

Household Tagging Databank: A Disaster Analysis Tool for the Vulnerable Sectors in Borongan City, Philippines

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Abstract: This study focused on the development of an information system that is capable of tagging barangay residents in their specific location and integrating their basic household information (head of the family, number of members, house area and house location). The system also holds data of different establishments, pathways and roads within the vicinity of the barangay. The primary goal of the study is to provide communities first hand data of each resident and utilize it during pre-calamity and post-calamity preparations. The road map visualization is also helpful in locating specific resident during disasters and natural calamities. The information system was subjected to a system evaluation and the results indicated that the Household Tagging Databank is compliant with all the ISO software quality standards.

Keywords: tagging, mapping, databank, disaster analysis, disaster risk, vulnerable sectors.

I. INTRODUCTION

The Philippines is among the most disaster-prone countries in the world. According to the World Risk Index of the 2012 (WRI Report, 2012), out of 173 countries, Philippines is 3rd in hazards exposure, 2nd in typhoons and earthquake, 5th in tsunami, 8th in flooding, 24th in exposure to landslide and 33rd to drought. The report further revealed that our country lies along the Pacific Ring of Fire and the world's busiest typhoon belt, with 1,200 km long Philippine Fault Zone (PFZ) and 23 active volcanoes. With these risks in line, Filipinos should prepare themselves along with the government in pinpointing the needs of every community to surpass every calamity. During calamities, local government units ensure that communities are secured and settled in safe areas. But the aftermath of the recent disasters that hit Borongan (2013 – Typhoon Haiyan, 2014 – Typhoon Ruby) were attestations that preparation of barangay residents is inadequate if not a complete failure.

This study aimed to address the problem of household information inadequacy through the development of a household databank that is capable of tagging residents in map and generating reports that can be utilized by the barangay disaster management team in identifying the residents that are vulnerable to disasters.

II. OBJECTIVES OF THE STUDY

This study aimed to achieve the following objectives:

1. Develop a household tagging databank that is capable of tagging residents in map and generating the following reports:
 - a. No. of households living in no build zones areas
 - b. List of PWDs
 - c. List of Households

- d. List of Senior Citizens
 - e. List of Children Below 12 years old
 - f. List of Pregnant Women
 - g. Total list of residents
2. Evaluate the system through the use of questionnaire based on the following ISO 9126 quality software metrics:
- a. Functionality
 - b. Reliability
 - c. Usability
 - d. Efficiency
 - e. Maintainability
 - f. Portability

III. METHODOLOGY

A. System Development:

This study used the V software development process model in the design and development of the household tagging databank. This developmental process is balanced and relies on the verification from the previous steps before proceeding forward. The static testing techniques, such as inspections and walkthroughs, was used to find faults in the functional specification, as well as defining test cases that are subsequently executed in system testing. The explicit recognition of testing in the model was very useful in planning and executing the information system.

