

MOBILE BLOOD DONATION APPLICATION

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ABSTRACT

The importance of blood in human existence and wellbeing cannot be underrated. Blood has been regarded as the basis of human living, thus if it is not in short of, human health might be at risk. Thus blood banking and blood donation in any medical operation for saving human's life must be readily available. In this study, the researcher proposed the development of a WAP-based blood application system that enables voluntary blood donors to apply to donate blood anywhere and at anytime, with the aim of solving the problem experience in the traditional blood donation application.

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CHAPTER 1

INTRODUCTION

The emergence of mobile technology is recently at its peak level, that it can not be disputed anymore. The both social and economical life of people has been influenced by the advent of mobile technology, people has been able to interact effectively. They no more worry about time and distance in there communication transformation through the mobile technologies. (Goh, Kim, Lavanya, Kim, & Soh, 2006; Muller, Lenhart, Henrici, Hillenbrand, & Muller, 2004). Moreover, researchers have highlighted the potentials that the mobile technology has in the future to consistently promote the effectiveness it has created to human communication and interactivity.

The online encyclopedia defines Mobile technology as a collective term used to describe the various types of cellular communication technology. Further more, the Mobile CDMA technology has emerged quite vastly over the past decades. Since the beginning of this century, a standard mobile device has gone from being no more than a simple two-way Pager or a numeric pager to being a cellular phones GPS navigation system, more so, late development of mobile technologies are embedded with web browser, and instant massager client, and a hand-held video gaming system. Many researchers argue that the future of computer technology rests in mobile and wireless computing.

It has been scientifically proved that the blood cells are basically responsible for blood clotting, and that once platelets are taken out of human body, they can not exist for more

The contents of
the thesis is for
internal user
only

REFERENCES

- American Association of Blood Banks (AABB) (1996). AABB Technical Manual, 12th ed.
- Andersson, E., P. Greenspun, et al. (2005). Adding Mobile Users To Your Community. Retrieved September 23, 2007, from <http://philip.greenspun.com/seia/mobile>.
- American Association of Blood Banks (AABB) (2002). Standards For Blood Banks and Transfusion Services, 21st ed. American Association of Blood Banks.
- Antovski, L. a. G., M (2003). M-Payments. Information Technology Interfaces, Journal of ITI International Conference, 95 – 100.
- Anitamedia under: AirstripOB: A Mobile Application for The Delivery Room. Retrieved from: (<http://anitamedia.wordpress.com/2010/02/22/airstripob-a-mobile-application-for-the-delivery-room/>).
- Ahmed B. Z. (2007), WAP-Based Application for Handicrafts products in Rural Area, UUM Library 2008 entry.
- Barclay, K., & Savage, J. (2004). Object-Oriented Design with UML and Java.
- Bennet, s., McRobb, S. & Farmer, R. (2002). Oriented-object system analysis and design using UML (2nd ed.) London: McGraw-Hill.
- Boujtita, N (2008). Improving Blood Banking protocols Using the Thermo Scientific RC3BP Plus TM. Thermo Fisher Scientific Inc., retrieved from; (www.thermo.com)
- Bullbrook, D. (2001). WAP A beginner's guide. California: Osborne McGraw-Hill.
- Chen, J., & Kinshuk, J. (2005). Mobile Technology in Educational Services. Journal of Educational Multimedia and Hypermedia, 14(1), 91-121.
- C, P. (2000). Blood donation systems as an integral part of the health system.
- 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. Journal of Electronics and Communication Engineering. 1, 23-31.
- David Travis (2008), Measuring user satisfaction. Retrieved from; (URL = <http://www.userfocus.co.uk/articles/satisfaction.html>.)
- 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.
- Damesyn M. A, Bethel J, Fridey J., McMullen Q, Garratty G, Busch MP. (2003), Behavioral and infectious disease risks in young blood donors: implications for recruitment. Transfusion. Unpublished.

