

# Friendbook: A Lifestyle Based Friend Recommendation System and Chat Application

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## ABSTRACT

We develop a system that allows users with similar interests to be quickly introduced based on the similarities in their lifestyles. With the development of social networks, it has been increasingly easier to make friends on the Internet. However, it may not be as easy to automatically find a friend with similar interests. Facebook count on a social link analysis among those who already share common friends and recommend proportioned users as probable friends. Regrettably, this approach may not be the most appropriate based on recent friend findings. A real online system named Friendbook, is implemented on a smart phone network. If high similarity is found in lifestyles of user's then they can be suggested as friend. A linear feedback mechanism is integrated that exploits the user's feedback to improve recommendation accuracy. Recommended friends can accept request and later chat using this application.

**Keywords:** Friend recommendation, Life style, Smartphone sensors, Social network

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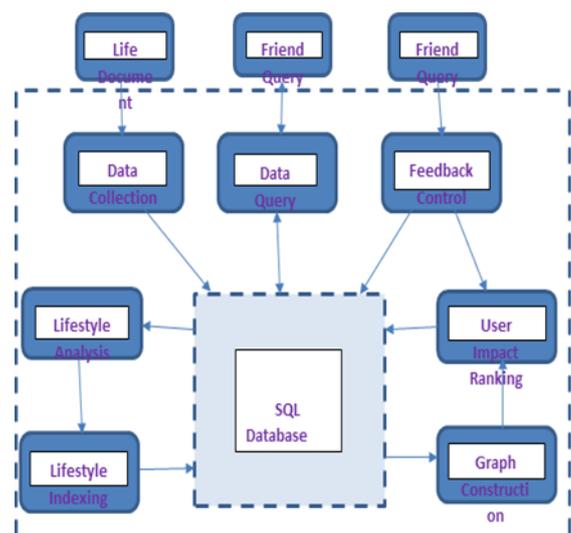
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## I. INTRODUCTION

Social networking has increased drastically and majority of the world population are following the social sites. Fact is people are busy in their lives due to which there is lack of communication among them. Social networking sites provides a platform that bridges up the lack of communication Social networks such as Facebook, Twitter, and Google+ has provided better ways of making friends. Through the source of Facebook statistics [IV], each person has an average of 120 friends, more than they had in the past. One major challenge with existing social networking site is the way they recommend friends to the user. Most of them depend on the existing user relationship to suggest friends. For example, Facebook analyses the social links of the user like who shares the common friends and suggest them the potential friends. There should be more factors that the system should consider while recommending friends. According to the recent study in the field of sociology, there are rules to group people together such as: Lifestyle, Behavior, Economic level, people they knew already, interests. Although Life style is unique rule, but it's somewhat difficult to capture through users web actions. Life style is closely related to daily activities. Therefore, we could extract the daily activities and recommend the friends based on it. The recommendation mechanism can be an App or an additional feature to the existing social networking site.



In our daily lives, we may have many activities, which form meaningful sequences of activities that shape our lives. This paper uses the word activity to specify the actions, such as “Sitting”, “walking”, or “typing”, while the phrase life

style to refer activities of daily lives, such as “office work” or “shopping”. For instance, the “shopping” mostly consists of the “walking”, but may also consist of “standing” or the “sitting” activities.

The proposed system also makes use of the advancement in the recent smartphones, which has become more popular. These smartphones are embedded with the rich sensors such as accelerometer, gyroscope, microphone, camera, GPS. Hence the smartphones are not just communication device rather they are main platform for sensing the daily activities of the user. In spite of the rich sensors there are multiple challenges for extracting the daily activities and recommending the friends. Firstly, How to extract meaningful activities from the noisy environment? Secondly How to measure the similarity among the users? Third who should be recommended to the user among the friend candidate? We present Friendbook, friend recommendation system based on sensor-rich smartphones.

