

## **WAP BASED EMAIL MANAGEMENT APPLICATION**

**Adel Odeh Awad Almuiet**

**Universiti Utara Malaysia**

**2008**

**WAP BASED EMAIL MANAGEMENT APPLICATION**

116  
5105.73  
11120

**A Thesis submitted to College Arts & Sciences in partial  
Fulfillment of the requirement for the degree master  
(Information Technology)**

**Universiti Utara Malaysia**

**By**

**Adel Odeh Awad Almuiet (800407)**

**Adel Odeh Awad Almuiet**

**All rights reserved 2008.**



**KOLEJ SASTERA DAN SAINS**  
**(College of Arts and Sciences)**  
**Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK**  
*(Certificate of Project Paper)*

Saya, yang bertandatangan, memperakukan bahawa  
(I, the undersigned, certify that)

**ADEL ODEH AL-MUIET**  
**(800407)**

calon untuk Ijazah  
(candidate for the degree of) **MSc. (Information Technology)**

telah mengemukakan kertas projek yang bertajuk  
(has presented his/her project paper of the following title)

**WAP BASED EMAIL MANAGEMENT APPLICATION**

seperti yang tercatat di muka surat tajuk dan kulit kertas projek  
(as it appears on the title page and front cover of project paper)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan  
dan meliputi bidang ilmu dengan memuaskan.

(that the project paper acceptable in form and content, and that a satisfactory  
knowledge of the field is covered by the project paper).

Nama Penyelia Utama  
(Name of Main Supervisor) **ASSOC. PROF. DR. WAN ROZAINI SHEIK OSMAN**

Tandatangan  
(Signature)

Tarikh (Date) :

11/11/08

ASSOC. PROF. DR. WAN ROZAINI SHEIK OSMAN  
Director  
ITU-UUM ASP COE  
For Rural ICT Development  
Information Technology Building  
Universiti Utara Malaysia

Nama Penyelia Kedua  
(Name of 2<sup>nd</sup> Supervisor): **MR. HAZARUDDIN HARUN**

Tandatangan  
(Signature)

Tarikh (Date) :

11/11/08

## **PERMISSION TO USE**

In presenting this thesis of the requirements for a Master of Science in Information Technology (MSc. IT) 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 purposes may be granted by my supervisor or in their absence, by the Dean of Graduate School. 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.

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

Dean of Graduate School

Universiti Utara Malaysia

06010 Sintok

Kedah Darul Aman

## **ABSTRACT**

WAP technology becomes the most appropriate and the useful tools to access the information about the different information and services anytime and anywhere. However this study identified the requirement model to manage the email by mobile device, which can be obtained easily way and flexibility to access and check the incoming emails by this service. This study introduces an application to manage the incoming emails for those who interested in using the mobile device. However, this service will help to reduce the time for the users to check their incoming emails, especially when they are away from their work or any place can not provide the Web services. For these reasons this study carry out the manage email by mobile to obtain the appropriate solution.

## **ACKNOWLEDGEMENT**

My gratefulness to my supportive and helpful main supervisor, AP dr .Wan Rozaini Sheik Osman and co-supervisor Mr. Hazaruddin Harun for assisting and guiding me in the completion of this research. With all truthfulness, without both of them, the project would not have been completed. they have always been my source of motivation and guidance. I am truly grateful for their continual support and cooperation in assisting me all the way through the semester. I am grateful to all lectures and friends for their help in making my project successful.

I also would like to thank Mr.Azmi Md.Saman for his effective and fruitful discussion for my research.

I would like to present my thanks to my father, my mother and all my family who have always been there for me.

I also would like to thank friends Ebraheem Alzoubi, Mohammad Al-muiet,Omar AL-harbi,Saleh Al-qotan and Hussein abo-dalbouh. Finally, I would like to express my appreciations to all my friends, colleagues, College Arts and Sciences staff, and everyone who has helped me in this journey.

