

SHOPPING DISCOUNT ALERT SYSTEM

NOOR MEZHER SAHAB

**UNIVERSITY UTARA MALAYSIA
2012**

Shopping Discount Alert System

**A project submitted to Dean of Awang Had Salleh Graduate School in
Partial Fulfilment of the requirement for the degree
Master of Science of Information Technology
University Utara Malaysia**

By

NOOR MEZHER SAHAB

Copyright © Noor, 2012. All rights reserved.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ ﴿١﴾ خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ

﴿٢﴾ اقْرَأْ وَرَبُّكَ الْأَكْرَمُ ﴿٣﴾ الَّذِي عَلَّمَ بِالْقَلَمِ ﴿٤﴾ عَلَّمَ

الْإِنْسَانَ مَا لَمْ يَعْلَمْ ﴿٥﴾

صِدْقَ اللَّهِ الْعَظِيمِ

سورة العلق

PERMISSION TO USE

In presenting this project in partial fulfillment of the requirements for a postgraduate degree from the University Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this project in any manner in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence by the Dean of Postgraduate Studies and Research. It is understood that any copying or publication or use of this project 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 University Utara Malaysia for any scholarly use which may be made of any material from my project.

Requests for permission to copy or to make other use of materials in this project, in whole or in part,

Should be addressed to

Dean of Awang Had Salleh Graduate School

College of Arts and Sciences

University Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

Malaysia

Abstract

The Web technologies have been very advanced now. They are incorporated with RFID, GSM, and mobile technologies in enabling the Web functions be accessed more widely. Hence, the business functions are accelerated. This study takes the advantages of such the advancements in assisting marketing purposes. Consequently, a system that alerts users of sales in malls based on their locations is developed, and is named Shopping Discount Alert System (SDAS). UML and Java are used in designing and developing it from start to finish. It sends the advertisements to users' mobile phones, so that the information is pervasive. The Shopping discount alert system has been functionally tested, besides its interface. Results show that the Shopping discount alert system runs well as intended, besides ensuring that the users are happy with the idea. It is anticipated that the Shopping discount alert system could reduce the cost for promotions in a long run.

ACKNOWLEDGMENTS

Praise to Allah for His guidance and blessing for giving me the strength and perseverance to complete this project.

I would foremost like to thank my parents, for providing me with the opportunity to pursue my goals and for their love and affection, which has helped me through the most trying times. I would like to thank my supervisor, Dr. Yuhanis binti Yusof for her guidance and constant motivation that has enabled me to complete this project work.

Special thanks to my husband, Qusay Abboodi Ali who with his encouragements and assistance helps me through the most challenging times, and for his continuous support for me to accomplish this work.

NOOR MEZHER SAHAB

TABLE OF CONTENTS

Permission To Use.....	I
Abstract.....	II
Acknowledgments.....	III
Table of Contents.....	IV
List of Figures.....	VIII
List of Tables.....	XII

CHAPTER ONE: INTRODUCTION

1.1 Background	1
1.2 Problem Statement	3
1.3 Research Questions.....	4
1.4 Research Objectives.....	5
1.5 Research Scope.....	5
1.6 Research Significance.....	5
1.7 Summary.....	6

CHAPTER TWO: LITERATURE REVIEW

Literature Review.....	7
2.1 Mobile Marketing.....	7

2.1.1 Short Message Service (SMS).....	9
2.2 Database Management System.....	10
2.3 GSM System Architecture.....	12
2.4 Mobile Web Application	14
2.5 Alert System via SMS.....	15
2.5.1 Heartbeat Monitoring Alert via SMS	17
2.5.2 Temperature Control Via SMS	18
2.6 Summary.....	19

CHAPTER THREE: RESEARCH METHODOLOGY

Research Methodology... ..	20
3. General Research Design Methodology.....	20
3.1 Awareness of Problem.....	22
3.2 Suggestion.....	22
3.2.1. System Requirements.....	23
Functional Requirements.....	23
Non Functional Requirements.....	26
3.2.2 System Design.....	27
Use case Diagram.....	28
Use case specification for (Shopping Discount Alert System).....	31

