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Gadget Commendation System Using Twitter Based Sentiment Analysis

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Abstract— In today's world mobile phones are an essential part in our day to day life. Which phone to trust and which not is a major question. This is where recommendation plays an important role in deciding which product to prefer. It is one of the method we use to derive the users interest. We are proposing a feature by using Social Media Based Filtering (Twitter Based Filtering). We also use content based filtering to derive user interest. In Twitter Based Filtering we fetch approx. 50 tweets at a time and analyse the reviews and get a real time idea of trending mobile phones and accessories. Sentiment analysis using Naive Bayes algorithm helps understand and classify the positive and negative views of the users on World Wide Web. By using trust based analysis this project assures that by considering all the parameters the project recommends the user with numerous phones and its accessories of its liking.

I. INTRODUCTION

A. Overview

Now-a-days many mobile phone selling websites are available on the internet. Many of them are having their own recommendation system to recommend mobile phones to the buyers. Generally the mobile phone recommended by most of the websites is not of the buyer's interest .This system combines the features of content filtering, collaborative filtering and association rule mining to produce efficient and effective recommendations

B. Objective

User satisfaction: A well designed recommender system enhances the experience of the user with the site. The user will find th recommendations interesting, relevant and, with a properly designed human-computer interaction, resulting in customer satisfaction . Enable the user to select apt items: that may be hard to find without a precise recommendation. This functionality also enables non-popular items that are actually considerable to Real time analysis and comparison: Including social media based filtering gives a new dimension to the recommender the real time check is performed. Products that are trending and preferred by the rest of the world are shown as – Recommendation .Product's features analyzed sentimentally: Tweets/

Reviews are processed Reviews are processed using sentiment analysis and conclusion is derived for the product or its specific feature. This gives a more detailed an clear idea which helps in deciding which phone to buy.

C. Motivation

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Naive Bayes is a popular algorithm for classifying text. Although it is fairly simple, it often performs as well as much more complicated solutions. In machine learning, Naive Bayes classifiers are a family of simple "probabilistic classifiers" based on applying Bayes theorem with strong (naive) independence assumptions between the features .One of the most well documented uses of Sentiment Analysis is to get a full 360 view of how a brand, product, or company is viewed by your customers and stakeholders. Widely available media, like product reviews and social, can reveal key insights about what a product is doing right or wrong. Sentiment analysis can be used to measure the impact of a product, or consumer's response to particular features of the product. It is an algorithm that is tuned to analyze the sentiment of social media content, like tweets and status updates or reviews. It takes a string, and returns the sentiment rating for the "positive," "negative," and "neutral." In addition, this algorithm provides a compound result, which is the general overall sentiment of the string.

II) RELATED WORK

Recommender systems intend to provide people with recommendations of items they might appreciate or be interested in. To deal with the ever-growing information overload on the Internet, recommender systems are widely used online to suggest to potential customers, items they may like or find useful. We use recommendations extensively in our daily lives.

Recommender systems can be broadly categorized in six different ways.

• Demographic-based,
• Knowledge-based,
• Utility-based,
• Content-based

If a new user logs in any existing system, the system suggests irrelevant products to the user, which is not what the user is exactly looking for. In the existing system ,it is very time consuming to search or get a near precise

product .On existing systems, there are a large number of products, so the user cannot find the appropriate product ,they need. e-commerce websites mostly display the arrivingand trending items on their home page. This part reviews other prior techniques that have been implemented in literature for ratings and recommendation.

Recommendation system E-commerce using sentiment analysis-By R. Lydia. Priyadarsini, M. Lovelin Ponn Felciah.(International Journal of Engineering Trends and Technology(IJETT) Volume 49 Number July 2017). [1] Description: Text Mining, Sentiment Analysis, is used. Fake reviews can also be detected .Advantages: User experience is considered and products are recommended accordingly . Limitations: Only analyses ratings from user reviews and user can't identify genuine reviews. User specific product recommendation and rating system by performing sentiment analysis on product reviews-By Vamsee Krishna Kiran M Vinodhini R E 2017 International Conference(ICACCS-2017)[2]Description: The proposed approach in this paper extracts feature extraction, natural language processing and sentiment analysis recommendations. .

