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RESEARCH ARTICLE

# USER GUIDED WEB BASED INTERACTION IN MIXED SERVICE ORIENTED SYSTEM

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***Abstract— A mixed service-oriented system composed of both human-provided and Software-Based Services interacting to perform joint activities or to solve emerging problems. Discovering right actor in the mixed service oriented system is challenging one. The trust between members is a key factor for successful collaborations. HPS allows experts to offer their skills and capabilities as services that can be requested on demand. The main complexity is response time will take more between the members. The trust based algorithm called Expert HITS are proposed to solve this problem. It based on the concept of hubs and authorities in web-based environments. Expert HITS promoting well-connected and rated hubs. The Expert Web is proposed and it consisting of connected experts that provide help and support in a service oriented manner. The members of the Expert Web are humans. The expert seekers send requests for support, abbreviated as RFSs. Experts may also delegate RFSs to other experts in the network, when they are not able to provide satisfying responses.***

***Key Terms: - Human-provided services; Software-Based Services; trust; hubs; authorities***

## I. INTRODUCTION

WEB services have paved the way for a new blend of compostable systems. Services already play an important role in fulfilling organizations' business objectives because process stakeholders can design, implement, and execute business processes using web services and languages such as the Business Process Execution Language (BPEL). A broad range of services is increasingly found in open web-based platforms. Users and developers have the ability to use services in various applications because services offer well-defined, programmable, interfaces. In process-centric collaboration, a top-down approach is typically taken by defining process activities and tasks prior to deploying and executing the process. Before creating the model, the designer must fully understand each step in the process. Flexibility in such composition models is limited since unexpected changes require remodeling of the process. Such changes may cause exceptions, disrupting the normal execution of the process. It is important to support adaptively in collaborations and compositions. An important role toward adaptive processes is the ability to support the execution of ad hoc activities and flexibility in human interactions to react to unexpected events. While the process-centric collaboration approach.

## II. MANUAL DISCOVERY

Manual discovery requires the expert seeker start asking information for an expert by asking other people for their opinion or to provide recommendations are performed by asking friends or colleagues who are all faced similar problems in the past. A person needs to know trusted experts and what data needs to be exchanged to solve a particular problem. The drawback is that People need extensive knowledge about the skills of colleagues and also if number of people increases the task will be very difficult. The discovery approach is not performed longer in a manual way.

### 2.1 THE EXPERT WEB

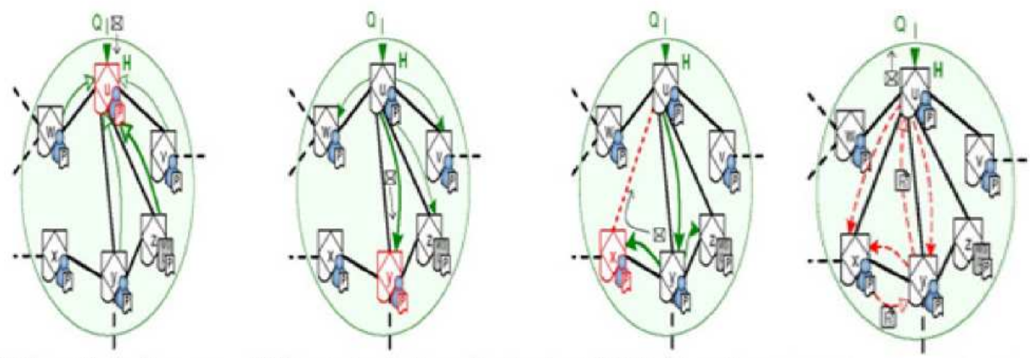
The Expert Web consisting of connected experts and provides the help and support services in distributed collaboration. These online platforms distribute problem-solving tasks among a group of humans. The members of the Expert Web are either human. The expert seekers send RFSs. Search query containing the set of relevant skills. Experts may also delegate RFSs to other experts in the network when they are Overloaded or not able to provide satisfying responses. Not only the users of the expert web establish the trust relations but also trust between the experts also important.

