

Machine Learning Techniques Applied to Profile Mobile Banking Users in India

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ABSTRACT

This paper profiles mobile banking users using machine learning techniques viz. Decision Tree, Logistic Regression, Multilayer Perceptron, and SVM to test a research model with fourteen independent variables and a dependent variable (adoption). A survey was conducted and the results were analysed using these techniques. Using Decision Trees the profile of the mobile banking adopter's profile was identified. Comparing different machine learning techniques it was found that Decision Trees outperformed the Logistic Regression and Multilayer Perceptron and SVM. Out of all the techniques, Decision Tree is recommended for profiling studies because apart from obtaining high accurate results, it also yields 'if-then' classification rules. The classification rules provided here can be used to target potential customers to adopt mobile banking by offering them appropriate incentives.

Keywords: Decision Tree, Logistic Regression, Machine Learning, Mobile Banking User Profiles, Multilayer Perceptron

INTRODUCTION

There are more than 950 million subscribers in India (Kumar et al., 2010). Hence, mobile banking is an emerging delivery channel for modern banking systems. In the international

scenario mobile banking have been successful in MPESA, GCash, DoCoMo and M-Pay in Poland but the adoption of mobile payments have not been very successful in Europe and United States (Dahlberg et al., 2008).

Beginning in 2008, rudimentary banking services are being offered through the mobile phone. Mobile banking is expected to provide the customer with the new levels of convenience

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and flexibility for the banking customer. For example, a customer who owns the mobile device can pay for a service or product using his mobile device similar to the Internet user who can operate his or her bank account by Internet banking. In the mobile payment context, a range of products and services can be purchased, from news to directory services, shopping and ticketing services, entertainment services and financial services. Several players have to cooperate to bring these services: mobile manufacturers, telecom service providers, the mobile payment solution providers and the banks (Carr, 2009). Banking services such as balance enquiry, alerts on debits and credits, as well transactions can be made on the mobile devices. Full-fledged payments are yet to emerge since there are business models, interoperability and security issues that are yet to be resolved (cf. Mobile Payment Forum of India – <http://mpf.org.in/>).

This paper studies the various factors that affect the intention of users to adopt mobile banking. The major influential factors have been identified through literature, and a survey was conducted with two hundred respondents in the Indian context. The paper analyses the survey data through the use of machine learning techniques to arrive at the most important and critical success factors that influences the adoption of mobile.

The paper is organised as follows: We survey literature on adoption studies and user profiling. The proposed theoretical research model employed in this study is outlined. Next, we briefly describe the machine learning

techniques used in this research. The empirical data collection undertaken through a survey is explained. We discuss the experimental setup used in the study and discuss the results obtained. Finally, we conclude the paper.

LITERATURE REVIEW

Fundamentally variables were drawn from adoption and diffusion theoretical models. Diffusion of Innovations Theory (Rogers, 1995), Theory of Planned Behaviour (Fishbein & Azjen, 1975; Azjen, 1985), Technology Acceptance Model (Davis, 1989) and other studies related to technology adoption (Chan & Lu, 2004; Shih & Fang, 2004; Tan & Teo, 2000; Williamson, Kirsty, Lichtenstein, & Sharman, 2006; Davis, 1989; Gefen, & Straub, 2000). The variables are explained the subsequent section. Variables were also cross checked with recent studies in technology adoption studies. Table 1 illustrates the number of respondents from more recent studies (Gebauer & Shaw, 2004; Hung, Ku, & Chang, 2003; Pavlov, 2003; Eastin, 2002; Lederer, Maupin, Sena, & Zhuang, 2000).

RESEARCH MODEL

A survey instrument was prepared based on a set of independent variables identified through literature survey. This research model identifies the psychological variables that influence the decision of an individual to adopt mobile banking.

Table 1. Number of respondents in technology adoption studies

Research	Number of Respondents
Gebauer and Shaw (2004)	17
Hung, Ku, and Chang (2003)	267
Pavlov (2003)	155
Eastin (2002)	274
Lederer, Maupin, Sena, and Zhuang (2000)	163

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