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Sentence Compression for Aspect-Based Sentiment Analysis: A Survey

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ABSTRACT: Sentiment Analysis is used to define the attitude of a writer with respect to some topic or the overall appropriate polarity of a document. The objective of our project is to build an communicating portal wherein the relative analysis of various colleges can be visualized. In doing so, instead of the basic truthful information, analysis will be done based on the feedback and reviews developed from various sources. In this approach, document level feeling analysis will be done considering every aspect of the same using the techniques of natural language processing.

I. INTRODUCTION

Sentiment Analyses deliberates on classifying documents according to their opinion and emotions expressed by their authors. Judging a document's orientation as positive or negative is a common two-class problem in feeling analysis, which is also known as sentiment orientation analysis in text classification. [1] Text classification has been found very useful in many areas. With the increase of internet, users are refreshed to leave feedback and comments and based on those, a lot of business trends are coming up. Many approaches have already been implemented for the same. One of the major styles is bag of words and bag of nouns which uses the underlying noun-adjective clustering thus forming proper structures and removing features. (Dim vector approach is also used for text classification.) In our project we have used the bagging and increasing technique to cluster features and the rest of the algorithm lies on that. [2]

II. RESEARCH BACKGROUND

There are two basic procedures to detect feelings from text. They are Symbolic techniques and Machine Learning techniques. The next two sections deal with these techniques.

A. Symbolic Techniques

Much of the research in invalid sentiment classification using symbolic techniques makes use of available lexical resources. Turney used bag-of-words approach for sentiment analysis. In that approach, relationships between the individual words are not considered and a document is represented as a simple collection of words. To determine the overall feeling, feelings of every word is determined and those values are combined with some combination functions. He found the split of a review based on the average semantic orientation of tuples extracted from the review where tuples are phrases having adjectives or adverbs. He found the semantic orientation of tuples using the search engine Altavista. Kamps et al. used the verbal database WordNet to determine the emotional content of a word along different dimensions. They developed a distance metric on WordNet and determined the semantic orientation of adjectives. WordNet database consists of words connected by synonym relations. Baroni et al. developed a system using word space model formalism that overcomes the difficulty in lexical replacement task [1]. It represents the local context of a word along with its overall distribution. Balahur et al. introduced EmotesNet, a conceptual representation of text that stores the structure and the semantics of real events for a specific domain. emotenet used the concept of Limited State Automata to identify the emotional responses started by actions. One of the participants of SemEval 2007 Task No. 14 used coarse grained and fine grained approaches to identify sentiments in news headlines. In course grained approach, they performed binary classification of emotions and in fine grained approach they classified emotions into different levels. Knowledge base approach is found to be difficult due to the requirement of a huge verbal database. Since social network generates huge amount of data every second, sometimes larger than the size of available lexical database, sentiment analysis became boring and erroneous. [3]



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B. Machine Learning Techniques

Machine Learning techniques use a training set and a test set for classification. Training set contains input feature courses and their corresponding class labels. Using this training set, a classification model is developed which tries to classify the input feature courses into corresponding class labels. Then a test set is used to validate the model by calculating the class labels of unseen feature courses. A number of machine learning techniques like Simple Bayes (NB), Maximum Entropy (ME), and Support Vector Machines (SVM) are used to classify reviews. Some of the features that can be used for sentiment classification are Term Presence, Term Frequency, negation, n-grams and Part-of-Speech. These features can be used to find out the semantic orientation of words, phrases, sentences and that of documents. Semantic orientation is the polarity which may be either positive or negative. Domingo's et al. found that Naive Bayes works well for certain problems with highly dependent features. This is surprising as the basic assumption of Naive Bayes is that the features are independent. Zhen Niue et al. introduced a new model in which efficient approaches are used for feature selection, weight computation and classification. The new model is based on Bayesian algorithm. Here weights of the classifier are familiar by making use of representative feature and unique feature. Representative feature is the information that represents a class and Unique feature is the information that helps in unique classes. Using those weights, they calculated the probability of each classification and thus better the Bayesian algorithm. Barbosa et al designed a 2-step automatic sentiment analysis method for classifying tweets. They used a loud training set to reduce the category effort in developing classifiers. Firstly, they classified tweets into subjective and objective tweets. After that, subjective tweets are classified as positive and negative tweets. Celikyilmaz et al. developed accent based word clustering method for normalizing noisy tweets. In intonation based word clustering, words having similar accent are clustered and assigned common tokens. They also used text processing techniques like assigning similar tokens for numbers, html links, user identifiers, and target organization names for normalization. After doing normalization, they used probabilistic models to identify polarity dictionaries. They performed classification using the BoosTester classifier with these polarity dictionaries as features and obtained a reduced error rate. Wu et al. proposed an influence probability model for twitter sentiment analysis. If @username is found in the body of a tweet, it is inducing action and it contributes to influencing probability. Any tweet that begins with @username is a retweet that represents an influenced action and it contributes to influence probability. They observed that there is a strong correlation between these probabilities. Pak et al. created a twitter quantity by automatically collecting tweets using Twitter API and automatically explaining those using emoticons. Using that corpus, they built a sentiment classifier based on the multinomial Naive Bayes classifier that uses N-gram and POS-tags as features. In that method, there is a chance of error since emotions of tweets in training set are labeled solely based on the polarity of emoticons. The training set is also less efficient since it contains only tweets having emoticons. [3]

