WEATHER INFORMATION SYSTEM FOR FARMERS BASED ON WAP TECHNOLOGY

A thesis submitted to the Faculty of Information Technology
In partial fulfillment of the requirement for the degree
Master of Science (Information Technology)
Universiti Utara Malaysia

By
Abdullatif Abdullah Ahmed Abolohom

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of Research and Post Graduate Studies. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to

Dean of Research and Post Graduate Studies
College of Arts and Sciences
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman.

ABSTRACT

The WAP application is an application that is accessed via mobile device over a wireless network; this technology has been rapidly growing and distributed in different environments and has basically affected our lives directly and indirectly. This study carried out an investigation into the Weather Information System for Farmers based on WAP Technology to simplify the weather queries via the mobile device. Furthermore the proposed application would be able to save the time and effort of the farmers in checking the required weather changes. The WAP Weather Information System was developed based on WML and ASP mobile programming architecture; furthermore, the usability testing results were obtained to determine the system usefulness. Finally, the WAP Weather Information System may help the farmers by providing them with useful functions, such as weather news, product price, and local news.

ACKNOWLEDGEMENT

By the Name of Allah, the Most Gracious and the Most Merciful

First, I would like to express my appreciation to Allah, the Most Merciful and, the Most Compassionate who has granted me the ability and willing to start and complete this study. I do pray to His Greatness to inspire and enable me to continue the work for the benefits of humanity.

My most profound thankfulness goes to my supervisor Dr. Mohd Syazwan Bin Abdullah for his scientifically proven and creativity encouraging guidance. Honestly, he has been all the time center of inspiration and guidance. I'm gratefully and deeply thank him for his support and cooperation as being equipped to provide his best help. My thanks also go to Dr.Tareg Abolohom and my uncle Eng. Taleb Alsabri who have supported and encouraged me the ability and willing to complete this study . "May Allah bless all of them"

Last but not least, I wish to thank all my dearest family members, especially my Father, my Mother, and my lovely Brothers and Sisters. I dedicate my admiration and thanks to all of them who have sacrificed their selves and supported me to the completion of the thesis. My demonstrative appreciations are to all my friends, my colleagues, all FTM staff, and everyone who has put the hand either directly or indirectly to complete this thesis.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

1

This chapter briefly presents the main idea of this work, detailing the questions and main elements involved in the study. The first sub-topic describes the overall idea in this study through the scenario and the introduction that lead to the implementation of the whole project. This is followed by the problem statement, objectives of the study, scope of the study, and significance of the study. The final section elaborates the way this report is organised.

1.0 Introduction

The purpose of Wireless Application Protocol (WAP) was designed to facilitate the manufacturers, vendors, and technology users around the world to independently access the Internet and advanced telephony services (Elalfy, 2005). WAP technology is capable of eliminating the gap between mobile devices and the Internet, and thus can provide and cater for mobile services.

In the context of the agricultural farmers in Kedah, they normally go to their plantations with minimum technology capability without knowing the weather status and changes. Moreover, different studies have illustrated the impact of weather changes on the farmer's performance and ultimately output. The WAP

The contents of the thesis is for internal user only

REFERENCES

Abowd, Gregory D.; Atkeson Christopher G.; Hong, Jason; Long, Sue; Kooper, Rob; Pinkerton, Mike. (1997). Cyberguide a mobile context-aware tour guide. Baltzer/ACM Wireless Networks.

Atanas Rountev, O. V., Miriam Reddoch (2006). Static control-flow analysis for reverse Engineering of UML sequence diagrams. 31(1): 96 – 102.

Atle Refsdal, K. S. (2008). Extending UML Sequence Diagrams to Model Trust-Dependent Behaviour with the Aim to Support Risk Analysis. 197(2): 1529.

Bahrami, A. (1999). Object Oriented System Development, McGraw-Hill, United States of America.

Bennett, S., McRobb, S., & Farmer, R. (2002). Object-oriented System Analysis and Design 2nd Edition. UK, McGraw Hill.

Bhattacharyya, D. (1997). Mediating India: An Analysis of a Guidebook. Annals of Tourism Research 24(2):371-389.

