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Recommendation of Cold-Start Product by Socializing E-Commerce

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ABSTRACT: Recently few ecommerce websites has been developed their functionalities to a extent such that they recommend the product for their users referring to the connectivity of the users to the social media and provide direct login from such social media (such as facebook, Google+ ,etc). For recommending the users that are totally new to the websites, we use novel solution for cross-site cold-start product recommendation, which aims to recommend products from e-commerce websites to users at social networking sites in "cold start" situations, a problem which has rarely been explored before. In specific, we propose learning both users' and products' feature representations from data collected from ecommerce websites using recurrent neural networks and then apply a modified gradient boosting trees method to transform users' social networking features into user embedding. We then develop a feature-based matrix factorization approach which can leverage the learnt user embedding for cold-start product recommendation. Recently, online shopping integrating third-party payment platforms (TPPs) introduces new security challenges due to complex interactions between Application Programming Interfaces (APIs) of Merchants. Malicious clients may exploit security vulnerabilities .To deal with the security issue in the early stages of system development, we adapt a formal method for modeling and verification of online shopping business processes with malicious behavior patterns considered based on Petri nets. Then, we synthesize the normal business process and malicious behavior patterns by an incremental modeling method.

KEYWORDS: e-commerce, product recommender, product demographic, Microblogs, recurrent neural networks.

I. INTRODUCTION

Web service discovery is a hot topic which plays a crucial role in the area of services computing. Some syntactic and semantic-based web service search engines have been proposed in the recent literature. Dong et al. [2] found that the traditional key word-based web service search was insufficient, and they provided a similarity search algorithm for web services underlying the Goggle search engine. Recommendation techniques have been used in recent research projects to enhance web service discovery. Mehta et al. [3] found that semantics and syntax were inadequate to discover a service that meets user requirements. They added two more dimensions of service description: quality and usage pattern. Based on this service description, they propose the service mediation architecture. Blake computed a web service recommendation score by matching strings collected from the user's operational sessions and the description of the web services. Based on this score, they judged whether a user is interested in the service. proposed a model for the context of web service interactions and highlighted the resource on which the web service performed. Based on the input keywords, users can get a set of recommendations with linkages to the query. Previous work mainly focused on providing a mechanism to formalize users‟ preference, resource, and the description of web services, and Maintaining the Integrity of the Specifications recommendations are generated based on the predefined semantic models. Different from these methods, our recommendations are generated by mining the QoS records that are automatically collected from interactions between users and services. Limited work has been done to apply CF to web service recommendation. [5] Combined the user-based and item-based CF algorithm to recommend web services. However,

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since neither of the two approaches recognized the different characteristic between web service QoS and user ratings, the prediction accuracy of these methods was unsatisfactory. Different from these existing methods, which suffer from low prediction accuracy, proposed an effective CF algorithm for web service recommendation with consideration of the region factor. Comprehensive experiments conducted with real QoS records show that our method outperforms others consistently.

II. RECOMMENDER SYSTEM

1. QoS based service ranking

QoS based administration positioning and their choice for a best web administration are at first in view of the figuring of fulfillment scores [1] of every web administration. Fundamental strides incorporates: the enlistment of web administrations in an administration registry (SD)[1],users determining the QoS necessities to the administration catalog. The SD at first matches client's useful prerequisites took after by the computation of fulfillment scores for every administration. The SD rattles off the administrations in light of the fulfillment scores [1]. QoS-based administration positioning and determination technique helps clients to choose the administrations that best fulfill their QoS prerequisites. The top positioned administration with the biggest fulfillment score is the administration that best fulfill client's QoS prerequisites.

2. Collaborative filtering

Collaborative filtering [3] is most commonly used in present web service recommendation systems. The basic idea in CF is to make automatic predictions about the interests of a user by gathering preferences or taste information from many users. The processing in CF algorithms are based on user-item matrix.CF techniques are generally divided into two broad categories- model based [6],[2] and memory based[3][2].