## II. LITERATURE SURVEY

There are many application system that anticipates predicts the user for the client. Recommendation can be object suggestion or connection recommendation. Object suggestion is process of suggesting user items based on his past experience. For example Amazon [II] and Netflix [III]. Whereas the sites like Facebook and LinkedIn suggest Friends based on users connection.

There are many other recommendation system such as one stated by Bian and Holtzman [V] presented Matchmaker, a friend recommendation system based on personality matching. Other recommendation system includes the involvement of physical and social content presented by Kwon and Kim [VI]. There are many such examples but proposed system works very differently as compared to the existing system. Proposed system mainly works on finding users with similar lifestyle,

Activity recognition plays important role to extract the activity of the user from the information collected by user's smartphone sensor namely gyroscope and accelerometer. CenceMe [VII] used multiple sensors on the smartphone to capture user's activities.

SoundSense [VIII] used the microphone on the smartphone to recognize sound. Lots of work is done during the recognition period, because it's very difficult to estimate the activity out of huge database of activity. For example a user's location can be guessed if he is active location wise, but if a user stays at home always and if he is watching a movie then such activities cannot be discovered. Farrahi and Gatica-Perez [IX] overcame the drawback of people staying in the same location by considering combined location and physical proximity sensed by the mobile phone.

Friendbook is based on client-server architecture where the Client part is played by the Smartphone and the Server part is played by the cloud system. On the client side our smartphone gathers all the information in the form of life documents; documents are processed by the topic model to extract the activities of the user.

And on the server side there resides many modules such as; Data collection module collects life documents from the user smartphone. Lifestyle analysis module extracts the life

style of the user. Life style indexing puts the life styles of users into the database in the format of (life-style, user) instead of (user, lifestyle). Friend matching graph represents the user similarity between user lifestyle, User impact ranking calculates the impact on the users affinity.

## III. MATERIAL AND METHODOLOGY

### A) Life style modelling

Life style and activities can be said as mirror image of daily lives, where daily lives can be said as collection of lifestyle and lifestyle can be said as the collection of activities. Furthermore, the recent advancement in the field of text mining can be beneficial for proposed system, using it proposed system can model the daily lives of user as life document and lifestyle as topic at last activities as the words.

Further the probabilistic problem can be used to discover the hidden life style form the life document. We also have proposed “bag-of-activity” to replace the original sequence of activities that we have recognized based on the raw information, therefore the bag-of-activity represent the life documents and the mixture of the activity words.

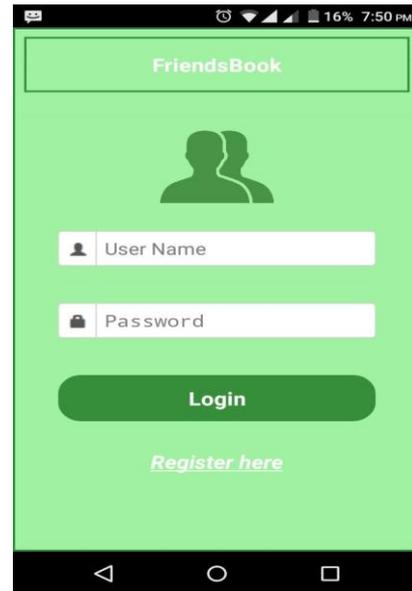
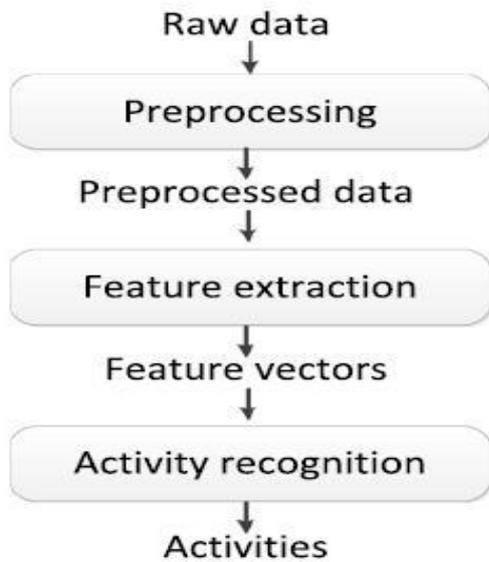
Let us assume  $w = \{w_1, w_2, w_3, \dots, w_n\}$  represents the activities and  $w_i$  is the  $i_{th}$  activity and  $W$  is the total number of activities. Let  $z = \{z_1, z_2, z_3, \dots, z_n\}$  represents the life style  $z_i$  is the lifestyle and  $Z$  is the total number of lifestyles.

