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Rule Based Social Network Mining and Forecasting For True Reviews

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Abstract: **In today's world, there is a tremendous amount of data generated and available on social networking websites. Researchers are always on the lookout for huge amounts of data for analysis purpose and hence, this type of data obtained from such sites can be of great use for them. One of the major problem in social networking is that the user can send friend request to anyone they know or they don't know and are more prone to get false data or reviews. Accepting friend requests does not determine how strong the friendship is. One of our major objectives is to determine the friendship strength between two users based on the interactions between them. The users' privacy here, is an important concern and thus we would be performing the mining in a purely ethical manner. Based on this friendship strength of the user, we are going to perform targeted advertisement by posting advertisement of various products and also generate true reviews about that product by collecting individual reviews of each user. The targeted advertising will not only help in posting advertisements of products that are of the users interest but will also boost businesses since only those advertisements will be posted to the users page that the user is more likely to buy. We can state that the reviews obtained on our website for trending products were true. The products who got good positive reviews on our site were true because we have verified about the popularity of these products. The Market demand for these products rose highly to a great level and hence, we can conclude that our system gives true reviews.**

Keywords: **Review based Forecasting, Social Network Mining, Targeted Advertising, True Reviews.**

I. INTRODUCTION

Nowadays, everyone is connected with each other with the help of social networking sites. Anyone can send a friend request to any person and get connected with them. They can interact with each other, follow each other's activities; but this does not determine the strength of the friendship they share.

In today's world, getting reviews of various products manually is very difficult and a tiring job. And no one has time to provide reviews for every product. Instead, we can ask reviews for product on social sites, where people sit in their leisure time.

We also know that people who share a good relationship tend to have a similar thinking. Also, door-to-door marketing requires more effort and manpower. So by determining friendship strength, we can perform targeted advertisement, since people with good friendship strength will have a similar liking towards the product.

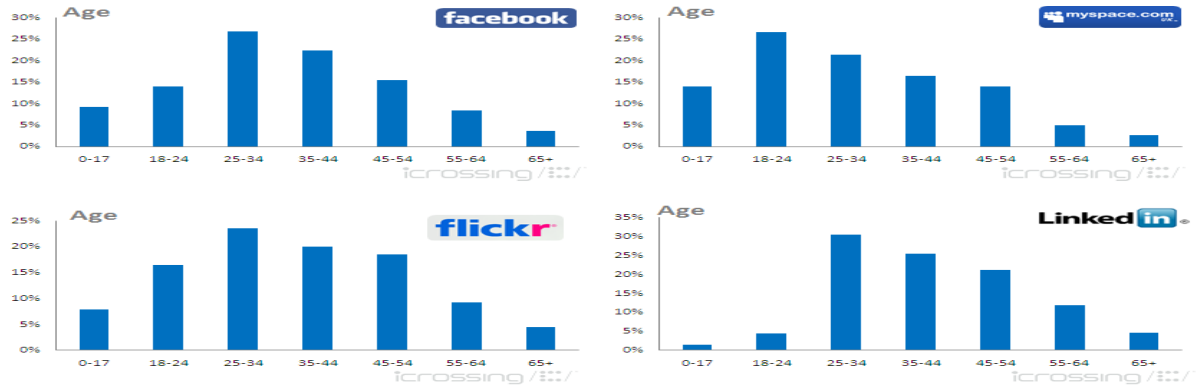

Fig. 1: Age group of users of Social Network Websites [1]

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As shown in the above fig. we can see that most of the users of Social Networking Websites have an age group of 20-50. That shows that the users are adults and more into online shopping. Thus, we can integrate social networking with advertisements for online shopping in order to obtain true reviews of the products, forecasting products, as well as letting users know what opinions their friends have on a particular product.

Our project is a social networking site in which the user can send friend requests to other users by searching them on the site. Once the friend request is accepted, the user can interact with the other user by chatting, messaging, or liking the other user's post, images, etc. Based on these interactions, the friendship strength between the two users will be calculated and a community will be generated of all the close friends. Various advertisements of the products will be posted in the community and all the users will be asked for reviews for that product. True review of that product for that community will be generated from the individual reviews of all users. With the help of all such true reviews from all the communities, the popularity of that product will be determined and targeted advertisement will be done in that community.

