InfoScout: An Active Recommender Agent

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Abstract

InfoScout is a proactive recommender agent designed to aid the effective creation and exploitation of formal and informal networks of social relations that form an important part of knowledge management strategies of an organization. It helps a user ask the right set of people for help on a topic or a problem on hand. InfoScout watches a user performing a particular task and suggests other people and resources in the organization that could potentially be of help.

Introduction

Most of the knowledge assets of an organization are neither explicit nor disembodied. A significant portion of these assets resides in people's heads in the form of tacit awareness of organizational processes, implicit expertise, and "gut feelings" about how to get things done. This suggests that the effective creation and exploitation of formal and informal networks of social relations is an important part of knowledge management strategies. Recommender Systems are a class of computer applications that assist and augment the process of locating and enlisting the relevant people to facilitate the process of bringing organization-wide knowledge capital to bear on a problem at hand. These systems help a user ask the right set of people for help on a topic or a problem. In this paper, we will discuss a recommender agent called InfoScout that watches a user performing a "particular task" and suggests other people and resources in the organization that could potentially be of help.

Recommender Agents

One important dimension along which the recommender agents differ is how proactive they are, in assisting users with locating appropriate people and resources within an organization. Agent amplified communication systems proposed by Kautz, Selman and Milewski 1996 involve a user explicitly using an agent to locate relevant expert contacts when there is such a need. The agent is passive and the user has to explicitly query the system with her needs in order to locate an expert. The ContactFinder agent (Krulwich and Burkey 1996) watches a bulletin board for the questions that a user is posing and informs the user of possible experts for the topics related to the question. ContactFinder is more active than the agents in an agent-amplified communication system in the sense that a user is provided with useful contact information even if she is not explicitly querying the system for the information. However, it does rely on the user submitting a question to a bulletin board. InfoScout is a highly active agent that watches what the user is typing and provides suggestions about other people and resources in the organization that could be of help for the task on hand.

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Figure 1 shows the architecture for InfoScout. It relies on a program that watches the keystrokes produced by a user. It tokenizes the keystrokes and uses these tokens to query an application called "Web Exchange" that serves as a gateway to the diverse enterprise-wide resources available to the Andersen Consulting (AC) personnel. AC uses a Lotus Notes™ enabled organizational knowledge repository called Knowledge Xchange™ (KX) to serve as a facilitator for knowledge sharing. However, given the size of AC and the number and diversity of its activities, KX soon grew into a very large database – giving rise to the need for effective tools for locating and browsing the resources. Web Exchange is intended to serve an "easy-to-use" interface to remedy this problem. A user can query Web Exchange along any of five dimensions – person, topic, client, project, or document – by choosing one of them and typing a keyword. For example, she can query for topic and keyword "agents". Web Exchange returns relevant information along the other dimensions for that keyword. For example, for a topic query on "agents", it returns information about people, clients, projects and documents relevant to "agents" available on the KX.

Two of the key issues that an active recommender agent like InfoScout needs to address are:

1. What to display?
   Querying on tokens generated by the user's keystrokes can lead to a lot of information being returned. The agent needs to be intelligent about what information it selects to be displayed.
2. How to display?
   The agent needs to strike a balance between being invasive and drawing the user's attention to potentially useful information.

What to display?

InfoScout tokenizes the stream of keystrokes and uses these tokens to query a local index of topics that it maintains. These topics are derived from the topics that exist on the KX system. Any piece of information that is added to the KX also comes with meta-data that includes a topic category for it. For example, a document on InfoScout would list "agents" as its topic. Each topic in InfoScout's local index is associated with a set of high information content keywords. These can be automatically selected from the information available on KX using statistical information retrieval techniques. For example, "agents" is associated with "information", "management", "autonomous", "multi-agent" etc. We build an inverted index from the set of all keywords into the topics. For example, the topics "client-server" and "client engagements" are indexed under the word "client". When a token is used to retrieve a set of topics from this index, these topics are added to the bag of active topics. If the new topic is already in the bag, its count is increased. Otherwise, the topic is added as a new element to the bag with a count of 1. If the count of a topic increases beyond a pre-determined threshold, that topic is used to query the Web Exchange and the information returned about related people, documents, clients and projects is displayed to the user.

How to display?

The retrieved information can be displayed on a small ticker at the bottom of the screen or a small flashing button could indicate new information that will be display upon clicking it. We need to develop the system further and experiment with it more to evaluate these and any other strategies to effectively display retrieved information.

Status and Future Work

InfoScout is in its early stages of development. At present, it uses the detected tokens to look for exact matches with the topic name (rather than the inverted index). The information is displayed in a small window at the bottom of the screen. We are in the process of progressively ramping up its features and capabilities. We are excited about the potential for InfoScout to serve as a vehicle to experiment with issues about what information an active agent can display and how it can do so in a non-invasive manner.

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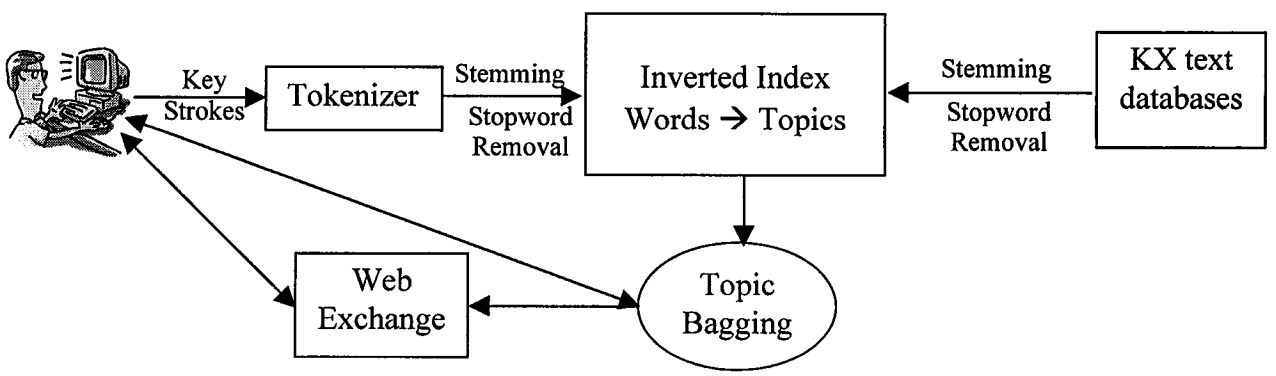

Figure 1: InfoScout Architecture