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Exploring Experts and Affixed Services in Service Oriented Systems

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Abstract:

In the technical world all the communications are done through the web and it is more essential. Web service is a mode of communication between two devices. There are two services to implement the communication between the human and the services they are web services and SOA. To support the complex interactions a mixed service oriented system is used. A mixed service oriented system is that combination of both Human Provided Services and Software Based services. The progression of making out the right actor whom the user demands for is very complicated. In mixed service oriented system by using the HPS the complexity of the system increases. We present an innovative approach for the flexibility of the system, so that EXPERTS can offer their expertise and skillfulness online. System is a trust based system algorithm known as Expert algorithm based on the Hubs and UserHITS in the web based environments.

Key words: *Human Provided services, Software based services, hubs, social trust.*

1.Introduction

Web services occupy an eminent role in the business environments in gratifying their objectives, making them to feel comfortable to use web services and BPEL. Human user interactions are currently not covered by the Web Services Business Process Execution Language (WS-BPEL), which is primarily designed to support automated business processes based on Web services. However the spectrum of activities that makes up general purpose business processes is broader than this, because people often participate in the execution of business processes. To support a broad range of scenarios involving people within business processes, a BPEL extension is required. The users and the developers can use various services in different applications.

Web based applications provide a wide range of services which is well-defined, programmable. When process-centric collaboration is used, which is a top down approach it is taken by defining process activities and tasks prior to organizing and accomplishing the process. In addition to that each time before creating the model, the designer must fully be familiar with the each step involved in the process. In such a composition models flexibility is limited because some unexpected changes require renovation of the process. That change causes exceptions, upsetting the normal execution of the process. In collaborations and compositions it is of great consequence to support adaptivity. The ability to support ad hoc activities and flexibility in human interactions to react to unanticipated changes is adaptive processes. While the process-centric collaboration approach follows a top-down methodology in modeling flows, ad hoc flows in flexible collaborations emerge at runtime. In this paper, we make use of software based services (SBSs) to endow with flexible interactions in service oriented services. The experts offer their skills and capabilities to the admin that can be requested on demand. The key contributions of the work are: 1) Evaluation of user reputation by using an approach called UserHITS. 2) Experts trust and expertise is calculated based on the expert seekers preferences. 3) Scalability, availability and effectiveness evaluation. The system mainly focuses on identifying the right actor, that is, the expert in the particular service requested by the user.

An expert is a person who is well skilled in a particular service. In the request provided by the user the skills are specified. The skills provided will be constructed as a query, that query will be processed and list outs the experts with ranks according to their skills and connection to other people having similar expertise. In addition to the process of exploring the experts requested by the user, the details about the experts of the related services will be collected and kept in the buffer. This process is done by the software based services. When the user requests for an expert, the query is processed. After processing the query, the details are matched up with the tree where the details of the experts are stored. The authorities are the experts whose details are stored in the database. The hubs are the experts who are known to the experts in the database. The hub score and authority score are calculated by the number of people referred. Finally the rank is calculated and according to it the experts are referred to the user. When the user starts using the contact of the expert, the details pertaining to the related services are collected and stored in the buffer, so that the details can be retrieved quickly.

This reduces the time of searching when the user requests for the next expert. This makes the system efficient, and also the user can get the details about the correct expert. This paper is prearranged as: in the second section an inspiring example explaining the need for interaction models. Third section gives the concepts of the UserHITS exploring. Section four discusses ranking experts using UserHITS and paper is concluded in section five.

2.Inspiring Scenario

An inspiring scenario is in an organization to develop software of a specified demand the higher authority has to find the exact expert who could complete it accurately with less time. Assume that there are many developers who can do the process. It is difficult to select the suitable expert based on the demand of the expert seeker. While an assortment of languages and techniques for modeling these processes already exists, for example BPEL, discovery and interactions with trusted experts. The BPEL demands for the precise definition of flows of input/output data. Even though it has been modeled as BPEL4People activities, ad hoc interactions adaptations are needed due to complexity of human tasks. Several challenges remain unsolved that are addressed in this paper.

