



# FRIEND RECOMMENDATION THROUGH SEMANTIC BASED MATCHING AND COLLABORATIVE FILTERING SYSTEM IN SOCIAL NETWORKS

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**Abstract:-** Social network sites have attracted millions of users with the social revolution in Web 2.0. Social networking services currently existing recommend friends based on their social graphs to users, this is not how user's preference on selecting friend in real life. In this paper, we present Friend recommendation through Semantic based matching and collaborative filtering System in social networks which recommends friends to users based on their life styles instead of social graphs. The main idea of proposed method for friend recommendation consist of three stages; (1) discovers life styles of users from user-centric sensor data; (2) measures the similarity of life styles between users; (3) recommends friends to users if their life styles have high similarity. Hear user can send query regarding certain issue and user can also send the feedback regarding recommendation. We have implemented this on android based smartphone and evaluated its performance. The results show that the recommendations accurately reflect the preferences of users in choosing friends.

**Key words:-** Friend recommendation, social networks, friend, life style

## 1 INTRODUCTION

Some years ago, people made friends with neighbors or colleagues. We call friends made through traditional way as G-friend. With the advent of Web 2.0, social networks, services such as Facebook, Twitter and Google+ have

provided us revolutionary ways of making friends. According to Facebook statistics a user has an average of 130 friends [2]. Mobile devices with context-aware sensors are becoming increasingly popular among people. The wealth of available sensor technologies creates more possibilities for context-aware systems. The context-aware systems should provide the user with adaptive recommendations for potentially relevant information.

Existing social networking services like Facebook recommend friend to user based on social graph. One challenge in existing social networking services is to recommend good friend. They recommend the friends to the user based on the social graph and mutually known friends. Unfortunately Existing recommendation may not be the most appropriate based on recent sociology findings [16], [23], [22], [21]. There are certain rules to group the people together include 1.habbits, 2.attitude, 3.tastes, 4.moral standards, 5.economic level and 6.people already known according to those studies. In existing recommendation system rule #3 and rule #6 are main factor of consideration. In our recommendation system we have taken all those rules into consideration to recommend friend to user. This recommendation mechanism can be deployed as a standalone app on smartphones or as an add-on to existing social network frameworks. In both cases, our recommendation mechanism can help mobile phone users find friends either among strangers or within a certain group as long as they share similar life styles.

In human beings life they have number of habits,

attitude, taste and they have some moral standards and their economic level. In this paper we have used this content to recommend the friend to user. It is difficult to obtain these information automatically so we asked user to enter these data. Our proposed solution is also motivated by the recent advances in smartphones, which have become more and more popular in people's lives. These smartphones (e.g., iPhone or Android-based smartphones) are equipped with a rich set of embedded sensors, such as GPS, accelerometer, microphone, gyroscope, and camera.

In spite of the powerful smart-phones, there are still multiple challenges for recommending potential friends based on their similarities. First, how to measure the similarity of users? Second, who should be recommended to the user among all the friend candidates? To address these challenges, in this paper, we present Friend recommendation through Semantic based matching and collaborative filtering System in social networks.

The contributions of this work are summarized as follows:

- To the best of our knowledge, this is the first friend recommendation system that users user's life style, attitude, tastes, moral standard and economic level information for friend recommendation.
- We propose a unique similarity metric to characterize the similarity of users and then construct a friend-matching graph to recommend friends to users based on their life styles.
- We integrate a linear feedback mechanism that exploits the user's feedback to improve recommendation accuracy.
- We conduct both small-scale experiments and large-scale simulations to evaluate the performance of our system. Experimental results demonstrate the effectiveness of our system.

The remainder of this paper is organized as follows. Section 2 introduces related works. Section 3 presents System design of the recommended method using lifestyle, attitude, tastes, moral standards, economic level, and people already known. Section 4 discusses and concludes our proposed recommendation method.

## 2 RELATED WORKS

### 2.1. Social Network Site

The evolution of the Web from Web 1.0 to Web 2.0 has brought up new platforms as SNSs that are used by users to articulate and manage their relationships. SNSs are an online phenomenon which has become extremely popular [5]. They provide social network based services to support easy message posting, information sharing and inter-friend communication [6].

SNSs are defined as web -based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system [7].

The SNSs are used to articulate and manage relationships to personally known people. It is expected that a recommendation sent by one of the social network contacts is perceived as highly relevant for the user. The success of SNS to bind users and their friends has initiated concepts for usage of social network data for a more precise and personalized recommendation of information to users [5].

