

Analysis of Student Feedback on Faculty Teaching Using Sentiment Analysis and NLP Techniques

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Abstract - In education system, student's feedback is very important to live the teaching traditional. Students feedback area unit usually analyzed victimization lexicon primarily based approach to spot the scholars positive or negative angle. The foremost objective of this analysis is to analysis the student's feedback and acquire the opinion. In most of the prevailing teaching analysis system, the qualifier words and blind negation words aren't thought of. The extent of opinion result isn't displayed-whether positive or negative opinion. To traumatize this downside, we've got a bent to propose to analysis the scholars text feedback automatically victimization lexicon-based approach to predict the extent of teaching performance. To extend the accuracy of the sentiment price, the comments undergone polarity identification, negation tagging, and intensity multiplication, taking into thought the terms close a given word.

Key Words: Sentiment analysis, lexicon based, dictionary based, corpus based, qualitative information, quantitative information.

I. INTRODUCTION

Sentiment analysis is additionally a way for tracing the ambiance of the people concerning any specific topic by reviews. Generally, opinion is additionally the results of people's personal feelings, beliefs, opinions, sentiments and desires etc. This analysis work concentrates on student's comments and Analysing student's comments pattern sentiment analysis approaches and will classify the scholars positive or negative feeling. Student's feedback can highlight varied issues that students might have with a lecture. Typically, students don't understand what the lecturer is creating a shot to elucidate, therefore by providing feedback, student's candidate this to the lecturer. The Input we've got a bent to require is qualitative info instead of quantitative info. The method of qualitative info analysis is awfully necessary and it'll enhance the teacher analysis effectiveness.

The taking of feedback plays a awfully vital role within the lifetime of students additionally because the academics. The scholars offer the feedback therefore to convey what's the distinction between the particular teaching that is presently going down in schools and what variety of teaching students very want for. These feedbacks show the school their overall performance in their specific subjects. They'll improve their teaching consequently then school analysis is that the method of gathering and process knowledge to live the effectiveness of teaching. There square measure totally different areas to be thought of for evaluating a college like

teaching, advising and analysis and critical activities. The foremost necessary advantage of this analysis is that the feedback the forms offer on to instructors, so they'll refine the courses and teaching practices to produce students with higher learning experiences.

This analysis shows the utilization of sentiment analysis to gauge the student's narrative comment within the analysis of their various school. The remainder of the paper is organized as follows: Section 2 presents a review of literature; planned methodology is conferred in Section 3; Section 4 describes the development of sentiment word information for teaching analysis. Section 5 presents the design of our planned system. Section 6 presents the case study and results of the teaching evaluation; and therefore, the final chapter presents the conclusion.

II. RELATED WORKS

The following are the variety of the work's on Student feedback using sentiment Analysis.

- Tanvi Hardeniya and Dilipkumar A.Borikar[8] in 2016 self-addressed the Dictionary- Based strategy to Sentiment analysis. They reviewed on sentiment analysis is completed and so the challenges and problems concerned inside the method are mentioned. The approaches to sentiment analysis mistreatment dictionaries like SenticNet, SentiFul, SentiWordNet, and WordNet are studied. Lexicon-based approaches are economical over a website of study. Though a generalized lexicon like WordNet might even be used, the accuracy of the classifier gets affected due to problems like negation, synonyms, sarcasm, etc. This has provided impetus to substantial growth of online buying creating opinion analysis a very important issue for business development.

- Another Approach was developed by Bhagyashree Gore supported Lexicon based mostly Sentiment Analysis of Parent Feedback to gauge their Satisfaction Level [10] in 2018. They used lexicon based mostly approach and computing of polarity values. Throughout this approach they produce a lexicon of words with opinion score assigned to that.

- R Mehana from Dr.Mahalingam school of Engineering and Technology Pollachi, Tamlinadu, India[6] developed Student feedback mining system adopting sentiment analysis in 2017. They projected a system to mine the feedback given by the students and acquire information from that and gift that info in qualitative method. They have known the frequency of each word and extract the topic that has the perfect

frequency count. Similar comments in every topic are clustered then the clustered words are classified into positive or negative comments.

