Personalized Recommender System

(A Personal Recommender System for Online Social Networking Sites)

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ABSTRACT
Recommender system for online marketing site plays a key role for the e-marketing or purchase made online by consumers. As there are many recommendations for a particular keyword, determining which recommendations have higher impact for a particular user is difficult. So it is useful to make a personal recommender based on the user preferences may helpful in solving such a problems and can deliver a good search result. Based on user actions (preferences, like) within a close group like any networking site a best personalized recommender can be designed.

As the growing popularity of www every things going to b dependent on the virtual world, e-commerce and e-advertisement are the very important aspect of them, the growing popularity of www also leaded to virtualized one's friend. So this work is defining a approach in which the personal relationships between friends is calculated after that this calculation can be used to determine the good recommender for a particular user based on his/her friends reviews and the his/her preferences.

General Terms
Trust friend, recommender, personalized recommender, and trust on social networking site.

Keywords
Trust, Trust_Friend ,Recommender, Trust metrics, ego user close-nest.

1. INTRODUCTION
1.1.General

In the world of virtualization each and every on line marketing sites are using the recommender system for recommending a product and services according to the user search, preferences, location , and even according to their bugged. As this work is dealing with the personal recommender within a closed group so the marketing site are beyond its scope. For our daily life and source of information we are dependent on the internet e.g. If anyone wants to book a show ticket for he would like to check the reviews of movies or before buying a product he would like to check the internet for product review and opinion (comments) about the product from the past consumers. But it is a blind faith, if we use a system based on his preferences and according to the reviews provided by his/her closest may lead to make a supper recommender system. This work is showing how recommender system can be improved by a personal recommender system within a group with social networking sites like facebook.

This work is dealing with the user's actions within a close group as predicating the social relationship of particulars on the virtual world says social networking site after that according to their preferences and his friends ratting for the product a new system can be defined for recommending a product or services on the basis of the user preferences. For that two main modules or purposed one to predicting the user's relationships within a networking site and another relationship can be used for predicating a good recommendation.

1.2.Main Track of This Work
1.2.1. Evaluating the Personal Relationships Within a Networking Site

The relationships on the networking site can be determined by the trustmatric. The trust matrices are used to define the degree of connection between two particular nodes on the network. There are different types of trust metrics acceding to the use but they can be categories in two mainly.

a. Global trust metrics:

b. Local trust metrics:

1.1.2. A Personalized Recommender System

In second phase this work is defining how the user preferences and the personal relationships on the social networking site are useful to implement a personalized recommender on the networking sites.

Why Social Networking Site

Growing popularity of social networking site everyone would like to have a personal virtual account where they are openly disusing about issues their likes for products review and many more even its leaded to be a source of information and fast information sharing system the As the people are used to interact with new issues and activities virtually. Networking sites like facebook and twitter are few of them where users interact frequently and provide their opinion about the product and services and even the marketing sites are also having pages and account on these sites to directly interact with consumers and use their opinions as the references and for advertizing their products.

How Do The Recommendations Work?

With over millions titles in the database, it isn't feasible to handpick recommendations for every product. Therefore there is many formulas used by many systems example of them is the formula uses factors such as user votes and keywords to generate an automatic response.

Faults: since recommended titles are not manually chosen, occasionally they may include less than perfect matches.

2. PROPOSED MODEL

Personalized recommender is a System which is applicable within a group only like facebook or twitter. It based on the ego user preferences and on the recommendation which can be calculated according products rating based on the ego user's closest friends as people wish to try new things based on the recommendation of their closest one.

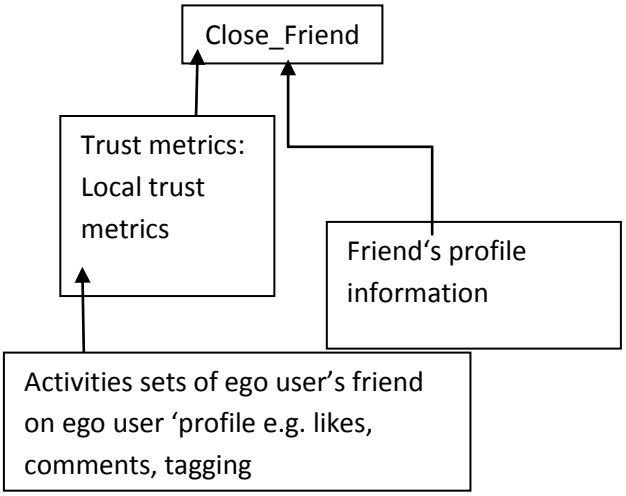
2.1.Trust Calculation

The purposed system is based on the personal relationships of the ego user with his/her friend on the social networking site so it is important to calculate the degree of close nest between the ego user and his/her friends based on that the system will rank them according to the trust rating. For the trust rating the new trust metric Trust_Friend is designed for this system. This is a type of local trust metric which is being used for the calculating the trust rating of his her friends based on the activities sets of ego user's friends on the ego user's profile.