### 2.2. Recommender System

Recommendation systems have received significant attention from both academia and industry since the mid-1990s when collaborative filtering was introduced. Recommendation systems are usually classified into two categories: content-based recommendations and collaborative filtering based recommendations [9], [10], [14], [12].

Content-based filtering recommends items that are similar to ones, the active user preferred in the past [13]. Content-based recommendation systems recommend an item to a user based on item description and user's interests [12] and are useful recommending web pages, news articles, items for sale, etc.

Traditional collaborative filtering recommends items to an active that have been rated highly by users who are similar to the active user [9]. Collaborative filtering based systems recommend items that other similar users have preferred. Collaborative recommendation computes the similarity to other users rather than to other items [12]. Several hybrid recommendation systems combine both collaborative and content-based methods [12].

In recent years some recommendation system that try to suggest item like Books, music, movie and so on are becoming more and more popular. For instance Amazon [1] recommends the item to user based on their previous visits and Netflix[3] recommends items that other users are looking at. Rotten Tomatoes [4] recommend movies to a user based on the user's previous ratings and watching habits.

Researchers proposed some other recommendation mechanisms. For example, Bian and Holtzman[8] proposed MatchMaker in this it recommend friend to user based on personality match using collaborative filtering. Kown and Kim[20] proposed Friend recommendation system where recommendation is based on Social and Physical context. But author did not specified what social and physical context is and how to obtain those information.

Geographically related friends recommendation is proposed by YU et al[15] in this recommendation mechanism it combines both GPS information and social network structure Hsu et al. [18] studied the problem of link recommendation in weblogs and similar social networks, and proposed an approach based on collaborative recommendation using the link structure of a social network and content-based recommendation using mutual declared interests. Gou et al. [17] proposed a visual system, SFViz, to support users to explore and find friends interactively under the context of interest, and reported a case study using the system to explore the recommendation of friends based on people's tagging behaviors in a music community.

Desikan [11] proposed incremental page ranking computation on evolving graph. Page,Brain, Motwani, Winograd [24] proposed page ranking citation Ranking which is used in web page ranking by using this we implemented the higher the ranking, the easier the user can be made friends with, because he/she shares broader life styles with others. Note that the work in this paper is significantly different from our preliminary demo work of Friendbook [19] that recommended friends to users based on the similarity of pictures taken by users.

### 3 SYSTEM DESIGN

In this section, we give a high-level system design of the recommended system. Figure 1 shows the system architecture of recommended

system adopts a client-server mode where each client is a smartphone carried by a user and the servers are data centers or clouds.

#### 3.1. CLIENT SIDE

In this client side where each client is the smartphone cared by the user and it consist of two modules namely Registration module, User module.

##### 3.1.1 REGISTRATION MODULE

In this module whenever new user comes to perform certain operation that new user must be registered in the system by giving certain details. When new user wants to register he needs to enter the details like username, password, Full name, some valid E-mail address, and date of birth of user in valid format, enter the valid 10 digit mobile number, and select the habit, attitude, tastes, moral standards, economic level that are related to him and upload the photo of the user. After entering those details only user will get registered and then only user can perform certain operations in the system.

##### 3.1.1 USER MODULE

In user module there are n numbers of users are present. After registration successful he/she has to login by using authorized user name and password. Login successful he/she will do some operations like search user, send request, view request, view rank, recommend friend.

In *search users* user can search the other users who are all registered by selecting the particular searching category, *send friend request* to the users whom they likes by selecting particular searching

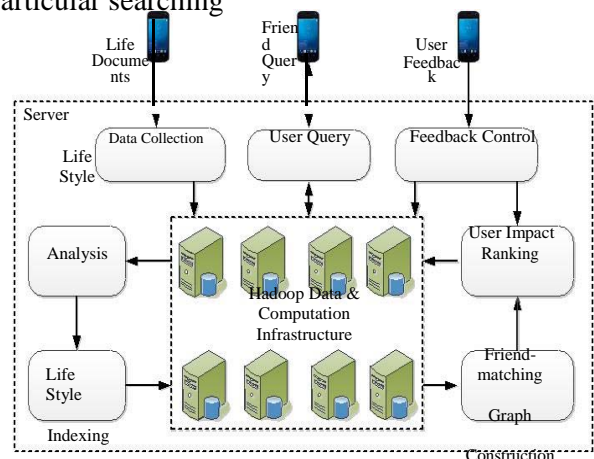


Fig. 1: System architecture.

category, *view friend request* hear user will view all the users who have sent the friend request. *view rank* hear user can view his rank which is generated by the recommendation system based on the user life style and friend requests got from other users, *Recommend the friend* hear user can suggest certain user to some other users based on their similar characteristics and also he/she can view the suggestions of certain users from the other user as well as our friend recommendation system based on their life style matching percentage with other Similar users.