- S. MacKim and R. A. Calvo projected Sentiment analysis in student experiences of learning [7] in 2016. they Classify the text supported the presence of unambiguous have an effect on words. In their approach, a bit set of opinion words is collected manually as a seed. They have a sentiment lexicon contains a listing of words aboard their individual polarity. Many like corpora are developed and that they created freely out there.

- Other interesting approach of Sentiment Analysis was presented in the work of M. A. Ullah [5] wherein they extract sentiments with polarities of positive and negative for specific subjects from a document, instead of classifying if the document is positive or negative. In this paper, they applied semantic analysis with a syntactic parser and semantic lexicon which gave them a high precision of 75% to 95% in finding the sentiments within web pages and news articles.

III. METHODS IN SENTIMENT ANALYSIS

There are two main approaches for lexicon based in Sentiment analysis:

A. Corpus based Approach

Using the corpus-based approach alone to identify all opinion words, however, it is not as effective as a result of the results of the lexicon-Based approach as a result of it's arduous to rearrange an outsized corpus to cover all English words. However, it's going to facilitate to hunt out domain and context specific opinion words using an online website corpus that is that the big advantage of this methodology. The corpus-based approach is performed in arithmetic approach or linguistics approach.

B. Dictionary based Approach

One amongst the simple techniques throughout this approach is supported bootstrapping pattern slightly set of seed opinion words and a web reference, e.g., WordNet. The strategy is to initial collect slightly set of opinion words manually with celebrated orientations then to grow this set by making an attempt inside the WordNet for his or her synonyms and antonyms. The modern found words unit of activity supplementary to the seed list. ulterior iteration starts. The repetitious technique stops once no additional new words unit of activity found. Once the manoeuvre completes, manual examination unit of activity usually administered to urge obviate and/or correct errors.

During this approach, opinion words unit of activity divided in an exceedingly combine of classes. Positive opinion words unit of activity accustomed categorical some necessary things, and negative opinion words unit of activity accustomed describe surplus things. the method started with the pre-processing of the input texts were the comments for

the school, that were composed of 1 or several sentences connected to a precise person, specifically a academic. For this project, the comments were assumed to be correct in terms of writing system and synchronic linguistics.

IV. SENTIMENT WORD DATABASE CONSTRUCTION

Throughout this paper we have a tendency to learned transient description regarding the strategies that we have a tendency to adopted to extract the key words from the student's feedback document. They are:

1. Tokenization

Tokenization is that the act of ending a sequence of strings into things like words, keywords, phrases, symbols and totally different elements named as tokens. Tokens will be individual words, phrases or perhaps whole sentences. Within the strategy of tokenization, some characters like punctuation marks square measure discarded.

2. Stop word removal

Stop words square measure words that square measure filtered out before or once method of tongue info. These words square measure removed to extract only the pregnant information. The list of stop words may even be ' the, is, at, which, on, who, where, how, hi, before, when' etc.

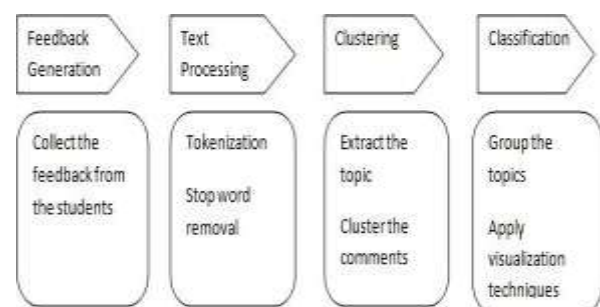


Fig 4.1: Diagram of proposed System

We projected a system to mine the feedback given by the scholars and procure data from that and gift that info in qualitative approach. Feedback was collected for a course; those feedback were pre-processed victimization text process techniques. In preprocessing, the feedback files square measure generated as a file. The file is tokenized into sentences and also the keywords square measure listed when removing the stop words. we've known the frequency of every word and extract the subject that has the best frequency count. Similar comments in every topic square measure clustered then the clustered words square measure classified into positive or negative comments. The classified comments square measure generated as a chart for straightforward visualization. This method of planned system started with the pre-processing of the input texts were the comments for the school, that were composed of 1 or several sentences connected to a precise person, specifically a academic. For this project, the comments were assumed to be correct in terms of writing system and synchronic linguistics.