## CHAPTER ONE

### INTRODUCTION

<b>1.1</b>	<b>Introduction .....</b>	<b>1</b>
<b>1.1</b>	<b>Problem Statement.....</b>	<b>3</b>
<b>1.2</b>	<b>Research Question .....</b>	<b>4</b>
<b>1.3</b>	<b>Research Objective .....</b>	<b>5</b>
<b>1.4</b>	<b>Research Scope .....</b>	<b>5</b>
<b>1.5</b>	<b>Research Significance .....</b>	<b>5</b>
<b>1.6</b>	<b>Organization of the Study .....</b>	<b>6</b>
<b>1.7</b>	<b>Summary .....</b>	<b>7</b>

## CHAPTER TWO

### LITERATURE REVIEW

<b>2.1</b>	<b>Wireless and mobile technology.....</b>	<b>8</b>
<b>2.2.1</b>	<b>The objectives of the WAP Forum are.....</b>	<b>10</b>
<b>2.2.2</b>	<b>Wireless Application Environment (WAE).....</b>	<b>10</b>
<b>2.2.3</b>	<b>Wireless Session Protocol (WSP).....</b>	<b>11</b>
<b>2.2.4</b>	<b>Wireless Transaction Protocol (WTP).....</b>	<b>11</b>
<b>2.2.5</b>	<b>Wireless Transport Layer Security (WTLS).....</b>	<b>11</b>
<b>2.2.6</b>	<b>Wireless Datagram Protocol (WDP).....</b>	<b>12</b>

<b>2.2.7</b>	<b>Wireless Markup Language .....</b>	<b>12</b>
<b>2.3</b>	<b>Previous and related works.....</b>	<b>13</b>
<b>2.4</b>	<b>Summary.....</b>	<b>17</b>

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

<b>3.1</b>	<b>Awareness of problem.....</b>	<b>19</b>
<b>3.2</b>	<b>Suggestion .....</b>	<b>19</b>
<b>3.3</b>	<b>Development .....</b>	<b>21</b>
<b>3.4</b>	<b>Evaluation .....</b>	<b>22</b>
<b>3.5</b>	<b>Conclusion .....</b>	<b>23</b>

## **CHAPTER FOUR**

### **ANALYSIS AND DESIGN**

<b>4.1</b>	<b>System Requirements .....</b>	<b>24</b>
<b>4.1.1</b>	<b>Functional Requirements.....</b>	<b>25</b>
<b>4.1.2</b>	<b>Non Functional Requirements .....</b>	<b>25</b>
<b>4.2</b>	<b>UML.....</b>	<b>27</b>
<b>4.2.1</b>	<b>Use Case .....</b>	<b>27</b>
<b>4.3</b>	<b>Use Case Specification .....</b>	<b>29</b>

<b>4.3.1</b>	<b>Use Case Specification for View Messages.....</b>	<b>29</b>
<b>4.3.2</b>	<b>Use Case Specification for Reject Messages.....</b>	<b>30</b>
<b>4.3.3</b>	<b>Use Case Specification for Accept Messages.....</b>	<b>31</b>
<b>4.4</b>	<b>Sequence and Collaboration Diagram.....</b>	<b>32</b>
<b>4.4.1</b>	<b>Sequence Diagram for View Message .....</b>	<b>32</b>
<b>4.4.2</b>	<b>Sequence Diagram for Accept Message .....</b>	<b>34</b>
<b>4.4.3</b>	<b>Sequence Diagram for Reject Messages.....</b>	<b>36</b>
<b>4.5</b>	<b>Class Diagram .....</b>	<b>38</b>
<b>4.6</b>	<b>SYSTEM DEVELOPMENT .....</b>	<b>38</b>
<b>4.6.1</b>	<b>Introduction to ASP.NET .....</b>	<b>38</b>
<b>4.6.2</b>	<b>Wireless Markup Language (WML) .....</b>	<b>39</b>
<b>4.6.3</b>	<b>System Development Screens .....</b>	<b>40</b>
<b>4.6.3.1</b>	<b>View Messages .....</b>	<b>40</b>
<b>4.6.3.2</b>	<b>Accept Messages .....</b>	<b>42</b>
<b>4.6.3.3</b>	<b>Reject Message .....</b>	<b>44</b>
<b>4.7</b>	<b>Use Test Case .....</b>	<b>46</b>
<b>4.8</b>	<b>System Evaluation .....</b>	<b>47</b>
<b>4.9</b>	<b>Conclusion .....</b>	<b>50</b>

## **CHAPTER 5**

### **DISCUSSION AND EVALUATION**

<b>5.1</b>	<b>System Evaluation.....</b>	<b>48</b>
<b>5.2</b>	<b>Conclusion .....</b>	<b>51</b>

