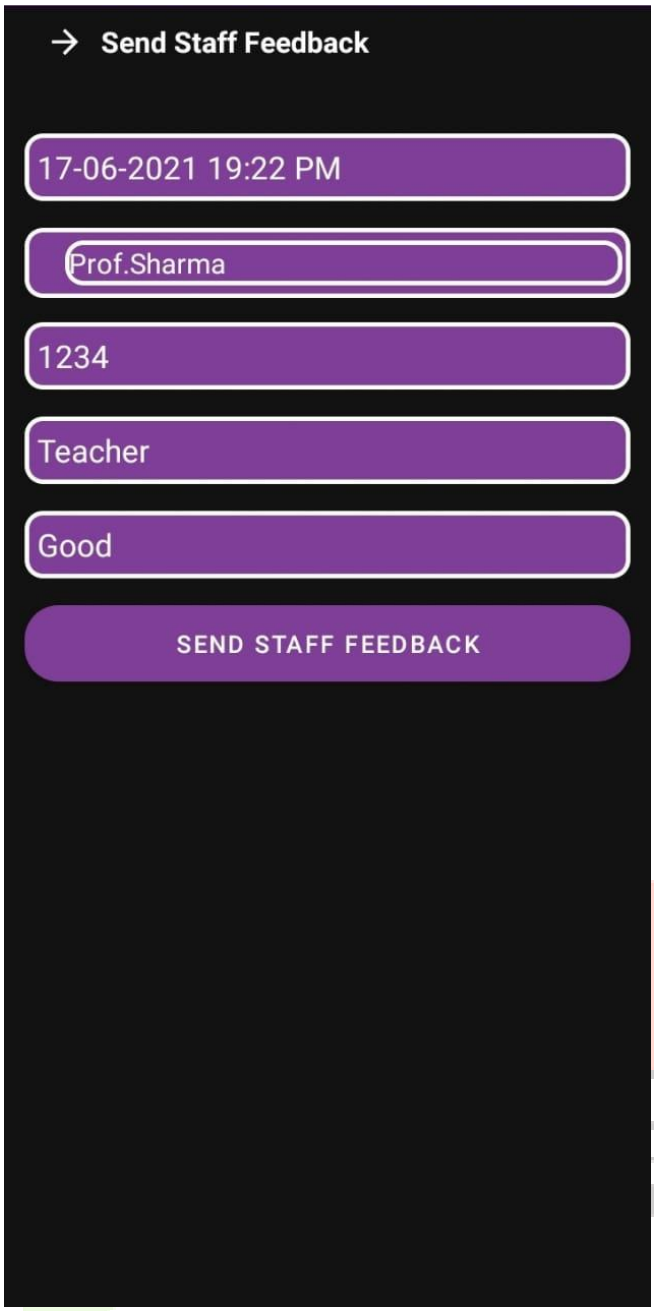
Fig.3. Final outcome screen

Screen Shot :-

- Mobile login screen :-



- Mobile send feedback screen :-



IV. CONCLUSIONS

In this project, we are developed novel sentiment analysis of feedbacks approach improving teaching and learning experience of teachers and students. The basic idea of the project was to apply machine learning and natural language processing and get correct sentiments behind a feedback like negative sentiment, positive sentiment or a neutral sentiment. Thus we conclude that our application will help bridge the understanding and coordination gap between teachers and students.

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