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FriendBook: An Efficient Way to Recommend Friends on Social Networks Through Life-Style

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ABSTRACT

The social networking world has grown over a past few years. Existing system recommends friends on Social networking sites depends on the user's mutual connections. This paper proposes Friendbook which recommends friends on social networks based on similar life style. Taking the advantage of smartphones sensors, Friendbook extracts the user life style from the data gathered by the sensors, and suggest friends to the users if they have high similarity. Inspired by the enhancement in Text mining technique the user life style is represented as the life documents, through the document his/her life style are extracted using the Latent Dirichlet allocation algorithm. This paper proposes a similarity matric that calculates the similarity between the users and measures the impact of users life style considering the life style with Friend Matching graph. After receiving request, Friendbook returns a list of potential friends to the query user. Finally Friendbook even has a feedback mechanism that helps to improve the recommendation system. Concluding Friendbook would be beneficial for user to bridge up his social life.

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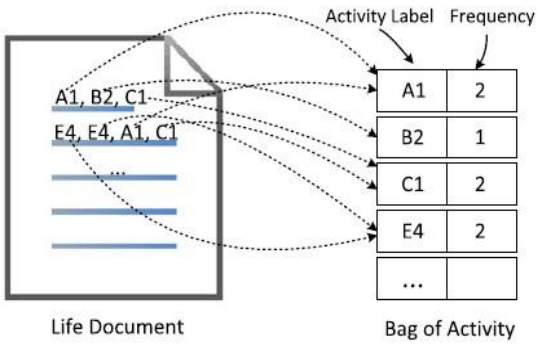
I. INTRODUCTION

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[4], 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 user‟s 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. RELATED WORK

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 ac tive 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 [9] 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.

Feedback control:-module that takes the user feedback

Existing System (Modification): Activity recognition serves as the basis for extractinghigh-level daily routines (in close correlation withlife styles) from low-level sensor data, which has beenwidely studied using various types of wearable sensors.Zheng et al. [33] used GPS data to understand thetransportation mode of users. Lester et al. [21] useddata from wearable sensors to recognize activities basedon the Hidden Markov Model (HMM). Li et al. [22]recognized static postures and dynamic transitions byusing accelerometers and gyroscopes. The advance ofsmartphones enables activity recognition using the richset of sensors on the smartphones. Reddy et al. [26]used the built-in GPS and the accelerometer on thesmartphones to detect the transportation mode of anindividual. CenceMe [24] used multiple sensors on thesmartphone to capture user's activities, state, habits andsurroundings. SoundSense [23] used the microphone onthe smartphone to recognize general sound types (e.g.,music, voice) and discover user specific sound events. EasyTracker [7] used GPS traces collected from smartphonesthat are installed on transit vehicles to determineroutes served, locate stops, and infer schedules.Although a lot of work has been done for activityrecognition usingsmartphones, there is relatively littlework on discovery of daily routines using smartphones.The MIT Reality Mining project [12] and Farrahi andGatica-Perez [14] tried to discover daily location-drivenroutines from large-scale location data. They could inferdaily routines such as leaving from home to office andeating at a restaurant. However, they could not discoverthe daily routines of people who are staying at thesame location. For instance, when one stays at home,his/her daily routines like "eating lunch" and "watchingmovie" could not be discovered if only using the locationinformation. In [13], Farrahi and Gatica-Perez took a stepfurther and overcame the short-coming of discoveringdaily routines of people staying in the same location byconsidering combined location and physical proximitysensed by the mobile phone. Another closely relatedwork was presented in [19], which used a topic modelto extract activity patterns from sensor data. However,they used two wearable sensors, but not smartphones,to discover the daily routines.

Disadvantages Of Existing System

1. Not efficient due to random person recommended as Friend.

2. Friend suggestion based on Social link and Mutual link.
3. Threat of Stalking.

III.PROPOSED SYSTEM

LIFE STYLE EXTRACTION USING TOPIC MODEL

A)Life style modeling

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, w2, w3,…….,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, z2, z3,…….,z_n} represents the life style $z_i$is the lifestyle and Z is the total number of lifestyles.