Advantages: User specific products are recommended according to the user history. Sentiment analysis is performed and products are recommended accordingly.

Limitations: Sometimes the products recommended may not be of the actual user interest and may lead to irrelevant suggestions .Online book Recommendation System by using Collaborative filtering and Association rule mining-By Suhasini Parvatikar Dr. Bharti Joshi 2015 IEEE International Conference on computational Intelligence and computing research[3]. Description: Various techniques have been introduced for recommending items i.e. Collaborative filtering and association rule mining .Advantages: Various techniques have been introduced for recommending items ie. Collaborative filtering and association rule mining.

Limitations: Lack of data. they need a lot of data to affectively make recommendations. Product Recommendation Based on Search Keywords-By Jiawei Yao, Jiajun Yao, Rui Yang , Zhenyu Chen 2012 Ninth Web Information Systems and Applications Conference [4].

Description :Various techniques have been introduced for recommending items ie. Collaborative filtering and association rule mining.

Advantages: Various techniques have been introduced for recommending items ie. Collaborative filtering and association rule mining.

Limitations: Lack of data. they need a lot of data to affectively make recommendations.Product Recommendation Based on Search Keywords-By Jiawei Yao, Jiajun Yao, Rui Yang, Zhenyu Chen 2012 Ninth Web Information Systems and Applications Conference [5]Description: The cold start problem of making effective recommendations to new users without any historical data on the website is still challenging. These new users often have some available information, such as search keywords, before visiting the website.

Advantages: It identifies search keywords as potential improvement for solving user cold start problem and make recommendations immediately after new users lands on the website ,without explicit user effort.

Limitations: Sometimes user searches things just for the sake of browsing. The suggestions can be vague and irrelevant Secure recommendation system for E- commerce website-By Bhagya Ramesh, Reeba R 2017 ICCP CT Description: The recommendation can be done based on user interest, interpersonal influence ,and interpersonal interest similarity.

Advantages: It is a secure recommendation system that protects users from data theft and other attacks .

Limitations: More emphasis is on security and recommendations are not that appropriate.

III) PROPOSED METHODOLOGY

In today's world purchasing the mobile phone is very difficult job .Which phone to choose ,analyzing the features and deciding which phone to choose should all have a single platform .The user should be recommended with the phone of his interest rather than the phones which he is not interested in .In the proposed system we have a website that allows users facilitate the process of choosing which mobile phone to buy. We use a user database for login and signup purposes .Our project fetches tweets from Twitter at a specific rate (tweets at a time) and later analyses it to generate reviews or modify rankings. Also the user is suggested with gadgets by referring to their past history .Advantages of the proposed system. The

recommendations are a result of real time analysis fetched from live tweets .The mobile phone recommendation system recommend mobile phones that are of Buyer's interest .Provide a dedicated chat box where the users of the websites can exchange opinions and communicate with each other Deploy a payment system where the user can buy the product.

The important parts of our system include:
Tweet Fetching: The first stage of analyzing the tweets for feature extraction is fetching the tweets from twitter. With the advent of Web 2.0 we can fetch tweets by using 4J API dedicated for java . The tweets are fetched a particular rate for being processed. Fetching all the tweets
Available would result in a noisy set, therefore the tweets are filtered by giving the 4J API key in the coding section. This helps us fetch the required tweets having the necessary key.
Analyzing the tweets and modifying the ratings: The fetched tweets are later analyzed sentimentally using Natural Language Processing and Naive Bayes Algorithm. The rating is incremented or decremented referring to the tweet analysis. The older ratings are updated with new modifications according to the real time situation.
Suggesting Phones using Filtering Techniques: The users past history is monitored over here. The inference is taken from the history and the user is suggested with products to buy in the recommendation section. The recommendations mainly comprise of the new launches and updates in the category of the users liking. The technique used here is a combination of two filtering techniques. First one is the collaborative based filtering and second one is the Content based filtering. References are taken from common user searches and liking to help the user get useful information. Chat Box: The project also deploys a chat box as an additional feature for user communication. The users of the website can chat with fellow registered users and share their opinions. Users can share the experiences after the use of a product.
Payment System: The project also deploys a payment system for purchasing a product. If a user likes the product and decides to purchase it then the website also allows the user to buy online .There is also a payment system where the user can pay the necessary cost of the product and purchase the mobile phone or its accessories.

