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Mining the Sentiments of Online Learner on Perceived Learning in Higher Education

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Abstract

Online learning platform provides asynchronous communication through extensive discussion forums. The learner is connecting & communicating, engrossed in discussions with peers and instructors through discussion platform, to deliberate on the structure, pedagogy and plausible learning through the online course as well as the learning environment including the instructor. A huge amount of text and graphical data is generated through this communication. Each learner is exposed to have his sentiments or opinion, emotions or attitude towards a specific course and its instructor more in the form of incomplete and short sentences, jargons, images, emoticons in comparison to the structured feedback in a formal learning setup. Though it makes the analysis of sentiments more difficult yet more realistic and without any limited formal process to evaluate the perceived learning. The present study seeks to explore the sentiments of online learners on their perceived learning using a Natural Language Processing (NLP) with lexicon-based approach of data mining. This will support online education providers to make online learning ecosystem more technically, pedagogically and socially sustainable.

Keywords: Online learning, sentiment analysis, natural language processing, online learning platform.

1. Introduction

In the current world of education the traditional classroom learning is moving more towards online learning. Online education ecosystem and global reach has shorten the distance between learners and different cultures with their explicit motivation of learning (academic, professional, personal). Higher educational institutions are providing the online learning facility to the learners for some of the courses which are aligned with their curriculum. The educational institutions are now willing to explore different learning method for learners vis-a-vis blended learning, flipped class learning and e-learning through varied learning platforms like Learning Management System (Moodle), Massive open online course portal (Coursera, Udacity, edx, Udemy,Swayam ,NPTEL), social media (Facebook, Twitter). With extensive learning modes, the learning process extends from offering a course to the evaluation of the performance of the learners including the effectiveness of the offered course through feedback/ open discussion forums.

During the process of learning through online sources a huge amount data about a learner /course /instructor/learning, is produced. The collection, analysis, measurement of online educational data to improve the education is described in terms of learning analytics. In the available research, learning analytics is considered as a study to analyze the learning & cognitive behaviour of learner, improvement in learning, student satisfaction for perceived learning, level and quality of teaching pedagogy of instructor and for the enhancement of curriculum. The learners have their sentiments or opinion, emotions or attitude towards a specific course and/or instructor. These sentiments need to be analyzed to conclude the effectiveness of online learning technically known as sentiment analysis.

Sentiment analysis, also known as opinion mining, is one of the fastest growing research areas since 2004. The use of sentiment analysis has flourished in various areas like review of customers on products, prediction of financial markets, reactions to political activities, public opinion etc. Further, sentiment analysis and natural language processing has also addressed the needs of the online learners. In higher

education, understanding the positive and negative sentiments of online learners can help instructors understand the students better, enhance the course structure, improve the teaching pedagogy.

To a greater extent, the global online forums do not facilitate the structured data. The sentiments shared are more in the form of incomplete & short sentences, jargon, images, emoticons etc. Though this makes the analysis more difficult, yet more realistic without any formal process to evaluate the perceived learning. The present study seeks to explore the unstructured data in terms of sentiments of online learners on their perceived learning.

2. Literature Review

The interest on other's opinion/sentiments is probably the most important and effective way to deliberate on the existing problems and finding the solution to those problems. There has been extensive increase in the analysis of the sentiments during the recent years and since 2004 sentiment analysis has become one of the fastest growing research areas in the field of politics, finance, markets, entertainment etc. The research area of sentiment analysis has outsized to an extent that the researcher finds it difficult to deal with information overload.

Sentiment analysis are one of the application of Natural Language processing in which analysis of text, emoticons and slangs etc can be processed. There are different levels of analysis are document level, sentence level and aspect level. In document level overall sentiment of the review is given .Sentence level analysis gives the emotion level of every sentiments and the aspect level analysis give the sentiment of word level analysis it is also called feature based analysis .Technically, different techniques of sentiment analysis include Lexicon-based approach , Machine Learning techniques, Cross-domain classification and Cross- language classification(Dolianti,2018). These techniques are further categorize into supervised, unsupervised learning techniques and semi supervised techniques (B.Liu, 2009) .Unsupervised learning approach in which labeled data is not require and in Supervised learning approach data is already labeled .Topic modeling technique which is comes under the unsupervised learning . The major topic modeling technique is LDA. Which is apply on unlabeled data. The mood of the learner is to be detected using LDA (Latent Dirichlet Allocation) approach, the effectual and suitable results are drawn(Fabio Clarizia,2018).

The available literature, from 2011 onwards, reflects on the analysis of structured data more and a little has been done to analyze the unstructured data including the graphics and emoticons. Whereas 21 century learners are more inclined to use graphics and incomplete text to express the sentiments due to ease. The present study will use the text (incomplete words) and graphics to explore and categorize sentiments based on the polarity rules using Lexicon-based approach in data mining. Dictionaries that are accessible are sentiwordnet, LIWC, WorldNet, MPQA etc.