- D, T. (2004). Models of Altruism as applied to Human Blood and Organ Donation.
- Dutoit, B. B. a. A. H. (2000). Object-Oriented Software Engineering—Conquering Complex and Changing Systems. Prentice Hall.
- Developershome.com (2005). Development of Wireless Markup Languages.
- Deitel, M. H., P. J. Deitel, et al. (2001). Wireless Internet and Mobile Business How to Program, Prentice Hall.
- Fredrick, K. (2009). A Web-based blood donor management information system for the Red Cross Society, Uganda (WBBDMI).
- Goh, K. W., Kim, E., Lavanya, J., Kim, Y., & Soh, C. B. (2006). Issues in Implementing a Knowledge-based ECG Analyzer for Personal Mobile Health Monitoring. Journal of Engineering in Medicine and Biology Society.
- Ghani, W. M. R. A. (2005). Modeling Mobile Payment Process Flow for Buying E-Book. Unpublished Master Thesis, Universiti Utara Malaysia, Sintok.
- Hoffer, J. A., J. George, et al. (2002). Modern Systems Analysis and Design. New Jersey, Prentice Hall.
- Hebert PC. et al. (1999). A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. Journal of N Engl J Med 340(6): 409–417.
- IEEE STD 830. (1998). IEEE Recommended practice for Software Requirements Specifications.
- International Council for Commonalty in Blood Banking Automation (ICCBBA) (2004), ISBT128 Standard: Technical Specification (Version 2.1.0).
- Jimoh, G. (2001). Mobile-based application for bus ticketing services in Nigeria ,Unpublished Thesis.
- Johan, 2004 information system analysis and design retrieved (2005) retrieved from; (<http://www.cs.toronto.edu/~jm/3405/slides2/sequence D.pdf>).
- Kalliola, M. (2005). Mobile payment.
- Lipscomb, J. & Rosenstock, R. (1997). Health care workers: protecting those Who protect our health. Infec Control Hosp Epidemiol.
- Mallat et al. (2004), Exploring consumer adoption of mobile payments - A qualitative study, Journal of Strategic Information Systems.
- Nielson, J. (2006), Quantitative Studies : How many users to test Alertbox. Retrieved from; (http://www.useit.com/alertbox/quantitative_testing.html).
- Nunamaker, J., Chen, M., & Purdin, T. (1991). System Development in Information Systems Research. Journal of Management Information Systems.

- Schei, E., & Fritzner, T. C. (2002). MOWAHS: A Study of Applications for Mobile Work.
- Stuart J. B. and Brian C. (2003). Mobile banking: Concept and Potential. *Journal of International Journal of Mobile Communications*. 1(3), 273-288.
- Sultanah Bahiyah Hospital, "About Us". Retrieved from;
(http://hsbas.moh.gov.my/modules/xt_conteudo/index.php?id=18)
- Schmidt, A. , Takaluoma A. , and Mantyarjarvi J. (2000). Context - Aware telephony over WAP. *Journal of Personal and Ubiquitous Computing*, 4(4), 1617 – 4917.
- Foo, S. M., Hoover, C. & Lee, W.M. (2001). *Dynamic WAP application development*. Greenwich: Manning Publication Co.
- Turban, E., Leidner, D., McLean, E., & Wetherbe, J. (2007). *Information Technology for Management: Transforming Organizations in the Digital Economy* (6th ed.): John Wiley & Sons.
- Two San Jose Hospitals Now Using iTriage Smartphone App to Connect with Patients (2010). Retrieved from (<http://www.prlog.org/10654769-two-san-jose-hospitals-now-using-itriage-smartphone-app-to-connect-with-patients.html>) by 6:02, on the 6th of June 2010.
- Vekstrend (2002). Dagens næringsliv.
- Voluntary blood donation <http://www.who.int>.
- WapForum (2002a). What is WAP Retrieved July 20, 2009, retrieved from (<http://www.wapforum.org/faqs/index.htm>).
- Wapforum (2002b). Wireless Application Protocol (WAP 2.0): Technical White Paper Retrieved September 23, 2007, from (www.wapforum.org/what/WAPWhite_Paper1.pdf).
- Wieggers, Karl E. (2003). *Software Requirements 2: Practical techniques for gathering and managing requirements throughout the product development cycle* (2nd ed.). Redmond: Microsoft Press.
- Kamran, S., Mohammad, H. Y. & Douglas, G. D. (2007). *Mined-knowledge and Decision Support Services in Electronic Health*, IEE Xplore
- Oba, Y., Otani, S., Yasuda, N. & Terada, K. (2001). Management of blood donor examination by Computers. *Risho Byori*, 19, (422).
- Ondrus, J. and Pigneur, Y. (2005), A Disruption analysis in the mobile payment market. *Journal of Annual Hawaii International Conference on System Sciences*.
- Yusuf K. (2008), WAP-Based Application for Product Promotion and Advertisement. UUM Library 2009 entry.
- Zikmund, W.G. (2000) *Business research Methods* (3 th ed.), fort worth: Harcourt College Publishers