II. SOCIAL MINING

i. ***Friendship Strength:*** A social network user *may* have many "friends", "connections", or "followers". Among those people it is not likely that the user will have the same relationship or connection with all of them. Friendship Strength shows the degree to which two individuals are connected to each other, the measure of how much related two individuals are based on their interaction. The friendship strength will be calculated based on how much two individuals interact, while doing so in an ethical way.

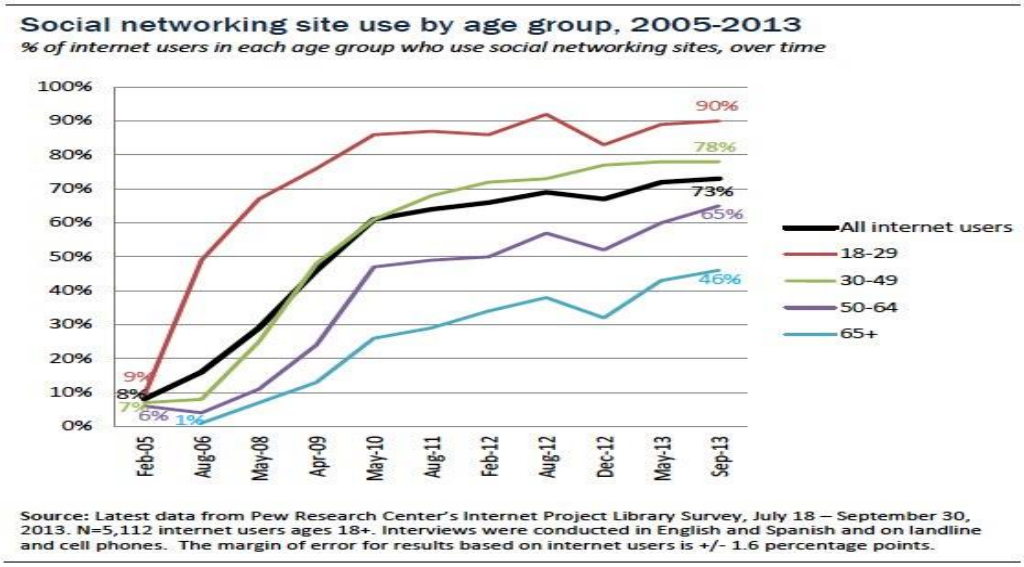

Fig. 2: Percentage increase in users of different age groups of Social Networking Websites over time[2]

The above fig. shows the graph of increase of Social Networking Website Users of different age groups from the year 2005. We can see that the number of users is increasing exponentially. Thus integrating a product review system with the social networking websites will be nothing but a boon for businesses. So as we see, all of these people are related with friendship. Due to the increase in the no. of users in the social networking fields, it has become essential to determine the strength of friendship between them.

ii. ***Community Cluster:*** This is a community managed by a user of the social networking website. The friends of the user with whom he/she interacts the most i.e. the individuals with whom he/she has high level of friendship strength will be placed in this community cluster. The community is created as it is more likely that the user will have more or less the same thinking and opinions as those with whom he /she has high friendship strength levels.

iii. ***Targeted Advertising:*** Targeted advertising is a type of advertising whereby advertisements are placed so as to reach consumers based on customer interests. Through targeted advertising we can display advertisements of those products to a customer that the customer will be more likely to purchase. This will boost business as well as customers will not be displayed unwanted advertisements.

iv. ***True Reviews:*** Nowadays, we find many false reviews about various products on e-commerce websites. With an increase in the misleading reviews due to the biased nature of some individuals towards a particular brand, there is a need for a system that would provide us with true reviews. A final review based on all reviews provided in a cluster. The true review will provide a final rating of a particular product.

III. RULE BASED MINING FOR ANY SOCIAL NETWORKING SITE

User A interacts with User B. The interactions or messages of user A to user B will be stored in the database and a count of interactions will be generated. These interactions are stored in order to calculate the strength of relationship that user A has with user B.

