Personalized Product Recommendation in Social Media using Kin and Kith Mining

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***Abstract*— A recommender system learns from a customer and recommends products that we will find most valuable from among the available products. Many of the largest E-commerce Websites are already using recommender systems to help their customers find products to purchase. The products can be recommended based on the top sellers on a site, demographics of the customer and analysis of the past buying behavior of the customer. The proposed system will use "mined" knowledge learned from the behavior of consumers and its relevant people – to guide consumers through the often-overwhelming task of locating products they will like. Recommender systems enhance E-commerce sales in three ways: Browsers into buyers, Cross-sell and Loyalty. This paper proposed new mining approach to recommend the products which are interest with their family members and friends. The data set are collected from the social networking sites. The data set consists of basic information about the visitor, likes and groups, interests etc., more generally, data mining has two phases. In the learning phase, the data mining system analyses the data and builds a model of consumer behavior (e.g., association rules). This phase is often very time-consuming and may require the assistance of human analysts. After the model is built, the system enters a use phase where the model can be rapidly and easily applied to consumer situations. By applying kin and kith mining concepts to analysis the data set to predict not only the users interest also finds the interests of the customers' friends and family members.**

Keywords*— *Recommender systems, Kin and Kith mining, E-commerce, Social network, users interest

I. INTRODUCTION

Recommender systems are a powerful new technology for extracting additional value for a business from its customer databases. These systems help customers find products they want to buy from a business. Recommender systems benefit customers by enabling them to find products they like. Conversely, they help the business by generating more sales. Recommender systems are rapidly becoming a crucial tool in E-commerce on the Web. Recommender systems are being stressed by the huge volume of customer data in existing corporate databases, and will be stressed even more by the increasing volume of customer data available on the Web. New technologies are needed that can dramatically improve the scalability of recommender systems.

The largest E-commerce sites offer millions of products for sale. Choosing among so many options is challenging for consumers. Recommender systems have emerged in response to this problem. A recommender system for an E-commerce site recommends products that are likely to fit her needs. Today, recommender systems are deployed on hundreds of different sites, serving millions of consumers. One of the earliest and most successful recommender technologies is *collaborative filtering* [1, 2, 3, 7]. Collaborative filtering (CF) works by building a database of preferences for products by consumers. A new consumer, Neo, is matched against the database to discover *neighbors*, which are other consumers who have historically had similar taste to Neo.

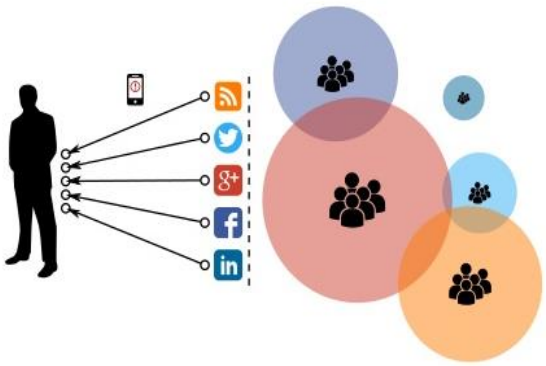

Fig.1. Personalized Recommender System using social media

Products that the neighbors like are then recommended to Neo, as he will probably also like them. Collaborative filtering has been very successful in both research and practice. Recommender systems are systems that provide users with an ordered list of items and information that help them to decide which items to consider or look at based on the individual user preferences [4, 5].

A content-based recommendation (CBR) requires data on the behavior of users and features of items. Its performance depends on the data and how this data is used, i.e. represented and inferred. Representation of and reasoning about the behavior of users and features of items raised a number of challenging issues. Features of items and users' behavior are subjective, vague and imprecise. These, in turn, induce uncertainty on representation of and reasoning about the items' features, users' behavior, and their relationship. Such uncertainty is non-stochastic or non-random and is induced from subjectivity, vagueness

and imprecision in the data, the domain knowledge and the task under consideration.

II. RELATED WORKS

Many works link social networks with recommendationsystem based on collaborative filtering. They are classifiedmainly into the Matrix Factorization (MF) based approaches,and the Neighborhood based social approaches [6]. Differentmethods are adopted to achieve this goal: Matrix Factorizationis used in [8], while in [9] social spectral regularization wasused, in [10] a social trust Ensemble (STE) was adopted, whilein [11] a slight twist on socialspectral regularization matrix(SoRec) is used.