(1) User-based CF
(2) Item-based CF

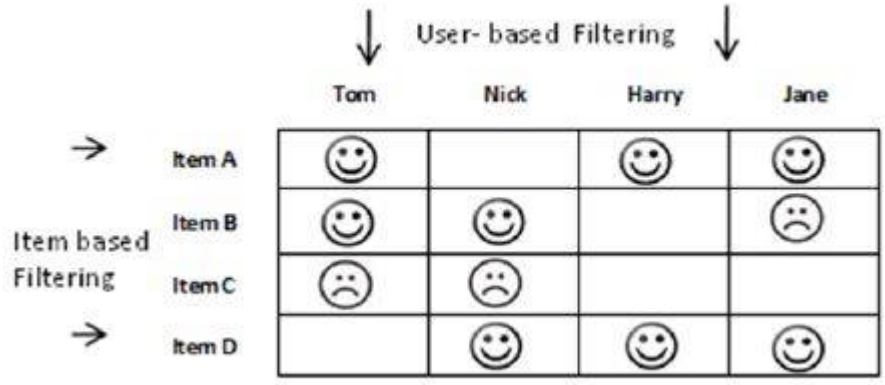

Fig. 1. Compare user-based and item-based filtering

Client Based sifting can be clarified as: In fig 1, it is found that clients Tom and Nick appear to have comparable interests as they both loved thing B and both abhorrence's thing C. So the thing A will be prescribed to Nick. Additionally thing based sifting [2] can be clarified as: Considering a thing D, two clients who enjoyed thing D Harry and Jane likewise loved another thing A. From this perception we can infer that individuals who loved thing D will likewise like thing A. So thing. Client based CF gives a subset of fitting clients as neighbors Taking into account their similitudes to the dynamic client and the Item-based CF will recover those things like the ones the dynamic client favored before.

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3. Similarity Calculation

Pearson Correlation Coefficient (PCC). It is used to measure user similarity [2] in recommendation systems. It measures the similarity between two service users based on the QoS values of Web services. PCC[3] similarity sim (a,b) of two service users ranges from -1 to 1.Two service users have similar Web service usage experiences if the PCC value is positive and a negative PCC value indicates that their experiences are opposite. The value is null when two service users have no commonly invoked web service.

4. Integrating Locations of Users and Services into Similar Neighbor Selection

Location information of both service users and Web services [5] can be found easily. As the IP address of the user is known it is much easier to locate AS number and the country where he is located. Similarly the location of web services is also found. The location information are then processed to produce a set of similar users and similar services that are closed to each other.

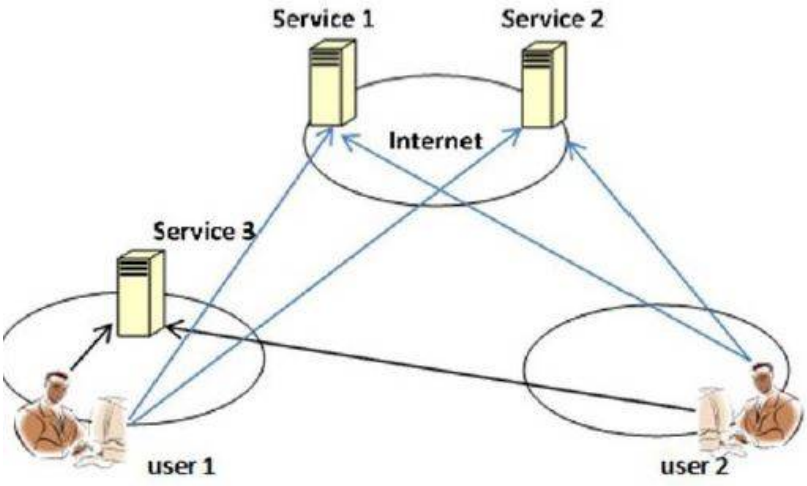

Fig. 2. Influence of user location

The network performance is likely to be poor when the service user and the service are located at different networks. The low performance is mainly due to the transfer delay and the limited bandwidth of the networks. Performance is found to be high if the user and the service are located in the same network. In figure 3,user 1 and 2 are located at two different geographical regions that are far from each other. Both user 1 and user 2 will experience a similar QoS values on accessing service 1 and 2 and they are similar. Service 3 is found to be in the same network of user 1 and therefore it is closer to him and the service is far away from user 2 and the QoS both users will obtain a different QoS values with respect to service 3.