Similarly, the interactions or messages of user B to user A will also be stored in the database and count of interactions will be generated. These will be used to calculate the strength of relationship that user B has with user A.

RULE 1:

TABLE I: Table for determining the Friendship Strength

No. of interactions per week	Factor	Friendship Level
above 100	5	Top Friend
75 – 100	4	Very Close
50 – 75	3	Close
25 – 50	2	Medium
10 – 25	1	Just Friends

After capturing the number of interactions, we will calculate the friendship strength. In order to calculate the friendship strength the following formula will be used

F. S. = Interaction (A→ B) * Factor + Interaction (B→A) * Factor

Where,

Interaction (A→B) is the number of interactions user A has with user B.

Interaction (A→B) is the number of interactions user B has with user A.

Factor will be obtained from the above table.

For example, Consider that user A has 97 interactions with user B and user B has 72 interactions with user A. The factors for user A and user B are 5 and 4 respectively.

The friendship strength for the above example is

Friendship Strength = (102*5) + (72*4)

= 792

RULE 2:

TABLE II: Table determining the Friendship Level

Friendship Strength	Friendship Level
Above 750	Top Friend
550 – 749	Very Close
400 – 549	Close
200 – 399	Medium
0 – 199	Just Friends

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IV. PROPOSED SYSTEM

The application will be a social networking site which will be integrated with a review based system. In this application, the users first need to register themselves on the site with the help of registration module. If he/she is already registered, the user can login to the system using the login module.

Once logged in, the user can send friend requests to his/her friends or relatives. The other person needs to accept the user's friend request to get connected with the user. The user does not need to send request every time he/she logs into the system. The users can unfriend the person using the unfriend module.

The user can now interact with his/her friend. Data mining algorithms will be applied to find the strength of relationship between persons since maximum people are connected by the relation of friendship. The strength of relation between friends will be calculated on basis of amount of interaction between them. A counter will be used for keeping a track of amount of interactions. At the end of every week, the strength of friendship between the user and his/her friends will be determined by taking into consideration the value of the counter. The strength of relationship will be categorized into communities (For example: acquaintances, just friends, close friends etc.) with the help of clustering technique.

The users of the application can also provide reviews about products on the website. Once a review for a product is provided by a user, a notification will be provided to all his/her close friends. When the user views a particular product, the application will display reviews of their close friends if any.

True reviews will be generated on basis of all the reviews provided by the members of the community. Semantic analysis will be done on all the reviews for a product in a community after which a rating for the product will be generated for that community.