Sequence Diagram.....	50
Collaboration Diagram For (Shopping Discount Alert System)	58
Class Diagram.....	64
3.2.3 Database Design.....	66
3.3 Development.....	68
3.3.1 Service Provider.....	69
3.4 Evaluation.....	69
3.5 Conclusion.....	70
3.6 Summary.....	70

CHAPTER FOUR: SHOPPING DISCOUNT ALERT PROTOTYPE

Shopping Discount Alert Prototype.....	71
4.1. Interface Design.....	72
4.1.1. Administer Manager and Customer Login.....	72
4.1.2. Administer Section (Main Page).....	73
Administer Add Manager.....	74
Administer (Update, delete, search)	75
4.1.3. Customer Section	76
4.1.4. Manager Section.....	79

CHAPTER FIVE : EVALUATION & RESULTS

Evaluation & Results.....	85
5.1. Demographic Data	85
5.2 Practices on Shopping Discount Alert System	89
5.3 Experience with the Shopping Discount Alert System SMS Alert Message.....	92
5.4 Summary	95

CHAPTER SIX : CONCLUSION AND RECOMMENDATION

Conclusion and Recommendation... ..	96
6.1.Problems And limitations.....	96
6.2 Recommendation... ..	96
6.3 Conclusion.....	97
References.....	98

LIST OF FIGURES

Figure 2.1 SMS commerce application Framework...	10
Figure 2.2 GSM system architecture with essential components.....	14
Figure 2.3 Mobile Web Application.....	15
Figure 2.4 Alert Systems.....	16
Figure 3.1 General Methodology for Design science Research.....	20
Figure 3.2 System Mobile and Email Architecture.....	22
Figure 3.3 Use Case Diagrams for (Shopping discount Alert system).....	29
Figure 3.4 Use Case Diagram for (Login).....	31
Figure 3.5 Use Case Diagram for (Add Mall Manager).....	33
Figure 3.6 Use Case Diagram for (Update and delete Mall manager).....	34
Figure 3.7 Use Case Diagram for (Search about Mall Manager).....	36
Figure 3.8 Use Case Diagram for (Register).....	37
Figure 3.9 Use Case Diagram for (Search about specific items).....	39
Figure 3.10 Use Case Diagram for (View and update profile).....	41
Figure 3.11 Use Case Diagram for (view and update).....	42
Figure3.12 Use Case Diagram for (Add item, Update, delete item and search item).....	44

Figure 3.13 Use Case Diagram for (send SMS and E-mail).....	46
Figure 3.14 Use Case Diagrams for (Logout)	48
Figure 3.15 sequence Diagram for (Administer).....	51
Figure 3.16 sequence Diagram for (Customer).....	53
Figure 3.17 sequence Diagram for (Manger part 1).....	54
Figure 3.18 sequence Diagram for (Manger part 2).....	55
Figure 3.19 sequence Diagram for (Manger part 3).....	56
Figure 3.20 Sequence Diagram for logout (Administer, Manager and customer)...	
.....	57
Figure 3.21 Collaboration Diagram for (Administer)	59
Figure 3.22 Collaboration Diagram for (Customer).....	60
Figure 3.23 Collaboration Diagram for manager (View profile and update profile.....	61
Figure 3.24 Collaboration Diagram for manager (adds item, update and delete item and search about item).....	62
Figure 3.25 Collaboration Diagram for manager (send SMS and E - mail).....	63
Figure 3.26 Collaboration Diagram for manager (Logout).....	64
Figure 3.27 Class Diagram for (Shopping Discount Alert System).....	65
Figure 4.1. System Mobile and Email Architecture.....	71
Figure 4.2. Main Interface(Shopping Discount Alert System)	72