2.1.1. Architecture Model of Calculating the Degree of Close-nest (Close Friend)

The Close friend can be calculated by the trust metric (Trust_Friend) and the by the getting information about the friends profile. Friends profile information like Location, preferences, time of being friend will lead to give a better result.

Trust_Friend metric is being defined by the activities sets of ego user's friend with ego user and on the ego user's profile. These activities sets are like, wallpost, comments, tagging, pokes,shares.



{Fig.1 Close_Friend Architecture}

2.1.2. Algorithm Model For Calculating Close Friend

For this considering the two main problem

1.Who are user's friends that he/she can trust most?

2.How to measure trust between a user and his/her friends-of-a-friends?

First one is important for calculating the close friend while 2nd is important in calculating the most recommended product in personalized recommendation on the social networking site.

For calculating close friend using social activities set as a social interaction between two directly connected social network users (i.e., facebook friends). The weightage of each and every activity is calculated. Social activities by a user on facebook for our work are: tagging of ego user by an ego user's friend on photo uploaded by the friend, likes, comments, share, poke, wall posts etc.

For calculating close friend we are calculating the weightage of every activity set. Then we are using it trust metric for close friend calculation

1. Weightage Calculation

It can be calculated for an individual user's (friend) activity with respect to the ego-user.

M=A particular action * total of that action by all friends on ego-user's profile;

S=Total of all activity set of all friends of ego-user with respect to ego-user;

$W_{(weightage)} = M/S$.

2. Trust calculation

The trust rating of an individual with respect to a friend can be calculated as follows:

$S_{a.} = \sum$of activity on users profile $_{(In\ w\ weightage)}$

$S_{p.} = \sum$of all activity of selected user $_{(friend)}$ on user's profile $_{(In\ weightage)}$

Hence, the trust rating of particular friend=$S_p/S_a \times 100$.

2.2.Personalized Recommender Calculation

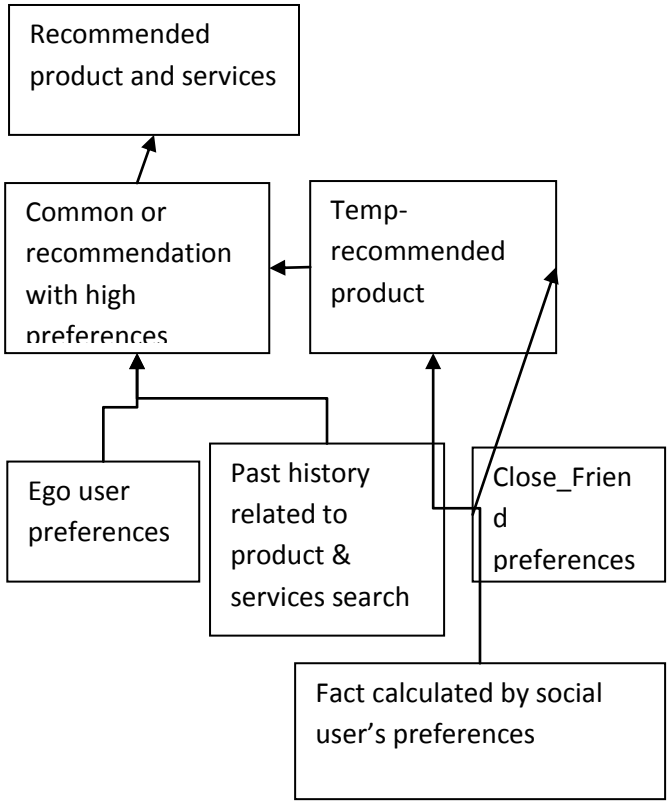
Personalized Recommender System is being defined by the review ratings and likes for a given product within a social networking site Facebook.

2.2.1 Architecture Model of Calculating Personalized Recommender

For the purposed model the two architectures are being defined on for calculating the close-nest of users on the social media and other is for the selecting the best recommender product and services for the ego user based on the his preferences and the friends reviews on that product. Recommender product can be calculated by the generalized architecture which is shown in the fig 2 where the preferences of the ego user and his friends can be calculated and from where we can get the recommended products.

