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Friends Wall: A Semantic-based Friend Recommendation System for Social Networks

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Abstract: Present social networking services suggest friends to user's based on their social activities, which may not be the most suitable to reflect a user's taste on friend choice in real life. In this project, we present Friends wall, a semantic-based friend recommendation system for social networks, which present friends to users based on their life styles instead of social activities. By taking benefit of sensor-rich Smartphone's, Friends wall discovers life styles of users, measures the resemblance of life styles between users, and suggest friends to users if their life styles have high resemblance. Inspired by text mining, in this project we design a user's daily life as life documents, from which his/her life styles are taken out by using the Latent Dirichlet Allocation [LDA] algorithm. We further aim a similarity metric to measure the resemblance of life styles between users, and estimate user's impact in terms of life styles with a friend-matching graph. Upon acquiring a request, Friends Wall returns a list of people with maximum resemblance scores to the query user. At last, Friends Wall incorporates a feedback mechanism to further amend the recommendation accuracy. This project will build Friends Wall and evaluate its performance on both small-scale experiments and large-scale model.

Keywords: Friend recommendation, Mobile sensing, Social networks, Life style, Data Mining, Machine Learning.

I. INTRODUCTION

Few years ago, people typically made friends with other who live or work. Friendship is an important part of human's life. Making friends is a very easy but making friends with our interests is a hard task. Many human being have many friend and have their own set of attractions. They are differ from person to person. Many social network provide recommendation system for making friends. The suggestion provided by supporting their users in various decisions making processes, such as location where are lives, as well as interest what music to be listen or what news to read. Recommendation system have to be valuable means for the online users to replication with the information overburden and have come to one of the most strong and accepted device in data mining. Example- Facebook, Amazon, Twitter.

In this recommendation system there are two major types: Collaborative filtering based recommendation and content based recommendations. The most important thing in friend book recommendation system to identify or guess the user choice and analyzing the user interest on his/her behaviour to generate the personalized friend recommendations. In friend recommendation system for location [based means friend is connect from location related (e.g. I am in Pune) have used in many social websites example:- Facebook, Twitter, Facebook is social network we can provide the recommendation system with friends of friends methods to recommends new friends to users. This can perform that making friends is an ordinary way of establishing relationship with others social network.

As they give the suggestions based on the predefined data or their mutual relationship hence the may give the incorrect and unsatisfied recommendation to the users for these purpose to overcome from this problem friendswall is proposed. In this system it will takes users daily activities as an life document and from this life document it will do analysis on that and then it will able to extract the users life style. From the various set of life styles it will recommend the appropriate friend to the user from their ranking.

II. LITERATURE SURVEY AND BACKGROUND

In this paper[1], K. Farrahi and D. Gatica-Perez, "Probabilistic mining of socio-geographic routines from mobile phone data", Selected Topics in Signal Processing, IEEE Journal, 2010.

Probabilistic mining of socio-geographic routines from mobile phone data is relatively little work on the investigation of large-scale human data in terms of multimodality for human activity discovery. This paper, suggest that human interaction data, or human proximity, obtained by mobile phone Bluetooth sensor data, can be integrated with human location data, obtained by mobile cell tower connections, to mine meaningful details about human activities from large and noisy datasets. This paper propose a model, called bag of multimodal behavior, that integrates the modeling of variations of location over multiple time-scales, and the modeling of interaction types from proximity.

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We have proposed a probabilistic methodology that successfully discovers recurrent patterns in people's lives from multimodal data, and that can use the discovered routines for data prediction, estimating location, and proximity data of users with varying entropy. Essentially, the method mines the most dominantly occurring human routines (topics) from a huge corpus of real-life human mobile data to determine recurring human patterns involving time of the day, semantic location, and proximity based interaction type. Our method also uses these rich human location-interaction topics to predict missing data, which in real life occurs very frequently with mobile phone data, and can also be seen as a method to verify the validity of the routines discovered. By computing the entropy of individuals based on their jointly modeled locations and interactions, our method is able to predict missing multimodal data over several hours for users with both low and highly varying lifestyles.

