MOBILE-BASED APPLICATION FOR BUS TICKETING SERVICES (MBTS)

Submitted by

ABKDA MOHAMMED ALI AKOUNNI

(801125)

Klala82@yahoo.com

Supervised by

MR. HARRYIZMAN BIN HARUN

COLLEGE OF ARTS AND SCIENCES (CAS)

UNIVERSITI UTARA MALAYSIA (UUM)

ABSTRACT

Mobile technology has been considered as a viable alternative for developing applications to be used in all our life activities. This proposal proposed to utilize such technology for booking tickets of MARA Liner to make this service available anywhere and anytime. The main objective of this study will be to develop and evaluate a prototype mobile-based Bus Ticketing Services (MBTS). This study aims to provide an effective utilization of WAP technology for bus transportation companies. The literature regarding to the mobile technology and its aspects has discussed to get the knowledge base for such mobile technology. This proposal has discussed the methodology of the research. It will guide to develop and evaluate the prototype. The methodology was adopted from SDRM and it includes four steps: Information Gathering, Prototype design, Prototype Development, and Evaluation. Results of user evaluation on the MBTS indicate that it has good usability in terms of Usefulness, Ease of Use and Outcome and Future Use. The results also indicate that there is a significant difference between two groups, first group of users who have mobile phone and other group of users who have not; for Usefulness Outcome/Future Use, while no significant difference for Usefulness and Ease of Use.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TABLE OF ABBREVIATIONS

WAP	Wireless Application Protocol
MBTS	Mobile-based Bus Ticketing Services
RDMS	Relational Database Management System.
EU	European Union
PDA	Personal digital assistants.
WWW	World Wide Web
IEC	International Engineering Consortium.
OMA	Open Mobile Alliance.
GSM	Global System for Mobile Communications.
GPRS	General Packet Radio Service.
OSI	International Standard Organization.
WAE	Wireless Application Environment.
WSP	Wireless Session Protocol.
WTP	Wireless Transaction Protocol.
WTLS	Wireless Transport Layer Security.
WDP	Wireless Datagram Protocol.
WML	Wireless Markup Language.
WTA	Wireless Telephony Application.
WSP	Wireless Session Protocol.
WTP	Wireless Transaction Protocol.
UDP	User Datagram Protocol.

OSI	International Standard Organization
WTLS	Wireless Transport Layer Security.
WDP	Wireless Datagram Protocol.
HTML	Hypertext Markup Language.
URL	Uniform Resource Locator.
XML	Extensible Markup Language.
GIF	Graphic Interchange Format.
JPG	Joint Photographic Experts Group.
PNG	Portable Network Graphics.
SMS	Short Message System
TCC	Trusted Credential Centre.
U-Payment	Ubiquitous Payment.
U-Receipt	Ubiquitous Receipt.
SDRM	System Development Research Methodology.
IDE	Integrated Development Environment.
UML	Unified Modeling Language.
PUEU	Perceived Usefulness and Ease of Use.

CHAPTER 1

INTRODUCTION

1.1 Background

Mobile technologies are rapidly growth; it has facilitated our daily life's activities. Moreover, it has played an important role in the management of relations between people, whether social or economic relations, or the everyday life (Goh, Kim, Lavanya, Kim, & Soh, 2006; Muller, Lenhart, Henrici, Hillenbrand, & Muller, 2004). Moreover, the evolution and relevance of this technology gave a new face of communication between people and opening up great prospects for continuing them. Indeed, the wide spread usage of mobile technologies for the past decade revolutionize the way people think and communicate.

The emergence of the Wireless Application Protocol (WAP) technology has brought a lot of changes to the way through which people conduct their operations anywhere and anytime. Nowadays, mobile services are considered as a new technology age that provides user interfaces for basic telephony and messaging services, as well as for more advanced and entertaining experiences. Therefore, Mobile-based Application for Bus Ticketing Services can improve people's life, make it simpler and allows peoples faster and efficient travelling anytime regardless the place.