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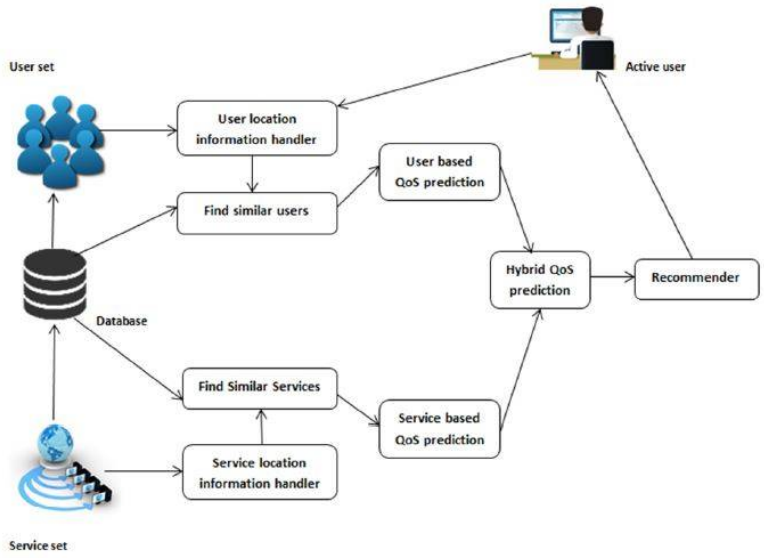

Fig. 3. Recommendation System

The recommendation system can be explained when an active service user searches for high-quality Web services in a Web service discovery system or the system is recommending high-quality Web services to an active user. The process is done by predicting the QoS values for the web services.

The system consists of:

(1) User location information handler: This is used to find the location information of a user which includes the AS number and the country name according to the user's IP address.

(2) Service location information handler: This is used to find the location information of Web services that includes the AS number and the country in which the Web Services are located.

(3) Find similar users: This module finds similar service users who are similar to the active user by considering both the user's QoS values and their corresponding locations. Similarity computation is done with a weighted Pearson Correlation Coefficient.

(4) Find similar services: This module finds similar web services for a target web service by considering both the users QoS values and their corresponding locations. Similarity computation is done with a weighted Pearson Correlation Coefficient.

(5) User-based QoS prediction: After finding similar users from the above step, QoS values are predicted accordingly for an active user.

(6) Service-based QoS prediction: After finding similar services from the above methods, QoS values are predicted.

(7) Hybrid QoS prediction: The final QoS predictions are obtained by combining the user based QoS prediction and the service based QoS prediction.

(8) Recommender: After predicting QoS values, recommendation of Web services are given to the active user.

III. ADVANTAGES AND DISADVANTAGES

Recommendation systems play a vital role in today's web. Here are some of the benefits and drawbacks of recommendation systems.

1. Recommendation systems are based on actual user behavior i.e. objective reality. This is the biggest advantage - watching people in their natural environment and making design decisions directly on the results. For example, the "Suggested Post" feature of Facebook suggests posts based on our activity and likes.