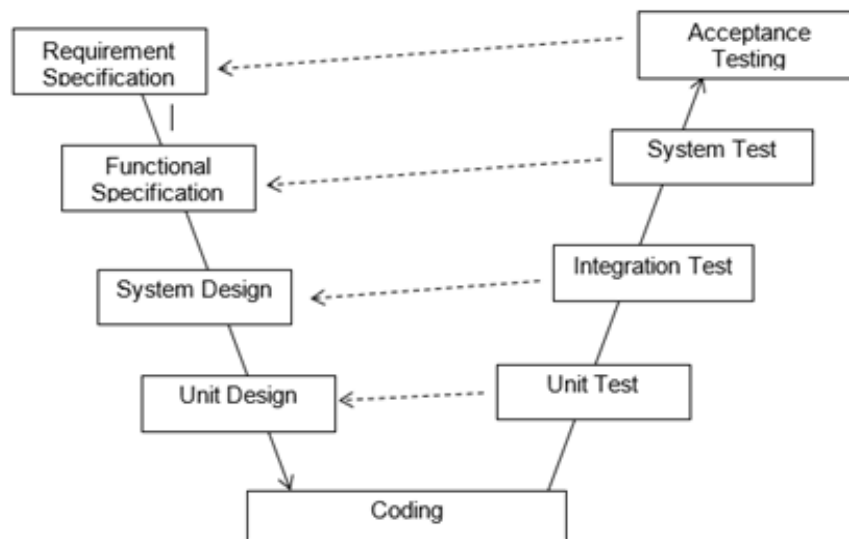


Figure 1. V-Model

The databank was developed using PHP scripting language and XAMPP Control Panel v3.2.1's Apache module as a server for loading and disseminating Information of the Community via Web-based system such as the Household information (Household ID, Household Head, Household Head's Gender, Number of Members, House Area, Household Location, Landmarks), Establishment Information (Establishment Name, Establishment Type, Establishment Owner, Establishment Area, Establishment Location, Landmarks), Road Information (Road Name, Road Length), Pathway Information (Pathway Name, Pathway Length), Barangay Officials List (Officials name, Officials Position), Notification (When, Where, What is the event of the Barangay, Who are invited) and Brief Information of the Barangay (Location, Landmass, Population, Number of Households).

B. Requirements Analysis:

The system requirements were defined in terms of the needs of the users. The identified needs was documented through the *User Requirements Document (URD)*. The URD describes the system's functional interface, performance, data definition, security and other requirements of the user.

C. Instrumentation and Data Analysis:

An evaluation tool based on the ISO 9126 Software Quality standard was used to evaluate the system. The evaluation considers the following parameters: functionality, reliability, usability, efficiency, maintainability and portability. Each parameter was rated depending on the level of agreement (Table 1) and was interpreted using the Interpretation on Table 2.

Table 1. Level of Agreement

Scale	Interpretation
5	Strongly Agree
4	Agree
3	Neutral
2	Disagree
1	Strongly Disagree

Table 2. Interpretation

Scale	Interpretation
4.20 - 5.0	Excellent
3.40 - 4.10	Very Good
2.60 - 3.30	Good
1.80 - 2.50	Fair
1.00 - 1.70	Poor

IV. SYSTEM TESTING

System testing compares the system specifications against the actual system. The test checks if the integrated product meets the specified requirements and is conducted before the system is released for implementation and utilization of intended users.

In this study, the performance of the system was evaluated in terms of functionality and acceptance of the users which covers the other parameters of the ISO 9126 Quality Software Model. Functionality test is considered as a mandatory requirement, ensuring that all components as defined by this parameter is complied. While the acceptance parameters are considered optional. The former was conducted by the computer experts and some student-programmers of the University and the latter was conducted by the intended users which includes the officials and residents of a barangay. They evaluated and examined the system if it is ready for deployment, determine if it is free from errors and finally ascertain if the objectives of the study was achieved.

Table 3. System's Mandatory Parameters (Functionality)

ISO SOFTWARE METRICS	Requirements Complied?	
	Yes	No
Mandatory Parameters		
Functionality. Provides primary information of the barangay. Enable to view map and dissemination of information. Enable to add and update the primary information of the barangay officials, establishment, household, road, pathways, notifications and the brief information of the said barangay.	93.33%	6.67%
Weighted Mean:	4.2	

Table 4. Weighted Arithmetic Mean on System’s Optional Parameters

Software Quality Criteria (Non-Functional Parameters)	RESPONSES (f)					Weighted Mean	Interpretation
	5	4	3	2	1		
1. Reliability	6	23	2	-	-	4.1	Excellent
2. Usability	11	15	4	-	-	4.2	Excellent
3. Efficiency	8	13	4	-	-	4.3	Excellent
4. Maintainability	11	15	4	-	-	4.2	Excellent
5. Portability	10	13	7	-	-	4.1	Excellent
Overall Rating						4.2	Excellent