Figure 4.3. Administer Login (Shopping Discount Alert System).....	73
Figure 4.4. Administer Main Page (Shopping Discount Alert System).....	73
Figure 4.5. Administer Add Manager (Shopping Discount Alert System).....	74
Figure 4.6. Administer update and delete Manager (Shopping Discount Alert System).....	75
Figure 4.7. Search about Manager (Shopping Discount Alert System).....	76
Figure 4.8. Customer Registration (Shopping Discount Alert System).....	76
Figure 4.9. Customer Main Page (Shopping Discount Alert System).....	77
Figure 4.10. Customer view profile (Shopping Discount Alert System).....	77
Figure 4.11. Customer Update profile (Shopping Discount Alert System).....	78
Figure 4.12. Customer search for Item using link (Shopping Discount Alert System).....	78
Figure 4.13. Customer search using category (Shopping Discount Alert System).....	79
Figure 4.14. Manager main page (Shopping Discount Alert System).....	79
Figure 4.15 Manager view profile (Shopping Discount Alert System).....	80
Figure 4.16 Manager Update profile (Shopping Discount Alert System).....	80
Figure 4.17 Manager add item (Shopping Discount Alert System).....	81
Figure 4.18 Manager Update and delete item (Shopping Discount Alert System).....	81
Figure 4.19 Manager View item (Shopping Discount Alert System).....	82

Figure 4.20 Manager View item (Shopping Discount Alert System)...	82
Figure 4.21 Screenshot on sending SMS ...	83
Figure 4.22 Screenshot on receiving SMS ...	83
Figure 4.23 Screenshot on receiving E-mail ...	84
Figure 5.1 Gender.....	86
Figure 5.2 Ages.....	87
Figure 5.3 Cities.....	88
Figure 5.4 Mobile phone ownership.....	88
Figure 5.5 E-mail ownership.....	89

LIST OF TABLES

Table 3.1 Functional Requirement.....	24
Table 3.2 Non-functional Requirement.....	26
Table 3.3 User Information Table.....	66
Table 3.4 Manager Information Table.....	67
Table 3.5 Customer Information Table.....	67
Table 3.6 The software involved in Shopping discount Alert System.....	69
Table 5. 1 Gender	86
Table 5. 2 Age	87
Table 5.3 Cities.....	87
Table 5.4 Mobile phone ownership	88
Table 5.5 E-mail ownership	89
Table 5.6 Question 1.....	90
Table 5.7 Question 2.....	90
Table 5.8 Question 3.....	91
Table 5.9 Question 4.....	92
Table 5.10 Question 5.....	92
Table 5.11 Question 6.....	93
Table 5.12 Question 7.....	94
Table 5-13 Question 8.....	94

APPENDIX.....109

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Information and communication technology (ICT) has been one of the important determinants for the rapid growth of E-Commerce transactions all over the world since the last decades. In Malaysia, the upshot of ICT and the initiative by the government for the development of E-Commerce have been emphasized for the purpose of deploying resources in developing knowledge-base economy. In addition, the internet advancement and the improvement of ICT have positive implications for the E-Commerce development in the country to participate and sustain in the competitive advantage. By definition, E-commerce refers to the process of buying or selling products or services over the Internet. The increasing rate of internet users, online shopping activities, and adoption of new technologies are the key drivers for the development of E-Commerce transactions, in which websites are the main interface between online merchants and their customers (Muhammad, Dominic, Durai, Naseebullah, & Alamgir, 2011).

Online shopping is becoming increasingly popular because the speed is getting faster and websites are getting easier to use (Ontario, 2008), especially with the ability of performing transactions in wireless environments. The development in wireless environment and digital media such as mobile phones provide new marketing media for the businesses and marketers.