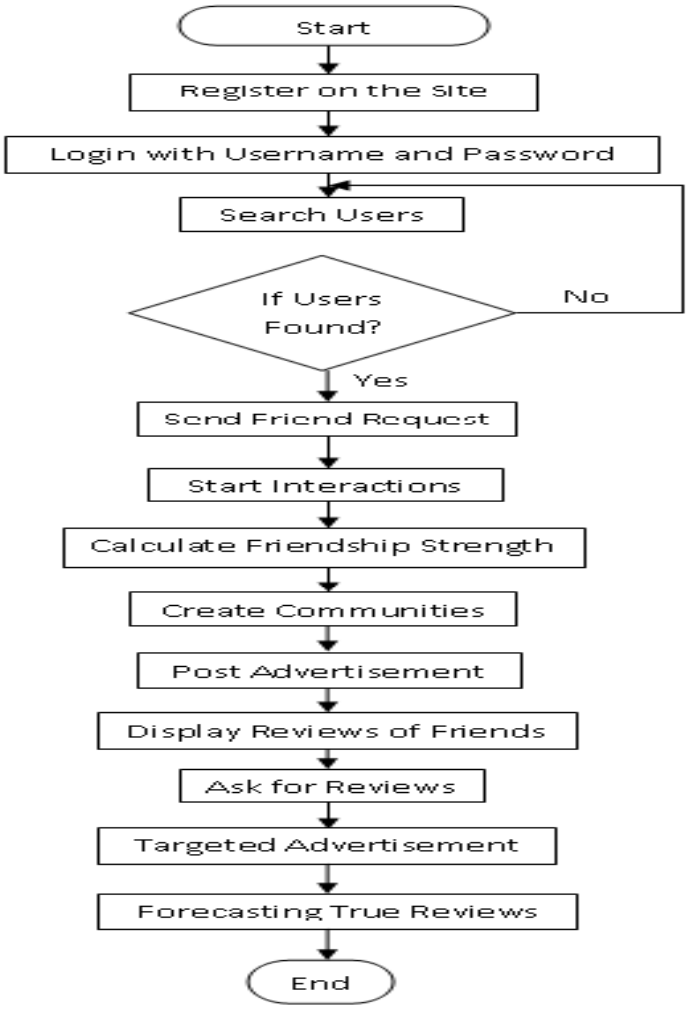

Fig. 3: Flow chart of the proposed system [3]

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Targeted advertising on the social network site based on his/her reviews for various products and the strength of the friendship through which user will be displayed advertisements on the basis of their reviews. Based on the overall ratings and reviews of a particular product, its popularity will be calculated and the most popular products can be viewed by the user.

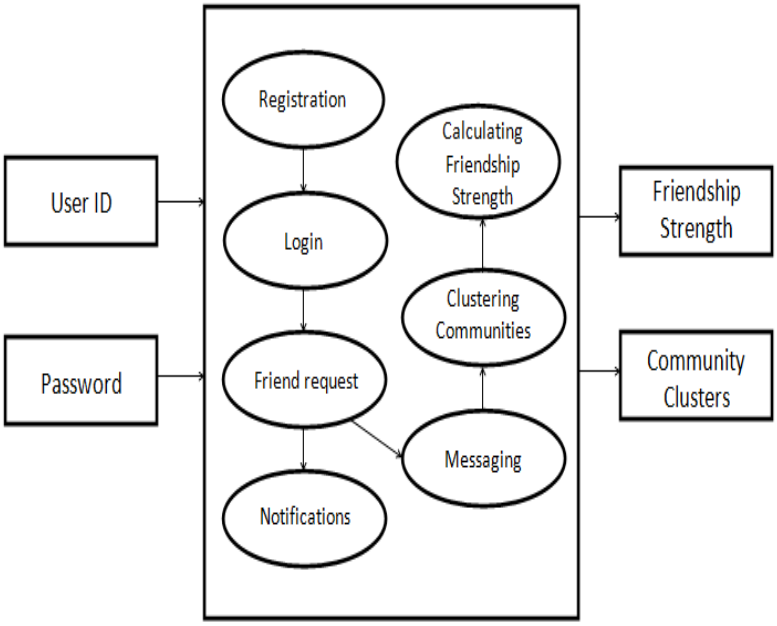

Fig. 4: Block Diagram of System that will generate friendship strength and create communities[4]

User will provide his/her personal details for registering onto the site. The user will set a User ID & Password for his/her account. These will be the inputs to the application. This input will be used for Login purpose for gaining access to his/her personal account. A Registered user will be able to send friend requests to his/her relatives or known individuals. Once friends, the user will get notifications about the activities of his/her friends. The users of the application will also be able to provide reviews about certain products on the website. Based on the number of interactions between friends via messages, the strength of friendship between two users will be calculated. Different clusters will be formed depending on the strength of friendship between the users (Example: Close friends, Just friends, Acquaintance).

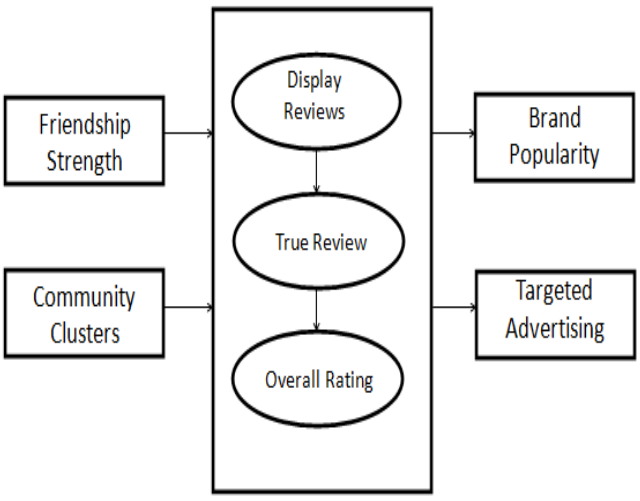

Fig. 5: Block Diagram of System to determine brand popularity and perform targeted advertising [5]

Based on the strength of Friendship, reviews of a user's close friends will be displayed. True reviews will be generated based on the Community Clusters formed. This data will then be useful for calculating the overall rating of the product.