3. Classification of information

Classification is that the strategy of organizing info into categories for its best and economical use. A well-planned info arrangement makes essential info straightforward to hunt out and retrieve. This will be of specific importance for risk management, legal discovery, and compliance.

Faculty matter Comments exploitation Lexicon based Approach throughout this paper we've got a bent to learned concerning varied lexicons that unit won't to urge the opinion of student analysis. The lexicon- based approach depends on opinion (or sentiment) words, that unit words that express positive or negative sentiments. Choosing the sentiment lexicon to just accept is extraordinarily necessary. The following section describes some common sentiment lexicon.

Liu Lexicon: Liu lexicon consist to facet of around 6800 English words classified into positive and negative opinion teams. Liuet al used the adjective word and opposite set sin WordNet to predict linguistics orientation of adjectives. Firstly, as mallist of seed adjective staged with either positive or negative labels is seventeen manually created. This seed adjective list is actually domain freelance. As an example, great, fantastic, smart square measure positive adjectives; and unhealthy, boring square measure negative adjectives. The list is then enlarged exploitation Word web, leading to an inventory of 4783 negative terms and 2006 positive terms as well as misspellings, morphological variants, slang, and social-media mark-up that square measure helpful for social network information analysis. But Liu lexicon cannot cowl all of planet issues in terms of sentiment analysis for education a domain.

Afinn Lexicon: Afinn lexicon was initially came across in 2009 for tweets downloaded for online sentiment analysis in connectedness the United Nation Climate Conference (COP15). The previous version termed AFINN-96 distributed on the online has 1468 whole completely different words, likewise as several phrases. The foremost recent version, AFINN-111 contains 2477 distinctive words and fifteen phrases. AFINN uses a rating vary from -5 (very negative) to +5 (very positive). For straightforward labeling the author only scored for valence, leaving out, e.g., judgement /objectivity, arousa land dominance. The words were scored manually by the author. The synonym finder in Afinn lexicon initiated from a set of obscene words. Most of the positive words were tagged with +2 and most of the negative words with -2, strong obscene words with either four or -5.

Sentiment word information contains immense quantity of words. It consists many intensive words, positive words, negative words and conjointly neutral words. The sentiment score ranges from -1 to +1. Once the score is one then it may be thought of as positive; whereas once score shows -1, it is aforesaid to be negative word. Once the sentiment score equals to zero (0), it's thought of as neutral class. Some example words are shown in below Table 4.1.1.

Example Opinion Words		
Opinion word	Score	Description
care	+2	verb
useful	+2	adjective
helpful	+2	adjective
clear	+2	adjective, verb
good	+2	adjective, verb
joyful	+1	adjective
marvellous	+3	adjective
brilliant	+3	adjective
ordinary	0	adjective
complex	-3	adjective
confuse	-3	verb
normal	0	adjective
complicated	-3	adjective
sleepy	-2	adjective
fast	-1	adjective
daily	0	adjective
most	+100%	Intensifier
slightly	-50%	Intensifier
really	+25%	Intensifier
little	-50%	Intensifier
very	+50%	Intensifier
easily	+25%	Intensifier

Table 4.11: Sample words in sentiment word database.

Using the sentiment word database, the sentences are processed as below:

1. Text extraction:

The comments, that consists of few sentences unit of measuring go alternative routes into clause supported clause level mark. The clause level punctuation is any word from regular expression $^[\.,:;!?\$]$.

2. Text cleaning:

This is to urge eliminate special characters and switch the majuscule letters into minuscule ones. The is employed to urge eliminate special characters and alter majuscule into minuscule letters.

3. Stemming:

Stemming might even be a heuristic technique for collapsing distinct word forms by making an attempt to urge eliminate affixes. Noun square measure in either singular or descriptor exploitation either -es or -s suffix. Similarly, verb square measure in either gift or verb kind exploitation -ing and -ed severally. Adjectives square measure in comparative kind exploitation -er suffix or superlative kind exploitation -est suffix. very cheap kind is then used for wanting up the word in lexicon.