The contents of
the thesis is for
internal user
only

- Bultan, T., Ferguson, C., & Fu, X. (2009). *A tool for choreography analysis using collaboration diagrams*. Paper presented at the Web Services, 2009. ICWS 2009. IEEE International Conference on.
- Chan, S., Fang, X., Brzezinski, J., Zhou, Y., Xu, S., & Lam, J. (2002). *Usability for mobile commerce across multiple form factors*. *Journal of Electronic Commerce Research*, 3(3), 187-199.
- Chen, J., Subramanian, L., & Brewer, E. (2010). *Sms-based web search for low-end mobile devices*. Paper presented at the Proceedings of the sixteenth annual international conference on Mobile computing and networking.
- Chen, Y. F., Gibbon, D., Liu, Z., Shahraray, B., & Wei, B. (2006). *Personal Media Alert Systems: Personalization and Dissemination of Broadcast Content with a P2P Micropayment Scheme*. Paper presented at the Multimedia and Expo, 2006 IEEE International Conference on.
- Chitnis, M. Tiwari, P. & Ananthamurthy, L. (2002). Sequence Diagram in UML. Retrieved May 5, 2011, from developer.com web site:<http://www.developer.com/design/artical.php/3080941>.
- Crawford, I. (1997). Questionnaire Design. In I. Crawford, Marketing Research and Information Systems (pp. 32-42). FAO Regional Office for Africa Retrieved April 25, 2011 from <http://www.developer.com/design/article.php/3080941/Sequence-Diagramin-UML.html>.

- Daintith, J. (2009). "System design", A Dictionary of Computing. Retrieved May 1, 2011, from <http://www.encyclopedia.com/doc/1O11-systemdesign.html>.
- de Arantes, W., & Verdier, C. (2005). Public health alert system for health networks: application to cardiology. Paper presented at the Computers in Cardiology, 2005.
- Degeratu, A. M., Rangaswamy, A., & Wu, J. (2000). Consumer choice behavior in online and traditional supermarkets: The effects of brand name, price, and other search attributes. *International Journal of Research in Marketing*, 17(1), 55-78.
- Dennis, A., Wixom, B. H., & Tegarden, D. (2009). *Systems Analysis and Design with UML Version 2*. New Jersey: WILEY.
- Don, C. BYU, H. 2004. Using a MySQL Database, <http://quizgen.org/tut/q23.MySQL.p7.pdf>
- Drossos, D., Giaglis, G. M., Lekakos, G., Kokkinaki, F., & Stavraki, M. G. (2007). Determinants of effective SMS advertising: an experimental study. *Journal of Interactive Advertising*, 7(2), 16-27.
- DuBois, P. (2003). *MySQL cookbook*: O'Reilly Media.
- Erl, T. (2005). *Service-oriented architecture: concepts, technology, and design*, Prentice Hall PTR.
- ErsavaÅŸ, B. F. (2005). Java Server Pages (JSP) and MySQL Internationalization, Localization, and Turkish Language Support.

- Faulkner, X. and F. Culwin (2005). "When fingers do the talking: a study of text messaging." *Interacting with Computers* 17(2): 167-185.
- Field, A. P. (2009). *Discovering Statistics Using Spss*. Singapore:SAGE Publications Asia-pacific Pte Ltd.
- Field, A. P. (2009). *Discovering Statistics Using Spss*. Singapore:SAGE Publications Asia-pacific Pte Ltd.
- Fielding, R. T. and R. N. Taylor (2002). "Principled design of the modern Web architecture." *ACM Transactions on Internet Technology (TOIT)* 2(2): 115-150.
- Fielding, R. T. and R. N. Taylor (2002). "Principled design of the modern Web architecture." *ACM Transactions on Internet Technology (TOIT)* 2(2): 115-150.
- Florescu, D., Levy, A., & Mendelzon, A. (1998). Database techniques for the World-Wide Web: A survey. *SIGMOD record*, 27(3), 59-74.
- Ghezzi, C., & Tamburrelli, G. (2009). *Reasoning on non-functional requirements for integrated services*. Paper presented at the Requirements Engineering Conference, 2009. RE'09. 17th IEEE International.
- Ghezzi, C., & Tamburrelli, G. (2009). Reasoning on Non-Functional Requirements for Integrated Services. *IEEE* , 69-78.
- Goldstein, A., & O'Connor, D. (2000). *E-commerce for development: prospects and policy issues*: OECD Development Centre.

