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Faculty Evaluation System

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Abstract

An automatic system to analyze the textual feedbacks of faculty members teaching in any institute is proposed. The proposed system extracts all the important aspects from the feedbacks and then sentiment score of each aspect for each faculty is calculated using machine learning algorithms. The proposed system is flexible and versatile than the existing feedback evaluation system of teachers where students evaluate the teachers on predefined aspects decided by experienced and senior faculty and administrators. Our system, Faculty Evaluation System (FES) identifies strengths and weaknesses of teachers on all those aspects which are important to students. This information may also be used by higher authorities of the institute to form appropriate teams of faculty members for different academic and administrative activities of the institute.

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1. Introduction

Taking feedback of teachers from students in schools or colleges is an important activity of any educational institute. Traditionally teachers' feedback evaluation system is a questionnaire based system where a pre-designed questionnaire form is given to each student. The form may have 10 or more questions and students assign a grade to each question for every teacher according to the predefined measuring scale. On the basis of responses of all students, it is determined how much a teacher is able to contribute in his/her course. The main problem of questionnaire based system is that higher authorities identify the key points of a teacher and form question set on the

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basis of their personal experiences without taking into account students' view. Due to this, traditional questionnaire based system becomes very restricted as students can give their views for only those questions which are mentioned in the questionnaire.

A teacher despite having a good command over the subject may have some vital social merits/demerits which may affect the thinking of students either in a positive way or in a negative way. Every teacher has its own way of delivering lectures and students can easily identify the qualities/features of any teacher. For instance, the way a teacher introduces a new topic, his/her gesture in the class, writing skills, the method of answering questions, the knowledge of subject, etc may be more important to a student than the actual contents covered by the teacher to complete the course. Therefore, instead of taking pre-defined aspects, it will be more meaningful to extract the relevant features of a teacher from students' feedback.

To measure the effectiveness of a teacher to the satisfaction of every student, we are proposing an aspect based sentiment evaluation system. In the proposed system, we collect student feedback in the form of running text. Using linguistic features and machine learning techniques, in the first phase, important aspects of teachers are identified from the collected feedbacks and then for those aspects, the students' views are processed to find out the sentiments of students as either "good", "satisfactory" or "unsatisfactory" about every teacher for all the important aspects extracted from the data itself. This evaluation model overcomes the problems of traditional feedback system and it also allows the administration to make use of the information about each teacher on a variety of aspects for assigning important responsibilities to them. During the aspect identification process, the system chooses the vital aspects by grading each aspect on the basis of feedback of students. Aspect detection and evaluation of each aspect for every faculty allows an institute to use this information for effective utilization of its people leading to better growth. We divide our research paper in eight sections. Related works are discussed in section 2. Architecture of proposed system is given in section 3. Process of feature extraction is discussed in section 4. Feature sentiment evaluation is explained in section 5. Sentiment aggregation and report generation are discussed in section 6 and 7. Conclusion and future work are in section 8.

2. Related Work

Hu and Liu [1] proposed a method to perform aspect based sentiment analysis of products reviews. In this paper, authors assume that the product aspects are nouns and noun phrases. Nouns and noun phrases are extracted using association rule mining algorithm of data mining. Each sentence of review is considered as a transaction. This method is quite simple and has been used by many researchers with some modifications.

Popescu and Etzioni [2] used point wise mutual information gain (PMI) to check whether a noun or a noun phrase is a valid aspect or not. Authors computed PMI between candidate aspects and meronymy discriminators of product. Meronymy discriminators of product "camera" are 'of camera', 'camera has', 'camera comes with'. PMI (w_1 , w_2) is the ratio of joint concurrences of word ' w_1 ' and word ' w_2 ' with respect to the individual occurrences of word ' w_1 ' and ' w_2 '. Only those candidate aspects are considered valid aspects whose PMI score is greater than threshold value. Threshold value is determined experimentally.

Qiu et al. [3] proposed a double propagation algorithm to extract new aspects and sentiment expressions on the basis of syntactic structures of aspects and sentiment expressions. They use the bootstrapping technique where they start with some seed sentiment words and on the basis of known seed words new aspect are identified and vice versa.

Jin and Ho [4] consider aspect based sentiment analysis as a sequence labelling problem. Authors manually tag each word of reviews with appropriate labels and impose lexicalized Hidden Markov Model and from the tagged sentences, system learns patterns to identify aspects and sentiment expressions.

Jakob and Gurevych [5] extend the approach suggested by Jin and Ho [4] using Conditional Random Fields algorithm (CRF). CRF is learned in one domain and used to extract in other domain.

Mei et al.[6], proposed a topic model based approach which consists of an aspect model to determine aspects of the products and then positive and negative sentiment model determines the polarity of extracted aspects.

A. Kumar and R. Jain [7], proposed a system architecture to perform sentiment based analysis of teachers' feedback given by the students in textual form. Authors ignored objective sentences and identified the essential aspects of teacher by using conditional maximum entropy based approach with mutual information and TF-IDF of respective words in subjective sentences. Sentiment score is assigned to all identified aspects on the basis of point wise mutual information gain between identified aspects and sentiment words.

Ding, Liu and Yu [8], proposed a sentiment lexicon based method to determine sentiment polarity of aspects in sentences. Score +1 and -1 is assigned to all sentiment word belonging to positive and negative lexicons

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