4. Negation Marking:

Negators unit of measuring words and phrases that switch sentiment orientation of different words at intervals constant sentence. The negation marking technique of defender Potts is applied. This methodology appends a _NEG suffix to each word standing between a negator and a clause-level mark.

For example, given the text “It isn't delicious: it's TOO spicy!!!”. The content once applying the pre- process technique is “it isn't delicious _NEG it's too spicy”.

5. Parts of speech:

POS Tagger is employed to assign a part of speech to every word at intervals the text (and completely different tokens), like noun, verb, adjective, etc.

V. SYSTEM ARCHITECTURE

In this paper, we have a tendency to followed the below design System to research topics and their sentiments from the coed generated feedback. We have a tendency to tokenized the feedbacks into sentences. Topics were extracted from the feedback document. The subsequent design shows however the comments are extracted and got scored.

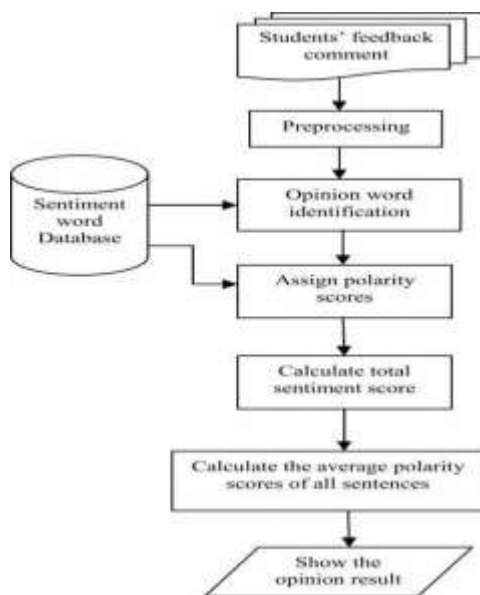


Fig. 5.1: The Architecture model of sentiment analysis

The first a part of the pre-processing module is that the sentence splitter. It's the method wherever the comment was broken down into smaller components, specifically in sentence level below the method. Afterwards, these sentences dampened from the sentence splitter were additional dampened into words

Then the words are labelled in their individual a part of speech. Within the opinion word identification. The words

that unit used for opinion analysing unit categorizes into following:

Negation words:

The negation words unit the words that reverse the polarity of sentiment, high-power sensible (+2) into not sensible (-2). (e.g. no, not, neither, nor, nothing, never, none) unit very important in characteristic the emotions, as their presence can reverse the polarity of the sentence.

Blind negation words:

Words like would love, needed, require, needed etc., are very important in characteristic the emotions. as Associate in Nursing example:

‘Her teaching method needed to be better’, ‘better’ depicts a positive sentiment but the inclusion of the blind negation word ‘needed’ suggests that this Sentence is depicting negative sentiment. Within the projected approach whenever a blind negation word happens in a {very} very sentence its polarity is instantly labelled as negative and allotted the opinion score to (-2).

Adjective, adverb, verb, noun words:

Most of the opinion words unit adjective. as an example: ‘She is knowledgeable. Her discussions unit fascinating. I understand her teaching’. throughout this sentence ‘knowledgeable’ and ‘interesting’ unit positive adjective opinion words, ‘understand’ can be a positive verb opinion.

Intensifier words:

They're classified into two major categories, depending on their polarity. Amplifiers (e.g., very) increase the linguistics intensity of an in-depth lexical item, whereas down toners (e.g., slightly) decrease it. For example, “Her clarification is de facto very good”. Throughout this sentence ‘really and very’ unit intensifiers that increase the positive sentiment polarity.

Next, the polarity of the words in every sentence were summed up, and divided by the overall range of subjective words. Then, it had been classified as powerfully Positive, Positive, Negative or powerfully Negative. Then, the polarities of all the sentences were averaged. When the averaging, the ultimate output was classified supported 3 classifications: Positive, Neutral or Negative.