- Who is the right expert that can assist in solving problems which people face while participating in the process?
- How can third parties (experts) be contacted and informed about the current situation and how can they easily be involved in ongoing collaborations?
- Based on which decision are experts selected, which information needs to be exchanged, and how can such scenarios be supported in service-oriented systems?
- How can one support trusted interactions in such dynamically changing environments?

2.1.Mannual Exploring

The exploring process starts with the expert seeker initiate an inquiry for an expert to their friends, colleagues who have faced the same problem in the past for their opinion. By using the suggestions of other people, the expert who is trustworthy is identified. If the expert seeker identifies the exact expert, contact can be established by using some of the standard tools like electronic-mail, messaging, or making a call. A serious disadvantage is that people should have knowledge about the friends or colleagues and structures of the organization. This process of exploring experts manually becomes very much thorny when the number of experts increases. The skills, reputation, and trust that are calculated could change dynamically which makes manual exploring tricky.

2.2.The Skillful Network

Recent technologies cannot completely address the challenges specified above. In this paper we present a skillful network consisting of experts which provide support in service oriented manner. Example is the crowd sourcing applications in enterprise environments. The members of skillful network are either some company employees providing help online, or can be provided as software-based services. Experts can also delegate Request For Support (RFSs) to other experts in the network when they are overloaded or unable to provide satisfying responses. Subsequent to this not only expert seekers establish trust, but also trust between the experts transpires.

3.Exploring Experts

This section explains about the basic concepts of the process of discovery of experts. This methodology is based on the following ideas: 1) a query is collected containing the set of required skills 2) collecting the details of the experts satisfying these demands and 3) accumulating the particulars of the experts who are not satisfying the search but related to it. We also need to consider whether the expert will be able to delegate the RFSs to other peers in the skillful network.

3.1.Expert Algorithm

The following steps in Algorithm 1 outline our approach at a high level, which will be detailed in the following sections. First, matching is performed based on the query context. In this step, a set of skills is specified to retrieve qualified users. Second, expert hubs are discovered using link and interaction information. We will further elaborate on this concept in the following sections.

Algorithm:Outline exploring approach

Input: Given a query context Q to discover expert hubs

- Find users matching demanded set of skills.
- Calculate hub-expertise of users given query context Q.
  - a) For each user calculate hub score in Q.
  - b) For each user calculate authority score in Q.
- Rank users by hub score.

Output: Ranked experts in Q

3.2.Pattern Matching Algorithm

The basic approach is to use a metric to calculate the overlap of two sets A and B. A straightforward way to define overlap similarity is $\frac{|A\cap B|}{n}$ [15]. In this work, we present an algorithm supporting the notion of strong, weak, and optional matching preferences through alternate approaches for calculating overlap similarities of sets of properties. These preferences have impact on matching of skill properties on lower levels. As mentioned before, all nodes in the skill tree that do not have successor nodes are called leaf nodes.The numerator of the set metric (i.e., $|A\cap B|$) is calculated by the Steps 1-3. The set similarity is divided by the number n based on different matching preferences. Minimum match (Step 1) means that user profiles and interaction data matching the query root node are taken into account for subsequent ranking. For example, the root node of a query in Fig. 3b is [SE]. All profiles and interaction data that have been tagged with elements underneath [SE] will then be considered for matching and ranking. As shown in Algorithm 2 (Step 4), n is appended to the matching result to obtain similarity scores based on the different preferences strong; weak, or optional as defined in the following:

$$n = \begin{cases} |\mathtt{childN}(q_p(L_i))| \cup |\mathtt{childN}(e_p(L_i))|, & \text{(a)} \\ |\mathtt{childN}(G_T(L_i))|, & \text{(b)} \\ |P(L_i)|. & \text{(c)} \end{cases} \qquad (1)$$

Condition (a) is satisfied if strong preferences are selected, (b) if weak or optional and (c) otherwise.

Algorithm2: Tree matching algorithm.

Input: Given a query context Q containing a set of properties qp and elements E Compute:

- Get all elements e ε E′ whose properties provide a minimum match of topics.
- Extract topic tree matching query root node.
- Iterate through each level and calculate overlap similarity of property in query at current level i.
- Divide similarity by n and append score with w_{Li} to previous score sum.
- Output: Ranked elements according to similarity

3.3.UserHITS Model

In this section, we discuss the formal model for our proposed expertise ranking algorithm consisting of two components 1) hub score H(u; Q) of user u in query context Q and 2) authority score A(v; Q) of user v in the same query context Q.

