

# Application of Intelligent Agents in Mobile Shopping



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## 1. INTRODUCTION

There has been an exponential growth in the use of digital mobile devices in various fields these days. This has resulted in an increased effort to develop various commercial applications that would provide leverage to this extensive use of these digital mobile devices rather than desktop PCs. One such area is the evolution of e-commerce having application in mobile commerce (m-commerce). There is no precise meaning for m-commerce or mobile e-commerce as such. However, the core of mobile e-commerce (Abbott, 2001) uses a terminal such as a telephone, PDA, or custom terminal and the public mobile network to access information and conduct business transactions that result in the transfer of value in exchange for information, services or goods. There are opportunities to enable mobile devices as universal devices for mobile commerce applications. But still the system lack intelligence towards shopping i.e users have to be knowledgeable in selecting the criteria towards mobile shopping and also system search based on criteria only and nothing beyond it. Therefore, it is for the user to refine if the search is not successful. Some examples of m-commerce (Abbott, 2001) include the purchasing of airline tickets, purchasing of movie tickets, restaurant bookings and reservations, mobile banking and so on.

Normally when we think of buying a particular product (Thomas & Harold, 2003), things that normally come to our mind are the price, the quality, the brand, etc., of the desired product. To get this information, we often do window shopping in the conventional shopping method before we decide on buying the product. In electronic shopping we put an appropriate query, taking into consideration factors like the cost, the quality of product, etc. We also at times, compromise on the selection of the item, if we do not get an item suiting to our preconceived specifications. We human beings, under such circumstances, interpret various aspects depending on several considerations and make a balanced compromise before taking a decision on the deal.

In the mobile environment the same job will be replicated by an intelligent Agent (Pleisch and Schiper, 2004; Jennings and Wooldridge, 1998; Altshuler et al., 2006) for getting the details on the specifications of the customer desired item by performing the search operation – a replication of the job done by a human agent in window or electronic shopping. It may be mentioned here that considerable research attention is being paid to the application of agents in various areas, these days. Quite amount of work been done in using intelligent agents for mobile shopping which accepts parameters from the user towards mobile shopping and agent does shopping based on fuzzy preferences or applying intelligence similar to how human being would do (Weng & Thomas, 2007; Guan et al., 2002; Foensca et al., 2002; Brown and Suresh, 2009; Brown and Suresh, 2011).

So taking all the above points into consideration, smart agent based mobile shopping and secured payment system was developed (Smith and Suresh, 2012) which allows intelligent agents to shop based on layman's language rather than users being technically knowledgeable about the criteria while mobile shopping. Also system possess past search experience towards shopping which is an improvement over

earlier system. The details on mobile payment is been discussed in another chapter (Suresh, 2015). The rest of the chapter is organized as follows. Section 2 talks on Electronic/Mobile shopping. Section 3 talks on Intelligent Agent Technology. Section 4 discusses on agent based mobile shopping system. Section 5 is conclusion and future work.

## **2. ELECTRONIC/MOBILE SHOPPING**

Electronic commerce (e-Commerce) (Abbott, 2001) refers to the buying and selling of products or services over electronic systems such as the Internet and other computer networks. The definition has evolved since its inception; in as early as in 1970's, the technique of e-commerce was merely the sending and receiving of invoices electronically using varying technologies including EDI (Electronic Data Interchange). The period during 1980's saw the emergence of other forms of e-commerce, which included telephone banking, credit cards and the ATM (Automated Teller Machine). From 1990's onwards, e-commerce technique included enterprise resource planning systems (ERP), data mining and data warehousing. Most recently, since 2000, a significant amount of businesses have offered their services on the World Wide Web and persons have started to associate e-commerce with purchasing goods through the Internet via secure protocols and electronic payment services. Consequently, among the most widely used security technologies is the Secure Sockets Layer (SSL), which is built into the leading Web browsers.

M-commerce (Abbott, 2001) is often represented as a derivative of e-commerce, implying that any e-commerce site should be made available from a mobile device which however seems to be a misrepresentation. Mobile-Commerce is the exchange or buying and selling of services and goods, both physical and digital, from a mobile device. There are similarities in terms of being able to purchase a product or service in a virtual environment but there are however, unique characteristics and functions which distinguish both. Recent studies have shown that m-commerce sales has increased to almost US\$7 billion in 2011 as it proved itself to add tremendous value in accelerating online and in-store purchases and as such many organizations are investing more resources on developing better front-end mobile experiences and ensuring compatibility with their back-end technology (Rao et al, 2005). An example of such an application is the EBAY mobile application which allows its users to shop, buy, pay and review purchase history. So having seen what Mobile shopping is, we will now look into intelligent agent technology followed by agent based mobile shopping.

## **3. INTELLIGENT AGENT TECHNOLOGY**

Mobile agent has been defined as a software program that acts autonomously on behalf of a user and moves through a network of heterogeneous machines (Pleisch and Schiper, 2004). Agents are designed as components which deal with request and act immediately with the help of third parties when needed. Agents also possess property towards operating autonomously through communicating indirectly asynchronous service requests rather than through direct, synchronous service invocation (Poslad et al., 2000). Agents interaction occurs at the peer-to-peer level and also mediating, collaborating, and co-operating to achieve their goals. A common attribute of an agent is its migration between platforms.

An agent is considered as intelligent if it exhibits smartness in its behavior. In general, intelligent agents are generally mobile. Bigger sized agents are less desirable in getting moved. Multiple auto-

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