Web Services For Social Network

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Abstract-*Existing social networking services suggest friends to users based on their social graphs, which may not be the most appropriate to reflect a user's preferences on friend selection in real life. In this paper , we present Linkzone, a web services for social networks, which recommends friends to users based on their life styles and habbits instead of social graphs. By taking advantage of sensor-rich smartphones, Linkzone discovers life styles of users from user-centric sensor data, measures the similarity of life styles between users, and recommends friends to users if their habits and life styles have high similarity. Inspired by text mining, we design a model based upon user's daily life as life documents, from which his/her life styles are extracted by using the Latent Dirichlet Allocation algorithm and k-means clustering. We further propose a similarity metric to measure the similarity of habits and = life styles between users, and calculate users' impact in terms of life styles with a friend-matching graph. Upon receiving a request, Linkzone returns a list of people with highest recommendation scores to the query user. Finally, Linkzone integrates a feedback mechanism to further improve the recommendation accuracy. We have implemented Linkzone on the Android-based smartphones, and evaluated its performance on both small-scale experiments and large-scale simulations. The results show that the recommendations accurately reflect the preferences of users in choosing friends.*

I. INTRODUCTION

Existing social networking services suggest friends to users based on their social graphs, which may not be the most appropriate to reflect a user's preferences on friend selection in real life. In this paper, we present Linkzone, a web services for social network, which recommends friends to users based on their life styles and habits instead of social graphs. By taking advantage of sensor-rich smartphones, Linkzone discovers life styles of users from user-centric sensor data, computes the similarity of life styles between users, and recommends friends to users if their habits life styles have high similarity. Inspired by text mining, we model a user's daily life as life documents, from which his/her life styles are extracted by using the Latent Dirichlet Allocation algorithm. We further propose a similarity metric to measure the similarity of life styles between users, and calculate users' impact in terms of life styles with a friend-matching graph. Upon receiving a request, Linkzone returns a list of people with highest recommendation scores to the query. Finally, Linkzone integrates a feedback mechanism to further improve the recommendation accuracy. We have implemented Linkzone on the Android-based smartphones, and evaluated its performance on both small scale experiments and large-scale simulations.

The results show that the recommendations accurately reflect the references of users in choosing friends. As time passes, World Wide Web (WWW) goes on growing. Lots of information is available on WWW. All the information which we get is not relevant, only few of them are relevant. When a user tries to search something on WWW she/he lands up with thousands of result. As a result, she/he will mess up with huge information. Hence fetching the actually required details becomes cumbersome and time consuming. This gives rise to data filtering system. In early days, for data filtering, Information Filtering (IF) was used. IF was basically developed for filtering documentation, articles, news etc. Looking to our era, e-commerce is growing explosively. Whenever a user makes a search for particular item on internet to buy, she/he will get many options. Looking at the options user gets confuse what to buy, and will not able to sort the item that is suitable to him/her.

This problem gave rise to Recommendation System [RS]. A recommender system is a personalization system that helps users to find items of interest based on their preferences. Recommender systems are efficient tools that overcome the information overload problem by providing users with the most relevant contents. The importance of contextual information has been recognized by researchers and practitioners in many disciplines including Ecommerce, personalized IR, ubiquitous and mobile computing, data mining, marketing and management. There are many existing e-commerce websites which have implemented recommendation systems successfully. We will discuss few website in our coming section that provides recommendation. Items are suggested by looking at the behavior of like-minded-users. Groups are formed of such users, and items preferred by such groups are recommended to the user, whose liking and behavior is similar to the group. In our model we have incorporated user preferences obtained from Social Networking Site. Social Networking sites are used intensively from last decade. According to the current survey, Social Networking sites have the largest data set of users. Each social networking site notes/records each and every activity of user (like: what user likes? what user is doing? what is user's hobby? Etc). Social Networking site will prove to be largest domain in understanding the user behavior. One of the best examples of social networking is FACEBOOK. According to current news FACEBOOK is trying to develop algorithm, to understand user behavior. Social Networking sites can help us in getting important information of users, such as age, gender, location, language, actives, likes etc. our model takes into account these parameters of the user to recommend books. Most of the friend suggestions mechanism relies on pre-existing user relationships to pick friend candidates. For example, Facebook relies on a social link analysis among those who already share common friends and recommends symmetrical users as potential friends. The rules to group people together include:

1) Habits or life style
2) Attitudes
3) Tastes
4) Moral standards
5) Economic level; and
6) People they already know.

Apparently, rule #3 and rule #6 are the mainstream factors considered by existing recommendation systems.

II. SYSTEM ARCHITECTURE

Existing System:

- Most of the friend suggestions mechanism relies on pre-existing user relationships to pick friend candidates like friend of friend.
- Facebook relies on a social link analysis among those who already share common friends i.e. mutual friend and recommends symmetrical users as potential friends. The rules to group people together include:

  Habits or life style
  Attitudes
  Tastes
  Moral standards
  Economic level; and
  People they already know.