Concept recommendation means finding users' profiles of concepts, then trying to recommend items or links that are related to these concepts to users, the advantage of these solutions is that they permit to find likeminded users, even if they don't consume, or click on the same items. Not like other model based recommendation solutions, such a solution saves lost of information as it is the case in clustering or matrix decomposition. Many works address the concept similarity in recommendation.

iSoNTRE offers a methodology to transform the general purpose social networks into a source of recommendation. In traditional social recommender systems surveyed in [12], after having information from the recommendation based social networks (epinions or flickers) different recommendationmethods are proposed and evaluated. This operation results in having for every resource a list of concepts and their frequency in each resource. iSoNTRE collects all these information in a Resource Concept Matrix with extracted rating of each resource towards each concept **RC1** Matrix with M resources and K concepts.To have a matrix of users and resources all whatiSoNTRE do finally is to have RC1 * MC1 which results in knowing what is the predicted rating of each user towards each resource, then over this matrix any recommendation method can be used.

Recommendation engines come up with suggestions in various ways, including demographic filtering, collaborative and content-based recommendation. In demographic recommendation [13], users are classified based on their personal data like age, gender, and etc. Each product is assigned to one or more classes with certain weights and the user is attracted to items from the class closest to their profile. Collaborative recommendation [15] recommends products based on set of users, whose ratings have the strongest correlation with the current user. Content-based recommendation [14] analyzes the content similarity, such as textual titles or descriptions, between products to suggest appropriate products.

Most E-commerce recommendation engines use a combinationof user query analysis [18] and user collaborativefiltering [9], but overlook the importance of ever changingglobal trends which are essential to the Fashion industry asthe clothing articles preferred wary according to seasons,media, and current trends which is adeptly captured inMatch-BOT using Google Trends.The enginetracks the users outside the system to gather informationand perform analytics which may be a user privacy concern[16]. Inside the system, they track similar user activity. Thenovelty of Match-BOT is that it is a unique amalgamationof user preferences and the global trends. The combinationis ratio specific i.e the system administrator can chooseup-to what degree the global trends will contribute to thesuggestions returned. Also, the algorithm has a feedbackloop which makes it adaptive as the suggestions adapt to newer purchases and dynamic shifts in global fashiontrends.

Match-BOT is truly novel in its system which has tremendous potential to integrate different factors affecting a customer's decision to purchase a certain commodity on an E-Commerce website. It formulates a wonderful interface through which the businesses can customize the mechanism of product recommendation. Collaborative filtering (CF)is the most successfulrecommender system technology to date, and isused in many of the most successful recommender systemson the Web. CF systems recommend products toa target customer based on the opinions of other customers.These systems employ statistical techniques tofind a set of customers known as *neighbors*, that havea history of agreeing with the target user (*i.e.*, theyeither rate different products similarly or they tend tobuy similar set of products). Once a neighborhood ofusers is formed, these systems use several algorithmsto produce recommendations.

Most collaborative filtering based recommender systems build a neighborhood of likeminded customers. The Neighborhood formation scheme usually uses Pearson correlation or cosine similarity as a measure of proximity [13]. The neighborhood formation process is in fact the model-building or learning process for a recommender system algorithm. Clustering techniques work by identifying groups ofusers who appear to have similar preferences. Once theclusters are created, predictions for an individual canbe made by averaging the opinions of the other usersin that cluster. Some clustering techniques representeach user with partial participation in several clusters.

The prediction is then an average across the clusters,weighted by degree of participation. Clustering techniquesusually produce less-personal recommendationsthan other methods and most often lead to worse accuracythan nearest neighbor algorithms.

The simplest method for identifying relevant users (i.e.,users whom we want to target with advertisements) wouldbe to manually construct rules detecting whether the givenmessages match particular patterns associated with theproducts or brands that will be advertised. However, this isa time consuming approach which may require significantexperience with the message and user patterns on Twitter.

Therefore, in addition to using a subset of manual rules calledtext extractors (for which the tradeoff is computationalefficiency versus more detailed targeting

rules), we developa method that can construct probabilistic relevance modelsautomatically based on product descriptions and then tunethe models based on the observed performance. This presentstwo significant challenges. First, a single product catalog cancontain numerous types of products. Second, the type oflanguage used in product catalogs can be quite different fromthe language used in social media.