- Heinonen, K., & Strandvik, T. (2006). *How do consumers react to mobile marketing?*
Paper presented at the Mobile Business, 2006. ICMB'06. International Conference
on.
- Hellerstein, J. M., Stonebraker, M., & Hamilton, J. (2007). Architecture of a database
system. *Foundations and Trends in Databases*, 1(2), 141-259.
- Hellerstein, J. M., Stonebraker, M., & Hamilton, J. (2007). Architecture of a database
system. *Foundations and Trends in Databases*, 1(2), 141-259.
- Hoffman, J. (1996). *Introduction to structured query language*: J. Hoffman.
- Hord, J. (2006). "How SMS works." *Retrieved April 14: 2006.*
- Hord, J. (2006). "How SMS works." *Retrieved April 14: 2006.*
- Huebsch, R., Chun, B., Hellerstein, J. M., Loo, B. T., Maniatis, P., Roscoe, T., et al.
(2005). The architecture of pier: an internet-scale query processor. *Departmental
Papers (CIS)*, 305.
- Jubadi, W. M., & Sahak, S. F. (2009). Heartbeat Monitoring Alert via SMS. *IEEE* , 1-5.
- Jubadi, W. M., & Sahak, S. F. (2009). *Heartbeat Monitoring Alert via SMS*. *IEEE* , 1-5.
- Junior, W. M. d. A., & Verdier, C. (2005). Public Health Alert System for Health
Networks:

- Kaindl, H., Kramer, S., & Kacsich, R. (1998). A Case Study of Decomposing Functional Requirements Using Scenarios. *IEEE*,156-163 .
- Kamran, M., & Juena, S. S. (2008). Utilization of Mobile Advertising in B2C Marketing.
- Karolidis, D., A. Papadakis, et al. (2005). MoBINo: an integrated mobile and web based environment for automatic SMS notification. *Proceedings of the 9th WSEAS International Conference on Communications*, World Scientific and Engineering Academy and Society (WSEAS).
- Kuechler, B. and V. Vaishnavi (2008). "On theory development in design science research: anatomy of a research project." *European Journal of Information Systems* 17(5): 489-504.
- Liang, Y. D. (2009). *Introduction to Java programming: Comprehensive version*, Prentice Hall.
- Markett, C., SÃ¡nchez, I. A., Weber, S., & Tangney, B. (2006). Using short message service to encourage interactivity in the classroom. *Computers & Education*, 46(3), 280-293.
- Martin, R. C. (2003). UML Tutorial: Part 1 -- Class Diagrams .Retrieved April 4, 2011 from <http://www.objectmentor.com/resources/articles/umlClassDiagrams.pdf>.
- Midmarket CIO (2005). Definitions Rational Rose, Retrieved May 2, 2011, from <http://searchciomidmarket.techtarget.com/definition/Rational-Rose>.

Midmarket CIO (2005). Definitions Rational Rose, Retrieved May 2, 2011, from <http://searchciomidmarket.techtarget.com/definition/Rational-Rose>.

Mitrovic, A. (2003). "An intelligent SQL tutor on the web." *International Journal of Artificial Intelligence in Education* 13(2-4): 173-197.

Muller, N. J. (2002). *Desktop encyclopedia of telecommunications*: McGraw-Hill.

Muhammad, J., Dominic, P., Durai, D., Naseebullah, R., & Alamgir Khan, A. (2011). Towards Digital Economy: The Development of ICT and E-Commerce in Malaysia. *Modern Applied Science*, 5(2), 171-178.

Nasco, S. A., & Bruner II, G. C. (2007). Perceptions and recall of advertising content presented on mobile handheld devices. *Journal of Interactive Advertising*, 7(2), 51-62.

Nelson, G. and J. Wright (2005). "Real time decision support: creating a flexible architecture for real time analytics." *DSSResources. COM* 11: 18.

Nelson, G. and J. Wright (2005). "Real time decision support: creating a flexible architecture for real time analytics." *DSSResources. COM* 11: 18.

Novak, L. and M. Svensson (2001). "MMS- Building on the success of SMS." *ERICSSON REV(ENGL ED)* 78(3): 102-109.

Novak, L. and M. Svensson (2001). "MMS- Building on the success of SMS." *ERICSSON REV(ENGL ED)* 78(3): 102-109.