H(u;Q): Hub score of user u acting as a reliable entry point to the Expert Web brokering RFSs to authoritative users. Hubs are identified based on the demanded expertise, knows relations connecting u to other experts and feedback ratings received from prior delegations.

A(v; Q): Authority score of user v. Authorities are skilled users (experts) that are connected to influential hubs. In our model, authority means that users process RFSs received from hubs in a reliable, trustworthy manner.

w_{uv}: Trust influences the delegation behavior of hubs by selecting authorities based the success of interactions in our example successfully delegated and processed RFSs.

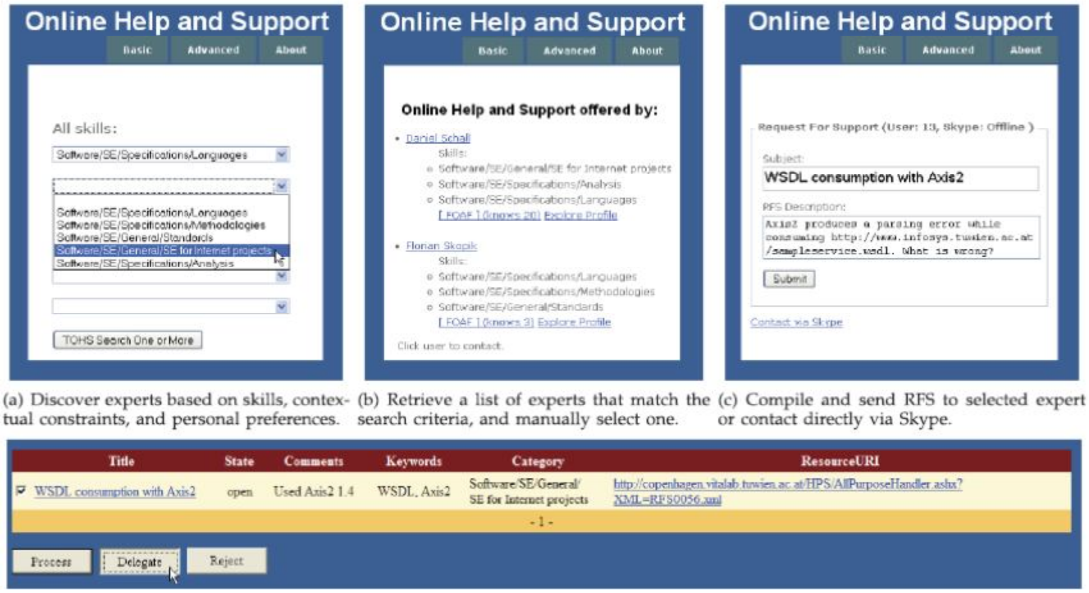
4.Expert Discovery Application

We present user interfaces demonstrating the integration with infrastructure services including Skill Requirements Definition, Expert Discovery, Expert Involvement, RFS Creation, Profile Visualization, RFS Delegation Management, and the Social Network Management. The screenshots at the top in Fig.1 visualize the input data provided by the expert seeker and the figure at the bottom shows a simple HPS-based RFS form. All user interfaces have been implemented using state-of-the-art web technologies.

The following steps are performed:

- The expert seeker specifies a set of demanded skills using dropdown lists. For simplicity, we do not visualize selection options for matching preferences
- A list of experts is retrieved matching the search criteria (Fig. 1b). The set of expert skills are visualized. Additionally, the experts' profile can be retrieved. Such profile information is typically available via public web sites containing information about collaborators, joint projects or scientific papers published by an expert. As mentioned before, FOAF profile information and knows relations are using by UserHITS. The expert seeker can also visualize the social network as a graph (see Explore Profile). We use a JavaScript library (http://thejit.org) for graph visualization.
- In Fig. 1c, the expert seeker enters information regarding the RFS. Upon submission, form elements are translated into XML and SOAP messages. This is done on the client side using XForm technology and a browser plug-in for XForm processing. Additional communication tools might be used (if available) such as Skype, however, without the ability to perform complex interactions such as delegations or duplication of requests (4-eyes principle).
- The expert can review a request (see Fig. 8d) and decide whether to process a request or delegate the request to some other peer.