III. PROPOSED SYSTEM

The recommender system solution is a customer engagementapplication for social media. It interfaces electronicallywith various social media data providers, processes highvolumes of raw unstructured social media messages,scores the brand-relevance of each message, andrecommends topic-specific messages for engaging customersthrough social media. A web-based dashboard provides:1) visibility to relevant social media messages, 2) the abilityto filter recommendations by brand and hotwords (wordsdeemed important in the product catalog), and 3) thecapability to message potential customers and trackcustomer responses.Paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

Our proposed Recommender systems will use "mined" knowledge learned from the behaviour of consumers and its relevant people – to guide consumers through the often-overwhelming task of locating products they will like. Recommender systems enhance E-commerce sales in three ways: Browsers into buyers, Cross-sell and Loyalty.

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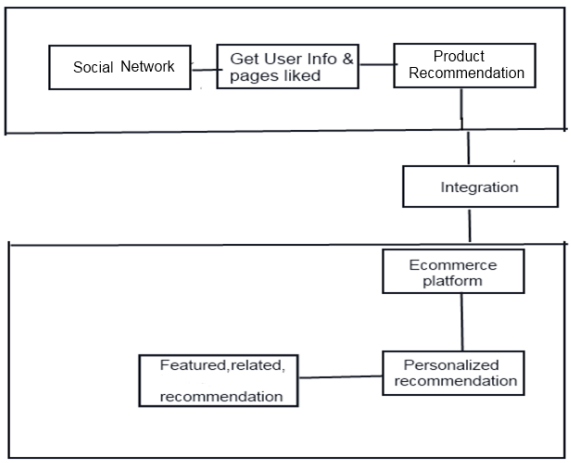

Fig.2. System Architecture of Recommender System

This system recommends the product using social media pages likes. Using access permission collects the pages likes and recommend product for application users.It recommends products in ecommerce platform based on individual user behaviour, bought products, best seller products, featured products and related products. The system uses facebook API to get information from the user and about the user in the social media. The information retrieved includes the details about the users, their friends and preferences, which group they all are belong and interests. Based on the information gathered using the application the product recommendation process being carried out.

The system introduces another form of recommendation approach in E-commerce sites. It not only recommends a product by social media information, also from the usual commercial sites recommendation methodologies. This includes similar things bought together, most popular and related items to the product being purchase.The user interests are predicted by applying mining process over the information collected from the users' facebook profile. The table 1 below will shows the recommended products for a particular user.

TABLE I. USER RECOMMENDATION TABLE

Users	USER RECOMMENDATION TABLE
	Recommendations
User A	black solid cotton shirt black solid linen shirt red checked shirt red solid cotton shirt
User B	red solid linen shirt orange striped cotton shirt red slimfit denim jeans black regularfit linen jean black slimfit denim jeans
User C	red cotton regularfit jeans red linen regularfit jeans black linen regularfit jeans black denim slimfit jeans
User D	green checked cotton shirt green checked linen shirt white checked cotton shirt red striped linen shirt red striped cotton shirt red cotton regularfit jeans

The Featured recommendation displays products which are recommended as best products. It's a great way to bring your customers' attention to products that are on sale, in season, back in stock, or just worthy of extra attention. The featured recommendation offers more flexibility than other product recommendations. The recommended products for every person are predicted and stored in individual tables. In the above table the User A's recommended products are displayed, based on the interests of user A's the advertisements are being generated. Once the advertisement is generated these advertisement will be displayed in users' profiles as well their friends' wall in social media. This will lead to tremendous change in sales of the E-Commerce sites.

IV. CONCLUSION

In this project, various recommendation approaches are proposed to achieve maximum accuracy in user interests. By using kin and kith mining concepts we can recommend a product not only the particular user their family and friends too. The data for the project are got from the facebook using the developers' work place. By using the Facebook API the users likes are predicted and stored in a respective format. Using this like and other information the products for the particular user are suggested. E-commerce integration helps to make some other recommendations to improve the buying nature of the user. The recommendation in the E-commerce site based on featured, related items, best seller and things usually bought together. By sharing the personalized recommended products with friends profile to improve the sales of the firm. Finally our project increases the user interest accuracy and their buying nature.

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