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Based on the overall rating of the product, we will come to know about the most popular products in our application & hence will use this information for targeting the interested audience of our application.

V. IMPLEMENTATION

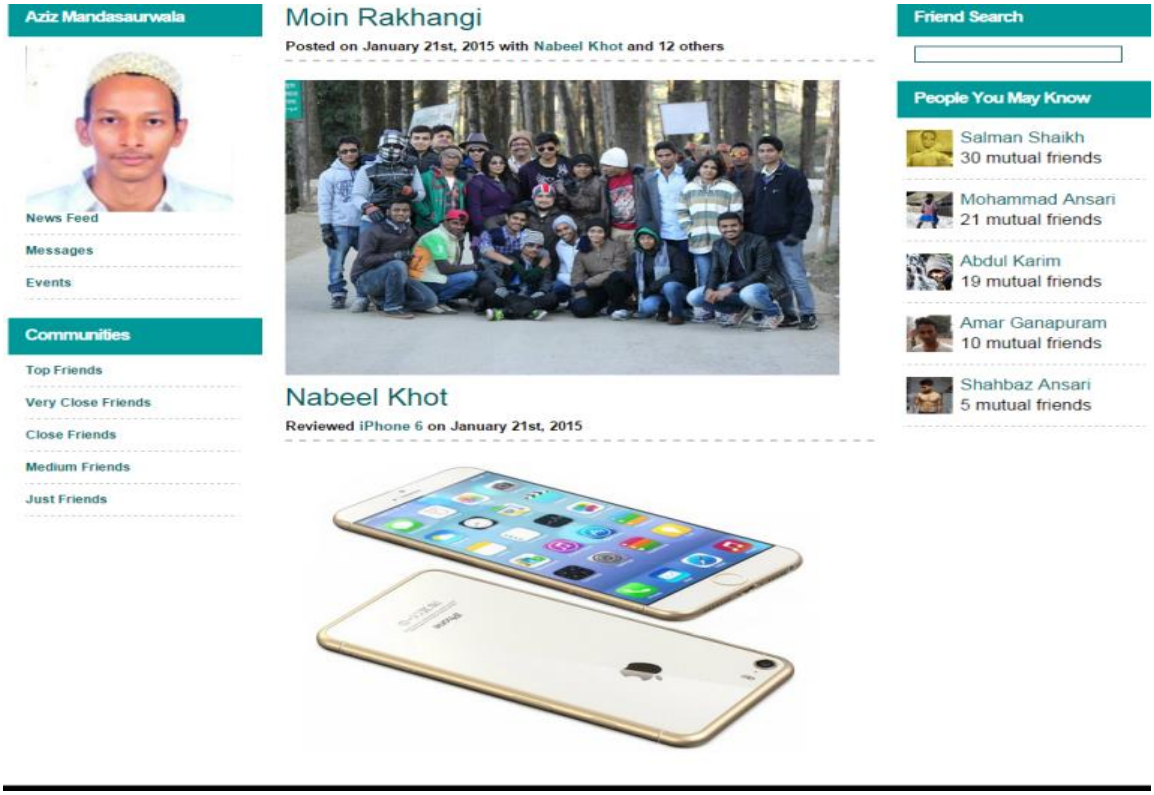

Fig. 6: Screenshot of Homepage [6]