Let d= {d1, d2, d3,…….,d_n } represents the life documents and the di 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 [10]; 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 „N" users the. Kmeans is also used to acquire the location of the user. The kmeans is used derive the local location of the user.

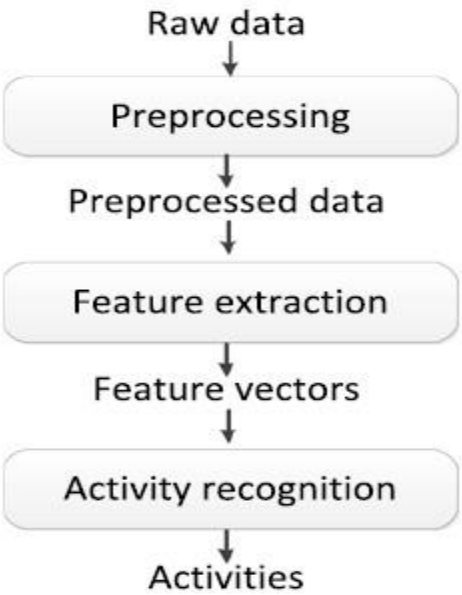
3) Friend matching graph

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 and 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. Similarity between two users *Sa* and *Sb* can be represented as:

$S(a,b)=S_c(a,b).S_d(a,b)$

Advantages of Proposed System

1. Recommendation based on similar LifeStyle.
2. No threat of being Stalked.
3. More chances of people becoming close friends
4. If within a diameter of 1km will be notified about nearby friend.



Here $S_c$is used to measure the similar life style as whole and S_d is used to measure the dominant life style. 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.

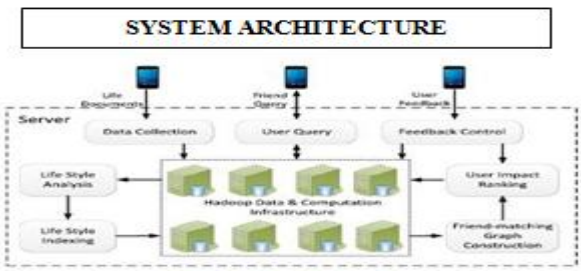
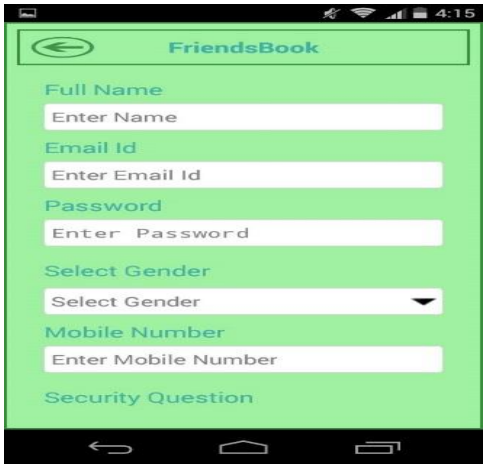


Figure 1. System Architecture of Friendbook[1]

IV. IMPLEMENTATION

Friendbook is the firstfriend recommendation system exploiting a user'slife style information discovered from smartphonesensors. Inspired by achievements in the field of text mining,we model the daily lives of users as life documentsand use the probabilistic topic model to extract lifestyle information of users. We propose a unique similarity metric to characterizethe similarity of users in terms of life styles andthen construct a friend-matching graph to recommendfriends to users based on their life styles.