Xia et al. used an collective framework for sentiment classification. Joint framework is obtained by combining various feature sets and classification techniques. In that work, they used two types of feature sets and three base classifiers to form the ensemble framework. Two types of feature sets are created using Part-of-speech information and Word-relations. Naive Bayes, Maximum Entropy and Support Vector Machines are selected as base classifiers. They applied different ensemble methods like fixed combination, subjective combination and Meta-classifier combination for sentiment classification and obtained better accuracy. Certain attempts are made by some researches to identify the public opinion about movies, news etc. from the twitter posts. V.M. Kiran et al. utilized the information from other freely available databases like IMDB and Blippr after proper modifications to aid twitter sentiment analysis in movie domain.[2]

III.LITERATURE REVIEW

The earlier studies under the field of sentiment analysis were based on document level sentiment analysis [1]. The research aimed at classifying the whole document as positive or negative. The basic theory in this case was that each document expresses opinion on only one entity expressed by only one opinion holder. Sentiment classification can be done using supervised learning techniques and unsupervised learning techniques. Supervised learning techniques include text classification based on a classifier [14]. Supervised learning technique takes into account features like 'terms and their frequency, parts of speech, 'sentiment words and phrases, 'sentiment shifters and so on [6]. Invalid learning techniques make use of fixed syntactic patterns that occur in an opinion. This technique uses POS classification which identifies nouns, adverbs, adjectives etc. in a sentence. Based on knowledge and arrangement of these words we identify the entity, aspect and the opinion [15].



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Another approach under invalid learning technique is maintaining dictionary of feeling words and their weights based on which opinion. This approach also takes into consideration effect of cancellation or sentiment shifters [8]. Later sentence level sentiment analysis and aspect level sentiment analysis also emerged as field of research. In sentence level sentiment analysis we perform analysis at sentence level. Here the basic aim is to identify subjective and objective sentences. A model, native Bayes classifier is used for identifying partiality in sentences [14].

Aspect level sentiment analysis or feature based opinion mining is the core concept behind this paper. Research has been done on aspect level sentiment analysis [5] which aims to identify various product reviews available on the internet and analyzing them. Thus there are 2 basic tasks involved in aspect level sentiment analysis [6] and they are, aspect extraction and aspect sentiment classification. This paper introduces a concept of aspect value which tells how much clear or specific is the opinion that is being given. This is done using the aspect tree. The concept is utilized in an application of LOR system. The sentiments on aspect are analyzed by means of dictionary of sentiment words [7].

IV.CONCLUSION

Sentiment detection has a wide variety of applications in information systems, including classifying reviews, summarizing review and other real time applications. There are likely to be many other applications that is not conversed. It is found that sentiment classifiers are strictly dependent on domains or topics. From the above work it is plain that neither classification model consistently outpaces the other, different types of features have distinct distributions. It is also found that different types of features and classification algorithms are combined in an efficient way in order to overcome their individual drawbacks and benefit from each other's merits, and finally we got the idea of proposed approach implementation setups.

V.FUTURE WORK

In future, more work is needed on further improving the performance measures. Sentiment analysis can be applied for new applications. Although the techniques and algorithms used for sentiment analysis are advancing fast, however, a lot of problems in this field of study remain unsolved. The main challenging aspects exist in use of other languages, dealing with negation expressions; produce a summary of opinions based on product features/attributes, complexity of sentence/ document , handling of implicit product features , etc. More future research could be dedicated to these challenges.

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