The contents of the thesis is for internal user only

REFERENCES

Amor (2002). Internet future Strategies: How pervasive computing services will change the world. USA: Prentice Hall.

Andersson, E., Greenspun, P., & Grumet, A. (2005). Adding Mobile Users To Your Community Retrieved September 23, 2007, from http://philip.greenspun.com/seia/mobile

Antovski, L. a. G., M (2003). M-Payments. Information Technology Interfaces, 2003. ITI 2003. Proceedings of the 25th International Conference, 95 – 100.

BBC News (2004, November 2, 2004). Mobiles Double up as Bus Tickets Retrieved August 31, 2009, from http://news.bbc.co.uk/2/hi/technology/3975419.stm

Best, J. W., & Kahn, J. V. (2000). *Research in education* (8th ed.). USA: Allyn and Bacon.

Bullbrook, D. (2001). WAP A beginner's guide. California: Osborne McGraw-Hill.

Carlsson, C., Carlsson, J., & Walden, P. (2005). *Mobile Services For The Hospitality Industry.* Paper presented at the Thirteenth European Conference on Information Systems, Regensburg, Germany.

Cervera, A. (2002). Analysis of J2ME for Developing Mobile Payment Systems.

Chen, J., & Kinshuk, J. (2005). Mobile Technology in Educational Services. *Journal of Educational Multimedia and Hypermedia, 14*(1), 91.

Clark, S. (2009). Austrian mobile and rail operators develop VDV-based NFC ticketing Retrieved July 12, 2009, from http://www.nearfieldcommunicationsworld.com/2009/01/27/3660/austrian-mobile-and-rail-operators-develop-vdv-based-nfc-ticketing/

Coakes, S. J. (2005). *SPSS version 12 for Windows Analysis Without Anguish*. Sydney: John Wiley & Sons Australia.

Dankers, J., Garefalakis, T., Schaffelhofer, R., & Wright, T. (2002). Public key infrastructure in mobile systems. *Electronics and Communication Engineering Journal*.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *International Journal of Human-Computer Interaction, 7*(1), 57-78.

Deitel, M. H., Deitel, P. J., Nieto, T. R., & Steinbuhler, K. (2001). *Wireless Internet and Mobile Business How to Program*: Prentice Hall.

Deshpande, N. M., & Keskar, D. V. (2002, November 2002). Open Wireless Services: Developing Applications for Mobile Devices. *Intel Developer Update Magazine*.

Developershome.com (2005). Development of Wireless Markup Languages.

Dutoit, B. B. a. A. H. (2000). Object-Oriented Software Engineering—Conquering Complex and Changing Systems. Prentice Hall.

El-Alfy, E.-S. M. (2005). A General Look at Building Applications for Mobile Devices.

Foo, S. M., Hoover, C., & Lee, W. M. (2001). *Dynamic WAP Application Development*. Greenwich, UK: Manning Publications Company.

Ghani, W. M. R. A. (2005). *Modeling Mobile Payment Process Flow for Buying E-Book.* Unpublished Master Thesis, Universiti Utara Malaysia, Sintok.

Goh, K. W., Kim, E., Lavanya, J., Kim, Y., & Soh, C. B. (2006, August 28). *Issues in Implementing a Knowledge-based ECG Analyzer for Personal Mobile Health Monitoring.* Paper presented at the Engineering in Medicine and Biology Society, New York City.

Guillaume, D. (2009). De Lijn' shows the advantages of travelling in groups Retrieved 2009, from http://www.duvalguillaume.com/news/tag/de-lijn

Hoffer, J. A., George, J., & Valacich, J. (2002). *Modern Systems Analysis and Design*. New Jersey: Prentice Hall.