  Delegation loops or cycles are prevented by the RFS Delegation Management. Delegation rules ensure that RFSs are not delegated back to the originally delegating HPS.



All skills:

Software/SE/Specifications/Languages

Software/SE/Specifications/Languages
Software/SE/Specifications/Methodologies
Software/SE/General/Standards
Software/SE/General/SE for Internet projects
Software/SE/Specifications/Analysis

Online Help and Support offered by:

- Daniel Schall
  Skills:
  - Software/SE/General/SE for Internet projects
  - Software/SE/Specifications/Analysis
  - Software/SE/Specifications/Languages
  [FOAF] (knows 20) Explore Profile
- Florian Skopik
  Skills:
  - Software/SE/Specifications/Languages
  - Software/SE/Specifications/Methodologies
  - Software/SE/General/Standards
  [FOAF] (knows 3) Explore Profile

Click user to contact.

Request For Support (User: 13, Skype: Offline)

Subject:
WSDL consumption with Axis2

RFS Description:
Axis2 produces a parsing error while consuming http://www.infosys.tuwien.ac.at/sampleservice.wsdl. What is wrong?

(a) Discover experts based on skills, contextual constraints, and personal preferences. (b) Retrieve a list of experts that match the search criteria, and manually select one. (c) Compile and send RFS to selected expert or contact directly via Skype.

Title	State	Comments	Keywords	Category	ResourceURI
☑ WSDL consumption with Axis2	open	Used Axis2 1.4	WSDL, Axis2	Software/SE/General/ SE for Internet projects	http://copenhagen.vitalab.tuwien.ac.at/HPS/AllPurposeHandler.ashx?XML=RFS0056.xml

- 1 -

(d) Experts browse through the list of received RFSs and process, delegate or reject them.

Figure 1: expert involvement in online help and support

5. Experiments

In Figure 2, we show the essential steps of the UserHITS ranking algorithm including data sources used to calculate the weighted interaction graph. A query interface enables expert seekers to specify queries based on preferences.

As mentioned before, preferences include demanded set of hierarchically defined skills (Skill Matching). User profiles are evaluated to find the potential candidate experts. The UserHITS calculation is performed online based on the weighted, trust-based interaction graph.

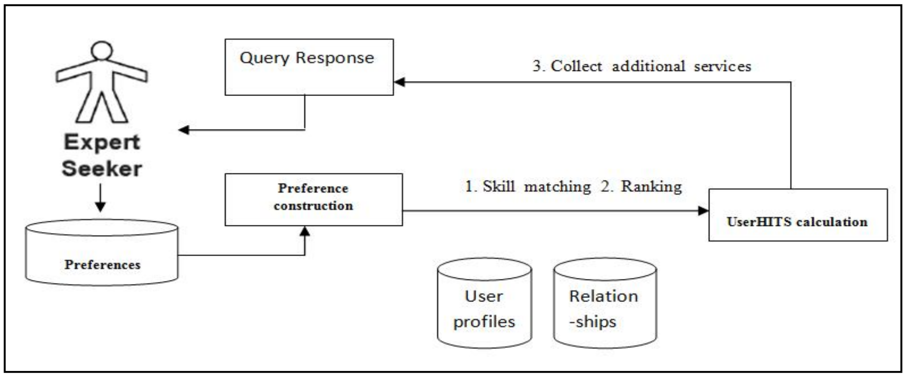
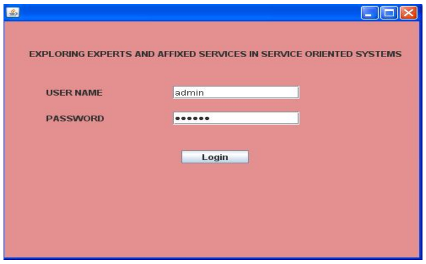