Disadvantages Of Existing System

- Existing social networking services recommend friends to users based on their social graphs, which may not be the most appropriate to reflect a user's preferences on friend selection in real life

Proposed System

- A web services for social networks, which recommends friends to users based on their life styles instead of social graphs.
- We model a user's daily life as life documents, from which his/her life styles are extracted by using the Latent Dirichlet Allocation algorithm.
- Similarity metric to measure the similarity of life styles between users, and calculate users'

Advantages Of Proposed System

- Recommended friends to users if they share similar life styles.
- The feedback mechanism allows us to measure the satisfaction of users, by providing a user interface that allows the user to rate the friend list
- User can send request to anyone and provide security parameters.

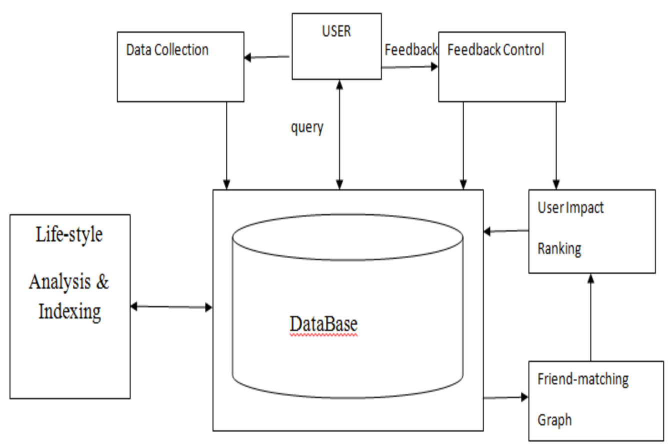

Fig 2. System Architecture

III. METHODS AND ALGORITHMS

1. Latent Dirichlet Allocation algorithm
2. K-means clustering algorithm

IV.IMPLEMENTATION

Mathematical Model

Let S is the Whole System Consists:

S= {U, w, z, d, Q, F, L,}.

Where,

1. U is the set of number of users.

   U= {u1,u2,........,un}.

2. Q is the set of query generated from user.

   Q= {q1,q2,.........,qn}.

3. F is the set of feedback of users.

   F= {f1,f2,......... ,fn}.

4. Let w is the set of activities

   w= [w1,w2,…….,wW]

   wherewi is the ith activity and W is the total number of activities.

5. Let z is the set of life styles

   z = [z1, z2,……,zZ]

   wherezi is the ith life style and Z is the total number of life styles.

6. Let d is the set of life documents

   d = [d1, d2,…….dn]

   where di is the ith life document and n is the total number of users.

7. Let p(wi|dk) is the probability of the activity wi in a certain life document dk.

8. Let p(wi|zj) is the probability of how much the activity wi contributes to the life style zj.

9. Let p(zi |dk) is the probability of the life style zj embedded in the life document dk.

10. So according to the probabilistic topic model, we have

$$p(w_i|d_k) = \sum_{j=1}^{Z} p(w_i|z_j)p(z_j|d_k)$$

Let Li = [p(z1|di) , p(z2|di),……., p(zZ|di)] and

Lj = [p(z1|dj), p(z2|dj),……, p(zZ|dj)] are set of the life style vectors of user i and user j, respectively.

The similarity of life styles between user i and user j, denoted by S(i, j), is defined as follows:

S(i,j) = Sc(i,j).Sd(i,j)

$$S(i,j) = S_c(i,j) \cdot S_d(i,j)$$

Where, Sc(i, j) is used to measure the similarity of the life style vectors of users as a whole,Sd(i, j) is used to emphasize the similarity of users on their dominant life styles.

We adopt the commonly used cosine similarity metric v for Sc(i, j), that is,

$$S_c(i,j) = \cos(\mathbf{L}_i, \mathbf{L}_j)$$

Sc(i,j) = cos(Li, Lj)

Friend-matching graph:

It is a weighted undirected graph, G = (V,E,W),
Where,
V = {v1,v2, …..vn} is the set of users and n is the number of users
E = {e(i, j)} is the set of links between users, and

$$E = \{e(i,j)\}$$

W : E→R is the set of weights of edges.

There is an edge e(i,j) linking user i and user j if and only if their similarity

$$S(i,j) \geq S_{thr}$$

S(i,j) >= Sthr

Where, Sthr is the predefined similarity threshold. The weight of that edge is represented by the similarity,

$$\omega(i,j) = S(i,j)$$

W(i,j) = S(i,j)
We use the following representation to convert the graph into a matrix representation,

$$N = (N_{ij})_{n\times n} = \begin{bmatrix} 0 & \omega(1,2) & \cdots & \omega(1,n) \\ \omega(2,1) & 0 & \cdots & \omega(2,n) \\ \vdots & \vdots & \ddots & \vdots \\ \omega(n,1) & \omega(n,2) & \cdots & 0 \end{bmatrix}$$

V.CONCLUSION

In this paper we designed and implemented the Linkzone, a web services for social network. It is Different from the other friend recommendation mechanisms relying on social graphs in existing social networking services, where as this Linkzone 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 Linkzone 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. 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 implement the life style extraction using LDA and the iterative matrix-vector multiplication method in user impact ranking incrementally, so that Linkzone would be scalable to large-scale systems. Third, the similarity threshold used for the friend-matching graph is fixed in our current prototype of Linkzone. 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 equipments (e.g., Fitbit, iwatch, Google glass, Nike+, and Galaxy Gear) to discover more interesting and meaningful life styles.

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