Let  $d = \{d_1, d_2, d_3, \dots, d_n\}$  represents the life documents and the  $d_i$  is the life document and  $D$  is the total number of life documents.

### B) Activity recognition

Proposed system recognizes the activities of the users. Life styles are the mixture of the activities, and to recognize them proposed system follow two approaches supervised learning and unsupervised learning. Both the activities are tested using many techniques. As we know the user activities are unpredictable and cannot be anticipated so the supervised learning is unsuitable for proposed system. Therefore proposed system prefers the use of unsupervised learning. Therefore proposed system have adopted the K-means algorithm to cluster the data into groups where each cluster can be said is an activity. Since the raw data are very noisy so proposed system use the Sliding window to filter the outliers of noisy data. Also the life style is the mixture of all the motion activities and also non-motional activities. Therefore proposed system uses two motion sensors namely Gyroscope and Accelerometer. Gyroscope is a sensor that measures the location proximity and the accelerometer measures the speed or the Velocity. Friendbook also indulges the use of popular K-means Algorithm. K-means algorithm groups the similar objects into a class specific objects. The activities of the users are grouped into the clusters and the clusters contains the numerous activities. K-means is also used to acquire the location of the user. The k means is used derive the local location of the user.

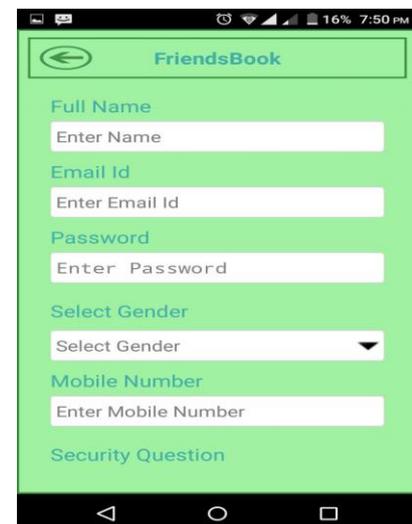
**IV. EXPERIMENTAL RESULTS**



**C) Friend matching graph**

Friend matching graph is used to represent the similarity between the different users. Using the constructed graph we can obtain that how a user can be chosen as friend for another user. Hence we developed new similarity matrix to calculate the similarity between two users. The graph has been constructed to display the relationship between the user. Graph consists of weighted links and the weights of the links are in numerical hence the number denotes the similarity between the two users. Also it may happen that a user life style consist of a Dominant life style and that dominant life style plays an important part in finding the potential friends because if their majority of life style are not similar than that would result in dissimilar life styles.

From the Beginning of the graph matching we define a threshold value and the value is used to compare with the weighted links and the values of the links should be less than the threshold in order to represent that the two users can be good friends



**D) Chatting Module**

User can accept request from recommended friends list and later on friends can chat using this application.

**E) Media Files Extraction**

Media files such as Music files, Video files can be extracted to find similarity between lifestyles. Lifestyle behavior of friends can be identified using files in gallery.





## V. CONCLUSION

In the proposed system, we present the implementation and style of friend recommendation to the social network based mostly upon lifestyle. It is varied from alternative friend recommendation systems and it's supported by social graph in existing social network service. Friend recommendation system has the collected from life designs from user specific device data on sensible phones and recommendation is finished to alternative users on basis of it, if they share similar life. Media files from user's smartphones help to recommend friends. Location can be a factor to suggest friend having same interest, same lifestyle.

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