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A Survey on Sentiment Analysis using Natural Language Processing

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ABSTRACT: In this paper, we have introduced the concept of sentiment analysis using a web application. The application consists of a database that holds data from various social networking sites and online forums. This is a small scale application which is a part of larger corporate projects. It is based on API integration, Natural Language Processing and is programmed using HTML5, Bootstrap, JQuery, with the help of Spring Tool Suite. The application helps user in efficient decision making by accessing the data present in the database.

KEYWORDS: Natural Language Processing, DAO controller, authentication, API, query

I. INTRODUCTION

Sentiment analysis is used to identify and extract relevant information from the database. The project has a very wide scope and it helps us to assess public opinions. As sentiment analysis is on the rise, our project emphasizes on integrating different APIs which makes our project scalable for future use. Our application has a web portal that is easily understandable by a common user. The application uses a search box for the query to be entered by the user, in response to which, the user receives sentiment analysis of their query. The application uses public APIs to get data which is then stored in the database. The processing is done using sentiment analysis and NLP algorithms and the result is shown on the dashboard.

II. RELATED WORK

The paper [1] contains three algorithms: Naïve Bayes, KMP, Boyer Moore which implements classifiers. These algorithms are lengthy and consume a lot of time.

Analysis of Text Mining Techniques over Public Pages of Facebook is explained in paper [2].

Two text mining approaches which give relation between posts and comments over any two public pages.

Predicting Political Preference of Twitter Users is explain in paper [3].

Problems related to political preferences of twitter users are given in this paper.

Paper [4] contains Twitter Sentiment Classification using Distant Supervision. This paper demonstrates how the data can be retrieved efficiently at user end. Back end processing computes to major lack of throughput.

The paper [5] explains the process and challenges of opinion mining and it's applications. It gives application oriented approach which can be used to develop this web application.

Paper [6] gives us Review on Natural Language Processing Tasks for Text Documents.

Paper [6] also describes different pre-processing steps that are used to implement NLP tasks. But a reliable strategy for NLP is not provided in this paper.

Sentiment Analysis on Twitter Data is given in paper [7].



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This paper demonstrates benefits of twitter data and how companies can use sentiment analysis to extrapolate relevant information about their products.

The steps carried out are:

1. Retrieval of tweets
2. Pre-processing of extracted data
3. Parallel processing
4. Sentiment scoring module
5. Output Sentiment

Semantic Analysis of Judicial Sentences Based on Text Polarity Gomez and his colleagues have proposed an approach to analyse the principle of legality, impartial judicial procedures by examining the judicial decisions in paper [9]. They have determined that court judgments consist of an emotional content, which implies that the principle of neutrality is not fully met. However, from their initial findings generate sufficient evidence to identify the existence of an emotional inference mechanism in judicial decisions. The paper fails to elucidate in this work what type emotion is being related to polarity. Opinion Mining, Analysis and its Challenges have been discussed in paper [8] Sharma and her colleagues have used opinion mining along with analysis to solve the problems related to opinions about products, reviews ranking in movies, Politian in newsgroup posts, review sites etc. The paper covers the sources from which the data is extracted, the classification, evaluation process and the grouping techniques, tools used for mining and analysis. The problems faced in this method are 1) Product reviews, comments and feedback could be in different languages. 2) As noun words are considered as feature words but Verbs and adjectives can also be used as feature words which are difficult to identify.

III. PROPOSED RESEARCH

SYSTEM DESIGN

SYSTEM ARCHITECTURE

The fig.1 gives a brief idea about sentiment analysis system architecture.

LAYERED SYSTEM ARCHITECTURE

There are four layers in system architecture as follows:

- Presentation Layer
- Framework Layer
- DAO Layer
- Database Layer

Presentation Layer

Presentation layer interacts with user. It contains GUI components and controllers. User can give input through this GUI and after analysis the result will be displayed on the same GUI.

Framework Layer

It has three layers. Service Layer, NLP layer, Integration Layer.

Service Layer provides service to the user

NLP layer process the data i.e, performs sentiment analysis

Integration Layer integrates APIs and data from websites into database.

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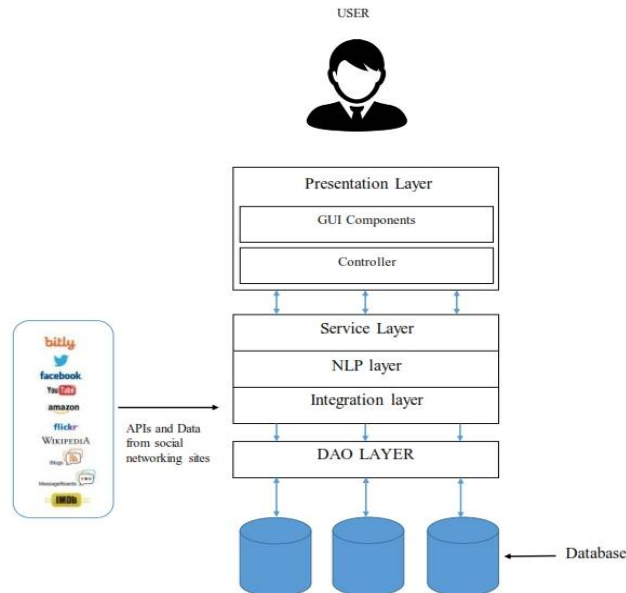
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Data Access Object Layer

It connects the Database and the Framework and provides the framework access to database. This layer basically looks after the requests for accessing and storing the data.

Database Layer

Database used to store all the data received from APIs in the desirable format and can be retrieved on demand.



Advantages

Using sentiment analysis, we can speculate the tone, attitude and emotions behind the expressions made by users' reviews or comments. This is a massive advantage to organizations as most of their products are directly related to customer opinions.

Sentiment analysis is hence used extensively to understand and gain insight into target audiences sentiments

Disadvantages

Sentiment analysis deals with categorizing the reviews into positive, neutral or negative. Most reviews and opinions mentioned online are not articulated and might give out mixed meanings and hence be difficult to classify. Also, phrases, satire, figures of speech, sarcasm cannot give out the required meaning.

IV. CONCLUSION AND FUTURE WORK

This application is a small scale application and can be extended to different projects such as shopping websites (eg. PepperFry) and also can be used by as a tool to monitor events such as traffic, pollution based on live real time data



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received from public portals. Sentiment analysis can be performed to retrieve relevant information from the database according to user requirement. Sentiment analysis is a useful tool to help users make sound decisions efficiently.

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