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2. Recommendation systems are great for discovery. For example, the "Genius Recommendations" feature of iTunes, "Frequently Bought Together" of Amazon.com makes surprising recommendations which are similar to what we already like. The "Now Touching The Void and Into Thin Air" example discussed in class is a best example.
3. Recommendation systems are effective tools for personalization. We often take recommendations from friends and family because we trust their opinion. They know what we like better than anyone else. This is the sole reason they are good at recommending things. This is what recommendation systems try to model.
4. Recommendation systems are always up-to-date. A new product in Amazon gets recommended as long as people rate it highly. The ability for a recommendation system to bubble up activity in real time is a huge advantage because the system is always on.
5. Most of the organizational maintenance of a site is keeping the navigation system in line with the users' changing needs. With recommendation systems, organizational maintenance is reduced. Based on user activity, the system recommends navigation options to the user. It still takes a designer to decide what type of information should be displayed on what screen. This introduces a drawback too. Keeping the system up and running becomes a major task. So maintenance has to be shifted elsewhere.
6. Recommendation systems are intensive, database-driven applications that are difficult to set up and get running.
7. Sometimes recommendation systems are wrong which makes people unhappy. Here are two cases where recommendation systems went awry. In 2005, Wal-Mart's movie recommendation system recommended movies to users in an inappropriate. Amazon started promoting their new clothing site by recommending clothes to users shopping for DVDs.
8. One drawback associated to news recommendation sites such as Digg is "gaming the system". When a news story is popular, it gets promoted to home page as a recommendation for everyone to click on and read. This leads to thousands of users clicking on the article and reading it. This huge increase in attention is attractive to people willing to game the system for their own personal benefit.

IV. OBJECTIVES

1. The boundary between e-commerce and social networking has become blurred.
2. Some e-commerce websites also support the mechanism of social login, which allows new users to sign in with their existing login information from social networking.
3. None of the e-commerce systems have adopted the use of micro-blogging and other demographic information for cold start situation where a customer to ecommerce site is offered suggestion of the products.
4. We are focused on the details of the micro blogs, demographic information, location information, etc. to address the product recommendation. In this paper, we address the problem of recommending products to users who do not have any purchase records, i.e., in “cold-start” situations. We called it cold-start product recommender.
5. Once user send that review then that post is updated on social to recommendation friends.
6. Due to the heterogeneous type of the data in the social network posts, information extracted from micro-blogs cannot be used directly for product recommendation on ecommerce websites .Therefore, one huge challenge is to transform users’ micro-blogging information into another meaningful representation, which can be used more effectively for product recommendation.

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V. RELATED WORK(COMPARATIVE)

NO	PAPER TITLE	AUTHOR , JOURNAL NAME AND YEAR	REFER POINTS
1	On optimal decision for QoS-aware composite service selection	Ping Wang , Kuo-Ming Chao , Chi-Chun Lo 2009 Elsevier	1. In This Paper Refer the decision maker's imprecise perceptions under incomplete information, but also objectively determine the importance weights of QoS criteria. 2. The weightings are based on group preferences for a group of participants and realistically attain a QoS-based Ranking of a list of web services. 3. The proposed approach enables decision makers to select OoS aware services from the marketplace. In the multiple attribute Decision-making applications.
2	QoS-Based web service composition based on genetic algorithm	M. AllamehAmiri, V. Derhami, M. Ghasemzadeh Journal of AI and Data Mining Vol. 1, No.2, 2013, 63-73.	1. In this paper, It showed how can find the suitable web service composition using genetic algorithms. 2. Some new ideas for generating chromosomes, selection and crossover functions were proposed. 3.The experimental results Demonstrated the advantages of the proposed ideas are to overcome local optimums. Experimental results show that since GA is a K beam search, it can find suitable composition plan much faster than other random search approaches.
3	Time-Aware Collaborative Filtering for QoS-Based Service Recommendation	Chengyuan Yu, Linpeng Huang 2014 IEEE International Conference on Web Services	1.Collaborative filtering is an effective method for web Service selection and recommendation. In order to improve the prediction accuracy of Collaborative filtering algorithms, various factors are taken into account. 2.But seldom do investigators take the factor of time into account.

