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Bridging Social Media to E-commerce For Cold-Start Product Recommendation

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Abstract — *In recent years-commerce websites and social networking websites are not much used. Many product purchase websites use the strategy of login with social networking site accounts such as Facebook, twitter, or any other social media. E-commerce users can add their product purchase in micro blog data webpage. In this paper, the propose system gives solution to cross-site product recommendation problem in which newly login users to e-commerce sites get relevant recommendation of products as per their interest. In cold-start product recommendation system, product recommended for e-commerce web sites to social networking site. A major task is to extract the knowledge from social networking site such as user profile, demographic attributes and network attribute and use that knowledge to give proper recommendation to newly login users. This system proposes to link the users from e-commerce and social networking websites as making a bridge to map users' feature to another feature representation*

Keywords *– E-commerce, demographic attribute, recommendation system, micro blogging data.*

I. INTRODUCTION

Nowdays ,recommendation system have aim to provide relevant recommendation to the proper user from the available information era, which is widely used in various fields like e-commerce ,weather prediction etc.In traditional system,there is preference gives to offline shopping instead of online shopping ,because user was not believe on online shopping .Newly recommendation system focuses on finding the factor which determine users interest to buy the product from online shopping .In this paper ,system propose which gives emphasis on relevant recommendation providing to the users and distinguish users into two groups one with definite purchase intension and another without having such motivation.

II. RELATED WORK

1] Sui, Li, Yulan He [1], In this paper, we study the recreational problem of recommendation product system, which gives proper recommendations to newly login users to e-commerce who has not historical data on websites. In this we propose to make a bridge between social networking and e-commerce websites. so that users having accounts on both the websites, to map their social networking features to other features to get proper recommendation.

2] J. Wang & Y. Zhang [2], purpose of recommendation system provide a recommendation to specific users on the basis of their interest, but the recommendation is also based on when the recommendation system is provided. Let us take an example, a user who purchases a laptop.After 3 years the battery of laptop is failing. Now to bring a new laptop is not a proper recommendation as the laptop is not failing. only battery is failing and after taking a new laptop it is also not relevant to recommend for taking a right battery.Hence, when the proper recommendation is provided to the user is also needed.

3] M. Giering [3], Users gets a proper recommendation on the basis of demographic attribute, network attributes, temporal attribute and providing recommendation from retail stores. In which demographic attributes contain age, gender, interest field, etc. Details of system implementation and proper recommendation issues are arising in the model in the real world application.

4]G.Linden ,B.Smith,& J.York[4], various recommendation algorithms are used which gives list of words from comments,which are related to e-commerce website based on users interest.this list of words becomes input to e-commerce website.they provide relevant product to the users.they also use various attributes like demographic information ,network related,temporary basis information to provide relevant product recommendation to users.At Amozon.com there are three common approaches to solve the recommendation problem :traditional collaborative cluster model and search based methods.

5]V.A.Zeithaml[5],In this article more emphasis is giving on demographics attribute in which by breaking the huge document into small fragments for grocery products .this attribute may be age, gender ,working status,income marital status and relation between them.find out to provide recommendation to the user .demographic attributes differs from

the traditional supermarket shopping in tremendous way.this technique affects the retailers and manufactures of grocery products.

6]W.X.Zhao,Y.Guo,Y.He,H.Jiang,Y.Wu and X.Li[6], purpose of recommendation system is to improve the user experience and increase the sales of the e-commerce products .however recommendation is limited as their is not much information about purehead product on e-commerce websites ,as it is increasing as per users different activities on e-commerce websites.in this paper ,the system develop the great product recommendation system called METIS,a Merchant Intelligence Recommender System, which extracted the users purchase history information from micro blogging data and makes recommendation based on matching the demographic attribute from users profile and online review.

7]Jinpeng Wang1,Wayne Xin Zhao [7],the approach of this paper is to extract the product information mention from online reviews .that extraction of words categorizing into different number of product groups.these groups of products are used to recommend the product using weighted matrix factorization method. Bootstrap approach is also used to extract the product related data from review documents.

8]Aurania Seroussi,Fabian Bohneft[8] In recent year ,giving personalized recommendation system is widely used as huge amount of personal information is available online.by rating prediction also personalized recommendation can be done .thus accurate and proper recommendations plays vital role in the system. This rating prediction algorithm based on matrix factorization have becomes more popular because of accuracy and easy functionality .however it does not provide accurate prediction .for this people who submitted only a few ratings.in this paper ,the issues are highlighted which occur with newly login users,and their attributes of account are taken into consideration for generating the rating prediction.

9]Tomas Mikolov[9],many machine learning algorithm are used which has input as a documents.whem it uses a concept of bag-of-words then it has two major drawbacks like they lose the order of words and they also avoid the meaning of the words.our algorithm represent document as a huge data set from that proper words are extracted avoiding the drawbacks of bags-of-words of the models.finally we have set of e-commerce related words ,which are geting by several text-classification methods and sentimental analysis works.text classification and clustering plays important role in many application .

III. PROPOSED WORK

The system proposes to connect the social media to e-commerce websites to map the users on social network feature to developed e-commerce websites for product recommendation. In specific, the data is gathered from the e-commerce websites using neural networks. By using demographic attributes, network attributes, text attributes and temporal attributes, etc. social media recommend the specific product to specific user.

