Recommendation of Product using Sentiment Analysis of Product Reviews

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Abstract: Online shopping is trend amongst youngster. To purchase a product from online shopping site and give the reviews about products, is   common in current era. But while purchasing product, sometimes it become difficult to choose between two products. So, to overcome this problem, there is need of such a system which will help user to decide which product he/she should buy.
In this paper, we proposed such system which helps user to decide between two products. This approach is based on sentiment analysis and takes into consideration 1. Users reviews about product and 2. Price of product.

Keywords: Sentiment analysis, product reviews, product recommendation, product feature, natural language processing, sentiwordnet

I. INTRODUCTION

Over the last few years, sentiment analysis and natural language processing are the topics of researcher's interest. Sentiment analysis is part of natural language processing which tries to analyse or extract sentiment from input. Mainly sentiment analysis is divided into three parts: Sentence level analysis, document level analysis and aspect-level analysis. [2] gives that opinion mining can be performed by two tasks, i.e. Subjective and Objective and polarity of opinion is determined by using subjective sentence (polarity, i.e. positive and negative). [1] uses sentiwordnet for polarity calculation. It gives output of sentence as positive score, negative score and objective score.
Online shopping is one of the most comfortable way for shopping in this new era of technology. People buy online products as it provides easy way of home delivery and posts their reviews about the products they have purchased. These reviews can perform a better way to recommend product to customer who is not experienced about the product and wants to buy some product. Also we can make comparison of two products and based on product reviews analysis, can suggest which product will best to buy.
So, proposed approach focuses on recommending a product based sentiment analysis of product reviews. In our paper, we are using sentiwordnet which is open source library for calculation of polarity of sentence. This system can be deployed on internet, so that user can provide url of product and get comparison of two products, so that he/she will get some help to choose which product should he/she buy.

II. LITERATURE SURVEY

[1] Method mentioned in paper gives a semantic approach for a sentiment analysis, which is based on use the SentiWordNet lexical resource. The lexicon used in the hereby presented application is SentiWordNet. SentiWordNet is a public lexical resource designed for the sole purpose of opinion mining and sentiment analysis. It assigns three types of scores to each word: positivity, negativity and objectivity.
[2] It uses Lexicon based approach for classification of reviews. It provides a sentiment feature set including semantic information and structural information. Approach in this paper, proposes a novel framework based on recursive auto encoders for sentence-level sentiment classification. Also it uses a method to reduce supervised features using n-grams and statistical analysis and built a Twitter-specific lexicon for sentiment classification. It consists of probabilistic model called JST model based on latent Dirichlet allocation (LDA) to analyze sentiment and topic from text. This approach uses the dictionary for classification and it is difficult to update the dictionary. So, this approach is not suitable for domain specific classification.

III. SYSTEM ARCHITECTURE

System is mainly divided into four modules,
1.   **Obtaining reviews:**
      In this module, reviews from shopping sites are acquired by using web scraping techniques.
2.   **Data Preprocessing:**
      In this module, different data preprocessing techniques are applied on reviews obtained.
3.   **Sentiment Analysis:**
      In this module, sentiment analysis is done using sentiwordnet.

4.   Product Recommendation
        In this module, product is recommended by performing different mathematical formulations.

Following figure gives information of our system architecture.

