MOBILE NOTIFICATION FOR MAIL DELIVERY FOR UUM POST OFFICE

A thesis submitted to the Graduate School in partial fulfillment of the requirement for the degree Master of Science (Information Technology)

University Utara Malaysia

By

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ABSTRACT

The last two decades have witnessed rapid adoption and intense use of various information and communication technologies (ICTs) as an essential foundation for business activities. Presently, we are witnessing how the advent of the mobile and wireless technologies have influenced contemporary businesses and organisations. Mobile technologies such as mobile phones and personal digital assistants (PDAs) not only change the way people communicate, but also, change the way the postal service does business. Nowadays, postal offices are using new technology to improve the quality of their services. They introduce new services and products with the support of different information and communication technologies to reach millions of people all over the world. With mobile phones as a necessity to all people today, information could be sent faster to inform news regarding postal services including mail delivery services. Mail delivery service is an important service in post offices and the most needed especially for students. This research intends to investigate the possibility of a post office using a mobile-based system to notify students about the status of postal delivery services. A requirement model was produced and a prototype was developed as part of the study.

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LIST OF ABBREVIATIONS

Acronym Meaning

UUM Unversiti Utara Malaysia

MNMD Mobile Notification for Mail Delivery for UUM Post Office

DPP Dewan Penginapan Pelajar (Residential Hall)

PMB Post Malaysia Berhad

ENS Emergency Notification System

UCD University of Colorado Denver

DLC Development Life Cycle

OO Object-Oriented

GUI Graphic User Interface

WML Wireless Markup Language

JSP Java Server Page

PDA Personal Digital Assistant

MLNS Mobile Location-Based Notification Service

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This research describes the ability to notify the students about their mails through mobile phone. Mails are type of post which is written as documents, typically enclosed in envelopes, small packages and parcels, which are delivered around the world. The Malaysian postal service, Post Malaysia Berhad (PMB) works together with UPS, DHL and FedEx using current ICT technology. Once the post office in UUM receives the mails from the main office in Alor Setar, the workers will arrange to send the mails to the Dewan Penginapan Pelajar (DPP) where students stay. There are four types of services used by PMB to send documents or letters within the country, i.e. normal delivery service, registered service, poslaju service and express service. Normal service refers to the regular way of sending mail where the sender uses a stamp to send a mail. It takes a few days but is secured. In contrast, in using the registered service, the sender has to fill in a special form, and pay for the service to send the mail. The student also pays for normal service but as stamp. On the receiving side, the receiver must sign upon receipt. This is faster than the first method and again is secured. Even though poslaju service is faster and more secured compared to the previous two, it is more expensive. The express service, on the other hand, could be used for sending mails inside and outside of Malaysia very quickly.

The contents of the thesis is for internal user only

REFERENCES

- Albers, M. j., & Kim, L. (2000). *User web browsing characteristics using palm handhelds for information retrieval*. IEEE Educational Activities Department Piscataway, NJ, USA
- Amato, G., & Straccia, U. (1999). User profile modeling and applications to digital libraries. *Lecture Notes in Computer Science*, 45(3), 184-197.
- Andreadis, A., Benelli, G., Giambene, G., & Marzucchi, B. (2001). Analysis of the WAP protocol over SMS in GSM networks. *Wireless Communications and Mobile Computing*, 1(4), 381-395.
- Bastos, R., & Ruiz, D. (2002). Extending UML activity diagram for workflow modeling in production systems, New York.
- Bernardi, S., Donatelli, S., & Merseguer, J. (2002). From UML sequence diagrams and statecharts to analysable Petri net models, New York.
- Beyers, W. B., & Alvine, M. J. (1985). Export services in postindustrial society. *Papers in Regional Science*, 57(1), 33-45.
- Birmingham, W. P. (2007). An agent-based architecture for digital libraries. *Ann Arbor*, 1001(48), 100-109.
- Booch, G., Rumbaugh, J., & Jacobson, I. (1996). The unified modeling language. *User Guide*, 13(3), 40-55.
- Buchanan, G., & Hinze, A. (2005). A generic alerting service for digital libraries , New York.
- Chambers, C., Ungar, D., & Lee, E. (1991). An efficient implementation of Self, a dynamically-typed object-oriented language based on prototypes. *Higher-Order and Symbolic Computation*, 4(3), 243-281.
- Chesnais, A., Helfer, B., Paxinos, G. M., Brown, J. R., Enger, G., Hansmann, W., et al. (2003). ACM SIGGRAPH. *COMPUTER*, *37*(2), 30-36.