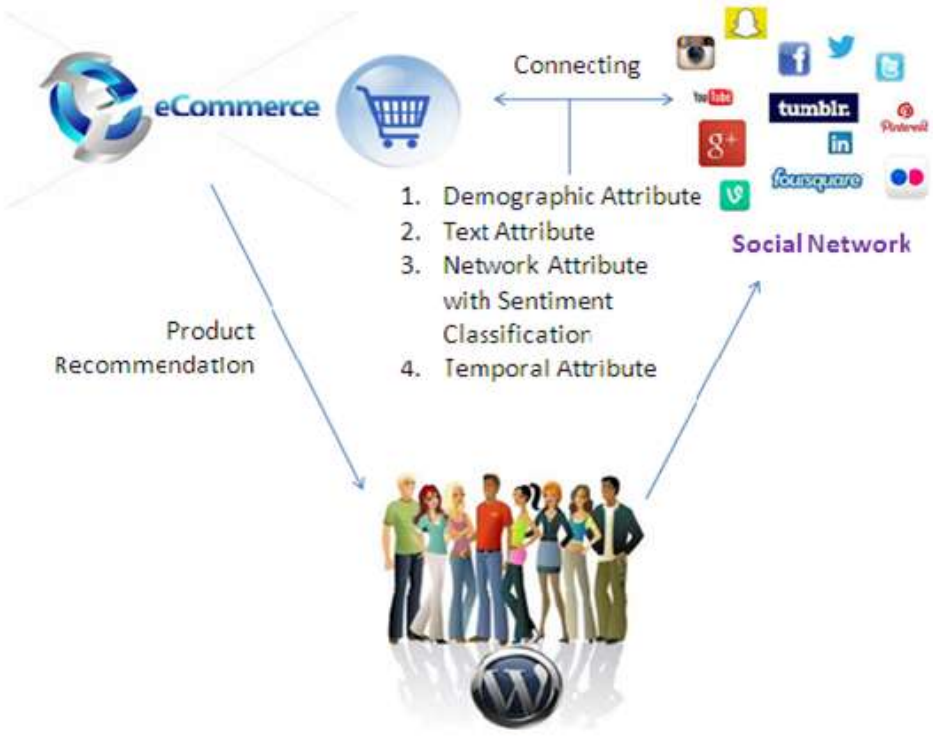

Figure 1: **Architecture of Proposed Work**

IV. ALGORITHM

4.1. Latent Dirichlet allocation (LDA)

Algorithm LDA (C, S)

{

//In this algorithm in each loop a topic is sampled for each word instance from the group of words (comments).

//Input: words w € documents d

Where,

- w be the corpus of words.
- d is the set of documents.
- N be the count of words.
- K be the number of words in the document.
- α and β are LDA constants.

//Output: topic assignments z and counts $n_{d,k}$, $n_{k,w}$ and n_k

Notation:

- $n_{d,k}$ the number of words assigned to topic k where topic k belong to d.

$n_{k,w}$ count of word w is assigned to topic k

1. Initialization of z and incrementing counter
2. for each loop do
3. for i = 0 → N-1 do

word← w[i]
topic← z[i]

$n_{d,\,topic}$ - =1 ; $n_{word,\,topic}$ -=1 ; n_{topic} - =1

for k = 0 →K – 1 do

$$p(z = k|.) = (n_{d,k} + \alpha_k) \frac{n_{k,w} + \beta_w}{n_k + \beta \times W}$$

end

4. Topic ← sample from p(z|.)
5. z[i] ← topic.
6. $n_{k,topic} += 1$; $n_{word,topic} += 1$; $n_{topic} += 1$\
7. end
8. end
9. return z, $n_{d,k}, n_{k,w}$, n_k
10. end

}

4.2. SENTIMENT ANALYSIS:

Algorithm Sentimental_Analysis(C,S)

{

// C is the comment written by user

// S is status of the User

- Get Terms - Reduce each review to the list of words
- Filtering - Remove unnecessary words that will not add value for sentiment analysis
  e.g. is, among, but, and, it, that

-Base Word - Convert all inflections to their root word

- fry, fries, fried -> fry
- going, go, went, goes -> go
- movies, movie -> movie

- Make Features - Use the words thus extracted from a review as features to indicate the positiveness or negativeness of that review

-Classifier - Train a classifier to predict positivity

Comment Analyzer

Input: Preprocessed comment

Output: Comment categorized as positive negative or neutral.
overallPol: Polarity of the whole comment.
sentPol: Polarity of the sentence within the comment.
POS: Part of Speech of the word.

```
BEGIN
    overallPol = 0
    For each sentence in comment
    {
        sentPol = 0
        For each word in sentence
        {
            If Polarity[word] == Positive
            {
                If POS[word] == Adjective
                    sentPol = sentPol + 4
                Else if POS[word] == Adverb
                    sentPol = sentPol + 3
                Else if POS[word] == Verb
                    sentPol = sentPol + 2
                Else:
                    sentPol = sentPol + 1
            }
                Else if Polarity[word] == Negative
                {
                        If POS[word] == Adjective
                          sentPol = sentPol - 4
                        Else if POS[word] == Adverb
                          sentPol = sentPol - 3
                        Else if POS[word] == Verb
                          sentPol = sentPol - 2
                        Else
                          sentPol = sentPol - 1
                }
              Else if word is a Negation word
                 sentPol = - sentPol
        }
        overallPol = overallPol + sentPol
    }
    If overallPol >0
        Return Positive Comment
    Else if overallPol <0
        Return Negative Comment
    Else
    Return Neutral Comment
}
```

V. CONCLUSION

In this system ,we have studied a recreational problem of recommendations system in which the proper relevant recommendation is provided to the newly login user to e-commerce website to the social networking sites using various attributes .such as newly login users problrm called as cold-start product recommendation problem .such users having account on both e-commerce and social networking websites as well hence by making a bridge between them and mapping the various features using matrix factorization to provide proper recommendation to cols-start product recommendation problem .the result shows that,our proposed system is effective in providing the relevant product recommendation to newly login users to e-commerce websites.we believe that our proposed system will have impact on both research and industry communities.

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