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Service-based Trusted System using Social Networking

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Abstract: ***People can connect to each other and communicate through some platform or services called as Social Networking. With it, users share their ideas, interests and opinions with their relatives or friends. But in them, social networking will be used based on trust. It will be used to provide recommendation for any task. It may provide voting network through which all users can vote to any system and from the given vote it's possible to define some ranking system. According to given ranking it may define personal ranking as per specific criteria like service. For that purpose we require one centralized system which may manage all this services and analyze it. This work is focused on above system and it will create some system based on service. In current era all the products are sold by providing good services. Through social networking it may define some criteria and from that user may select as per his/her profession. Then he/she provide their opinion about any product/ system. So that new customer can get idea and solve his/her own query regarding that product. So it is very helpful to take decision from the system. i.e., "Service based Trusted System with Social Networking".***

Keywords: Social trust, Social Networking, Service Based System, Trusted System, Service oriented system, Trust based Service System, Ranking or Voting System.

1. INTRODUCTION

Online service focuses on providing the facility of social networking or relations among people. Each & Every user has social link and many services. People can use social networking for sharing ideas, visions, interests, own experience, result, generate a query and also response or reply to it.

Services are delivered to satisfy the needs or aspirations of customers. It may be classified services by many different ways like 1) Location based Service 2) Product oriented Service 3) Use oriented Service. Many people use social networking for entertainment service and use location of mobile. Location based service are used to recognize a location of a person or object, parcel/ vehicle tracking services, for personal life, indoor object search etc.

Inside Product based Service, there is not sold only product but they also provides maintenance services, advice and consultancy. In some cases it may have taken back agreement when the product reaches its life. While in Use oriented Service, product is owned by a provider and there is not fully access of product to the customer. The user pays for the use of the product. Sometimes he/she has unlimited access to the leased product [2].

There are a lot of service sectors available in the world. Various activities are performed in different domains like retail, banks, hotels, real estate, education, health, social work, transport, computer services, media, and communications. Sometimes people required help for services in any domain. At that time, he may have confusion. It is possible to solve any query of user.

Generally, offline people always try to contact their nearest friend or colleague before buying any product and take recommendation from them about any product. So it is directly concerns with the trust of their friend.

But by using social networking recommendation can be got about any product. For example if any user wants to join any course under some university, he may ask to other one reliable or trusted person regarding that course/university.

2. ORGANIZATION OF PAPER

This thesis-proposal discusses the research to be carried out in the partial fulfillment of master degree of computer engineering. The related work to the research problem is detailed in Section 3. Section 4 includes the description of problem of context. Section 5 includes the system architecture and its overall design. Section 6 describes the system Algorithm in a very systematic manner which includes the step by step approach to find the final results. To perform in different variation an example is provided in Section 7. Section 8 gives the conclusion along with the Section 9 which describes about References. The information of Author is contained in the last of this paper which gives brief description about the authors.

3. RELATED WORK

Today social networking and community services are used to share information with any known persons. People can share their interests, expertise or knowledge through this kind of communication network. So, it may be helpful for them [1]. If interests of two persons are matched then he/she may be useful to provide recommendation on the basis of matching qualifier like age, field or hobbies etc. this network can be useful to control traffic as vehicular network [7].

Through social networking, anyone can get recommendations from opinions of their friends and other relations. For that voting or ranking system can be used. To find opinion, relationship and attitude is major features to be considered. Trust can be determined by the degree of relationship between two persons. Personal information and interaction between two people are used and from that further data processing can be performed [2].

Social network can be used as tagging network. Inside it, one can be tagged in multiple images of another user. User can generate matrix from this tagging process and get idea about tied up between two persons [10]. Person can preserve their privacy and share it to their known persons only via social network [8]. Business can be possible with the help of social networking by creating group of people and communicate with each other.

Trust network can be social and interpersonal. Generally trust can be probable on neighbours, relatives or friends [9]. Trust can be found by different ways on the basis of various criteria like; reply time, number of mutual friends, behaviour of person with other one, history of anyone etc. trusted system should manage trust as well as identity of any user. It may be defined any trust network or cliques of multiple nodes and then assign depth, weight and friendship on the basis of their relationship and trust.

In real life, it is obvious that anyone has belief, disbelief or uncertainty about other one. Each and every time it is noted down that person is reliable or not. Trust can be evaluated and trust relation will be changed time by time. So, it should be updated and on the basis of that calculation can be performed [3].

There are many services provided by social network. Product, use of product, domain based or location based services are major inside it [12]. Inside friendship, if anyone has idea about something then he may suggest his friend regarding this. Like after watching movie people can share idea about it with his friend or relatives [11].