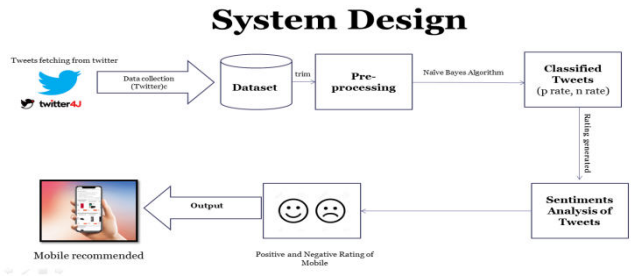


Figure 1

IV) EXPERIMENTAL ANALYSIS

A. Classification of different sentiment analysis algorithms:

From a theoretical point of view, it is a little bit hard to compare the two methods. One is probabilistic in nature, while the second one is geometric. However, it's quite easy to come up with a function where one has dependencies between variables which are not captured by Naive Bayes (y(a,b) = ab), so we know it isn't an universal approximator. SVMs with the proper choice of Kernel are (as are 2/3 layer neural

networks) though, so from that point of view, the theory matches the practice .But in the end it comes down to performance on our problem - we basically want to choose the simplest method which will give good enough results for our problem and have a good enough performance. Spam detection has been famously solvable by just Naive Bayes, for example. Face recognition in images by a similar method enhanced with boosting etc.

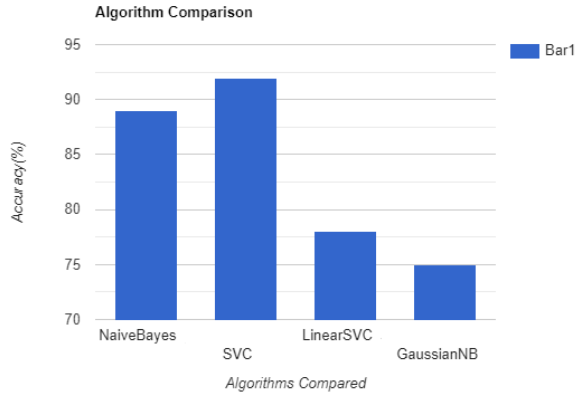
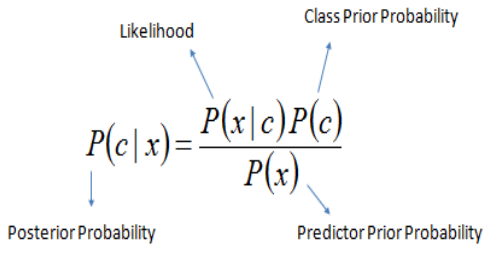


Figure 2

Bayes theorem provides a way of calculating the poster
P(c|x), from P(c), P(x), and P(x|c). Naive Bayes classifi
the effect of the value of a predictor (x) on a given clas
of the values of other predictors .This assumption is cal
independence.



$$P(c|X) = P(x_1|c)\times P(x_2|c)\times\cdots\times P(x_n|c)\times P(c)$$

P(c|x) is the posterior probability of class (target) given predictor (attribute).
P(c) is the prior probability of class.
P(x|c) is the likelihood which is the probability of predictor given class.
P(x) is the prior probability of predictor.

V) RESULTS AND ANALYSIS

Naïve Bayes Classifier classifies the dataset into two types of ratings. Positive Rate (P-rate) and Negative Rate (N-rate). The positive reviews
come under the P-rate and Negative reviews come under N-rate:
P-Rate: Words which give a positive feedback from the tweet and considered in P-rate. Phrases can include 'good', 'very good', 'excellent ' , 'satisfied' ,'happy' add up to the positive rating. The value of the rating depends on the intensity of the word encountered in the tweet.' Excellent' is given a P-rate of a higher value than simple 'good'.