Temp recommended product is being calculated by friend's preferences and the social user's preferences. And common recommended product can be defined by the ego user

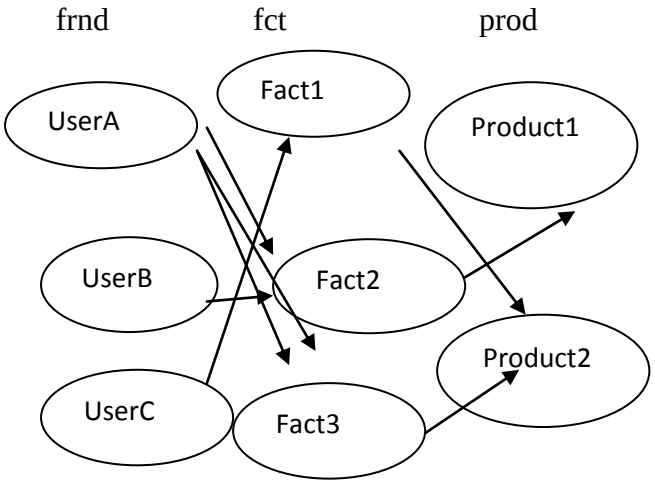
preferences and the other users preferences on the social network. From the common or high preferred recommended product the final recommended product can be selected.



{Fig.2 A sample architecture of selecting recommender product}

2.2.2. Calculation Model of (Personalized Recommender System)

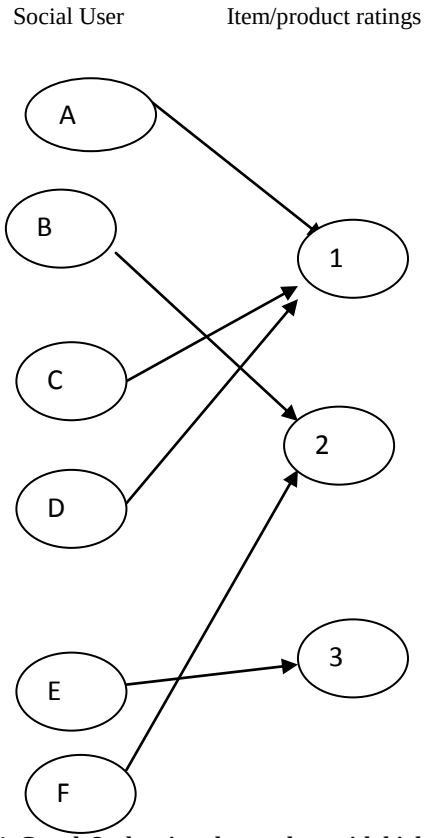
1.The graph is showing how to calculate the facts provided by



{Fig.3. Graph 1 show the selection of product according to the fact provided by friends}

the different friends on different product.

2.The graph showing how to evaluate the accuracy of facts, as item1 is trusted by more users then item2 and then item3.



{Fig.4. Graph 2. showing the product with higher ratings and being recommended.}

2.3. Selecting Best Personalized Recommendation

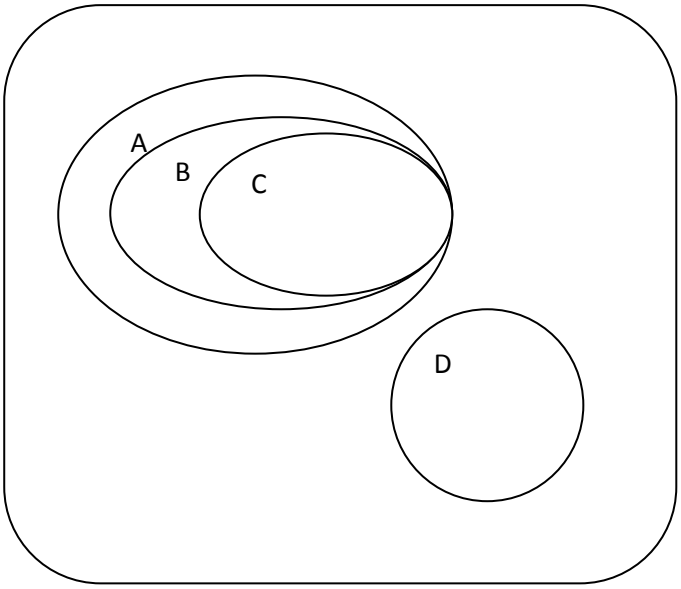
Assuming the four basic Sets.