New items which are very expensive are always purchased on the basis of experience of our relatives. From that it is possible to find user × item rating matrix which provides recommendation [10].

Above related work displays that person uses social networking for only entertainment but it may be helpful for providing various kinds of services which are given in this paper. As social networking site, facebook is used to develop an application in real world. Some types of services may be provided for different domains like, for help or support for any commercial sector or noncommercial sector.

4. PROBLEM CONTEXT

This work shall be focused on the trust based system in which we will focus on service region. Different person may have different services like Student, Employee, Business man, general woman etc. In these categories as per user's profession they will have different choices and criteria. By using social networking we will create one trusted system which is focused on the service which user provides.

Inside facebook we can create one application in which users are connected with each other and then they provides their ideas as per their services and from that analysis can be performed. We can also make any service based system through which user can get recommendation as well as provide it to other person.

So that other person will not misguide before getting any service or purchasing any product. It will analyze behavior, interest and other matters and from that it will generate some analysis which is used to provide any proper suggestion. We will select services and take data then analyze it and generate resultant idea.

Table 1: Various Kinds of Services

Sr No	Person	Services
1	Student	Playing any game, Cycling, Watching movie/TV, Cycling, Group Discussion, Use Electronic devices, Get Knowledge etc.
2	Employee	Work, Private Investment, Watch on different organization, Comparison with other employee, Growth of Organization etc.
3	Business person	Financial Investment, Maintain different departments like Raw material, Purchase, Account, Personnel and find status of it.
4	Woman	Product & Price, Quality, Services, Quantity, Schemes etc.
5	Retired	Nearest Garden for walking, Nearest Bank, Hospital, Knowledge about Religious Books, Novels etc.

5. ARCHITECTURE OF SERVICE SYSTEM

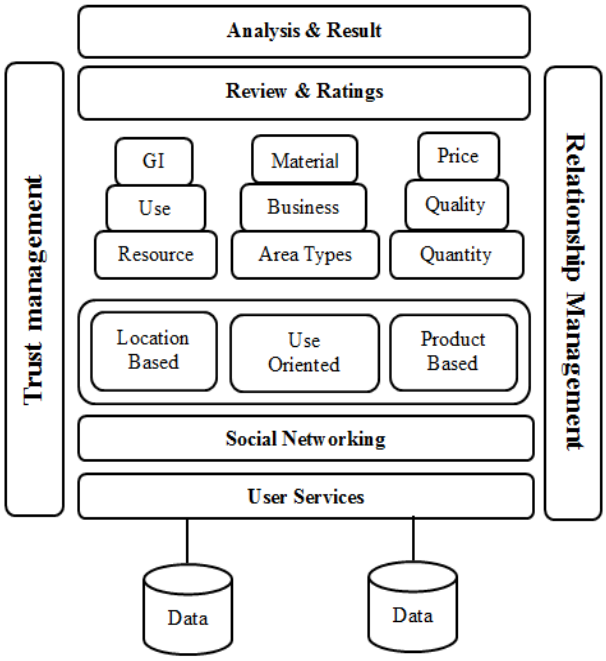
Figure-1 shows architecture of service based system. Inside it, there are 4 basic regions.

In use oriented System, whenever a person purchased a product, there may be some kind of problem regarding use of the product. So, it may provide use oriented service to user by supplying information of resources and use.

Inside location based Service; Define a location of any user and from that user can analyze it through different criteria. It provides services for location of any user. It may check about GI (Geographical Information), what kind of area there are, how much business growth is etc.

There may be product based Service. Generally people find more and more before they are purchasing a product. So, they can get opinion from their relatives, friends, friend of friend etc. Trusted people give proper information to the user for any product for criteria like material, quality and price from user's neighborhood.

Figure 2: System Architecture



User can update status and review other one. From that as per services there may be many types of review possible like, Domain review, User Review, Geo logical Review, Manufacturing review, specification review etc. Then, on the basis of review analysis may be performed. There may be given rating to user and services. Then as per interest and analyzing friends' profile, we can measure trust and finally as per priority final result can be generated.

6. SYSTEM ALGORITHM

After analyzing various papers, trust can be found by various ways. It is one kind of hypothetical process which may consider various criteria. Before starting the process of calculating trust, it should be required some steps to follow.

To analyze any person first of all take a test of multiple choice questions and get answer from any user who wants to use this application [11].

Step 1: User provides rating to different services from the uses of it and then create user x item rating matrix. From user information find details about user. There will be some specific range for rating given by users to services. So, Value should be in between provided range [10].

$$R_{mxn}=\begin{pmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ : & : & . & : \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{pmatrix}$$

Where $0 \le r_{ij} \le x$, here x is the scaling factor decided during voting. The rating matrix defined above is between services versus users.

