

# A Methodological Framework to Identify the Students' Opinion using Aspect based Sentiment Analysis

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**Abstract**— Now-a-days, students write feedback of the courses in every semester and discuss with their friends in chat rooms, mails and social media sites. This type of discussions on social media which is called as opinions, may be in the form of feedback, remarks, reviews, comments, clarifications, observations and explanations irrespective of their course. It is evident that these opinions may help the teaching community to identify students' feelings and attitudes towards teaching-learning. The feedback taken during the course will help to address the issues of teaching-learning rather than taking at the end of every semester or a course. So, the opinions collected from the social sites, need to be analyzed using any of the sentiment analysis techniques for better understanding of the students. Analyzing such information improves monitoring of students' performance and their learning outcome. To implement this ideology, the researchers propose a methodological framework for extracting the insights from students' opinion, that is posted on social media websites.

**Keywords**— *Students' Opinion; Aspect Based Sentiment Analysis; Methodological Framework; Teaching-Learning; Social Media Sites.*

## I. INTRODUCTION

The significant advancement of the last two decades is the swift growth of information technology in many areas such as education, economy, health, agriculture, social life and entertainment. Today, Internet is one of the vital learning environment that delivers a new and rich style of learning. The technological penetration lives in both formal and informal education. It has twisted a need to study the numerous characteristics of this new way of learning and exploring with different learners' needs. Today, everybody is interested in knowing others' opinions, feelings. The opinion of the other people may be positive, negative or neutral. Students normally inhibited to express their opinions to the teachers directly regarding teaching methods and their level of understanding during class hours. They feel free to share their observations and views in social media sites such as Twitter, YouTube, Facebook, Forums or blogs etc., on any subjects or teachers with their friends. So, we can easily collect fair comments and feedback from social media sites. But, accumulation and examining of this kind of social media data is a challenging task.

## II. ANALYTICS IN EDUCATION

Today's society is driven by data, as evidenced by the popular use of the term Analytics. Education Analytics will help academicians to improve teaching and learning, cut costs and improve efficiencies by enhancing student achievement. Enhancing teaching and learning through educational data analytics is a value-added assessment and helpful to a teacher to improve her / his students' academic gains. The processes of data assessment and analysis will enable the academia to measure, improve and compare the performance of individuals, departments and institutions. This Academic analytics will help to predict students' academic performance, and advisors to customize learning paths. These mining data will support in teaching and learning customization, tutoring, or intervention within the learning environment. The proposed study uses the data and models to predict student progress and performance, and the ability to act on that information. This analysis is associated with student learning to observe and understand learning behaviors in order to enable appropriate intervention.

## III. SENTIMENT ANALYSIS

In this scenario, Sentiment Analysis (SA) or Opinion Mining (OM) is the computational study of opinions, emotions and sentiments that are shared by others in social networks [11]. Social networking sites, Online Reviews and Open Forums generate large amount of data that are shared by all who have the same idea or view. Today, education system has to be tuned to know the opinion/attitude/emotion of students to identify their mind-set towards the teaching-learning process adopted by the teachers. Therefore, the proposed conceptual data analytic framework aims to position Big Data Analytics within the academic domain. This determines the polarity of the students' opinion. The polarity measurement will be performed in three levels namely, Document Level (DL), Sentence Level (SL) or Entity Level (EL)/Aspect Level (AL) [13]. An Entity/Aspect Level provides a better result to analyze the comments, views and feedback that are posted in the social networking sites with DL and SL. Analytical tools like Hadoop, Map Reduce, Pig, Hive and machine learning algorithm such as Naïve Bayes, Support Vector Machines, Maximum Entropy and Lexicon Based approaches are used to determine the polarity [12].

#### IV. REVIEW OF LITERATURE

Nabeela Altrabsheh et al. [1] introduced an architecture for Sentiment Analysis in Education (SA-E). Different methods were used to collect the feedback which helped to identify the student's attitudes/opinions towards the teachers. They compared with previous feedback systems which provided the limited amount of text as feedback such as clickers, SMS and Mobile Phones.