- Ontario. (2008). E-Commerce: Purchasing and Selling Online – What You Need to Consider [Electronic Version]. Retrieved 20 June 2009 from http://www.bruce.on.ca/tools/ECommerce_Purchasing_and_Selling_Online.pdf.
- Pan, H., Jiang, W. R., Yan, J., Ge, X., Pang, H., & Chen, J. (2010). *Design and Implementation of E-commerce Feature Major Website*. Paper presented at the Multimedia and Information Technology (MMIT), 2010 Second International Conference on.
- Perry, B. W. (2004). Java servlet and JSP cookbook, O'Reilly Media.
- Rangone, A., & Renga, F. M. (2006). *Mobile Advertising: a Framework for the Appraisal of the Campaigns*. Paper presented at the Mobile Business, 2006. ICMB'06. International Conference on.
- Reese, G. and A. Oram (2000). Database Programming with JDBC and JAVA, O'Reilly & Associates, Inc.
- REN, Y., & WANG, Z. (2006). Design and Implementation for Dynamic Table Structure Based on JSP and MySQL [J]. *Computer Engineering*, 5.
- Rettie, R., & Brum, M. (2001). M-commerce: *The role of SMS text messages*. Paper presented at the COTIM 2001 Proceedings. From E-Commerce to M-Commerce.
- Saad, Salah Eldeen Ali (2009) *Marketing Distribution Using Mobile Technology*. Masters thesis, Universiti Utara Malaysia.

Sang, B. K., Ramli, A. R., Prakash, V., & Mohamed, S. A. (2003). *SMS Gateway Interface Remote Monitoring And Controlling Via GSM SMS. IEEE* , 84-87.

Scharl, A., Dickinger, A., & Murphy, J. (2005). Diffusion and success factors of mobile marketing. *Electronic Commerce Research and Applications*, 4(2), 159-173.

Sengupta, S., & Bhattacharya, S. (2008). *Formalization of UML diagrams and their consistency verification: AZ notation based approach*. Paper presented at the Proceedings of the 1st India software engineering conference.

Siang, B. K., Bin Ramli, A., Prakash, V., & Bin Syed Mohamed, S. (2003). *SMS gateway interface remote monitoring and controlling via GSM SMS*. Paper presented at the Telecommunication Technology, 2003. NCTT 2003 Proceedings. 4th National Conference on.

Song, J. and F. Zahedi (2001). "Web design in e-commerce: a theory and empirical analysis." *ICIS 2001 Proceedings*: 24.

Subramaniam, S. K., Husin, S. H., Yusop, Y. b., & Hamidon, A. H. (2007). *Real time mailbox alert system via SMS or email. IEEE* , 1-4.

Von der Mañÿen, T., & Lichter, H. (2002). *Modeling variability by UML use case diagrams*. Paper presented at the Proceedings of the International Workshop on Requirements Engineering for product lines.

Wapforum (2002b). Wireless Application Protocol (WAP 2.0): Technical White Paper

Retrieved September 23, 2009, from

www.wapforum.org/what/WAPWhite_Paper1.pdf

Xiao, Q., Zhou, S., Xing, Y., Dai, G., & Wu, Y. (2007). *Wireless pre-paid Phone cards distributing system based on SMS*. Paper presented at the Software, Telecommunications and Computer Networks, 2007. SoftCOM 2007. 15th International Conference on.

Xiao, Q., Zhou, S., Xing, Y., Dai, G., & Wu, Y. (2007). *Wireless pre-paid Phone cards distributing system based on SMS*. Paper presented at the Software, Telecommunications and Computer Networks, 2007. SoftCOM 2007. 15th International Conference on.

Yew, T. L. (2000). *Development of a web-based distance learning environment using database*. University of Oklahoma.

Yew, T. L. (2000). *Development of a web-based distance learning environment using database*, University of Oklahoma.

Yu, Y., & Liang, S. (2011). Sale system analysis and design for the online cosmetic store based on JSP. Paper presented at the Software Engineering and Service Science (ICSESS), 2011 IEEE 2nd International Conference on.

Zhao, L., Chen, X., & Ding, J. (2010). Interference Clearance Process of GSM-R network in China. IEEE , 424-428.

Zarka, N., Al-Houshi, J., & Akhkobek, M. (2006). Temperature Control Via SMS. IEEE , 2678-2683.