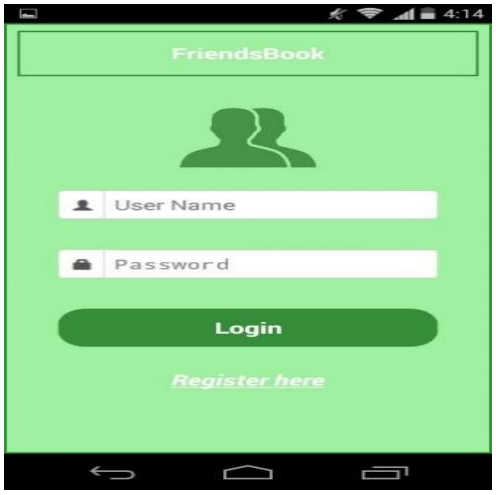


Fig. User Login

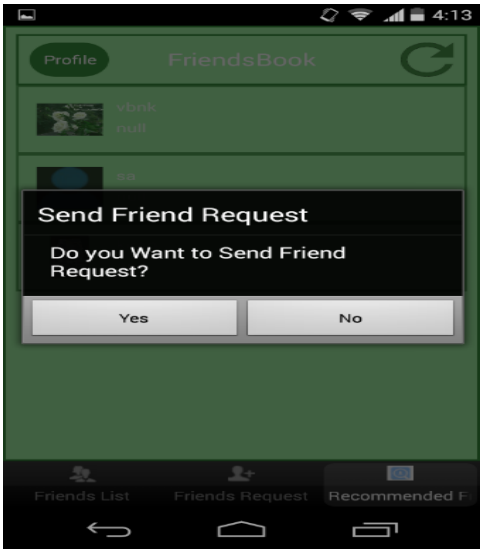


Fig. Friend Request Send

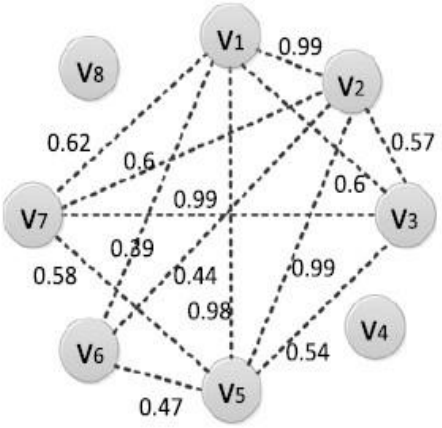


Figure 4. Friend matching graph [1]

V. CONCLUSION

Friendbook provides a platform for recommending friends based on similar life styles of the user. The important feature about the Friendbook is that it uses the smartphone sensors to derive the users" activities from his daily life. Therefore smartphone will never be only communication devices in fact they will be the systems sensory organs. Security is the main concern in every system. Friendbook however lacks here. As said the user"s will be recommended friends if they have similar living. But the suggested friends can be stranger which can be dangerous, because the stranger can kind of threat for the user, the stranger could cause harm to the user. This drawback can be resolved in the future.

Similarity threshold used for the friend-matching graph is fixed. It would be interesting to explore if the threshold values changes dynamically. In future more sensors on the mobile phones can be used into the system and also utilize the information from wearable sensors (e.g. Fitbit, iwatch, Google glass, Nike+, and Galaxy Gear) to discover more interesting and meaningful life styles. For example, we can incorporate the sensor data source from

Fitbit, which extracts the user‟s daily fitnessinfograph, and the user‟s place of interests from GPS traces to generate an infograph of the user as a "document". From the infograph, one can easily visualize a user‟s life style which will make more sense on the recommendation. Actually, we expect to incorporate Friendbook into existing social services (e.g., Facebook, Twitter, LinkedIn) so that Friendbook can utilize more information for life discovery, which should improve the recommendation experience in the future.

REFERENCES

1.Zhibo Wang, Jilong Liao, Qing Cao, Hairong Qi, Zhi Wang, "Friendbook: A Semantic-Based Friend Recommendation System for Social Networks" ieee transactions on mobile computing, vol. 14, no. 3, march 2015.

2. Amazon [2014] (online) Available:www.Amzazon.com

3. Netfix. (2014). [Online]. Available: https://signup.netflix.com.

4. Facebook statistics. (2011). [Online].Available: http://www. Digitalbuzzblog.com/facebook-statistics-stats-facts-2011.

5. L.BianandH.Holtzman, "Online friend recommendation through personality matching and collaborative filtering," in Proc.5th Int. Conf. Mobile Ubiquitous Comput., Syst., Services Technol., 2011, pp. 230–235.