## **CHAPTER SIX**

### **CONCLUSION**

<b>6.1</b>	<b>Recommendation.....</b>	<b>53</b>
<b>6.2</b>	<b>Future Work.....</b>	<b>54</b>
<b>6.3</b>	<b>Conclusion.....</b>	<b>55</b>
<b>7</b>	<b>Reference.....</b>	<b>56</b>

## LIST OF FIGURE

<b>Figure 2.1:</b> Wireless and mobile technology .....	<b>9</b>
<b>Figure 3.1:</b> Research Design Methodology (Vaishnavi and Kuechler, 2004) .....	<b>18</b>
<b>Figure 3.2:</b> The Prototyping Processes Adapted from (Laudon & Laudon 2000).....	<b>21</b>
<b>Figure 4.1:</b> Use Case Diagram for Manage the email by mobile.....	<b>28</b>
<b>Figure 4.2:</b> Sequence Diagram for View Message .....	<b>32</b>
<b>Figure 4.3:</b> Collaboration Diagram for View Message .....	<b>33</b>
<b>Figure 4.4:</b> Sequence Diagram for Accept Message.....	<b>34</b>
<b>Figure 4.5:</b> Collaboration Diagram for Accept Messages.....	<b>35</b>
<b>Figure 4.6:</b> Sequence Diagram for Reject Messages.....	<b>36</b>
<b>Figure 4.7:</b> Collaboration Diagram for Reject Messages.....	<b>37</b>
<b>Figure 4.8:</b> Class Diagram.....	<b>38</b>
<b>Figure 4.9:</b> View Messages.....	<b>41</b>
<b>Figure 4.10:</b> Accept Messages.....	<b>42</b>
<b>Figure 4.11:</b> Read the message or back to inbox.....	<b>44</b>
<b>Figure 4.12:</b> Reject Message.....	<b>45</b>
<b>Figure 4.13:</b> Back to Inbox.....	<b>45</b>
<b>Figure 5.1:</b> Histogram for ease use .....	<b>50</b>

## LIST OF TABLE

<b>Table 3.1: Time Schedule.....</b>	<b>23</b>
<b>Table 4.1: Use Case Specification for View Messages.....</b>	<b>29</b>
<b>Table 4.2: Use Case Specification for Reject Messages.....</b>	<b>30</b>
<b>Table 4.3: Use Case Specification for Accept Messages.....</b>	<b>31</b>
<b>Table 4.4: use test case for view messages.....</b>	<b>46</b>
<b>Table 4.5: use test case for accept messages.....</b>	<b>46</b>
<b>Table 4.6: use test case for reject messages .....</b>	<b>47</b>
<b>Table 5.1: Questionnaire Criteria.....</b>	<b>49</b>
<b>Table 5.2: Descriptive Statistics.....</b>	<b>50</b>

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Introduction**

E-mail is an efficient and timely communication tool used to carry out departmental activities and to conduct business within the Government, with business partners and with citizens. E-mail has become an important component of any office automation system. It expedites exchange of information, speeds up the decision making process and reduces paperwork, resulting in increased productivity, reduced costs and better delivery of services and programmes.

Email is one of the best things about the internet. It allows one to keep in touch with family and friends all over the world and find out about online support a group, email is a powerful tool but also one that can be abused very easily (Childs, 2007).

E-mail has become the means of choice for much of the world's correspondence. These benefits become problems when the volume of use becomes very large. Workers feel overwhelmed by the sheer quantity of messages and are less productive as a result. The

The contents of  
the thesis is for  
internal user  
only

### **6.3 Conclusion**

This chapter discussed on user acceptance, usability results and system limitations. At the end of the chapter proposed recommendation to support efficiency, effectiveness and satisfaction system to Manage email by mobile.

## Reference

Aleahmad, T. & Slotta, J. (2002). Integrating handheld technology and web-based science activities; new educational opportunities. ED\_MEDIA 2002, pp 24 – 29, United States: Association for the Advancement of Computing in Education.

Agrawal, D.P. & Zeng, Q.-A. (2003), Introduction to wireless and mobile systems, Brooks/Cole Publishing, Pacific Grove, Calif.