Figure 2: UserHITS calculation steps

6. Results

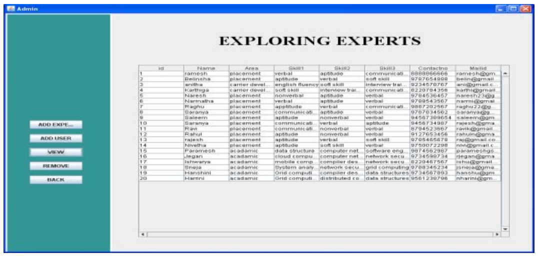
Login


EXPLORING EXPERTS AND AFFIXED SERVICES IN SERVICE ORIENTED SYSTEMS
Login

USER NAME admin

PASSWORD ••••••

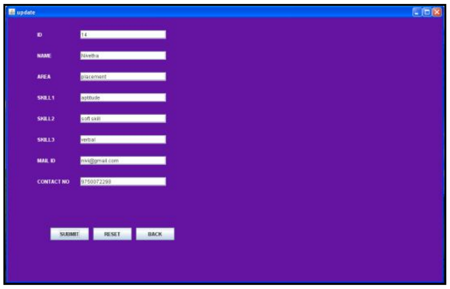
View



EXPLORING EXPERTS

id	Name	Area	Skill1	Skill2	Skill3	Contactno	Mailid
1	ramesh	placement	verbal	aptitude	communicati...	8888866666	ramesh@gm...
2	Belinsha	placement	aptitude	verbal	soft skill	9787654888	belin@gmail...
3	anitha	carrier devel...	english fluency	soft skill	interview trai...	9234578767	ani@gmail.c...
4	Karthiga	carrier devel...	soft skill	interview trai...	communicati...	8220784356	karthi@gmail...
5	Naresh	placement	nonverbal	aptitude	verbal	9784536457	naresh23@g...
6	Narmatha	placement	verbal	aptitude	verbal	9789543567	narmi@gmai...
7	Raghu	placement	apptitude	verbal	communicati...	9887202567	raghu22@g...
8	Saranya	placement	communicati...	aptitude	verbal	9787834562	saranya@g...
9	Saleem	placement	aptitude	nonverbal	verbal	94567389654	saleem@gm...
10	Saranya	placement	communicati...	verbal	aptitude	9456734987	rajesh@gma...
11	Ravi	placement	communicati...	nonverbal	verbal	8794523867	ravik@gmail...
12	Rahul	placement	aptitude	nonverbal	verbal	9127653456	rahuln@gma...
13	rajesh	placement	aptitude	verbal	soft skill	9785465678	raj@gmail.co...
14	Nivetha	placement	aptitude	soft skill	verbal	9750072298	nivi@gmail.c...
15	Paramesh	acadamic	data structure	computer net...	software eng...	9874562987	parameshgs...
16	Jegan	acadamic	cloud compu...	computer net...	network secu...	9734598734	rjegan@gma...
17	Ishwarya	acadamic	mobile comp...	compiler des...	network secu...	8220467567	ishu@gmail...
18	Sneja	acadamic	System analy...	network secu...	grid computing	9788345234	jsneja@gma...
19	Hanshini	acadamic	Grid computi...	compiler des...	data structures	9734567893	hanshu@gm...
20	Harini	acadamic	Grid computi...	distributed co...	data structures	9561238796	nharini@gm...