## III. EXPERTISE MODEL

The given search query containing the set of relevant skills, who is the expert satisfying these demanded skills and how well the expert connected to other people having similar expertise. From the Expert Web's point of view, finding the right expert by performing skill matching is not sufficient. Also need to consider whether the expert will be able to delegate RFSs to other peers in the Expert Web.

### 3.1 TRUST RELATION

Trust in the expert web reflect the expectation of one expert has about another future behavior to perform delegated RFSs dependably, securely, and reliably based on experiences collected from previous interactions.



(a) Expert hub discovery. (b) Trusted selection of authority. (c) RFS delegation. (d) RFS reply and rating

Fig 1 .Expert HITS discovery model

### 3.2 HUBS

A good hub is characterized by a neighborhood of peers that are satisfied with received RFSs. On the other hand, delegation of work is strongly influenced by trust .For example, whether the initial receiver of the RFS (hub within the Expert Web) expects that the peer will process work in a reliable and timely manner. RFS receivers need to be trusted by influential hubs that are highly rated in order to be recognized as authoritative peers in the Expert Web.

### 3.3 AUTHORITIES

A member of the Expert Web receives an RFS and delegate work to some other peer in the network. Receivers of the delegated work, however expect RFSs fitting their skills and expertise (i.e., being an authority in the given domain). Careless delegations of work will overload these peers resulting in degraded processing time due to missing expertise. In the Expert Web, authorities give feedback using rating mechanism to indicate their satisfaction whether a particular hub distributes work according to their skills and interest.

*Note that, hub and authority scores are available for each member in the network. Thus, a member may act as a hub and authority by processing or delegating tasks.*

### 3.4 EXPERT QUERIES

Expert hubs are well connected given a particular query context. Delegation is important because expert hubs will attract many RFSs over time. Being a hub in the Expert Web also means that a person knows many other experts in similar fields of interest. The major challenge is that hubness needs to be calculated on demand based on a given query. A query determines the context specified as the set of relevant skills.

Consider a query QA or QB is specified either manually by a (human) expert seeker or derived automatically from a given process context, for example a predefined rule denoting that a particular set of skills is needed to solve a problem. The purpose of a query is to return a set of experts who can process RFSs, either by working on the RFSs or delegation. Thus, QA would return HA as the user who is well connected to authorities in query context QA.

There are two influencing factors such as relations, determining hub and authority scores: 1) how much hubs trust authorities and 2) ratings hubs receive from authorities. Trust mainly influences the potential number of

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users (e.g., known by HA ) who can process delegated RFSs. On the other hand, receivers can associate ratings to RFSs to express their opinion whether the delegated RFSs fit their expertise. QB may demand for a different set of skills. Thus, not only matching of actors is influenced, but also the set of interactions and ratings considered for calculating Expert HITS.

## IV. EXPERT DISCOVERY

The discovery approach by defining a matching procedure and an algorithm for calculating Expert HITS.

### 4.1 EXPERTHITS 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. An algorithm is presented for matching preferences through 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. For simplicity, we do not consider unbalanced trees or complicated branching structures. An algorithm for matching elements which may have interaction data (RFS-based interactions) and user profiles holding skill information and also calculate hub and authority scores (shown in algorithm 1).