Holzberg, C. S. (2000). E-mail Unplugged: Explore Your Wireless Access Options *8*(7), 22-25

International Engineering Consortium (2007). Web ProForums Retrieved August 13, 2009, from http://www.iec.org/online/tutorials/wap/index.html

Kalkbrenner, G., & Nebojsa, F. (2001). Campus Mobil: Mobile Services for Campus and Student needs Retrieved August 15, 2009, from http://ls12.cs.uni-dortmund.de/~kalkbren/campusmobil.pdf

Kalliola, M. (2005, April 23, 2005). *Mobile payment.* Paper presented at the Seminar on Towards the Next Wave of Mobile Communication, Helsinki, Finland.

Kustin, S. (2002). The Proliferation of Wireless Internet Access Devices and its Effect on Consumer Behavior Patterns

Laudon, K. C., & Laudon, J. P. (1995). *Management Information Systems: Organization and Technology*: Prentice-Hall, Inc. Upper Saddle River, NJ, USA.

Lee, K. J., Ju, J.-I., & Jeong, J. M. (2006). *A Payment and Receipt Business Model in U-Commerce Environment.* Paper presented at the 8th international conference on

Electronic commerce: The new e-commerce: innovations for conquering current barriers, obstacles and limitations to conducting successful business on the internet

Lewis, J. R. (1995). IBM Computer Usability Satisfaction Questionnaires: Psychometric Evaluation and Instructions for Use. *International Journal of Human-Computer Interaction, 7*(1), 57-78.

Mallat, N., Rossi, M., Tuunainen, V. K., & Oorni, A. (2008). An empirical investigation of mobile ticketing service adoption in public transportation. *Personal and Ubiquitous Computing, 12*(1), 57-65.

McDonough, B. (2002). Report: Global PDA Sales Grew 18 Percent in 2001. *Newsfactor Network*.

Muller, J., Lenhart, T., Henrici, D., Hillenbrand, M., & Muller, P. (2004). Developing Web Applications for Mobile Devices.

NeoMedia Technologies (2008). EMT- the mobile bus ticket system in Spain (Gavitec) Retrieved July 12, 2009, from http://www.mmaglobal.com/studies/emt-mobile-bus-ticket-system-spain-gavitec

Nielsen, J. (2006). Quantitative Studies: How Many Users to Test? Retrieved September 20, 2009, from http://www.useit.com/alertbox/quantitative_testing.html

Nilas, P., Sueset, T., & Muguruma, K. (2004). A PDA-based high-level human-robot interaction. *Robotics, Automation and Mechatronics, 2004 IEEE Conference on, 3*, 1158 -1163

Nunamaker, J., Chen, M., & Purdin, T. (1991). System Development in Information Systems Research. *Journal of Management Information Systems, 7*(3), 89 –106.

Nylander, S. (2004). *Different Approaches to Achieving Device Independent Services – an Overview*: Swedish Institute of Computer Science.

Open Mobile Alliance (OMA) (2004). Open Mobile Alliance Overview Retrieved August 13, 2009, from http://www.openmobilealliance.org/docs/OMAShortPaper_May2004v.1.pdf

Pallant, J. (2007). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS* (3rd ed.). Wellington, New Zealand: Allen and Unwin.

Schei, E., & Fritzner, T. C. (2002). MOWAHS: A Study of Applications for Mobile Work.

Turban, E., Leidner, D., McLean, E., & Wetherbe, J. (2007). *Information Technology for Management: Transforming Organizations in the Digital Economy* (6th ed.): John Wiley & Sons.

Wang, H., Huang, X., & Dodda, G. R. (2006). *Ticket-based mobile commerce system and its implementation* Paper presented at the 2nd ACM international workshop on Quality of service and security for wireless and mobile networks

WapForum (2002a). What is WAP Retrieved July 20, 2009, from http://www.wapforum.org/faqs/index.htm

Wapforum (2002b). Wireless Application Protocol (WAP 2.0): Technical White Paper Retrieved September 23, 2009, from www.wapforum.org/what/WAPWhite_Paper1.pdf

What-Is.Net (2006). What is a PDA Retrieved May 1, 2007, from http://www.what-is-net.info/what-is-a-pda.html?gclid=CJ2toePA-4sCFQmJTAod3SWnYA