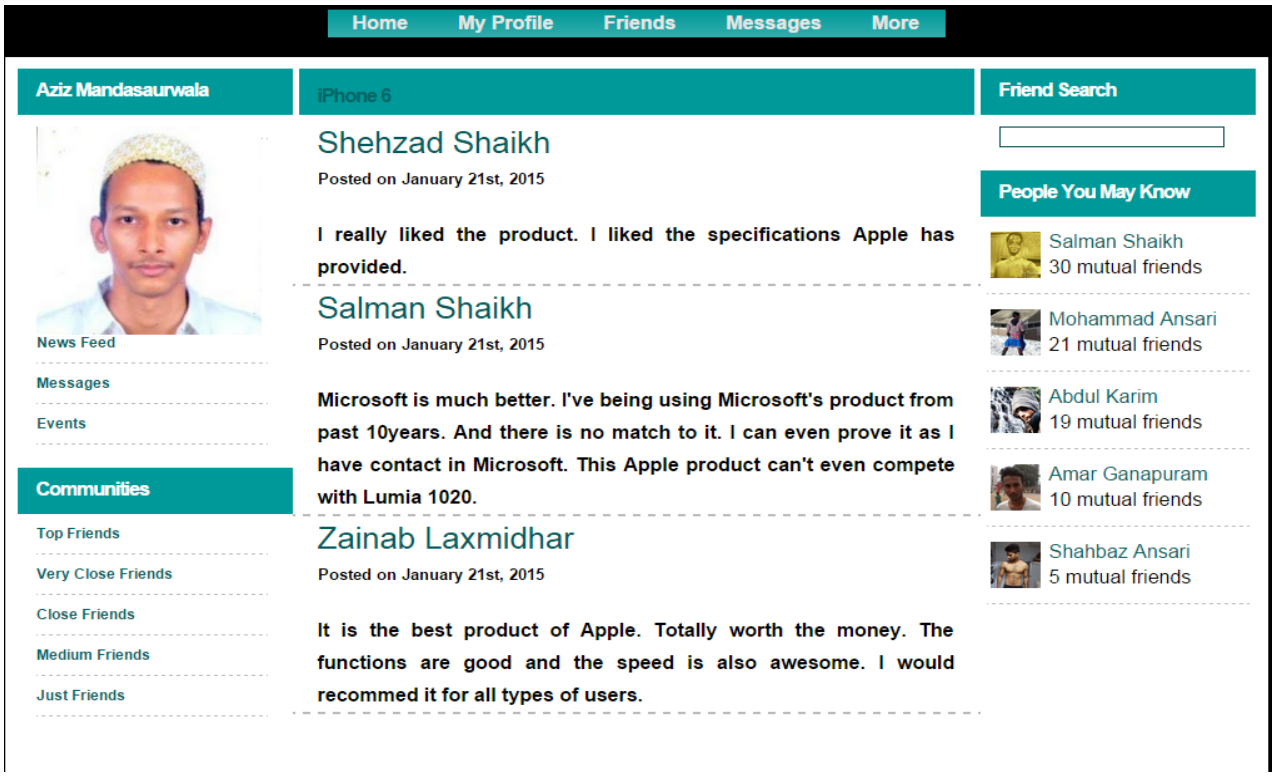

Fig. 7: Screenshot of User's Profile [7]

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FIRST_NAME	LAST_NAME	EMAIL_ID	NO_OF_INT1	NO_OF_INT2	FRIENDSHIP_STRENGTH
Salman	Shaikh	shaikh.sallu@live.in	115	90	935
Ashfaq	Mavli	ashfaq>mavli@gmail.com	97	99	784
Ahmed	Ansari	ahmedansari@gmail.com	72	102	792
Taha	Kanchwala	tahak353@yahoo.com	84	106	866
Shehzad	Shaikh	cybershaz@gmail.com	95	93	752

Fig. 8: Table containing the values for determining the strength of Friendship[8]

VI. CONCLUSION

We performed a survey and based on our survey, we can state that the reviews obtained on our website for trending products were true. We can say that the products who got good positive reviews on our site were true because we have verified about the popularity of these products. The Market demand for these products rose highly to a great level and hence, we can conclude that our system gives true reviews. We performed mining in an ethical way and found out the strength of friendship without disturbing the privacy of the users. Forecasting done in our project has been done in the proper manner and hence, we can say that we have done the project in a proper manner.

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