During this paper, we have a tendency to use Text Blob that could be a python library and offers an easy API to access its strategies and perform basic information processing tasks. Since, it's engineered on the shoulders of NLTK and Pattern, thus creating it easy by providing Associate in Nursing intuitive interface to NLTK. Here, the sentiment property returns a named section of the shape Sentiment (polarity, subjectivity) it very depends on what type of text analysis we wish to perform and what information feels like. Text Blob is less complicated to use if we're simply obtaining started

with information processing primarily because of 2 reasons - it's an honest interface and a superb documentation.

In this way, the opinion result will be showed.

VI. CASE STUDY AND RESULTS

In this system, there are basically three different modules which are as following:

- ØAdmin Module
- ØStudent Module
- ØFaculty Module

Firstly, there's admin module which has admin login portal. The username and password of admin is initially fixed. After login, Admin views the students as well as faculty accounts and can modify their details. The whole data is stored in the database. The admin also adds the students and faculty details in the database. The admin also can delete the student's as well as the faculty data. The admin can view all the feedbacks results present in the database. The identity of the student who gave the feedback is given by the admin. Then there's student module that has student login portal. Every and each valid student has their distinctive username and password that is given by admin. The username and password once entered are checked with data in database. When login, the coed will read the subject's feedback that he/she needs to submit. Then in the feedback form, the name of the faculty automatically comes who teaches that particular subject. Within the feedback form, there are multiple fields that student should show his opinion. The fields are Vocabulary and visual communication, Audibility, clarification, Subject Command etc., when the submission of feedback the answers of all the queries are analyzed and also the result's hold on in information.

ESM	VBL	DCI	ISC
Everything is good	Voice is so fast	Friendly interaction	Intime syllabus was completed
Good	Bad	Bad	Good
I am not satisfied with the explanation	good	Doubts are clarified even outside the classroom	All topics covered in time
Good	Very good	Very good	Very good
Good	Good	Good	Good
Good	Good	Good	Good

Table 6.1.1: Student Feedback table

Where

ESM: - Explanation and subject Command VBL: -Voice and visual communication DCI: -Doubt clearance and Interaction

If the coed has already given the feedback of that specific teacher, then he/she can't provide the feedback once more. Then eventually there's faculty module that has teacher login portal. Every and each school has their distinctive username and password that is given by the admin. The username and password once entered are checked with data in database. The faculty will read their overall performance in keeping with the student's feedback. And student's identity isn't unconcealed to the faculty.

There will be a graphical illustration of student's feedback in order that faculty will clearly perceive his/her strengths. Next, the polarity of the words in each sentence were calculated. The polarity scores are assigned as given below: If there's only 1 opinion word in an exceedingly sentence, the corresponding positive scores or negative scores area unit allotted mistreatment **Ws=Os**

If one modifier word and one opinion word area unit found along,

$$Ws = (100\% + Sinf) * Os$$

If 2 modifier words and one opinion word area unit found in an exceedingly sentence **Ws=(100%+Sinf) * (100%+Sinf) * Os**

If a negation word ahead of the opinion word is found in an exceedingly sentence **Ws=Ws*(-1)**.

Where

'Ws' is that the linguistics orientation score of mixing words.

'Sinf' is that the qualifier worth of word supported 100 percent.

'Os' is that the score of opinion word from sentiment word info.

Student Feedback Table:

Let us consider there are 6 students. They have to give feedback to one of their faculty.

Following table represents the feedback form for one faculty(say):

Subject: OST lab

Faculty: S.Joshua Johnson Class&Section:3&C Academic year:2018-2019

ISC: Intime Syllabus Coverage

Graphical Representation of student feedback on faculty teaching:



Fig. 6.1: Feedback result of Faculty in Graphical Notation

VII. CONCLUSION AND FUTURE SCOPE

This project is designed in order to reduce burden of maintaining bulk of records of all student's feedback details. This system uses preprocessing, topic extraction, clustering, classification to represent the student views in a graphical way. This system will be useful to improve the students learning and instructor's methods of delivery. The Opinion Mining and in language process community, Sentiment Analysis become a most fascinating analysis space. A lot of innovative and effective techniques required to be fancied that ought to overcome these challenges faced by Sentiment Analysis.

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