# WEB BASED POST FLOOD DISASTER MISSING PEOPLE TRACKING INFORMATION SYSTEM

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Web Based Post Flood Disaster Missing People Tracking Information System
A report submitted to the Dean Wag Hag Salleh graduate School of Arts and Science in
partial fulfillment of the requirements for the degree Master of Science (IT)
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# **ABSTRACT**

In the case of large scale disaster, such as earthquake, volcanic explosion, sea wave and flood despite those the horrible phenomenon, website post flood disaster is required not only for governmental supporters but also residents and volunteers to communicate each other. It is possible to track and manage missing people by web based disaster management information system during the post flood disaster circumstances.

Thus, this study proposed web based to show information about missing people during and post flood disaster to track and report missing people. This web based has been developed using java programming and JSP which facilitates good design and services.

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## **CHAPTER ONE**

### INTRODUCTION

### 1.1 Introduction

Disasters are not new phenomenon for communities, societies and regions where many life and properties are lost caused by flood, typhoon, earthquakes, tornadoes, volcano or wars. Disaster management is a vast process to provide helping, emergency services to search and recover people, properties, and belongings in the event of a calamity. Information Technology (IT) has been useful to reduce the disaster impacts via social network Medias, and web services (WS) where people can get in touch with lost relatives and friends. IT tools are very important to manage in a disaster (Xia & Jin, 2009). One of the challenges for all mankind in a natural disaster is managing disaster for those who live in rural or under develop places of the world with limited use and access to World Wide Web (Hongxia, Abeda, & Hongyanc, 2008).

The devastating largest three hurricanes in the US during hurricane season are called Rita, Katrina, and Wilma affected. Katrina destroyed around 90 000 square mile. Rita destroyed and damaged over 350 000 residences. Using the web sites for a disaster event shows a vital usefulness where the web is useful for the exchange of information and communication for managing disaster under the difficult situation. For example, after Katrina Hurricane, web pages were helpful to determine more than 18000 records of children who were forced to move from the New Orleans. A survey of health emergency response management professionals shows that

# The contents of the thesis is for internal user only

### References

- Bach, H., Appel, F., Fellah, K. & Defraipont, P. (2005). Application of flood monitoring from satellite for insurance. In *Proceeding for IEEE International Geoscience and Remote Sensing Symposium*, VISTA 2005, Geowissenschaftliche Fernerkundung GmbH, Munchen, Germany held on November 27-28,2005. pp. 25-29. Munchen: CD-Publication.
- Berenbach, B., Paulish, J., Kazmeier, J., & Rudorfer, A., (2009). Software & system requirment engineering: in practice, Quality Attribute Requirements. New York: The McGraw-Hill.
- Bui, T., & Subba, R. (2009). A tale of two disasters: Assessing crisis management readiness. In *Proceedings for the 42nd Hawaii International Conference on System Sciences, HICSS* 2009, Hawaii, *October 5-8*, 2009. pp.1-10. Hawaii: IEEE CCECE.
- Calladene, T., Watson, G., Sheppard, T., Goillau, P., & Briscombe, N. (2005). Move to safety the role of human and technology factors in future flood warning systems: People and systems. *Who are we designing symposium*. 4(7). 61-67.
- Careem, M., Silva, D. C., Silva, D. R., Raschid, L., & Weerawarana, S. (2006). Sahana: Overview of a disaster management system. *Information and automation Journal*. 16(2), 361-366.
- Conallen, L. (2000). UML extention for web application. Retrieved April 15, 2011, from http://phrogz.net/tmp/webuml.
- Davis, F. D. (1989). Preceived usefulness, Preceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Katuk, N., Mahamud, R., Norwawi, N., & Deris, S. (2006). Web-based Support System for Flood Response Operation. *Disaster prevention and management*, 18 (3). 169-171.
- EatonThu. (2011). Missing.net responds to japanese disaster with altruistic innovation. Retrieved March 24, 2011, from http://www.fastcompany.com/1742386/missingnet-anexample-of-innovation-in-the-face-of-disaster
- Heckel, R., & Sauer, S. (2000). Strenghtening UML collaboration diagrams by state transformations. Retrieved April 30, 2011, from http://citeseer.ist.psu.edu/viewdoc/download;jsessionid=E7CA90C17730C6454584CE17B 566287?doi=10.1.1.10.6174&rep=rep1&type=pdf
- Hongxia, Z., Abeda, H. F., & Hongyanc, Z. (2008). Open source web-based GIS and database tools for emergency response. In *Proceedings for IEEE International Conference on Automation and Logistics, ICAL 2008.* Held on September 1-3, 2008 at Qingdao, China. pp. 2972-2976. Qingdao: IEEE Computer Society.