### 3.2 SERVER SIDE

On server side to fulfill the task of friend recommendation seven modules are designed namely Admin module, Data collection, Data analysis, Friend match graph, user impact ranking, user feedback control, user query.

#### 3.2.1 ADMIN MODULE

In this module, the Admin has to login by using valid user name and password. After login successful he can do some operations such as *add details* hear admin adds some general details regarding habit, attitude, taste, moral standards, economic level. These details will be used by the user to choose their respective once. In *view details* admin can view the details that are added by him. In *add groups* admin can create the new groups with certain names in later stages he adds certain person to certain group, In *view groups* admin can view all the groups that are created by him. In *from group* admin will add the registered user to certain group, In *View list of users* he can view all the registered user at a time and there details, In *view all user ranks* admin can view all users rank which is computed in user impact ranking, In *view friend match graph* admin can view the friend match graph between the users which are computed in friend match graph construction module.

#### 3.2.2 DATACOLLECTION

In this module it collect the raw data given by the users using his smartphones those data are regarding users life style, attitude, taste, moral standards and economic level by choosing the general details that are already added to the user by in admin module by the admin. These data will help us in recommending the good friend to user.

#### 3.2.3 DATA ANALYSIS

In this module data of the user that are collected from the smartphone are stored in the data base in proper way that is (details, user) not (user, details). So that those data will be used in further stages to recommend the good friend base on their similarities in their habits, attitude, taste, moral standards, economic level and people already known.

#### 3.2.4 FRIEND-MATCHING GRAPH

In this module data that are analyzed are used construct the graph that tells which user is having high similarities with which user and also tells us how much similarity exist between the user in percentage. Then by using those percentage value system will automatically recommend friends to the users whose life style is having high similarity percentage. System will automatically recommend the friend to the user when their similarity is more than 60 percentage.

#### 3.2.5 USER IMPACT RANKING

In this module system will calculate the users ranking based on the his behavior in the system and also how much friend recommendation that user got from other users based on that count the user impact ranking is calculated in the impact ranking module.

#### 3.2.6 FEEDBACK MODULE

In this module user send the feedback and rating of our recommendation system. User sends the feedback to the admin regarding certain issues in certain group and he/she also tells admin about the

matter on which he is giving feedback. User also sends the rating of our Friend recommendation system. Then admin looks into the feedback if any problem exist in certain issue then admin can think which solution is better to solve those issue. And then implement the best solution to solve the problem.

### 3.2.7 QUERY MODULE

In this module, the user can send query message to another user. If user want to send query message to another user, then enter group name, about and write query and send, that query will send to particular user.

## 4 CONCLUSION AND FUTURE WORK

In this paper, we presented the design of the Friend recommendation through Semantic based matching and collaborative filtering System in social networks. Which is different from the friend recommendation mechanisms relying on social graphs in existing social networking services, this recommendation system takes the user related data collected from user and by using that data we constructed the friend match graph and by using that graph we recommended potential friends to users if they share similar life styles. We also obtain the feedback and query from the user regarding certain issue so that we can resolve the problem. We also obtained the feedback from the user about our recommended system. We implemented our recommended system on the Android-based smart-phones, and evaluated its performance on both small-scale experiments. The results showed that the recommendations accurately reflect the preferences of users in choosing friends.

Beyond the current prototype, the future work can be four-fold. First, we would like to evaluate our system on large-scale field experiments. Second, we intend to obtain the user related data automatically by using the smartphone sensors. Third, the similarity threshold used for the friend-matching graph is fixed in our current prototype of our

recommended system. It would be interesting to explore the adaption of the threshold for each edge and see whether it can better represent the similarity relationship on the friend-matching graph. At last, we plan to incorporate more sensors on the mobile phones into the system and also utilize the information from wearable equipment's (e.g., Fitbit, iwatch, Google glass, Nike+, and Galaxy Gear) to discover more interesting and meaningful life styles.

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