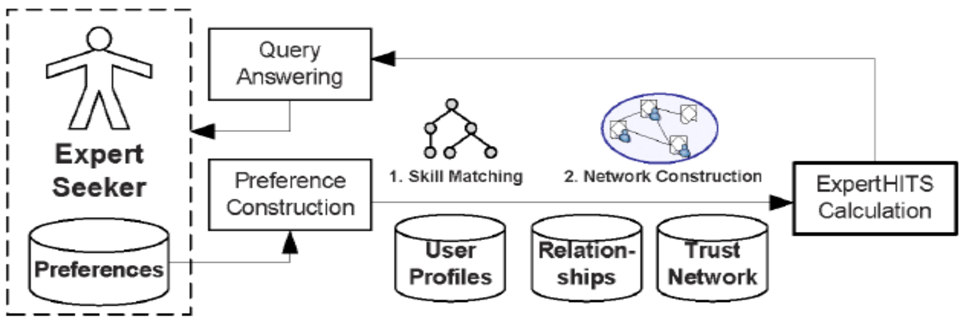


**Fig. 2. ExpertHITS calculation steps**

### ALGORITHM 1: EXPERTHITS ALGORITHM

**Input**: Given a query context Q to discover expert hubs.

1) Find experts matching demanded set of skills.
2) Start from the root node and match the query to the root node.
3) Iterate through each level and calculate overlap similarity of property in query at current level i. If the node will be empty then go to next node.
4) Calculate hub-expertise of expert given query context Q, For each expert calculate hub score. Hub score can be calculated as the rating through authorities based on delegation behavior.
5) For each expert calculate authority score. Authority score can be calculated as the rating through hubs based on reliability in processing delegated tasks.
6) Ranked expert are listed.

**Output**: Ranked elements

### 4.2 EXPERT HUB DISCOVERY

The discovery and selection of expert hubs and authorities (Fig. 1a and 1b) followed by the definition of delegation patterns and ratings (Fig. 1c and 1d) is shown.

### 4.3 EXPERTHITS MODEL

In this section, we discuss the formal model for our proposed expertise ranking algorithm consisting of two components. 1. Hub score of user u in query context Q and 2. Authority score of user v in the same query context Q.

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### 4.4 METRIC CALCULATION

Metrics support fast and reliable responses and neglect others such as costs. Calculate metrics in the scope of interactions (Request for support).For fast and reliable use metrics such as response time and success rate.

1. Response Time
2. Success Rate

Response Time is calculated as the duration between sending (or delegating) a request to a service and receiving the corresponding response. Success Rate is an RFS is considered successfully processed is the success rate.

## V. IMPLEMENTATION AND EXPERT DISCOVERY APPLICATION

To conclude implementation, The user interfaces demonstrating the integration with infrastructure services including the Skill Requirements Definition, Discovery of Expert, Expert Involvement, RFS Creation, Profile Visualization, RFS Delegation Management, and the Social Network Management. All user interfaces have been implemented using web technologies. The following steps are performed:

1. Discover experts based on skills, contextual constraints, and personal preferences.
2. Retrieve a list of experts that match the search criteria, and manually select one.
3. Compile and send RFS to selected expert or contact directly.
4. Expert browse through the list of received RFSs and process, delegate or reject them.

### 5.1 HUMAN PROVIDED SERVICES IN THE EXPERT WEB

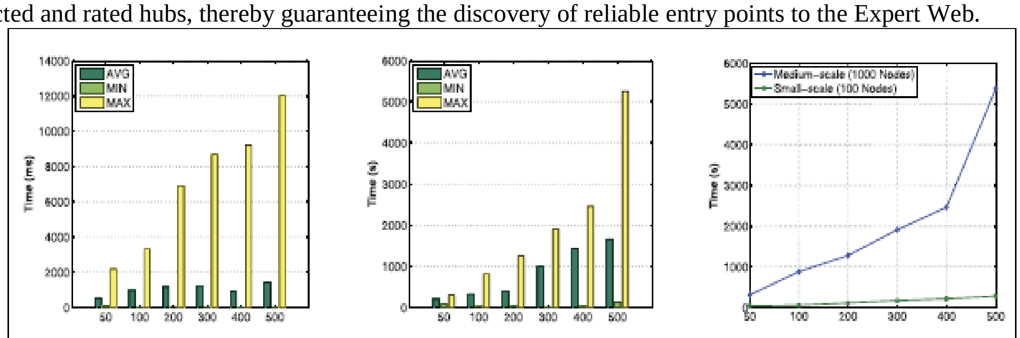
The interactions are governed by dynamics as new HPSs can be registered and flows of activities might change (delegation patterns) due to actor preferences, trust, and reputation. Human-Provided Services (HPSs) enabling flexible interactions in service-oriented systems. The discovery and interactions in mixed service oriented systems comprising HPS and software- based services (SBS). Experts offer their skills and capabilities as HPS that can be requested on demand.