V. GRAPHICAL USER INTERFACE (GUI)

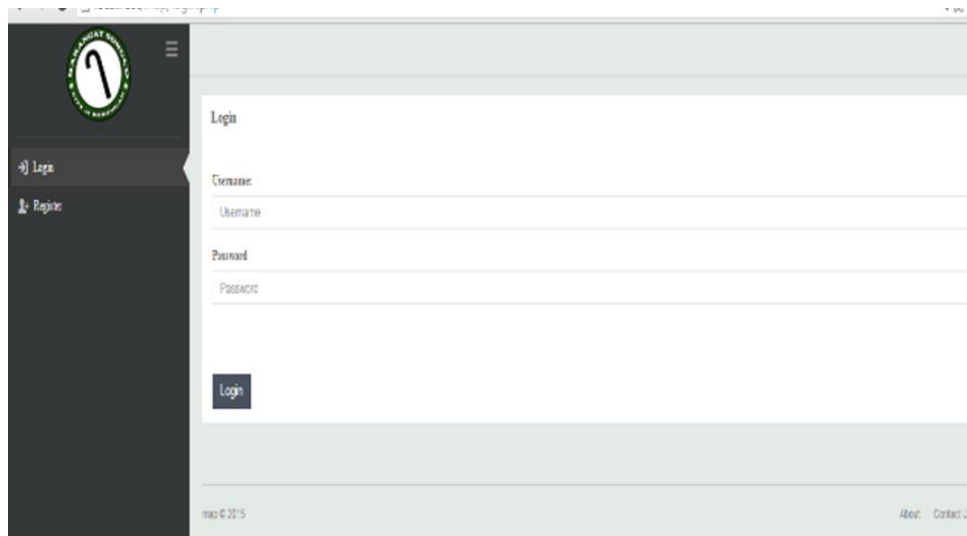


Figure 2. Administrator Log-in

Figure 2 shows the front line of the system in which the Administrator is required to register his or her valid account as to be able to access the main content of the system in which the Administrator can manipulate the data stored, either update, add or delete data from the system.



Figure 3. Administrator Main Form

Figure 3 shows the main content of the system where the map is displayed together with the markers that when click would should the information contained such as the household information, establishment information, road information, pathway information, barangay officials list, barangay notification and brief information of the barangay

The screenshot shows a web application interface for an administrator. On the left is a dark sidebar with navigation icons for Maps, Barangay Officials, Establishments, Household, Pathway, Road, MANDALAYAS, Household Information, and Notifications. The main content area displays a table titled 'Household' with columns for ID, Family Head, Gender, Number of Members, Number of Voters, and Map Coordinates. A modal dialog box is open over the table, asking 'Do you really want to delete this?' with 'OK' and 'Cancel' buttons. The table data is as follows:

ID	Family Head	Gender	Number of Members	Number of Voters	Map Coordinates	Delete
030795	alan jason gutierrez	Male	4	3	-155.175px, 229.562px	X Q
114	Fernando Lagrada	Male	6	4	-12px, 41.5px	X Q
342	Jesus Arroyo	Male	6	3	-18.375px, 38.5px	X Q
344344	Jerome	Male	4	4	-89px, 138.75px	X Q
44	Sir Neil	Male	8	6	-27.25 px, 59px	X Q
545	Gina Fugoso	Female	4	2	-41.8175px, 96.8175px	X Q
0254	apple giba	Female	1	1	-63.75px, 115.625px	X Q
75541	norilyn	Female	4	4	-76.5px, 109.5375px	X Q
924	Roberto Balajeboco	Male	11	10	-120.375px, 154.5px	X Q
927	Edison Lacorte	Male	4	2	-12.5px, 39px	X Q

Figure 4. Stored Data Form for Admin

Figure 4 shows the stored data of the system. The figure as well shows the form in which you can manipulate the said data stored. The Administrator can then add, update or delete any data contained in the system such as the household information, establishment information, road information, pathway information, barangay officials list, barangay notification and brief information of the barangay.



Figure 5. Users/Viewer Main Form

International Journal of Novel Research in Computer Science and Software Engineering

Vol. 3, Issue 3, pp: (7-12), Month: September - December 2016, Available at: www.noveltyjournals.com

Figure 5 shows the User/Viewers form in which they can and only can view the map with the information contained such as the household information, establishment information, road information and pathway information, via the map and barangay officials list, barangay notification and brief information of the barangay on the tab at the left side of the form.

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