Application of Intelligent Agents in Biometric Secured Mobile Payment System

Suresh Sankaranarayanan
SRM University, India

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. 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 & Schiper 2004; Jennings & 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 & Suresh, 2009, 2011). While unique features combined with an abundance of mobile digital devices and networks makes m-commerce an attractive venture, yet serious challenges also exist. However, one such concern is the security in doing transactions over this medium especially when making payments with the use of a credit card. The issue of security is however not restricted to M-Commerce as their consumers still at risk of fraud from card-cloning, identity theft, eavesdropping that can occur when conducting transactions in person and also via Electronic-Commerce (E-Commerce).So research was done in incorporating biometrics i.e., fingerprint towards mobile payment while conducting transaction wirelessly (Gordon & Suresh, 2010).

So taking all the above points into consideration, recently smart agent based mobile shopping and secured payment system was developed (Smith & Suresh, 2012) which allows intelligent agents not only to shop but also incorporate biometric feature along with Secure Socket layer (SSL) towards information

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being transmitted. The details of intelligence possessed by agents towards mobile shopping are discussed in one of the book chapter (Suresh, 2015). The rest of the chapter is organized as follows. Section 2 talks on security in Mobile shopping. Section 3 talks on Intelligent Agent Technology. Section 4 discusses on Intelligent Agent based mobile payment system. Section 5 is conclusion & future work.

2. SECURITY IN MOBILE SHOPPING

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 mis-representation. 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 security aspects in Mobile shopping

When addressing the issue of security in mobile shopping, we have to look at the current standardization efforts being made for the safe transmission of mobile payment "over the air". A few companies looking at M-Commerce standardization are: Pay Circle, Mobile Signature (MoSign), Mobile Payment Forum, Mobile Electronic Signature Consortium (mSign) and Encorus. These companies have paved the way for international acceptance of some standardization of cross-application infrastructure, development of secure and authenticated m-commerce using payment card accounts and other methods.

M-Commerce seeks to interlock two independent industry components; E-Commerce and Wireless technology which in themselves have their security challenges. Thus proper mechanism must be put in place to secure any data that is stored on the mobile device, the transaction details and the communication medium. To achieve effective mobile commerce security, serious considerations must be taken into account for the following security mechanism:

- **Authorization:** To ensure authorized use of system and performance of business functions by authorized users only.
- **Authentication:** To establish that all parties involved in the electronic transaction or communication who they claim they are.
- **Integrity:** To ensure that data on the host system or in transmission are not created, intercepted, modified or deleted illicitly.
- **Confidentiality:** To warrant that data are only revealed to parties who have a legitimate need to know it or have access to it.

Ecommerce has been plagued for years with identity theft, credit card theft, phishing and the general issues of authentication and nonrepudiation while wireless technologies are known to be weak.

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