

# A Survey on Applications of Mobile Agents in E-Business

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**ABSTRACT-** A mobile agent is a software program that can transport its state from one environment to another, with its data intact, and be capable of performing operations appropriately in the new environment. The use of mobile agent is a rising research field which has got a broad application in future. In this paper we examine the characteristics and types of the mobile agents. We also examine applications of mobile agents in the field of E-Business.

**Index Terms—** Mobile Agents- E-Commerce – Multi-Agent

## 1 INTRODUCTION

An agent is an autonomous entity which observes and acts upon an environment and directs its activity towards achieving goals. Their behaviors were restricted and have predetermined activities. Now with a rising growth in technology agents have become mobile agents.

Mobile agent technologies had changed the way we live and work. It offers a new computing paradigm in which a program, in the form of a software agent, can suspend its execution on a host computer, transfer itself to another agent-enabled host on the network, and resume execution on the new host. Nwana [1] classify agents into the following types.

- Collaborative
- Interface,
- Mobile
- Information
- Reactive
- Hybrid
- Intelligent.

Some essential characteristic features of the mobile agents are discussed by Jeffrey M. Bradshaw [2],

- ✓ The basic property of a mobile agent is to act on behalf of its users by moving across the network from host to host and bring back the result to the user.
- ✓ Agents bring the program closer to the resources.
- ✓ Agents have the capability of learning, cooperation with other agents and mobility.
- ✓ Mobile agents migrates the computation to the data instead

of the data to the computation.

- ✓ It uses limited memory space and CPU consumption.
- ✓ Agents offers less usage of bandwidth by migrating itself to server and returns only after the process is over and hence also reducing network load and traffic.
- ✓ Mobile agents are dynamic in nature as they can work on various heterogeneous execution environments.
- ✓ They are both autonomous as well as asynchronous.
- ✓ The mobile agents have the ability to react dynamically in unfavourable circumstances so that it can overcome faulty behaviour during their execution in complex distributed systems and hence possess the feature of robustness.
- ✓ They provide convenient and easier development paradigm.

## 2 MOBILE AGENT TYPES

Software agents can be classified into two types based on their mobility. Stationary agents are those that do not move over the networks and executes only on the system on which it begins execution whereas, mobile agents move across the network to carry on its task. Stephen Hagg [5] suggests four vital types of intelligent mobile agents based on the task they perform,

### 1. Shopping bots

Shopping bots are agents which assist users for shopping products and getting services online. They make the shopping process easy for the buyers by getting information on various product items and services and acknowledge the final result back to the one who dispatched it. They are called as shopping bots because the word “bot” refers to robot. So these agents’ acts like buyer’s personal robots that do his work. These can be mainly used for most for buying the products on trade and market along with electronic and other one size fits all products.

### 2. User or personal agents.

User agents are intelligent agents that perform the

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tasks for user on their behalf. Some of the tasks performed by user agents are checking of e-mail, play as your opponent in games, gathering of information, automatic filling of forms, scanning of web pages, searching of jobs etc.

### 3. Monitoring-and-surveillance or predictive agents.

Predictive agents are intelligent agents that foresee the changes of equipment (mainly computer system) by keeping watch over them. If there occurs any changes (changes in web page content) , anomalies, defects, malfunctioning or any other absurd behavior over those equipments, the agents reports back for action to be taken. The agents may also monitor company inventory levels, keep watch on competitors' prices by monitoring the web page (eg. Web watch) and pass them on back to the company, etc.

### 4. Data mining agents.

Data mining agents work on discovering information from varied sources. The user can sort through this information in order to find whatever information they are seeking. Once the information is got from different sources we can take actions on it. Patterns of information can be categorized into different classes by these agents. They can also detect major shifts in trends and can find out the presence of new data and alert you. These data mining agents can discover a downfall in manufacturing industry of a specific product in economy. After discovering, the industries can make intelligent decisions based on the transmitted information.

## 2.1 MOBILE AGENTS FOR E-COMMERCE

Multi Agent in e-commerce provides a new way to conduct various types of business such as B2B, B2C and C2C. [4]. Multi Agent systems in E-commerce can be classified into three categories namely, shopping agents, salesman agents and auction agents.

### 2.1.1 SHOPPING AGENT

These Agents make purchases in e-marketplaces on behalf of their owner according to user defined needs. A typical shopping agent may compare features of different products by visiting several online stores and report the best choice to its owner. Since the agent's moves to the source of information, the overhead of repeatedly transferring potentially large amounts of information over a network is eliminated. Example of shopping agents is ShopBot [7] which works in two phases, wherein in the first phase it creates a learning agent which gathers a vendor description for each merchant and in consequent comparison shopping phase it uses the information collected in the learning phase and decides which store offer the best price for a given product.

### 2.1.2 SALESMAN AGENT

These salesman Agents behave like a traveling sa-

lesman who visits customers to sell his products. This model of e-commerce uses a supplier driven marketplace and is particularly attractive for products with short life time. A supplier creates and dispatches an Multi-Agent to potential buyers by giving it a list of sites to visit. A system implementing salesman agents is Firefly where it uses collaborative filtering mechanism for recommendation the given product [6].

### 2.1.3 AUCTION AGENT

MIT Media lab's Kasbah [6] is an example of customer to customer multi-agent system. Using this agent users who wishes to buy or sell an item will create an agent by specifying the guidelines and moves it to the centralized market place. These multi-agent proactively seek out potential buyer and seller and negotiate with them on behalf of the user based on the user-specific constraints such as initial price, final price, data of completion and Incremental value.

## 3 CONCLUSION

Each of the above mobile agent types serves varying purpose based on users needs. If a buyer wants to shop online and search for similar products in more than a site by negotiating then it can use any one of the E-commerce agent types based on the needs. It reduces user's time and gives regular alerts for the buyer. The personal agents are said to take care of user's tasks and it greatly provides personal assistance and of great help to all Internet surfers. Remote monitoring and filtering are used to monitor computer systems and forecast any changes prior to it become worse. A data mining agent is used to find information from lots of different sources for user. All these types of agents greatly reduce the effort of humans and are becoming popular day to day. They are widely used and deployed in rich and unlimited domain fields.

## 4 REFERENCES

- [1] H. S. Nwana, Software Agents: An Overview, Knowledge Engineering Review, Vol.11, No 3, pp.1-40, 1996.
- [2] Jeffrey M. Bradshaw, An Introduction to Software Agents, Software Agents, MIT Press Book, 1997.
- [3] Danny B. Lange and Mitsuru Oshima, "Seven Good Reasons for Mobile Agents ", Communications of ACM , vol. 42, no. 3, March 1999.
- [4] Abdelkader outtagarts , "Mobile Agent-based applications: a Survey ", Intemational journal of computer science and network security, vol.9, No.11, pp- 331- 339 , 2009
- [5] Stephen Haag. "Management Information Systems for the information Age", Pages 224-228, 2006.
- [6] Pattie Maes, Robert H. Guttman and Alexandros G Moukas, "Agents That Buy and Sell ", Communications of ACM , vol. 42, no. 3, pp. 81 - 91, March 1999.
- [7] Robert B.Doorenbos et.al. A Scalable comparison-Shopping agent for world wide web, page 39-48, 2007.