Bellotti, V., Duchenaut, N., Howard, M., and Smith, I. (2003). Taking email to task: the design and evaluation of a task management centered email tool. Proceedings of the CHI 2003 Conference on Human Factors in Computer Systems, 345-352. New York: ACM Press.

Bick, A. (2005). The impact of personal digital assistants on academic achievement. Retrieved 31 December 2005 from <http://www.millburn.org/science/pda/NatJSHS.pdf>.

Borquez, A. D. (2004). Mobile and wireless technology: The impart in a higher education setting, Faculty of the Rossier School of Education Universtiay Of Southern California.

Brucher H. (2003 ) Using Mobile Technology to Support eDemocracy retrieved 14ogs 2007 from [ieeexplore.ieee.org/iel5/8360/26341/01174324.pdf?arnumber=1174324](http://ieeexplore.ieee.org/iel5/8360/26341/01174324.pdf?arnumber=1174324).

Caspar, R. & Atish, G. (2005). The effect of context and application type on mobile usability: An empirical study, Conferences in Research and Practice in Information Technology, Vol. 38. V. 2006. Australia.

Centre for Technology in Government, University at Albany. (1998). Models for Action Project: Developing Practical Approaches to Electronic Records management and Preservation, A Survey of System development Process Models.

Childs, R. (2007). Understanding Email Use: Predicting Action on a Message, 5 Jun 2007 ACM.

Clark ,H. & Brennan, S. (1991). Grounding in communication. In L.B. Resnick, J. Levine & S. Teasley, Eds. Perspectives on socially shared cognition. Washington D.C., APA Press.

Contacts to Support Long term Communication, Proceedings of CSCW 2002 Conference on Computer Supported Cooperative Work, 216-225. New York: ACM Press.

Cooke, M. (2004). Clomedia: The evolution of e-learning. Retrieved on January 21, 2008 from [http://www.clomedia.com/content/templates/clo\\_webonly.asp?articleid=571&zoneid=78](http://www.clomedia.com/content/templates/clo_webonly.asp?articleid=571&zoneid=78)

Csete, J., Wong, Y. H., Vogel, D. (2004). Mobile devices in and out of the classroom, Educational Development Centre, Hong Kong Polytechnic University.

Danesh, A. (2001). Geney: Designing a collaborative activity for the palm handheld computer. In Proceedings of CHI Conference on Human Factors in Computing Systems, 3(1). Retrieved 31 December 2005 from <http://www.ece.ubc.ca/~elec418/resources/geney.pdf>.

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

Elliott, G. & Phillips, N. (2004). Mobile commerce and wireless computing system: Pearson Education Limited.

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

Hinze A. & George Buchanan, (2006), The challenge of creating cooperating mobile services: Experiences and lessons learned. Australian Computer Society. Conferences in Research and Practice in Information Technology, Vol. 48. January 2006 Tasmania, Australia.

Holcomb & Tharp. (1991). User a Software Usability Model and Product Evaluation. *Interacting with Computers*. Vol 3 (2). United Kingdom: Oxford.

Horvitz, P. (2003). Pedagogical, technical and organizational hypotheses and realities, *Campus-Wide Information Systems*, 3 Nov 2003.

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

Jukka ,L.(2000). Wap application for pid controller tuning, in: Proceedings of the 2000 IEEE International Symposium on Computer-aided Control System Design, volume, Anchorage, Alaska, USA, pp. 168-172.

Kraut, R. E. & Attewell, P. (1997). Media use in a global corporation: Electronic mail and organizational knowledge. In S. Kiesler (Ed.) *Culture of the Internet*. (pp.323-342). Mahwah, NJ: Erlbaum.

Lafleur (2005). The impact of personal digital assistants on academic achievement. Retrieved 31 December 2005.

Laroussi, M. (2003). New e-learning based on mobile and ubiquitous computing: UBI-learn project, INSAT Centre Urbain Tunis Nord BP 676 CEDEX 1080 Tunis

Laudon, K. C., & Laudon, J. P. (2000). Management Information Systems: Prentice Hall PTR Upper Saddle River, NJ, USA.

Levitt, M. (2000). Email usage forecast and analysis, 2000-2005, IDC Report W23011.

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.

Lim C.C. (2004). Multimodal-based mobile application: a development of prototypes for accessing students academic result at UUM, Malaysia.