Bhavnani, A., Chiu, R., Janakiram, S., Silarszky, P., & Bhatia, D. (2008). The Role of Mobile Phones in Sustainable Rural Poverty Reduction. ICT policy division global information and communications department (GICT).

Cheverst, Keith; Davies, Nigel; Mitchell, Keith; Friday, Adrian (2000); Experiences of developing and deploying a context-aware tourist guide: The Guide project International Conference on Mobile Computing and Networking, Boston, ACM.

Davis F. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 13(3), P (319-340).

Dennis, A., Wixom, B.H., & Tegarden, D. (2005). System analysis and design with UML version 2.0: an object-oriented approach with UML, 2nd edition. Hoboken, NJ: John Wiley and Sons, Inc.

Dunham, M., et al. (1995). Mobile Computing and Databases: Anything New?

Elalfy E. (2005). A General Look at Building Applications for Mobile Devices. Distributed Systems Online, IEEE, 6(9), 1-3. Retrieved Dec 30, 2008 from: http://csdl2.computer.org/comp/mags/ds/2005/09/o9005.pdf.

Eriksson, H., & Penker, M. (1998). UML Toolkit. USA, John Wiley & Sons, Inc.

Erlandson & Ocklind, (1998). WAP- The wireless application protocol. Pages 165-174 in Mobile Networking with WAP. ISBN: 3-528-03149-2.

Goto, K., Matsubara, H., Myojo, S. (1999). Autonomous Decentralised Systems, Integration of Heterogeneous Systems Proceedings, the Fourth International Symposium, pp. 12-17.

Hoffer, J. A., George, J. F & Valacich, J. S. (1999). Modern Systems Analysis and Design (2nd Edition). United Kingdom: Addison Wesley Longman.

Hoffer, J. A., George, J. F & Valacich, J. S. (2002). Modern Systems Analysis and Design (3rd Edition) Upper Saddle River, New Jersey: Prentice Hall.

Hulberts, S.J. C. (1989). How Important Is Mobile Communication for a Truck Company? Proceedings of the Vehicle Navigation and Information Systems Conference, 11-13 Sep 1989, pp. 361-364.

Imielinski, T. and Badrinath, B. (1994). Mobile Wireless Computing - Challenge in Data Management, Communications of the ACM, 37(10) (1994) 18–28.

Imulienski, T., & Badrinath, B. (2001). Mobile Wireless Computing: Solutions and Challenges in Data Management. Retrieved from: http://citeseer.ist.psu.edu.html.

Imulienski, T., & Badrinath, B. R. (2001). Mobile Wireless Computing: Solutions and Challenges in Data Management. Retrieved from: http://citeseer.ist.psu.edu/imielinski93mobile.html.

International Federation of Agricultural Producers (IFAP) (2008). About the International Federation of Agricultural Producers. Retrieved on 3 Jan 2008.

Jacobson, I., Christenson, M., Johnsson, P. & Overgaars, G. (2004). Object-oriented Software Engineering: A Use Case Driven Approach (revised). Harlow, England: Addison-Wesley.

Jagoe, A. (2003). Mobile Location Services: The Definitive Guide. Upper Saddle River, New Jersey: Pearson Education Inc.

Kendall, P. A. (1996). Introduction to Systems Analysis and Design: A Structured Approach, Irwin, Times Mirror Higher Education Group, USA.

Kothari C. (1985). Research Methodology, Methods and Technique. Delhi: Wiley Eastern Limited.

Kramer, R., & Modsching, M. (2005). Development and evaluation of a context-driven, mobile tourist guide. International Journal of Pervasive Computing and Communication (JPCC).

Kray, C., Baus, J. (2003). A survey of mobile guides. Workshop HCI in mobile guides Mobile HCI, Italy.

Lieslehto, K. (2000). WAP Application for PID Controller Tuning, Proceedings of the 2000 IEEE International, Symposium on Computer-Aided Control System Design, Anchorage, Alaska, USA, pp. 168-172.

Nielsen, J. & Landauer, T. (2001). A Mathematical Model of The Finding of Usability problems. In ACM Interchi'93. Netherlands: Amsterdam.

