An Agent Based Approach to Finding Expertise

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Abstract. In many organisations people need to locate colleagues with knowledge and information to resolve a problem. Computer based systems that assist users with finding such expertise are increasingly important to organizations and scientific communities. In this paper we discuss the development of an agent based expertise finder (EF) suitable for use within an academic research environment. A key feature of this work is that the EF returns both recommended contacts and supporting documentation. The EF bases its results on information held within the organisation, for example publications, human resource records and not on CVs or user maintained records. The recommendations are presented to the user with due regard to the social context, and are supported by the documents used to make the recommendation. The technology used allows the development of distributed, interchangeable agents that use real time data to find expertise. It is our intention to use this approach within manufacturing and other knowledge intensive organisations.

1 Introduction

In the course of most activities, people face problems that they cannot solve alone. Their natural response is to study past experiences and re-use previously acquired knowledge, either from their own experiences or from resources within their organisation. Goa et al, [7] estimated that 90% of industrial design activity is based on variant design, while in a redesign activity 70% of the information is re-used from previous solutions [9]. For many problems, access to documentation through hypermedia or similar systems may give adequate solutions [6]. However to solve many problems people need to have specific expertise, that will allow the problem to be resolved. In this paper, the term expertise assumes the embodiment of knowledge and skills within individuals. This definition distinguishes expertise from an expert. An individual may have different levels of expertise about different topics. Expertise can be topical or procedural and is arranged and valued within the organisation. In some cases expertise can be captured from a person and used to populate a database. This works very well when the problem is restricted to a very specific domain, for example robot maintenance, [2]. However for many problems the required expertise can only be accessed through a social network.
To solve a specific problem people want to quickly find other people with the required expertise. In many organisations, key personnel (managers, senior employees, information concierges [10]) will facilitate the contacts. Recommender systems are one approach to automate this process, by augmenting and assisting the natural expertise-locating behavior within an organisation. A recommender system that suggests people who have some expertise with a problem holds the promise to provide, in a small way, a service similar to these key personnel. Expertise recommender systems can also reduce the load on people in these roles and provide alternative recommendations when these people are unavailable.

In the recommendations provided by the expertise finder (EF), trust is important, this can be achieved by showing why people were not recommended or why a document was not considered so important. A document might seem relevant based on a full text search but is actually twenty years old, an important factor in some situations, but not in others. The provision of evidence for its decisions in the form of a list of documents and other data is considered a key EF output. This approach contrasts with a number of reported systems where web based information is used to provide the recommendation, [3, 4, 5]. Answer Garden 2 [1] has an explicit expertise-location engine and provided computer-mediated communications mechanisms to find others with a range of expertise, though the mechanisms were not very elaborate. A different approach was taken by McDonnald [10] who used software developed by employees to identify their expertise in various aspects of software development.

2 Problem Definition and Context

When attempting to find an answer to a problem people will tend to use the social network around them. It is natural to first ask people nearby if they know the answer or if they can recommend someone else who may know the answer. Thus a chain of connections are made utilising the experienced members of an organisation. As people are now being moved around organisations at a faster rate and organisations are becoming increasingly distributed this model starts to fail. There may be no social connection between specially separated groups even though they work on similar problems. Our system attempts to alleviate this by using the company’s own resources to recommend people to contact. It does not replace the social network but attempts to speed up the connection making process.

The work reported in this paper presents details of an Expertise Finder system, which is summarised in Fig. [1] The problem that is being addressed is summarised in Fig. [1(a)] how does a person located in Site A, locate the best expertise to solve a specific problem? The person’s local network will only extend to within the site, and therefore expertise in other sites can not accessed. It should be remembered that sites can share common problems, but not necessarily be easily accessible to each other. For example within the academic community, a question on robotics could easily draw on expertise from either a Department of Mechanical Engineering or a Department of Cognitive Physiology. While the