H1: Explore the sentiments of online learners through sentiment analysis.

3. Research Methodology

The dataset of online reviews of learners is collected from coursera which consists of multiple reviews of different enrolled learners. That data is updated till 2019 offered by Coursera. Duration of course is 4 weeks. There are 319 reviews for analysis. The reviews are taken for analysis of sentiments through some basic steps to be followed as Data pre-processing and cleaning; Stemming and Lemmatization; Tokenization; Segmentation of sentiments. Data cleaning and preprocessing is the processes in which punctuation, digits, spaces. Then stopwords are to be removed. Stopwords are the words which does not give impact on Sentiments so it is to be removed. In 'English' dictionary 179 stopwords are there. and some of the stopwords are also appended and then removed like 'would'. After this step stemming or lemmatization is to be done. stemming is the process in which word is converted in to its root word like veryy is converted into very after stemming. In lemmatization the word is converted in to its original word like go, went, gone will give the word 'go'. In this study lemmatization is done .In tokenization the sentences are chopped into words. After that frequency of words is calculated. Now Lexicon based approach is used for the segmentation. For that KDD data of positive and negativewords text file is used (Bing Liu,2005). The sentiments are categorize in to three categories are Positive, Negative and Neutral. And also calculated the frequency of positive words, Negative words, and Neutral

words. Total count of +ve , -ve, Neu is also calculated. Python is used for above all the steps. And the libraries nltk, pandas etc are used.
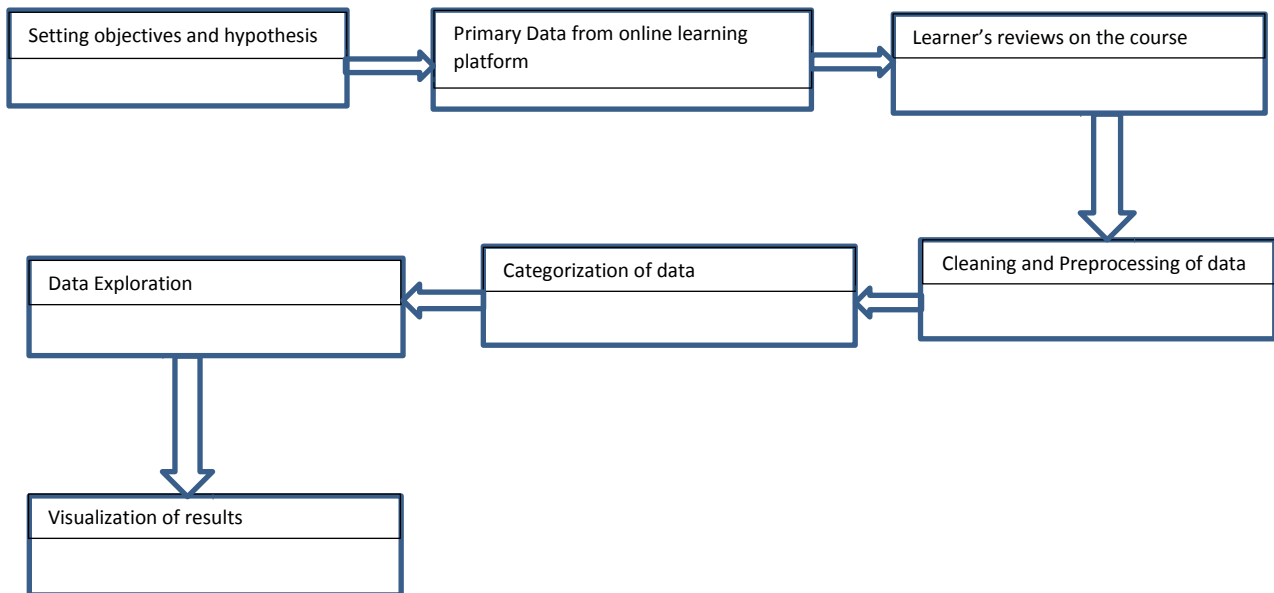

Figure 1: Work Flow

4. Conclusion

In the current world of education, the traditional classroom learning is moving more towards to the online learning. Thus it becomes essential to strengthen and sustain the online platform so that the global learners can garner the maximum benefit of it. The current study will help the academicians to develop an online education framework which gives exhaustive scope to the learners to share their views on learning and work on the reviews recursively to enhance various aspects of online learning through unstructured sentiments, 2. Will help various online platforms to provide the online education services with more variety, consistency and effectiveness to meet the needs of the online learners.

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