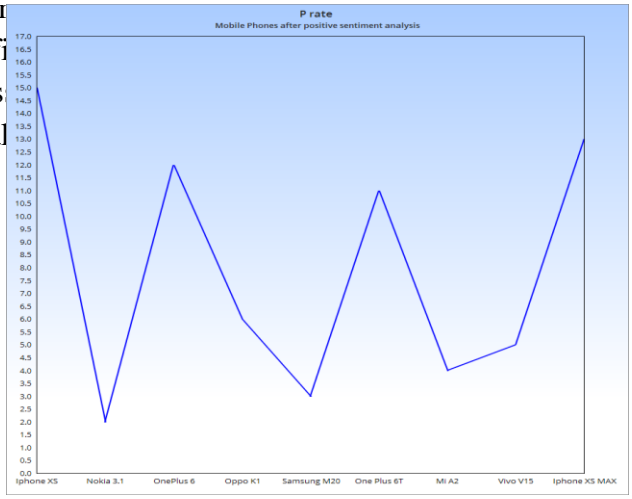


Figure 3

N-Rate: Words which give a negative feedback from the tweet and considered in N-rate. Phrases can include 'bad', 'very bad', 'poor ' , 'unhappy' ,'unsatisfied' add up to the negative rating. The value of the
rating depends on the intensity of the word encountered in the tweet.'
Very bad' is given a N-rate of a higher value than simple 'bad'.

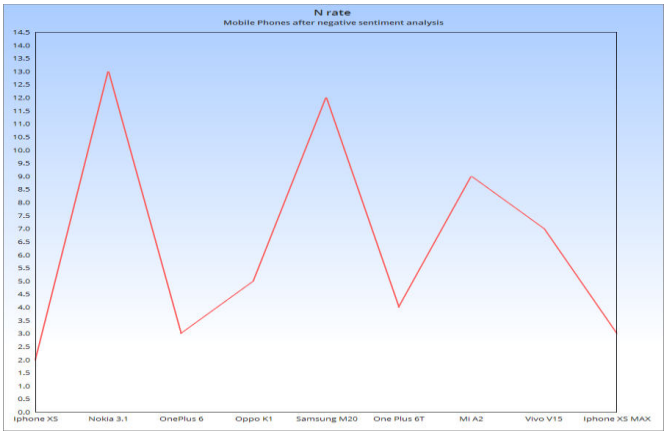


Figure 4

Following is the table for the P-rate and N-rate on our Dataset.

positivecollection	prate	negativecollection	nrate
good	3	not good	3
not bad	1	bad	2
nice	2	not nice	2
excellent	5	poor	1
like	2	dont like	1
g8	4	hate	4
greate	4	boring	3
intresting	3	dump	4
best	5	dull	5
better	4	rude	2
top	5	not	2
enjoyed	4	worst	5
better	2	harassment	3
superb	4	dont	1
awesome	4	poor	1

VI) SYSTEM REQUIREMENTS

x86 system /PC
An Intel based x86 architecture system running Microsoft Windows OS (XP or Higher).
The System should have minimum following configuration.
512 MB RAM
3 GB free Hard Disk space
2 GHz Pentium or higher processor.
The System should have recommended following configuration.
5 GB free hard Disk space
2 GHz or higher Pentium Dual Core processor 16
1 GB RAM
Software:
JAVA JDK 7
Apache tomcat Server.
Windows Operating System.
Eclipse
MySQL.

VII) CONCLUSION

The goal of the most recommendation system is to predict the buyers interest and recommends the mobile phones accordingly. This mobile phone recommendation has considered many parameters like content of the mobile phone and quality of the mobile phone by doing collaborative filtering of ratings by the other buyers. This recommender system
also uses associative model to give stronger recommendations. This system
does not have performance problem since it built

the recommendations offline.Also the Real time analysis done by fetching tweets from twitter and analyzing them helps users get the current scenario of the mobile phone market. The huge amount of time wasted in searching information about numerous mobile phones and collaborating it to select the best phone will now be saved. The project provides a single platform for mobile phone raking and recommendation.

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