fig. System Architecture
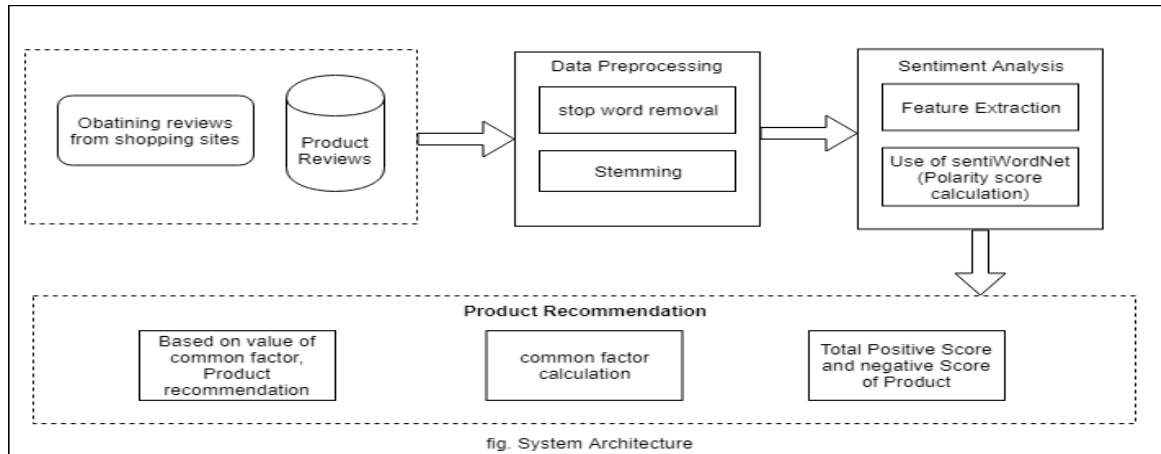
IV. METHODOLOGY

Methodology requires following steps to be performed
Step 1: Takes user reviews using web scraping from shopping website.
Step 2: Applies data cleaning such as:
        a.   Removal of extra symbols, emoji's.
        b.   Stemming
        c.   Stop words removal
Step 3: Categorization of reviews into feature based reviews and service based reviews.
Step 4: Calculation of sentiment scores using sentiwordnet.
Step 5: Take addition of total positive and negative scores of total numbers of reviews of the system for both the
        product.
Step 6: Calculate common factor calculation. For calculation use formula (1).
Step 7:
        if *(common factor of first product< common factor of second product)* then "Product one is better."
        else if (*common factor of first product < common factor of second product*) then "Product two is better."
        else "According to user reviews, both products are better to buy."

V. MATHEMATICAL FORMULA

$$Common\ Factor = \frac{Price\ Of\ Product}{Price\ of\ Product + Total\ Positive\ Score - Total\ Negative\ Score}$$

Where,
  Common Factor = factor that can be used to compare two products
  Total Positive Score = positive score calculated in step 5
 Total Negative Score = negative score calculated in step 6
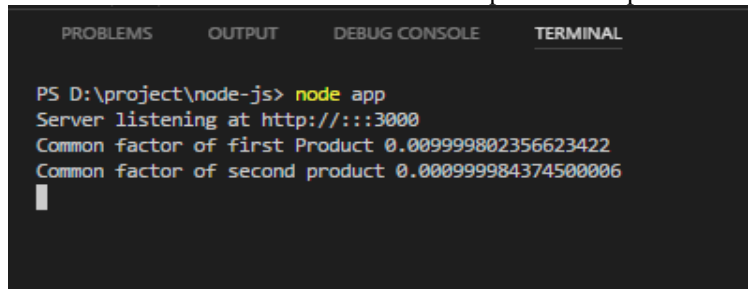
VI. RESULTS

1.   Categorization of product
This screenshot is of json file, which is generated instep 3 - Review categorization into Service reviews and Product reviews

2. Common factor

This screenshot is of console on which common factor values of both products are printed.

3. Output

This screenshot shows the recommends product.
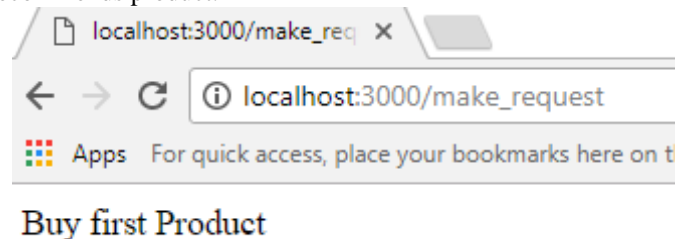
VII. FUTURE SCOPE AND CONCLUSION

In this paper, we introduced sentiment analysis and how it can be performed on product reviews. Which can be helpful to the different online shopping site users. By making use of this system, user can get suggestion for product to buy. So this system will be very useful. Currently this system works appropriately, by taking price of product into consideration.

Also, the categorization of reviews done using dictionary approach, so to increase accuracy of categorization, we need to add extra words which are related to category of reviews, i.e. Feature reviews and Service reviews.

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