USE OF SOFTWARE AGENTS IN E-COMMERCE: BENEFITS AND APPLICATIONS

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Abstract

This research highlights how software agents would influence the present marketing prototype in interactive media. It focuses on the importance of these in E-Commerce. E-Commerce is a platform for the online activities of commerce; increase in the activities of trade in cyberspace increases the business opportunities over internet. Software agents are the useful tools to help individuals to undertake their activities on E-Commerce surroundings. Software agents create different paths for communication. Software agents increase the effectiveness and efficiency in several levels of market processes. The agent technology builds the bridge between the previously existing physical market and consequences of virtual markets. Software agents will have dramatic competition effects by quick transfer of information through new technology. As the name indicates software agents acts as mediators for the processes of choosing products and merchants. Overall software agents act as a vehicle between E-Commerce and business.

Keywords: agent, Agent-Based technology, collaborative agent, e-business, E-Commerce, e-commerce analysis, Mobile agent, reactive agent, Software Agents

INTRODUCTION

An amorphous object called a software agent is demanding a lot of attention in the Internet world. Can it really be the panacea for the information-overloaded state we Internet-savvy Web users find ourselves in? How are software agents being used today to personalize and expedite Web-based transactions? This paper examines software agents, their definition, and how they are being applied to Electronic Commerce. In addition to defining a software agent, we describe the various software agents being used in Electronic Commerce applications.

Greater portion of daily activities such as shopping, socializing, and working are being transferred to the internet environment. Over the past few decades, human computer interaction, and electronic transactions are being used. Individual's online activities are getting more and more complex with growing opportunities of internet environment. The internet that has grown dramatically in the past few years would by now becomes unmanageable without E-Commerce for business Brown and Duguid (2000). It is claimed that within the next decade the internet could be populated with billions of agents exchanging information, goods and services with one another and with the people according to (Kephart and Greenwald, 2000).

E-commerce

Modern methodology of news selling and merchandising tools that refers to the need of market by cost reduction in turns giving quality goods and services. E-commerce means doing business over interconnected networks. The term commerce is treated as transactions between business clients. So the meaning Electronic Commerce is narrow to some people thus there is a usage of term E-Business. But E-Commerce is not just buying and selling but also providing services to the clients and providing both inter and intra transactions of information in the organization irrespective of the type of company. This extended use of internet for trade and business led to the use of software agents in E-Commerce.

Meaning of software agent

Nwana, (1996) and Schermer, (2007), defined software agent as a computer program that acts for a user or other program in a relationship of agency, which derives from the Latin *agere* (to do): an agreement to act on one's behalf. Such "action on behalf of" implies the authority to decide which, if any, action is appropriate.

 Although the theory of agents stated that agent is given a very famous with the growth of internet. Software agents are a piece of software which works for the user. However software agent is not just a program. An agent is a system situated within and a part of an environment that senses that environment and acts on it. Over time in pursuit of its own agenda and so as to affect what it senses in the future, Stan and Art (1996). Important use of agent concept is, as the tool for analysis not as dosage. As the system changes, one can understand it.

Characteristics of software agent

Software agents are like guards and locomotives of most E-Commerce. They however differ from traditional software. The following are very few characteristics:
- Software agents can do their task without any outsource intervention.
- Social interaction with other software agents and human.
- Software agents are specific in their goals.

- Good software agent is the one which has the attitude to receive and adopt changes Loannis and Dimitris (2005). The agent must be programmed in a powerful language so as to express the rules.
- Safety of the information must be promised by the agent.
- Effective usage of the existing resources.
- Agent must be a good sailor.
- Software agents have the ability to personalize.
- Software agents have the ability to be adaptive and proactive

Agents must be very careful in handling unauthorized users. The same information must be accessed by the user to which they have right.

Types of software agent

Agents are classified into different types based on the characteristics they posses. In order to possess the above properties agents must have distinct features such as locomotion, integration, co-operation, information, stimulation, etc. For the same sake software agents are classified into 8 agents.