1. A: Set of all recommendations on social networks S_{ar}: this is the set of the all product and services which is liked by users on social networks frequently.
2. B: Set of products liked in closed group Sg_l: This is the product and services which is being liked frequently by the ego user's friends group
3. C: Set of product liked by closest friend S_{cl}: These are the product and services which are recommended by ego user's close friends.
4. D: Set of ego user's preferences S_{el}: These are the products and services which the ego user like most.

And applying the set theory concept the best recommender can be selected.

As Shown in ven diagram,

1. C is sub set of B,
2. B is Subset of A,
3. A∧B∧C∧D=Best recommended product.



{Fig.5. Ven diagram for calculating the best recommended product for the ego user}

3. ANALYSIS AND DESIGN OF THE SYSTEM

3.1. System Definition

The Purposed System puts complete interface design of system using the Java language on the Netbean IDE to implementing algorithms and fetching data from facebook and posting the massages on the facebook. For database, it is using MYSQL database and JDBC technology at the client side to create a database connection for storing the fetched data and retrieving them for use in algorithms. For fetching the data sets from Facebook it is using FQL (facebook query language) and facebook4j library.

3.2. Accessing Facebook Through Java

As facebook is providing its own SDK for application development for the third parties like PHP SDK Graph API there and JavaScript SDK, there is no core library or SDK in java for developing facebook application except android API for developing applications. But it can be done using different libraries like facebook4j for developing a facebook application using java.

There are many works from scholar and are available online to access facebook by java. Some of them are https://code.google.com/p/facebook-java-api/, http://restfb.com/ , http://spring.io/guides/gs/maven/ ; http://facebook4j.org/en/index.html .Trust_system is using their references and code example for being developed. The important ones among them are facebook4j and restAPIs.

3.2.1. *Facebook4j*

Facebook4J is an unofficial library for integrating java applications with facebook API. It is open-sourced, mavenized Java library. The proposed model is being developed using this library.

3.2.2. Java API for Facebook:

It is java library for integrating facebook graph API. Provided by a Google community.

3.2.3. Restfb

Restfb is a simple and flexible Facebook Graph API and Old REST API client written in Java.
It is open source software released under the terms of the MIT License.

3.2.4. FQL

Facebook query language is official query language provide by facebook for developing 3rd party applications using GraphAPIs, JavaScript SDK. For querying purpose and fetching data it is being used in development of personalized recommender System.

Some of them:

1. *Fetching Information About Post:*

String query = "SELECT user_id, object_id, post_id, object_type FROM like WHERE user_id =me()";

2. *Fetching information about Messages:*

String query="SELECT actor_id, created_time, message FROM stream WHERE source_id IN (SELECT uid2 FROM friend WHERE uid1= me())";

3. *Fetching information about Photo:*

String query="SELECT object_id, pid, aid, src_big, src_small, caption, like_info, comment_info, modified, place_id FROM photo WHERE object_id IN (SELECT object_id FROM photo_tag WHERE subject = me() AND created > 1362117600) ORDER BY like_info.like_count DESC";

4. *Fetching information friend movies:*

String query="SELECT first_name, last_name, movies FROM user WHERE uid IN (SELECT uid2 FROM friend WHERE uid1 = me()) and NOT (movies = '')";

4. RELATED WORK

4.1. Making Facebook Application:

There are many APIs provided by facebook for the developing third party facebook applications. Among them, most popular is Facebook graph API used for developing the games for the facebook. Facebook also provides some of SDKs to facebook developers e.g. php SDK, JavaScript SDK

1. Registering for application on Facebook

There are simple steps to registering our application on facebook.

1.Registering as a facebook developer.
2.Resister a new application and get verified.
3.Setting up application.
4.Getting App_ID and APP_secreat.

Registering “Personalized Recommender System” and getting App_ID and APP_secreat

2. Getting access token and Authentication for application

Automatically: using php and JavaScript it is quite simple. A Sample code provided by facebook for loading javascriptSDK automatically.

```
<script>
    window.fbAsyncInit = function()
    {
    FB.init({
    appId : '1481983975354759',
    status : true,
    cookie : true,
    session xfbml : true });
    FB.Event.subscribe('auth.authResponseC
    hange', function(response)
    {
    if (response.status === 'connected')
    { var uid = response.authResponse.userID; var accessToken = response.authResponse.accessToken; testAPI(); }
    else if (response.status === 'not_authorized')
    {
    { // the user is logged in to Facebook, // but has not authenticated your app } }
    else { FB.login(); } }); };
    // Load the SDK asynchronously
    (function(d, s, id)
    { var js, fjs = d.getElementsByTagName(s)[0];
    if (d.getElementById(id)) {return;} js = d.createElement(s);
                    js.id = id; js.src = "//connect.facebook.net/en_US/all.js";
    fjs.parentNode.insertBefore(js, fjs); }
            (document, 'script', 'facebook-jssdk')); function testAPI()
                {

    console.log('Welcome! Fetching your information.... ');
                    FB.api('/me', function(response)
                    {
        console.log('Good to see you, ' + response.name + '.'); });
    }
    </script>
```