- Coad, O. O. A., & Comparison, T. (2008). Object-oriented analysis. *Yourdon Press/Prenlice-Hall*, 54(8), 41-64.
- Connolly, T. M., & Begg, C. E. (2005). *Database systems: a practical approach to design, implementation, and management* (2nd ed.): Addison-Wesley.
- Cranefield, S. J. S., & Purvis, M. K. (1999). *UML as an ontology modelling language*: University of Otago:Dept. of Information Science.
- Cullen, R. G., Officials, T., Center, A. P., & Bellefonte, P. (2007). SYMBOL OF PROGRESS AND FORWARD STRIDE. *THE HIGHWAY POST OFFICE*, 40(13), 2-12.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 13(3), 319-340.
- Denver, U. o. C. UC Denver Campus Emergency Notification System. Retrieved july 13, 2008, from http://www.cudenver.edu/
- Dumas, M., & Hofstede, A. (2001). UML activity diagrams as a workflow specification language. *Lecture notes in computer science*, 20(13), 76-90.
- Eisenstadt, S. A., Wagner, M. M., Hogan, W. R., Pankaskie, M. C., Tsui, F. C., & Wilbright, W. (1998). *Mobile workers in healthcare and their information needs: are 2-way pagers the answer?*. American Medical Informatics Association
- Eriksson, H. E., & Penker, M. (2000). *Business modeling with UML*: New York:John Wiley.
- Faensen, D., Faultstich, L., Schweppe, H., Hinze, A., & Steidinger, A. (2001). *Hermes: a notification service for digital libraries*.
- Faulstich, L. C., & Spiliopoulou, M. (2000). Building HyperView wrappers for publisher Web sites. *International Journal on Digital Libraries*, 3(1), 3-18.
- France, R., & Evans, A. (1998). The UML modeling notation. *Computer Standards & Interfaces*, 18(6), 312-326.
- France, R., Evans, A., Lano, K., & Rumpe, B. (1997). The UML as a formal modeling notation. *Computer Standards and Interfaces*, 19(7), 325-334.

- Geissbuhler, A., Grande, J. F., Bates, R. A., Miller, R. A., & Stead, W. W. (1997).

 Design of a general clinical notification system based on the publishsubscribe paradigm. American Medical Informatics Association
- Hinze, A., & Faensen, D. (1999). A unified model of internet scale alerting services. *Lecture notes in computer science*, 17(3), 284-293.
- Hirsch, B. T., Wachter, M. L., & Gillula, J. W. (1999). Postal Service compensation and the comparability standard. *Research in Labor Economics*, 18(4), 243-279.
- Hung, P. C. K., Ferrari, E., & Carminati, B. (2006). Towards standardized Web services privacy technologies. In: San Diego, CA, USA: IEEE International Conference on Web Services.
- Kaasinen, E. (2003). User needs for location-aware mobile services. *Personal and Ubiquitous Computing*, 7(1), 70-79.
- Kerridge, J., & Chalmers, K. (2006). *Ubiquitous Access to Site Specific Services* by *Mobile Devices*. Edinburgh, Scotland: IOS Press
- Kim, S. K., & Carrington, D. (1999). Formalizing the UML class diagram using Object. *Lecture Notes in Computer Science*, 17(3), 83-98.
- Kothari, C. R. (2005). *Research Methodology: Methods & Techniques*: College of Commerce University of Rajasthan: New Age Publishers.
- Lei, H., & Ranganathan, A. (2005). *Context-aware unified communication*. IEEE International Conference on Mobile Data Management.
- 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.
- Liu, L., Pu, C., & Tang, W. (1999). Supporting internet applications beyond browsing: Trigger processing and change notification. *Lecture notes in computer science*, 28(4), 294-304.
- Meyer, B. (1988). Object-oriented software construction: New York: Prentice-Hall
- Minh, L. E. (2004). *CAMERA SYSTEM SUPPORT FOR HIGHWAY TRANSPORTATION USING MOBILE DEVICES*. Florida: University of Central Florida Orlando.
- Oinas, H., Kurkela, V., Links, I., & Back, G. (2003). *Developing Successful Mobile Applications*, Mexico: International Conference on Computer Science and Technology

- Parthasarathy, M., & Bhattacherjee, A. (1998). Understanding post-adoption behavior in the context of online services. *Information Systems Research*, *9*(4), 362-379.
- pos. history of pos. Retrieved July 12 2007, from http://www.pos.com.my/V1/main2.asp?C=/V1/AboutUs/PMB/History.htm
- pos. pos services. Retrieved june 23 2006, from http://www.pos.com.my/V1/main2.asp?c=/V1/Posmel/main.htm
- Purchase, H. C., Colpoys, L., Mcgill, M., Carrington, D., & Britton, C. (2001). *UML class diagram syntax: an empirical study of comprehension*, Australia.
- Rao, R. B. (2004). Improved Cardiac Care via Automated Mining of Medical Patient Records. *Data Mining Case Studies*, *43*(6), 12-30.
- Robinson, H. (1970). The British Post Office: A History: London: Greenwood Press.
- Rumbaugh, J., Jacobson, I., & Booch, G. (1996). *The unified modeling language*: NewYork:University Video Communications.
- Selic, B., & Rumbaugh, J. (1998). Using UML for modeling complex real-time systems. *Lecture Notes in Computer Science*, *30*(5), 250-260.
- Sorensen, J. H., & Mileti, D. (1999). Decision making uncertainties in emergency warning system organizations. *International Journal of Mass Emergencies and Disasters*, 5(1), 33-61.
- Tao, Y., Wang, D., Shortliffe, E. H., & Lussier, Y. A. (2002). Extended attributes of event monitor systems for criteria-based notification modalities, London.
- Wagner, M. M., Tsui, F. C., Pike, J., & Pike, L. (1999). *Design of a clinical notification system*, New York.
- Weaver, J. F., Gruntfest, E., & Levy, G. M. (2000). Two floods in Fort Collins, Colorado: Learning from a natural disaster. *Bulletin of the American Meteorological Society*, 81(10), 2359-2366.
- Wegmann, A., & Genilloud, G. (2000). The role of use case diagrams. *Lecture notes in computer science*, 60(14), 210-224.