- **Collaborative agents:** A collaborative agent is a software program that helps users solve problem, especially in complex or unfamiliar domains by correcting errors, suggesting what to do next, and taking care of low level details. Collaborative agents are also refereed as collagen. In spite of their behavior of autonomy, co-operation, and learning, collagen punctuate the first two behaviors. In order to perform these they have to agree on acceptable protocols.
- **Interface agents:** Interface agents are computer programs that employ machine learning techniques in order to provide assistance to a user dealing with a particular application (Maes, 1994b). These agents take sufficient amount of time to understand and learn human behavior before they are onto work. In spite of their artificial learning thoughts they are limited co-operative with other agents Hyacinth and Divine (2003).
- **Mobile agents:** A mobile agent is an executing program that can migrate during execution from one machine to another in a heterogeneous network, (Brian etal 1993). Mobile agents are used to solve many problem of network computing with minimum bandwidth and connectivity, Holger (1997). The theme behind these agents is, 'give program the ability to move'. The main advantage of mobile agent over stationery agent are: (a).This is not bound to the system where it begins execution. (b) Can move from one system to another within the network. (c) Both the state and code is transported.
  - **Information/Internet agents:** The intelligent part of software which can automatically search for information on the website is termed as information agents. Information system can be considered as knowledge base system. These agents are defined by what they do unlike collaborative agents or interface agents which are defined by what they are. Hyacinth and Divine (2003).

- **Reactive agents:** These agents are responsible for stimulating the response to the present state of the environment in which they are embedded. These agents interact with other agents in a very simple and basic way. The important things which support reactive agents.(maes 1991 a). There is no prior specification of the behavior of these agents set since the dynamic interaction leads to the emergent complexity. (b) Reactive agents are responsible for collection of modules which operate autonomously. (c) Reactive agents tend to operate on representations which are close to raw sensor data, Hyacinth and Divine (2003). (d) Intelligent behavior is the interaction of these agents with their environment.

- **Hybrid agents:** Combining two or more of the previous mentioned agent philosophies will yield a better functioning agent. E.g.: Synergy of reactive and collaborative model. The expectation is that this hypothesis will come true.

- **Heterogeneous agents:** These agent systems unlike hybrid, refers to an integrated set up of at least two or more agents which belong to two or more different agent classes. These may also contain two or more hybrid agents, Hyacinth and Divine (2003)

- **Smarts agents:** The smart agents are the new form of software agents that interface with other agents forming an artificial intelligence. SMART stands for System for Managing Agents for Real Time. The key concept lies here is not the entire individual agent need be intelligent. But by working together in a smart way the agents form a type of emergent intelligence that may appears to exhibit intelligence.

Examples of Software Agents:

- Buying agents: Also know as shopping bots. These bots helps the users to surf while finding the products and services they are searching for. For example, when a person surfs for an item on eBay, at the bottom of the page there is a list of similar products that other customers who did the same search looked at. This is because it is assumed the user tastes are relatively similar and they will be interested in the same products.

- User agents: Also known as personal agents. These agents carry out user tasks automatically. For example, some bots sort emails according to the user's order of preference, assemble customized news reports, or fill out webpage forms with the user's stored information.

- Monitoring and Surveillance agents: Also known as predictive agents. For example, the agents keep track of company inventory levels, observe competitor's prices and report them back to the company, watch stock manipulation by insider trading and rumors, etc.

- Data-mining agents: This agent uses information technology to find out the modern fashion in information from many different sources. For example, the agent that detects market conditions and changes and relays them back to a user/company so that the user/company can make decisions accordingly. The others examples are User agent, Mail Transfer agent, SNMP agent, DAML (Defense Agent Markup Language), 3APL (Artificial Autonomous Agent Programming Language), OWL (Web Ontology Language), Management agents, etc.

Applications and Benefits of Software Agents:

Benefits of software agents

- Agents make less work for the end user and application developer.
- The agent can adapt to its user preferences and habit over a course of time.
- It will intelligently get shared among the community.
- Mobile agents manage the users' E-mail, fax, phone and pager as well as linking the user to Telescript-enabled messaging and communication services such as America Online and AT&T Personal Link Services.
- The most favorite area with respect to reactive agents is games and entertainment industry.
- Shopping agents are ideal applications of Agent Builder agents. These agents can be used to locate.
- Merchandise, compare prices, place orders, etc.

Applications of software agents

Intelligent Software agents will have numerous applications in the field of human like intelligence capabilities which is a area of research being done in Artificial Intelligence. Some of the applications are:

1. Logical Inference and Deduction
2. Contextual Domain Knowledge
3. Pattern Recognition
4. Learning and Adaptively.

Once the human-like intelligence capabilities are automated, autonomous operation permits software agents to process vast volumes of data which would be unmanageable by human agents.

Conclusion

After studying the characteristics of software agents and their applications, different conclusions were drawn that software agents are flexible enough to adopt and adjust themselves into changes. Software agents provide security to the information. Since E-commerce deal with business online, security plays the heart of business. Business needs lots of communication skills which is provided by software agents. Software agents are responsible for customer satisfaction in terms of B2B E-commerce. Software agents can be thus proved as an important entity with respect to E-Commerce. Without Software agents E-Commerce is like "a man having his leg cut".

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