In this paper[2], L. Gou, F. You, J. Guo, L.Wu, and X. L. Zhang. "Sfviz: Interest based friends exploration and recommendation in social networks", Proc. of VINCI, 2011.
Interest based friends exploration and recommendation in social networks various recommender systems are classified are discussed. This paper focuses on providing the overview about the various categories of recommendation techniques developed till now. This paper present review on recommendation system for finding friend on social networks.

In this paper[3], J.Kwon and S. Kim., "Friend recommendation method using physical and social context", International Journal of Computer Science and Network Security, 2010.

Social network sites have attracted millions of users with the social revolution in Web2.0. In the social network sites, a user can register other users as friends and enjoy communication. However, users of social network sites may easily get overwhelmed by the excessive volume of friend information. Recently context-aware mobile devices have been thoroughly integrated into all walks of life. The context-aware systems provide the user with adaptive recommendations from enormous information. Therefore, the essential factor of social computing is to recommend truly valuable friends using context. This paper proposes a friend recommendation method using physical and social context. The main idea of the proposed method is consisted of the following three stages;

(1) computing the friendship score using physical context;
(2) computing the friendship score using social context;
(3)combining all of the friendship scores and recommending friends by the scoring values.

We propose a friend recommendation method using the physical and social context. Our method presents a friendship score combining both spiritual friendship and social friendship. The spiritual friendship is computed by physical contexts and social friendship is computed by social contexts. The spiritual friendship score is computed by a logged context score and an inputted context score. The logged context score is computed using the traditional information retrieval method, BM25 weighting scheme. The social friendship score is computed using distance between friends in the friendship graph. The proposed method can be applied for context-aware applications using friend relationship in social network services. In future work, we will implement the algorithm using physical context and social context. We also will make a prototype using our method.

In this paper[4], A. D. Sarma, A. R. Molla, G. Pandurangan, and E. Upfal., "Fast distributed pagerank computation.Technical Report", Stanford InfoLab,2012.
PageRank has gained importance in a wide range of applications and domains, ever since it first proved to be effective in determining node importance in large graphs (and was a pioneering idea behind Google's search engine). In distributed computing alone, PageRank vector, or more generally random walk based quantities have been used for several different applications ranging from determining important nodes, load balancing, search, and identifying connectivity structures.

In this Paper presented fast distributed algorithms for computing PageRank, a measure of fundamental interest in networks. Our algorithms are Monte-Carlo and based on the idea of speeding up random walks in a distributed network. Our faster algorithm takes time only sub-logarithmic in n which can be useful in large-scale, resource-constrained, distributed networks, where running time is especially crucial. Since they are based on random walks, which are lightweight, robust, and local, they can be amenable to self-organizing and dynamic networks.

In this paper[5], Z. Wang, C. E. Taylor, Q. Cao, H. Qi, and Z. Wang., "Demo: Friendbook: Privacy Preserving Friend Matching based on Shared Interests", Proc. of ACM SenSys,2011.

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". This paper, develop a novel system that allows users with similar interests to be quickly introduced based on the similarity of pictures they took. A real online system, named Friendbook, is implemented on a smart phone network. Due to the limited resources on a smart phone as well as privacy issues, instead of directly comparing the original pictures for similarity measure, Friendbook uses "feature-based" picture comparison. By comparing features extracted from pictures taken by people who want to make friends, their similarity in interests can be automatically inferred based on the content of these pictures.

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III. MOTIVATION AND PROBLEM STATEMENT

The existing system only recommends the friends and friends of friends to the user. But sometimes it also gives us unwanted recommendation. So there is highly need of such system which recommends friends based upon user's lifestyle, attitude and taste Creating social networking application with friend recommendation system which will recommend friends based on lifestyle, thinking, posts etc, with data mining and machine learning approach.

The design and implementation of Friends wall, a semantic-based friend recommendation system for social networks. Different from the friend recommendation mechanisms relying on social graphs in existing social networking services, Friends wall extracted life styles from user-centric data collected from sensors on the Smartphone and recommended potential friends to users if they share similar life styles.

We implemented Friends wall on the Android-based Smartphone's, and evaluated its performance on both small scale experiments and large-scale simulations. The results showed that the recommendations accurately reflect the preferences of users in choosing friends.