## VI. EXPERTHITS CALCULATION

In Fig 2, the essential steps of the ExpertHITS ranking algorithm including data sources used to calculate the weighted interaction. A query interface enables expert seekers to specify queries based on preferences. Preferences include demanded set of hierarchically defined skills .User profiles are evaluated to find the potential candidate experts. The ExpertHITS calculation is performed online based on the weight. The performance of ExpertHITS as well as the influence of trust and ratings on hub/authority scores.

### 6.1 RESULT

Complexity is a crucial factor in order to support personalization of queries. The complexity for computing ExpertHITS is O(|N| * it). To test the effectiveness of ExpertHITS, perform the experiments to study the impact of ratings and trust on expert rankings. ExpertHITS exhibits the demanded properties of promoting well-connected and rated hubs, thereby guaranteeing the discovery of reliable entry points to the Expert Web.

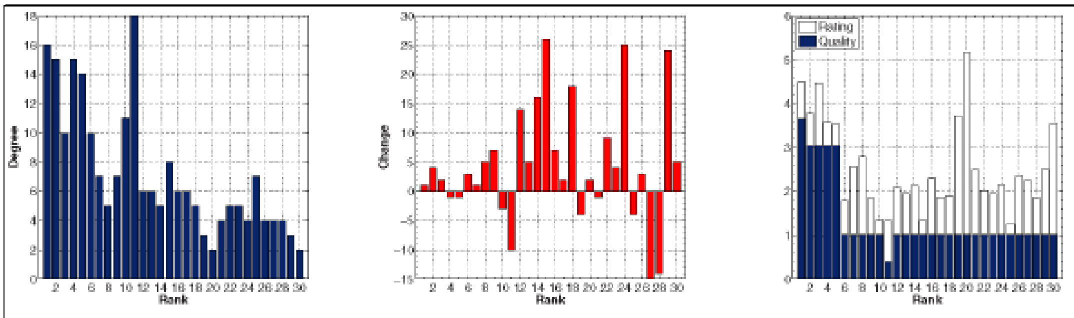



(a) Small-scale. (b) Medium-scale. (c) Total processing time.

Fig 3.Concurrent request processing time ExpertHITS

Small: 100 nodes, 400 edges (60 ms).
Medium: 1,000 nodes, 4,000 edges (600 ms).
Large: 10,000 nodes, 40,000 edges (12;100 ms).

To test the effectiveness of ExpertHITS, we performed experiments to study the impact of ratings and trust on expert rankings. In Fig. 11, To show the top-30 ranked experts in a small-scale network (100 nodes). Results are sorted based on the position within the result set (horizontal axis). Fig. 4 a shows the degree of network nodes and Fig. 4 b ranking changes obtained by comparing ranking results using the HITS algorithm without taking trust or ratings into account. In Fig. 4 c, show the average rating of each ranked node; average rating of node *u* received from its neighboring nodes divided by the expected rating. To define quality as the aggregated trust weights.




(a) Node degree. (b) Ranking change. (c) Ratings and quality.

Fig: 4 Impact of ExpertHITS on rankings.

## VII. CONCLUSION

Our approach is based on the Human-Provided 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. ExpertHITS can be computed in an online manner. Existing approaches in personalized expertise mining algorithm typically perform offline interaction analysis. ExpertHITS exhibits the desired properties; trust and rating weights influence hub- and authority scores are shown. These properties ensure that our algorithm discovers experts which are well connected to other experts.

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