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			Time is a very important factor to predict missing QoS values, since QoS performance of Web services is highly related to invocation time. 3.The reason why QoS performance of Web services is highly related to invocation time is that the service status (e.g., workload, number of clients, etc.) and the network environment (e.g., congestion, etc.) change over time
4	Location-Aware and Personalized Collaborative Filtering For Web Service Recommendation	R Archana , S Nagarajan, , Prasad B International Journal of Engineering Research in Computer Science and Engineering (IJERCSE) Vol 3, Issue 3, March 2016	1.This paper presents a personalized location-aware collaborative filtering method for QoS-based Web service recommendation. 2.Aiming at improving the QoS prediction performance, we take into account the personal QoS characteristics of both Web services and users to compute similarity between them. We also incorporate the locations of both Web services and users into similar neighbor selection, for both Web services and users. 3. Comprehensive experiments conducted on a real Web service dataset indicate that our method significantly outperforms previous CF-based Web service recommendation methods.
5	LOCATION-AWARE AND PERSONALIZED COLLABORATIVE FILTERING FOR WEB SERVICE RECOMMENDATION	Mr.Dheeraj D Rathod INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT] ISSN: 2394-3696 VOLUME 3, ISSUE4, APR.-2016	1. This paper has presented a personalized location-aware collaborative filtering method for QoS-based Web service recommendation. 2. Aiming at improving the QoS prediction performance, we take into account the QoS characteristics of both users and web services for computation of similarity between them. 3. We also incorporate the locations

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			of both Web services and users into similar neighbor selection, for Web services and users.
6	Analysis of Location-Aware web service recommendation	SeyedAbdollahMousavi, Prof. S.P. Medhane International Journal of Engineering and Technical Research (IJETR) ISSN: 2321-0869, Volume-3, Issue-12, December 2015	1. This specific report presents a QoS-aware web service professional recommendation approach. 2. The fundamental concept would be to predict web services QoS ideals as well as recommend the most beneficial one pertaining to productive users depending on historical web service QoS data. 3. Recommendation algorithm gives all recommended web services for active user. A nearest-neighbor algorithm is used to generate nearest web services i.e. Nearest-neighbor algorithm returns the Top-n web service results, based on this algorithm user can select perfect web service at particular location.
7	Location-Aware and Personalized Collaborative Filtering for Web Service Recommendation : A Review	ChinnuPriya J.V., Suja Rani M.S International Journal of Computer Applications (0975 - 8887) Volume 133 - No.14, January 2016	1.Collaborative filtering techniques presents a QoS based recommendation system.Basically the system will predict the QoS value of a web service and will recommend the best for an active user. 2.This can be integrated with the location information of both users and the services on finding the similar neighborhood results in better QoS predictions.As the IP address of the user is known it is much easier to locate AS number and the country where he is located.
8	Personalized QoS-Aware Web Service Recommendation via Exploiting Location and Collaborative Filtering	Nikita R.Gurjar, SandeepV.Rode International Journal of Advanced Research in Computer Science and Software Engineering Volume 5, Issue 1, January 2015	1. This paper presents an innovative QoS-aware Web service recommendation approach . 2. The basic idea is to predict Web services QoS values and recommend the best one for active users based on historical Web service QoS records. In order to better recommend Web services to users from amount of services with identical functions, this paper proposed a Web service recommendation approach based on collaborative filtering. 3.In this paper, recommendation

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			approach considered the correlation between QoS records and users‟ physical locations by using IP addresses, which has achieved good prediction performance and makes the QoS prediction more confident for Web service recommendation.
9	A Survey of Web Service Recommendation Techniques based on QoS values	AshwiniPuri, MansiBhonsle International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 12, December 2015	1.This paper has aimed to give the overview of web service recommendation system using collaborative filtering and gives brief explanation on its types and filtering procedure that is QoS prediction and recommendation. 2. QoS Prediction method has combined user-based and item-based algorithm to predict the unknown QoS values of services and then recommend 3.Web services with optimal QoS to the active user. Similarity calculation of users or services is based on historical invocation information of services or users.
10	Web Service Recommendation Based on Usage History	Nikita R. Gurjar, Dr. Sandeep V. Rode International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 6, June 2015	1.In this paper, It proposed location-aware Web service recommendation approach, which significantly improves the recommendation accuracy. 2.Location-aware Web service recommender system (named LoRec) is a system which employs both Web service QoS values and user locations for making personalized QoS prediction

