Towards an Autonomous Information Sharing System based on Mobile Agents

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1 Introduction

In this paper, we propose and implement an information sharing system based on autonomous mobile agents.

In recent years, we can get considerable amount of information from the Internet. The piece of information we really want is sometimes hidden within a vast amount of garbages. We call this situation "information overload".

In this situation, it is useful to share information with people who are interested in same (or similar) topic. In addition, to get more information, we have to share with previously unknown persons. To realize such information sharing systems, we have to overcome increasing communication cost and heterogeneity of user envionments, and so on.

Thus we adopt mobile agents to construction our information sharing system. Mobile agents are autonomous programs that can move computer to computer with their own internal condition. They can provide a convenient, efficient, and robust framework for implementing distributed applications.

2 Design of The Information Sharing System

The feature of our information sharing system is the autonomous information sharing using mobile agents. This is realized by an agent that has user's data and preference looks for the agents that have a similar profile, and exchange each data. In addition, we provide the directory service to realization of autonomy agents.

We build our information sharing system using four kinds of mobile agents (Server Agent, Directory Agent, Service Agent and User Agent). Information sharing is performed by movement and communication of these agents. Each agent works as fellows.

- Server Agent:

  A Server Agent exists in each host. It performs management and assignment of resources to the other agents on the host, and also it provides communication function between agents.

  The Server Agent provides a user interface to access the system. The user can set up the server and send query to a Directory Agent.

- Directory Agent:

  A Directory Agent provides a directory servcie to other agents in our system. An active agent has to report their profile that includes the current host, state, etc. to the Directory Agent. Agents can get various informations by sending queries to the Directory Agent.

- Service Agent:

  A Service Agent provides the information sharing service to User Agents, and also they have the function to distribute User Agents as user client software for their service.

- User Agent:

  A User Agent moves computer to computer with user's data and preference, and share information by receives a Service Agent's service.

In our system, there are various information sharing services that are distinguished to the data and a method of sharing.

3 Features of The Information Sharing System

Our information sharing system has following features.

- Sharing information with people who are interested in same (or similar) topic.

  One of the feature of our system is the autonomous information sharing. This is realized by an agent which has a user's data and preference looks for the agents which have the similar purpose by using mobility and a directory service which is provided by our system, and exchange each user's data.

- Sharing information with previously unknown persons

  Since our system consists of mobile agents, reducing communication cost and adaptiving a dynamic network environmental change is possible, and a dependence on a computer environment is low. Therefore, a flexible adaptation of previously users is possible

- Dynamic configuration change and load balance.

  Services on our system can dynamic configuration change and load balance by utlizing their mobility and direcotry service.

- Flexible and efficient communication mechanisms.

  We provide the flexible and efficient agent communication APIs to service developers. Since these APIs deliver a messege using the lightweight mobile agent, realizing an autonomous message is possible.

4 Implementaion

We implemented the proposed system. We used AgentSpace as the platform of our implementation, which is a mobile agent system implemented on Java (JDK 1.1 later).

5 Example: Bookmark Sharing System

We implemented the bookmark sharing system on our system. The bookmark sharing System is a system, which is aiming at sharing bookmarks among the users who have similar topics, and is implemented as a service on our system.

The bookmark sharing system consists of Bookmark Agents and Bookmark Sharing Agnets. A Bookmark Sharing Agent provides a bookmark sharing service to Bookmark Agents. A Bookmark Agent, which has user's bookmarks and the keyword as user's preference, itinerates autonomously the hosts where a Bookmark Sharing Agent exists, and shares bookmarks with other Bookmark Agents by receiving a bookmark sharing service. More over, a Bookmark Sharing Agent can dynamic configuration change and load balance by utilizing mobile agent's advantages and the directory service provided a Directory Agent.

6 Conclusion

We proposed and implemented the information sharing system based on autonomous mobile agents, and we implemented the bookmark sharing system on our system. By building the bookmark sharing system on our system, we showed that our system is effective.