4.2. Fetching Data from Facebook and Working with MySQL.

```
public class Friendlistinsert {

  public static void main(String[] args) throws JSONException, FacebookException{

    Connection con=null;

    String myfriends;

    try
    {

      Facebook fb=new FacebookFactory().getInstance();
fb.setOAuthAppId("1481983975354759","8ae9e85cfaedd37673e2aebff9706a7e");
fb.setOAuthPermissions("basic_info,email,publish_actions,publish_stream,read_friendlists");

      fb.setOAuthAccessToken(new AccessToken("CAAVD20hp8YcBAAkMWBNSk2ZAymUpkzfmpu8G6l11mh20E7MKx0WqOy0ElBkMlNSbrvwL5VcelYLfs5zkSkvOm2v4ZC0kMu"));

      //User user = fb.getUser("100000433373442");

      Map<String, String> queries = new HashMap<String, String>();

queries.put("all friends", "SELECT uid2 FROM friend WHERE uid1=me()");

queries.put("my name", "SELECT name FROM user WHERE uid=me()");

Map<String, JSONArray> result = fb.executeMultiFQL(queries);

JSONArray allFriendsJSONArray = result.get("all friends");

for (int i = 0; i < allFriendsJSONArray.length(); i++) {

  JSONObject jsonObject = allFriendsJSONArray.getJSONObject(i);

  User user =fb.getUser(jsonObject.getString("uid2"));

  //System.out.println(":"+user.getName());

      String username=user.getName();

      Class.forName("com.mysql.jdbc.Driver");
con=DriverManager.getConnection("jdbc:mysql://localhost:3306/facebook","root","hemant");

    String query="Insert into Friendlist values ('"+username+"')";

      Statement stmt=con.createStatement();

      stmt.execute(query);

      System.out.println(".....");

  }

Class.forName("com.mysql.jdbc.Driver");

con=DriverManager.getConnection("jdbc:mysql://localhost:3306/facebook","root","hemant");

String query2="Select name from friendlist";

Statement stmt=con.createStatement();

      stmt.execute(query2);

      // System.out.println("my friendlist:");

       ResultSet rs=stmt.executeQuery(query2);

      // while(rs.next())

       //{

        myfriends=rs.getString("name");

    // }

    System.out.println("my frinds: "+myfriends);
```

```
        }
        catch(Exception e)
        {
        System.out.println("Conn failed");
        e.printStackTrace();
        }
}
}
```

5. FUTURE ENHANCEMENT

As close friend finds the closeness of two friends who are already connected so till now friend of friends is beyond the scope of this paper. In future this System can use the information provided by friends of friend, improving Trust_Friend algorithm by implementing global trust metric. This would make the Recommender System more relevant and efficient. The review rating functionality can be improved by getting the activities sets of users who are not directly connected to the ego user but they are mutual friends and may be friend's friend. For this new trust metric can be purposed and implemented to help the ego user whom he could trust if he is not directly connected to them.

6. CONCLUSION

This paper presented a general model for the calculation of trust among social users on social networking sites, as well as described how a general model of trust is useful to make a personalized recommender system for a social user. For that a System is being deployed using a specific social network as a medium (i.e., Facebook). We proposed set of two algorithms – first one for calculating the trust among the users Trust_Friend for close Friend module and another for recommender, and we are using them to define our System model. And from here we have introduced two other problems, one how to calculate a trust rating for a friend who is not directly connected to ego user, and another how to make Recommender more efficient if there are conflicting facts.

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[11] Hemant Kumar Kushwaha M.Tech.Scholar, Ms. J.Jeysree Assistnat Professor Department of Information Technology, Faculty of Engineering and Technology, SRM University, Kattankulathur-603203, India "Trust_System How to know which fact is revelent and useful within a social networking site." 2014 IJEDR Volume 2, Issue 1 ISSN: 2321-9939