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VI. PROPOSED ALGORITHMS

a) SYSTEM WORKING AND ARCHITECTURE

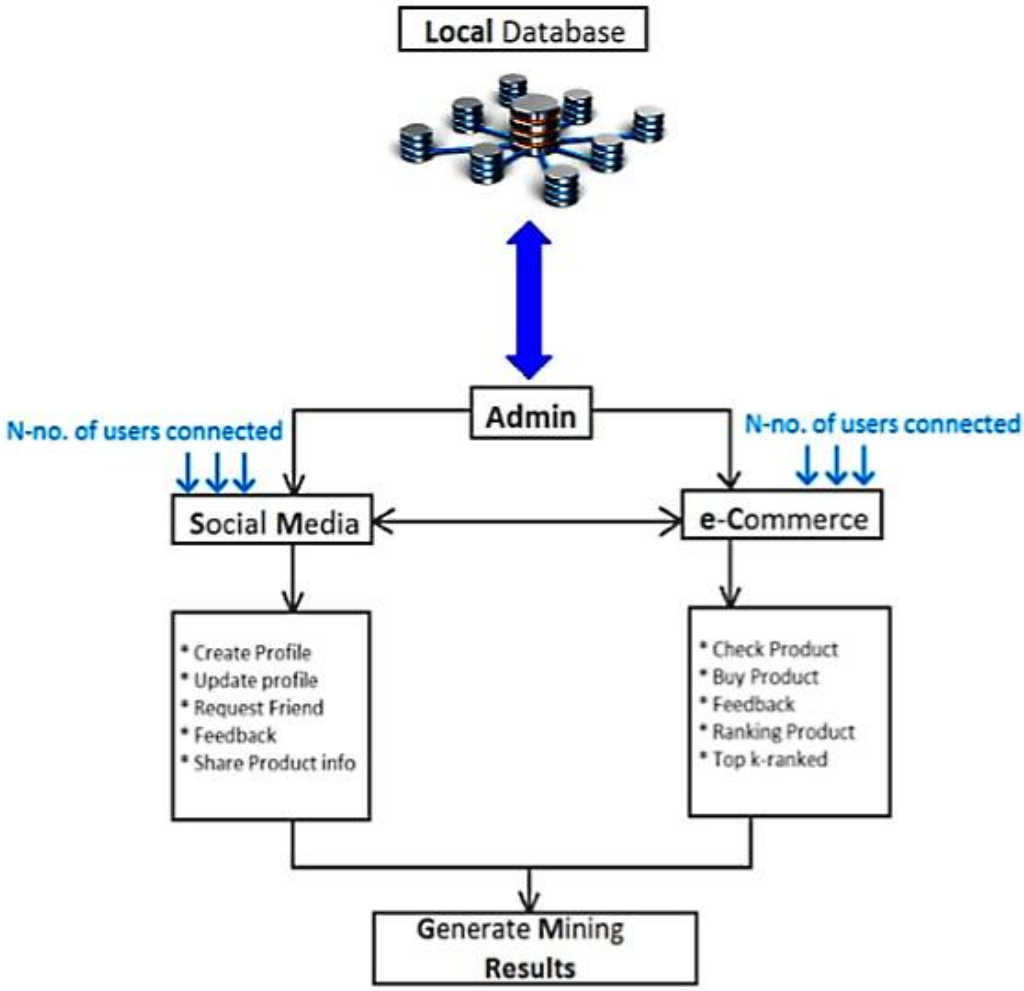

Fig. 4. Recommendation System

Description:-

1. The above figure shows the combination of the social and e-commerce.
2. This system gives the more accuracy for analysing the both technology.
3. In this system user can user both website same location. If any user can purchases the any product from e-commerce website.
4. But user use that product and he allow to give the review of the product, like how it is, how work functionality etc. so he can send review of the product.