Miaomiao Wen et al. [2] proposed a methodology to find out the student drop-outs in Massive Open Online Course (MOOCs). The students' opinions were collected from open forums, blogs and posts in the social networks in a particular week. Through this, they extracted the positive and negative feedbacks about a topic/ course. With these, the MOOCs were helpful improve the lectures, lecturers, courses and its tools. This was done at course level and user-level.

Pallavi K. Pagare [3] developed a workflow for both qualitative inquiry and large-scale data mining. It focused on engineering students' Twitter posts to know the problems and difficulties in learning such as heavy learning load, lack of social meeting and sleep deficiency in educational practices. This study presented an insight on student's incident by applying multi-label classification and decision tree algorithm. To get accurate result, this was compared with other generic algorithms.

N. D. Valakunde et al. [4] presented a concept paper on multi-aspect and multi-class document classification for various levels of SA. They have verified faculty performance on aspect based sentiment scores, like, knowledge, presentation, communication and regularity. These aspects were taken from the NAAC accreditation criteria. They have experimented with the dataset of students' feedback foreign years, which were not about the particular students or subject and not in real situation.

M Ravichandran et al. [5] developed the Twitter Sentiment Mining (TSM) framework based on e-learner's emotional state, in order to find the frequently interacting learners in e-learning environment. E-learning propagates the knowledge with the help of computers in a web based classroom environment. It is too hard to identify the learner's emotional state in the online courses. Using Naïve Bayesian approach, the model has been constructed for the training data of e-learners. This was compared with the standard classification algorithms too.

Sheetal R. Patodiya et al. [6] proposed a multi-label Naïve Bayes algorithm to classify the various aspects by analyzing the students' opinion from social media. This has multiple languages and images to improve the probability of sentences of other aspects. These aspects confer the positive way of taking education and the benefits of education.

Geetika et al. [7] proposed a technique of machine learning with semantic analysis for classifying the sentences on product reviews of twitter data. They proposed a framework and experimented it. This increased the result from 88.2% to 89.9% with the improved Naïve bayes and semantic analysis WordNet.

Nabeela Altrabsheh et al. [8] considered learning capabilities of machine learning algorithms such as Naïve Bayes, Complement Naïve Bayes, Maximum Entropy and Support Vector Machines. This was used to experiment the students' textual feedback in a unigram feature selection method. The tests were about the learning performance of the four models and 10-fold cross-validation. The SVM (Support Vector Machine) produced highest accuracy as compared with other models.

P. Bharathisindhu et al. [9] proposed a system that determined the sentiment of the E-courses through e-learning portals. With an automated sentiment analysis, all the sentiments were classified using Bayes rule. The sentiments classified to identify frequently accessed pages, current trends and remove the untapped pages to enhance the E-courses. It mainly helped the developers to modify the courses accordingly.

Zied Kechaou et al. [10] proposed and applied the combined HMM (Hidden Markov Model) and SVM to classify the users' opinion to extract the useful information from the users' feedback which is posted in the social networks. They applied only 20% of the data as testing data and the remaining as training data. They did not discuss pre-processing to remove the noisy text.

#### V. OBJECTIVES

After reviewing all the above literature, this research work is framed to identify the student's mind-set towards the teachers and their teaching. Using this system, the analysts can recommend modifications in course content and methodology of teaching.

#### VI. METHODOLOGY

Methodological way of presenting this framework will give a clear view. Sentiment Analysis is helpful in extracting knowledge from this unstructured students' feedback for the improvement of teaching and learning process. It makes it easy to know the opinions of the learners through an automated system. The aim of this framework is to identify the student's mind-set towards the teachers and their teaching. By this system, the analyst can be used,

- ❖ To know the students' views, feelings, comments, mind-setup towards their course and subject.
- ❖ To evaluate the teachers' performance and teaching.
- ❖ To extract and classify the aspects based on the subject.
- ❖ To measure the polarity of each aspect based on the subject.



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