Parikh, T., & Lazowska, E. (2006). Designing Architecture for Delivering Mobile Information Services to the Rural Developing World. Retrieved: Jan 5, 2009. From: http://www.cs.washington.edu/papers/www2006-parikh.pdf.

Petra Blixt (2005). Mobile Telephony in Rural India, Stockholm, Sweden 2005.

Polylab (1998). WAP Architecture. Retrieved Jan, 3, 2009, from (http://polylab.sfu.ca/spacesystems/teach/wireless/wap/. PDF).

Raffaele B., Marco C., & Enrico G., (2005). Mesh Networks: Commodity Multihop Ad Hoc Networks. IEEE Communications Magazine, 43(3):123–131, March 2005.

Schmuller, J. (2002). SAMS teach your self UML in Hours. SAMS Publishing, Indiana.

SIGMOD Record, Special Section on Data Management Issues in Mobile Computing, 24(4): December (1995) 5–9.

Silva, P.P.D. & Paton, N.W. (2003). UML: The Unified Modelling Language for Interactive Applications. Retrieved from:

http://scholar.google.com/scholar?q=UMLi:%20The%20Unified%20Modeling%20Language%20for%20Interactive%20Applications&hl=en&lr=&oi=scholart.

Sommerville, I., (2001). Software Engineering (6th Ed.). Harlow, England: Addison Wesley. Sparxsystems's UML Tutorial Page (n.d.). Retrieved from: http://www.sparxsystems.com.au/UML_Tutorial.htm.

Tétard, F. & Patokorpi, E. (2004). Design of a Mobile Guide for Educational Purposes, Conference '04, ACM, pp. 1-7.

U.S House of Representative (1999). Systems Development Life Cycle, pp. 1-12.

WAP (2005), retrieved Jan, 2, 2009 from (http://searchmobilecomputing.techtarget.com/sDefinition/0,sid40_gci213337,00.html).

WAP Forum (2000). Wireless Application Protocol White Paper. Retrieved: Jan 2, 2009. From: http://www.wapforum.org/what/WAP_white_pages.pdf.

WAP Forum (2001). WAP Architecture. Wireless Application Protocol Architecture Specification.WAP-210-WAPArch-20010712. Retrieved: Jan 2, 2009. From: http://www.openmobilealliance.org/tech/affiliates/wap/wap-210-waparch-20010712a.pdf.

WAP Forum (2002). WAP 2.0 Technical White Paper. Retrieved April16, 2007 from http://www.wapforum.org/what/WAPWhite_Paper1.pdf.

WAP, (2008), Wireless Application Protocol, retrieved on 12 Sep 2008, (http://en.wikipedia.org/wiki/Wireless_Application_Protocol).

Whitten J., Bentley L. & Dittman, K. (2001). System Analysis and Design Methods (5th Ed.) McGraw Hill: Boston.

Wireless Application Protocol Forum (1998). Wireless Application Protocol Architecture Specification, WAP Architecture Version 30. From (http://www.silicon press.com/briefs/brief.wml/brief.pdf).

Wireless Application Protocol Forum (1999). Wireless Application Protocol, Wireless Markup Language Specification Version 1.2. Retrieved April 16, 2007 from: http://www.wapforum.org/what/technical/SPEC-WML 19991104.pdf.

Yakasai, R. (2008). Rural Internet Propagation Enhancement (RIPE). A Position Paper to Workshop on Role of Mobile Technologies in Fostering Social Development June 2-3-2008, Sao Paulo, Brazil. Retrieved: Jan 3, 2009. From:http://www.w3.org/2008/02/MS4D_WS/papers/RIPEsystem_1_.pdf.

Yakasai, R. (2008). Rural Internet Propagation Enhancement (RIPE). A Position Paper to Workshop on Role of Mobile Technologies in Fostering Social Development June 2-3. Soohoo, K. (1997). Multi-Function Internet Appliances. 14 – 18.

Yiwei C., Martin K., Georgios T. & Sadeq M., (2006), Mobile Community Information Systems on Wireless Mesh Networks, An Opportunity for Developing Countries and Rural Areas, 2 Aug 2006, by worldwide-cellular users.