IV. PROPOSED SYSTEM

Dependencies of our framework User must be logged-in into application connected to the Friends wall. All the user activities are tracked and dumped into database along with user access permissions. Based on the information collected in the database potential friend is being recommended to the query user. Main steps to find people with similar interest and recommend querying user, the main steps are as follows:

Develop a web application which connects to Facebook Login page through which we can host the app and users can give permissions. To retrieve the user data through the access tokens specified for each user. Based on accessing permission given by user for a web application we can get the activities performed by user.
Develop and test a methodology to find the users with similar interest in online social networks on the basis of a simple metric of their activity level. We calculate the probabilistic values of each activity and find dominating life style, and recommend potential friend to the query user.

V. GOAL AND OBJECTIVES

Recommending friends to users based on their life styles instead of social graphs. To measure the similarity of life styles between users, and calculate users' impact in terms of life styles with a friend-matching graph.
Group people together include:

1) habits or life style;
2) attitudes;
3) tastes;
4) moral standards;
5) economic level;
6) people they already know.

VI. DETAILED DESIGN AND IMPLEMENTATION

We give a high-level overview of the Friendswall system. Figure shows the system architecture of Friendswall, which adopts a client-server mode where each client is a smartphone carried by a user and the servers are data centres or clouds.

On the client side, each smartphone can record data of its user, perform real-time activity recognition and report the generated life documents to the servers. It is worth nothing that an online data collection and training phase is needed to build an appropriate activity classifier for real-time activity recognition on smartphones.

As each user typically generates around 50MB of raw data each day, we choose MySQL as our low level data storage platform as our computation infrastructure. After the activity classifier is built, it will be distributed to each user's smartphone and then activity recognition can be performed in real-time manner.

As a user continually uses Friendswall, he or she will accumulate more and more activities in his or her life documents, based on which, we can discover his or her life styles using probabilistic topic model.

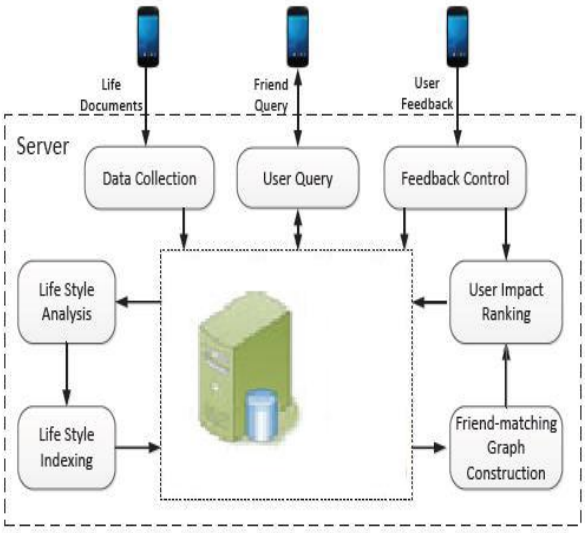

Fig: System Architecture of FriendsWall

As seen in the above fig the system architecture have 7 modules:

1. Data Collection Module:
In this module data which is required to construct a recommendation system is taken by the user. For this the data is extracted from the life document which is given by the user.

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2. Life Style Analysis:

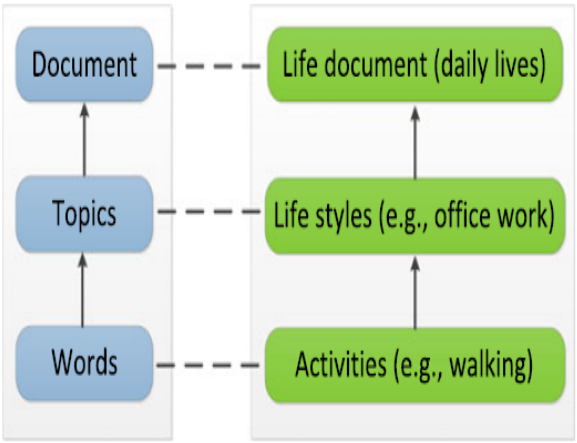

Fig: analogy between word documents and people's daily lives

In this module actual user's life style will be extracted from this life style analysis module by using the probabilistic module. Basically life style is a mixture of activities. For this analysis various calculations have to be performed in order to get the correct analysis. By taking the advantage of probabilistic topic model the topic that is activities are being calculated in terms of their likes-dislikes and matched-unmatched. By this module users life will be reflected at will give the total calculations of their choices.