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VII. STEPWISE EXECUTION

- Mart Algorithm

Gradient boosting algorithms aim to produce an en-semble of weak models that together form a strong model in a stage-wise process. Typically, a weak mod-el is a J-terminal node Classification And Regression Tree (CART) and the resulting gradient boosting algorithm is called Multiple Additive Regression Tree(MART).

1. Cold start is a situation when a recommender system doesn't have any historical information about user or item and is unable to make personalized recommendations. Cold start is the worst nightmare of any recommender system researcher.
2. So one way to deal with cold start is eliciting new user's preferences via initial interview. However, interview based elicitation is not useful as user often get bored when they are asked a series of questions. Now, ML guy can use his decision tree knowledge to learn a model that smartly chooses a minimum set of the question while learning user's preference.
3. Furthermore, there is a vast literature on Learning to rank for recommendation. Although, Learning to rank shares DNA with Information retrieval, its more ML technique.

VIII. EXPERIMENTAL RESULT

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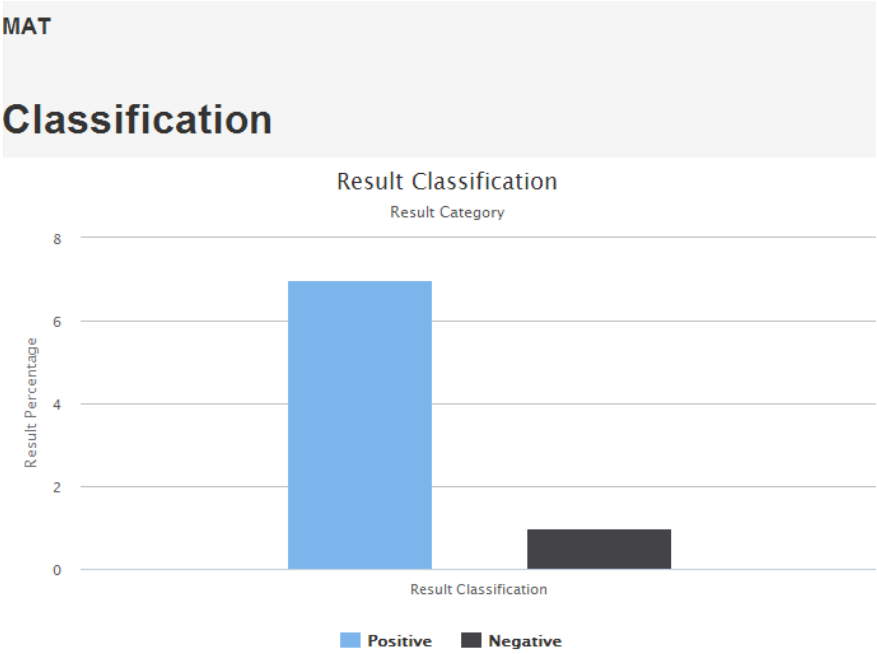

IX. CONCLUSION AND FUTURE SCOPE

In last few years the border between online media and e-commerce is diminishing.Many e-commerce site use recommendation system to recommend the product to customer.But traditional recommendation system use collaborative filtering which is learning about user searching history or clickstream. But one major problem is cold start problem means if user doesn't have any purchase history.For this problem solution is collect the attribute or feature of customer demographic attribute like gender, education, age also text attribute like opinion, interest and network attribute etc. For the purpose of extraction attribute we use Facebookapi.Then these extracted features are matched with e-commerce database. This matching process is done by using Multiple Additive Regression Tree (MART) algorithm. MART algorithm creates matrix factorization of this feature data and e-commerce data.Then admin or e-commerce site will be recommending the product to customer. and also proceed for next purchasing process.

X. FUTURE SCOPE

In Future scope we will work on AI Powered Personalization i.eon AI and machine learning engine understands your users' activities and behaviors as individuals and can make the right suggestions in terms of content or products to them. Lets say you have a website with a large email newsletter subscription base. You can recommend dynamic content that changes to suit every user based on their history with your brand. Similarly, in an ecommerce enterprise, you can make recommendations for products in emails and on your website that cater to every user personally.

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