Step 2: From the ratings of users it is easy to find similarity between multiple users by using Pearson's correlation coefficient. From that we can create similarity matrix which is shown below: [6]

$$Sim_{u,v}=\begin{cases} \dfrac{\sum_{i\in I}(r_{u,i}-\overline{r_u})(r_{v,i}-\overline{r_v})}{\sqrt{\sum_{i\in I}(r_{u,i}-\overline{r_u})^2}\sqrt{\sum_{i\in I}(r_{v,i}-\overline{r_v})^2}}, & \text{if } H \neq 0 \\ 1-\dfrac{6\sum_{i\in Service}(r_{u,i}-r_{v,i})^2}{n(n^2-1)}, & \text{if } H=0 \end{cases}$$

Where, $r_{u,i}$ denotes the rating of user u for item i.

$r_{v,i}$ denote the rating of user v for items i.

$\overline{r_u}$ is the average rating given by user u for all services rated.

$\overline{r_v}$ is the average rating given by user v for all services rated.

$$H=\sqrt{\sum_{i\in I}(r_{u,i}-\overline{r_u})^2}\cdot\sqrt{\sum_{i\in I}(r_{v,i}-\overline{r_v})^2}$$

$$S_{mxm}=\begin{pmatrix} 1 & s_{12} & \cdots & s_{1m} \\ s_{21} & 1 & \cdots & s_{2m} \\ : & : & . & : \\ s_{m1} & s_{m2} & \cdots & 1 \end{pmatrix}$$

Similarity value will be between -1 and 1.

Step 3: Scaling the above matrix between [0, 1]

a) It should be multiplied by α.

b) Performing the addition α to the resultant matrix.

$$S_{mxm} = \alpha * S_{mxm} + \alpha$$

Where $\alpha = 0.5$

Step 4: Find Normalized rating or predicted rating matrix by using following formula:[10].

$$N_{u,i} = \bar{r_u} + \frac{\sum_{v \in User} Sim_{u,v} \times (r_{v,i} - \bar{r_v})}{\sum_{v \in User} Sim_{u,v}}$$

Step 5: From the predicted rating matrix and actual rating matrix, it is easy to find degree of trust (Dmxn) which is formulated as below:[3]

$$D_{u(i,v)} = 1 - \frac{|N_{u,i} - R_{u,i}|}{S}$$

Where S represent rating scale of system

Step 6: Based on above equation, it may be defined trust matrix from various users on any service:[3]

$$T_{u,i} = \frac{\sum_{v \in User} D_{u(i,v)}}{U}$$

Where U denotes set of users who have rated services

Step 7: Here, the Reliability Matrix provides the value of reliability of various services. Also Reliability table would give various views regarding the Service_ID and Reliability of each service.

$$Rel_m = \begin{pmatrix} rel_1 \\ rel_2 \\ : \\ rel_m \end{pmatrix} \text{ where } rel_i = \forall i \in n \text{ Max } (T_{u,i})$$

Table 2: Reliability Table

Sr no	User u	Reliability (rel_i)	Service_ID
1			
2			
:			
m			

Step 8: The most reliable service(s) from the various statistical analysis can be tabularized as:

Most Reliable Service(s)

$= \forall i \in m [\text{Max } (rel_i) \cap \text{Count } (Service\_ID_i)]$

Thus, it will provide the information about reliable services.

7. ILLUSTRATIVE EXAMPLE

There are a lot of services which may be provided by using this system. Inside it user A can see as well as update information regarding like product, material, how to use a product, geo information, domain wise, sensitive, general etc. these all information can be updated as well as used by any person.

One another feature may be included that any user can update their status as per his/ her knowledge. Status may be reviewed by multiple persons. In next phase analysis can be performed as per different criteria like, Interest, Age, Which kind of site visited, which kind of audio, video he plays, how much trust you have on your friend/relatives, relationship will also be measured etc.

User can set priority to his/her friend as per his trust and relationship with them. Services can be set as per priorities given them. Some ratings can be given to specific services. From that there may be chosen best one which is feasible for user's problem. Finally they can get result which may be implemented to solve our problem.

8. CONCLUSION

From the above all analysis we conclude that proposed system will be useful in many areas and task is based on service. It may be useful for student, employee, other person etc. The social networking websites are very much helpful to clearly understand the concepts and queries regarding the Services in Social Networking.

This services are of many types and covers, but surveying a few of them would lead to path in one directions; although it will help us getting the results more reliable, balancing and other aspects to its much of extent.

The system will be extended for large purpose of services. It can be enhanced to a lot of greater extent by improving the algorithm which can include geographic locations, enhanced path system by implementing latest mathematical equations to come up with new ideas and hope.

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