Insert Expert



ID 14

NAME Nivetha

AREA placement

SKILL1 aptitude

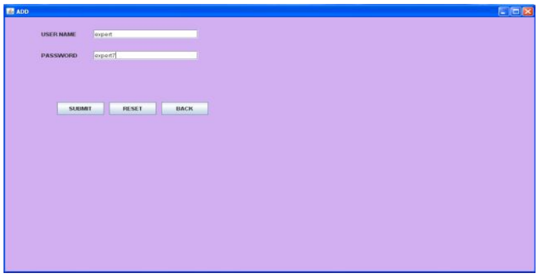
SKILL2 soft skill

SKILL3 verbal

MAIL ID nivi@gmail.com

CONTACT NO 9750072298

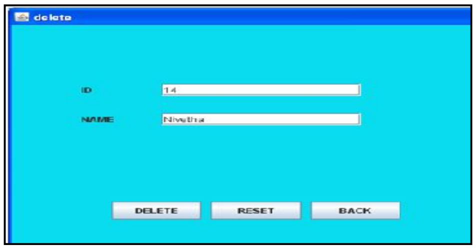
Isert User



USER NAME expert

PASSWORD expert7

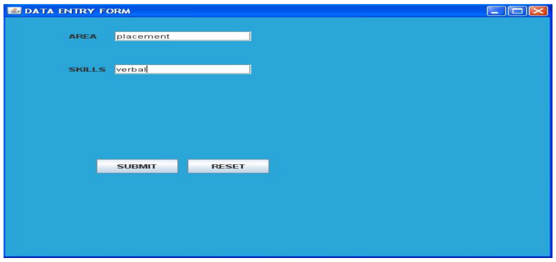
Delete



ID 14

NAME Nivetha

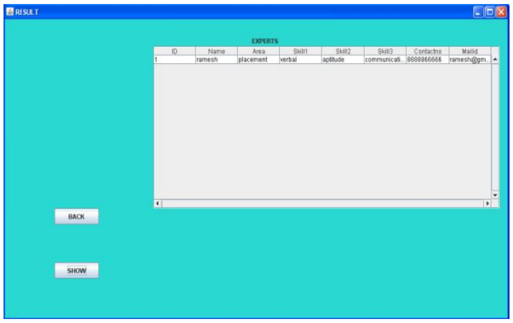
Skill Entry



AREA placement

SKILLS verbal

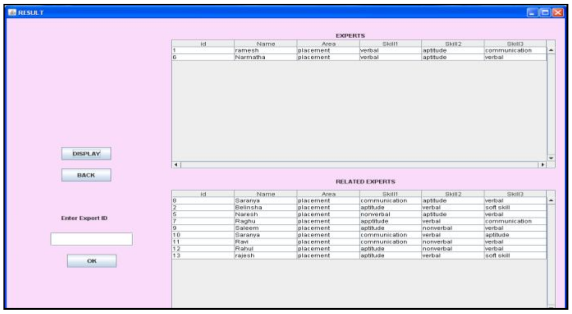
Display Experts



EXPERTS

ID	Name	Area	Skill1	Skill2	Skill3	Contactno	Mailid
1	ramesh	placement	verbal	aptitude	communicati...	8888866666	ramesh@gm...

Expert Details



EXPERTS

id	Name	Area	Skill1	Skill2	Skill3
1	ramesh	placement	verbal	aptitude	communication
6	Narmatha	placement	verbal	aptitude	verbal

RELATED EXPERTS

id	Name	Area	Skill1	Skill2	Skill3
8	Saranya	placement	communication	aptitude	verbal
2	Belinsha	placement	aptitude	verbal	soft skill
5	Naresh	placement	nonverbal	aptitude	verbal
7	Raghu	placement	apptitude	verbal	communication
9	Saleem	placement	aptitude	nonverbal	verbal
10	Saranya	placement	communication	verbal	aptitude
11	Ravi	placement	communication	nonverbal	verbal
12	Rahul	placement	aptitude	nonverbal	verbal
13	rajesh	placement	aptitude	verbal	soft skill

7.Conclusion

Unlike traditional models found in process-centric environments, we proposed the combination of preplanned process steps and ad hoc activities to solve emergent problems in distributed collaboration environments. Our approach is completely based on the software based Services concept enabling knowledge workers to offer their skills and expertise in service-oriented systems. Expert discovery is greatly influenced by (behavioral) trust and reputation mechanisms. We demonstrated a novel approach for estimating expert reputation based on link structure and trust relations. Trust information is periodically updated to capture dynamically changing interaction preferences and trust relations. We have shown that UserHITS can be computed in an online manner, thereby enabling full personalization at runtime. Existing approaches in personalized expertise mining algorithm typically perform offline interaction analysis. Our empirical evaluations have shown that UserHITS exhibits the desired properties; trust and rating weights influence hub- and authority scores. These properties ensure that our algorithm discovers experts which are well connected to other experts.

Although we have focused on the application of UserHITS in human-centric and social collaborations, we believe that the underlying trust-based interaction model can be applied to coordination problems in distributed systems in general. In our future work, we will study network effects of two-sided markets [32] in mixed service-oriented systems. Also, we plan to make the system available for public use.

8.Reference

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