- Japan.person-finder.appspot.com. (2011). I'm looking for someone. Retrieved March 29,2011, from www.japan.person-finder.appspot.com/?lang=en
- Jin, Z., & Xia, S. (2009). Assuring information quality for designing a web service based disaster management system. *Fuzzy Systems and Knowledge Discovery, 1*(4), 14-16.
- Johnson, R. (2000). GIS technology for disasters and emergency management, ESRI White Paper. Retrieved April 24, 2006, from www.esri.com/library/whitepapers/pdfs/disastermgmt.pdf
- Ketua Pengarah Jabatan Pengairan & Saliran Malaysia. (2011). flood and drought management in malaysia. Retrieved April 1, 2011. from http://www.docstoc.com/docs/33733336/flood-risk-management-in-malaysia
- Kern, J., & Garrett, A. (2003). Effective sequence diagram generation. Retrieved April, 25, 2011, From http://www.sinter.com.tw/borland/together/together\_tech/20263.pdf
- Krishnan, H., & Samuel, P. (2010). Relative Extraction Methodology for Class Diagram Generation using Dependency Graph. In *Proceedings of the International Conference on Communication, Control and Computing Technologies, ICCCCT 2010*, held on October 7-9, 2010 at Kanyakumari, Tamilnadu. pp. 815-820. Tamilnadu: IEEE.
- Laudon, K., & Laudon, J. (2000). *Mobile commerce security and payment methods*. Hershey,PA,USA: Idea Group Publishing.
- Liu, S., & Chan, W. (2003). The malaysian flood hazard management program. *International Journal of Emergency Management (IJEM)*, 4(1), 3.
- Mandal, S., Saha, D., & Banerjee, T. (2005). A neural network based prediction model for flood in a disaster management system with sensor network. In *Proceeding for IEEE International Intelligent Sensing and Information Processing*. Held on 4-7 January 78-82 at Jamshedpur, India. pp 78-82. Jamshedpur: Xlari.
- Matar, M. (2005). Space-based facilities for environmental disaster monitoring, and management. In *Proceedings for International Conference on Recent Advance in Space Technologies*. Held on 9-11 June 2005 at NARSS, Cairo, Egypt. pp. 660-666. Cairo: IEEE.
- Shiratuddin, N., & Hassan, S. (2010). Design research in software development constructing and linking research questions, Objectives, Methods and outcomes. Malaysia Sintok: Penerbit Universit Utara
- Snead, B. (2000). *Development and Application of Unsteady Flood Models Using Geographic Information Systems*. Unpublished master's thesis, Civil Engineering Department of the University of Texas at Austin.

- Srichaikul, P. (2006). The Importance of the Internet in Disaster Relief. Retrieved April 2 ,2011, from http://www.itu.int/ITUD/emergencytelecoms/events/ThailandWork shop/final1/Session/ Srichaikul.pdf
- Toriman, E.M., Hassan, J.A., Gazim, B.M., Mastura, S.A.S., Jaafar, O., Karim, O., & et al .(2009). Integration of 1-d Hydrodynamic Model and GIS Approach in Flood Management Study in Malaysia. *Research Journal of Earth Sciences*, 1(1), 22-27.
  - Touir. A., Al-Owasisheg. A., & Mathkour. H (2008). The Architecture and the Design of a Pilgrim Tracking System. In *Proceedings for the 3rd International Conference Information and Communication Technologies: From theory to applications*. Held on 7-11 April, 2008 at Riyadh, SAK. pp 1-5. Riyadh: IEEE.
  - Vaishnavi, V. & Kuechler, W. (2004). Design research in information systems. Retrieved March 15, 2011, from http://desrist.org/design-research-in-information-systems
  - Wang, S., Shao, Y., & Liao, J. (2004). Monitoring for 2003 huai river flood in china using multisource SAR data. *The Knowledge Innovation Program of Chinese Academy of Sciences and the National High Technology Program*, 1 (4), 2260 2263.
  - Wegmann, A., & Genilloud, G. (2000). *The role of "Roles" in use case diagram* (Institute for computer Communication and Application ICA Technical Report No.1015). Swiss Federal Institute of Technology (EPFL) Switzerland.
  - Agile Software Developers. (2011). What is analysis. Retrieved 28, April, 2011, from http://www.agilemodeling.com/ essays/agileAnalysis.htm
  - www.water.gov.my. (2011). Flood management division. Retrieved March 29,2011, from www.water.gov.my/index.php?option=com\_content&view=article&id= 213%3 Abahagianpengurusan-anjir&catid=66%3Adivisions&Itemid=544&lang=en
  - www.mkn.gov.my (2011). Majlis keselamatan negara. Retrieved April 20, 2011,http://www.mkn.gov.my/mkn/default/subarticle\_m.php?mod=4&fokus=19&article=1 49
  - Yamamoto, S., & Kobayashi, D., (2010). Distributed autonomous system for victims of the earthquake disaster information system for local residents. In *Proceeding for SICE Annual Conference 2The Grand Hotel, Taipei, Taiwan.* 1927-1928.
  - Zhao, H., Zahedi, M., & Chou, H. (2010). Ontology for developing web sites for natural disaster management: methodology and implementation. In *Proceeding for IEEE Transactions On Systems, Man, And Cybernetics—Part A:Systems And Humans, 41*(1), 50-62.