3. Life Style Indexing Module:

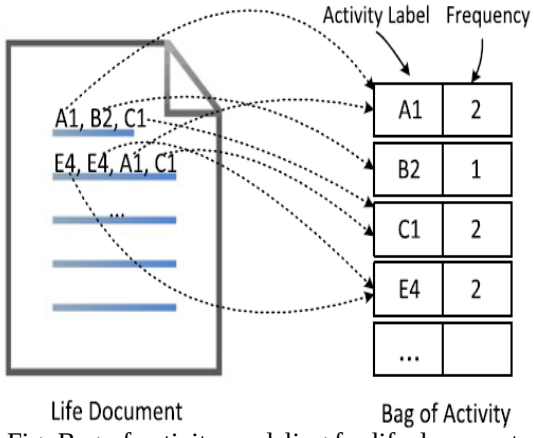

Fig: Bag-of-activity modeling for life document

Whenever the data is given to the system it have to be in the proper format so it will be easy to system to classify or performing operations over the data so for this purpose life style indexing module is proposed. This module actually done the job of database management it takes the life document of the user and puts the life style of the user in the database in the specific format as (life style, user). Because of this the data will be maintained in the proper format.

4. Friend Matching Graph Module:

After indexing data is handled by friend matching module. This module is responsible for construction of friend matching graph. Friend matching graph is a representation of the relationship between users.

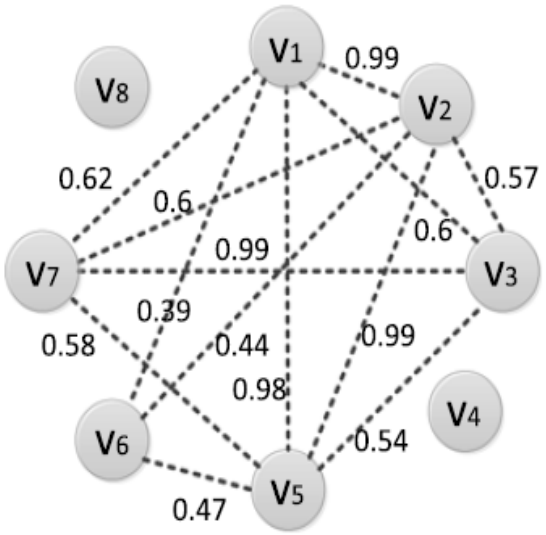

Fig: An example of friend-matching graph for eight users.

5. Impact Ranking Module:

Here in this module ranking is done on the users likes and dislikes from these ranking overall impact of the users will be calculated on the basis of friend matching graph.

6. Users Query Module:

This module is for taking the query from the user as an input and then it sends the ranked list of friends to the user.

7. Feedback Mechanism Module:

This is the last module of the system. System allows users to give a feedback of recommendation result which will be useful to improve the accuracy for the future recommendation.

VII. EXPECTED OUTPUT

1. Admin Module

Friendwall system adopts the client-server architecture. So there is Admin module and User module.On the server side the data processor extracts users data which is collected at the server. According to that data the friend matching graph will construct. The request interpreter takes the request from user and recommend friends to user according to the matching graph. Admin can create a group, edit a group and also can delete group. Admin can store centralized data of users collected at the server. Admin has the authority that he can view user profile. Admin has the work that to manage registered user. Also he has to manage event and group. When user sends some query then admin has to manage that query. Admin will generate the report of user information.

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2. User Module

User module is nothing but the client side of the architecture. By using the sensor-rich android system we can analyse the users life style. Communication component is used to send query to admin module to recommend a friend and admin will give response of that query. Firstly, user has to login with their user id and password. If the user is authorized person then he/she can create his own profile, also update and manage his own profile. User can view his own profile. User can send requests to his friends and can add friends in his friend list.

VIII. CONCLUSION

In our methodology, we exhibited the design and usage of Friend search, a semantic-based friend proposal framework for social networks. Not the same as the friend proposal instruments depending on social charts in existing social networking administrations, the outcomes demonstrated that the suggestions precisely mirror the inclinations of clients in picking companions.

Past the present model, the future work can be focused on actualizing it on other social networking, and same can be utilized to manufacture a stand-alone application and access the client movement through versatile sensors. Friend search can use more data forever disclosure, which ought

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