Luchini, K., Quintana, C. and Soloway, E. (2004). Design guidelines for learner-centered handheld tools. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems. Pp. 135-142, ACM Press.

Mackay, W. (1988). Diversity in the Use of Electronic Mail: A Preliminary Inquiry. ACM Transactions on Office Information Systems, vol. 6, no. 4, October 1988: 380-397

Maureen, O. N. (1998). Client Server Approach to Mobile Location Services. Retrieved from: [www.w3.org/mobile/posdep/signalsoft.htm](http://www.w3.org/mobile/posdep/signalsoft.htm) [25<sup>th</sup> November 2005].

Microsoft (2006). Design guidelines for mobile devices-based on centered handheld tools. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems.

Monica, R. (2005). Educational Development Centre, Hong Kong Polytechnic University.

Nielsen (1993), usability is a multidimensional concept that is traditionally associated with five attributes: learnability, memorability, efficiency, errors, and subjective satisfaction.

Personal Communications special issue on IMT-2000(1997), Vol. 4, No. 4, August 1997, IEEE.

Pratt A. (2006). Email Overload in the Workplace: A Multi-Dimensional Exploration. Retrieved Oct 12, 2008 from: <http://orange.eserver.org/issues/5-1/pratt.html>.

Ramon ,C, Venkata N.P. Padmanabhan,(1996), "Fast and Scalable Handoffs for Wireless Internetworks," Proc. ACM Conference on Mobile Computing and Networking (M0bicom'96), pp. 56-66, 1996.

Ramsay, M. & Nielsen, J. (2000). WAP Usability. Retrieved 3/9/2008 from <http://www.useit.com/alertbox/20001210.html>.

Ravden, S. & Johnson, G. (1989). Evaluating Usability of Human Computer Interfaces: a Practical Methods. UK: Ellies Horwood Ltd Chichester.

Samir (2008) proposed a ticket booking system for al Bus Transport by using the mobile computing and handheld devices technologies.

Skog, B. (2002). Mobile and the Norwegian teen: Identity, gender and class. In J. E. Katz & M. A. Aakhus (Eds.), *Perpetual contact*. Cambridge, MA: Cambridge University Press.

Silva, P. & Paton, N. (2003). UML: The Unified Modeling 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>.

Somerville, B. (2001). Mobile and the Norwegian teen: Identity Perpetual contact. Cambridge, MA: Cambridge University Press.

Sommerville, I. (2001). Software Engineering (6<sup>th</sup> ed.). Harlow, England: Addison

Steve, W., Victoria, B.i, and Paul, M., (2005), Revisiting and Reinventing Email, Volume 20, Numbers 1 and 2.

Stretch (2005).Handling Email Overload. Retrieved Sep 11, 2005, from <http://www.stretcher.com/stories/01/011008j.cfm>.

Sproull, L., and Kiesler, S (1991). Connections. Cambridge, MIT Press.

Vahey, P. & Crawford, V. (2002). Palm education pioneers program: final evaluation report. SRI International. Retrieved 28 Novemebr 2005, from [www.palmgrants.sri.com/PEP\\_Final\\_Report.pdf](http://www.palmgrants.sri.com/PEP_Final_Report.pdf).

Vaishnavi, & Kuechler. (2004). Design research in information system. Retrieved Oct 15, 2008, FromHttp://Www.Isworld.Org/Researchdesign/Drisisworld.Htm

Wei, G., N. Mousseau, and P. Derreumaux. (2004). Complex folding pathways in a simple  $\beta$ -hairpin.

Whittaker, S. Jones, Q., and Terveen, L. (2002a). Persistence and Conversation Stream Management: Conversation and Contact Management. Proceedings of HICCS'02, 335-344. New York: IEEE Press.

Whittaker, S. Jones, Q., and Terveen, L. (2002b). Contact Management: Identifying

Whittaker, S. and Sidner, C. (1996). Email Overload: Exploring Personal Information Management of Email. Proceedings of CHI 96 Conference on Human Factors in Computing Systems, 276-283. New York: ACM Press.

Wireless Application Protocol Forum (1999). Wireless application protocol, wirelessmarkup language specification Version 1.2. Retrieved Aplril 16, 2007 from: <http://www.wapforum.org/what/technical/SPEC-WML-19991104.pdf>