Engaging the Flood Volunteers through Mobile and Web based Neogeography Platforms for efficient Aid and Relief coordination

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Abstract

The recent flood disaster that hits certain areas in Malaysia has given massive loss to the affected victims and huge damaged to certain areas. Nevertheless, the instant aid and relief supplies and supports from various sources including individuals have reduce the flood victims' burden at some extent. However, there is an argument that arises on the effectiveness of the aid and relief coordination and distribution to the affected area. This paper proposed the use of mobile and Web based Neogeography platforms to collectively centralize the aid and relief activities data among volunteers (that draw from NGOs, ad-hoc volunteer teams and individual volunteers) so that it could be shared to other volunteer teams and authority to plan for aid and relief disaster recovery activities. The proposed platforms are anticipated able to assist the authorities for effectively coordinating the aid and relief actions that involving various parties.

Keywords. Flood Disaster Information; Neogeography; Web and Mobile Mapping

1 Introduction

The recent flood disaster affected thousands of homes at certain area in Terengganu, Kelantan, Pahang, Perak, Perlis, Sabah and Sarawak. This crisis has given a big impact to the infrastructure, economy and social of the affected area. Several flood relief funds to support the victims and rebuild the affected areas emerged from other countries such as Thailand and Japan, non-profit organization (NGOs), private parties and individuals. Various ad-hoc volunteer communities were established and formed to assist in aid and relief operations. For example, various calls for pledges and donations were established that took several forms including cash, recycle items and new goods, urgent necessities such as diapers, mineral waters, canned food etc. There were also calls for supplying jet skies, boats and 4WD vehicles to transport aid workers and relief supplies, particularly to the remote area.

There are several web based portals that have been developed by the authorities to share and create alerts among the citizens of the current disaster status. For example, e-Banjir Negeri Kelantan [1] portal to updates the status at each evacuation centers, the water levels etc.; the Public Info Banjir [2] developed by the Department of Irrigation and Drainage Malaysia, the Portal Bencana [3] developed by the National Security Council, Prime Minister's Department and the JKR Disaster Management Centre [4] developed by the Public Work Department to share their authorize data related to the current disaster. There is a mobile application, namely TogetherWithU [5] that integrates several platforms related to flood recovery activities. The application integrates eBantuan Banjir portal that supplied real time authoritative data related to the water levels' status, current evacuation statistics, weather status with the e-sukarelawan portal and related flood crowd funding pledges in Malaysia. This mobile application is supported by several organizations including the Ministry of Communication and Multimedia Malaysia and NGOs that actively involved in the current flood recovery processes. However, the aids and relief coordination during disaster and post flood seems not systematic. Each ad-hoc volunteer teams posted their aid and relief activities only at their own portals. For example they shared their activities at their organization's Facebook

accounts such as in ' IKRAM Malaysia' and the 'Persatuan Sukarelawan Cakna Komuniti'. There were some volunteers shared their aid and relief activities to separate Facebook communities such as 'I Love Kuala Krai ', 'Info Banjir Kelantan ' and 'Info Banjir Terengganu'. They also shared the information to public figure's Facebook account such as 'Raja Shamri Fan Page'. There were also other volunteers especially individual and ad-hoc groups that run their relief activities without reporting to any party and platform. Hence, it was difficult, particularly for the authority to track the areas that have been served, over served and underserved, as well as the types of aid and relief supports that have been received at that area. There are several problems raised due to the decentralized information that unable to collectively store the information and data among various aids and relief teams. For example, among them issues that were viral in the social media was villagers fought between each other to fight for the given aids, complaints from victims that aids were distributed according to particular political party and there were a group of victims that received redundant aids although they already collected the items etc.

In the current era of Web 2.0, citizens act as sensors in analyzing scientific data as well as generating location based data [6]. Neogeoraphy based platforms have been used widely to collect user-generated content for various contexts including political crisis, natural disaster recovery, reporting infected plants etc. Turner [7] defines neogeography as meaning 'new geography' and as consisting of a set of techniques and tools that fall outside the realm of traditional geographic information systems (GIS). On this platform, the data contributors and end users could draw from geoliterate and non-geoliterate groups that do not attend related professional courses. They are using open source tools and free mapping providers such as OpenStreetMap and Google Map to share location based data on online maps. They are geotagging photos and information using social media tools such as Facebook and Flickr and sometimes create maps for sharing trivia and personal information. Mapping activities have not been specialized to a group of professional geoliterate who have attended specific classes such as geoinformatic, cartographic and surveying courses. This amateur geographer voluntarily creates and contributes geospatial localize data. They use tools and practices that somewhat different than the conventional ways which have been applied for several decades. The proliferation of smartphones and tablets accompanied with location based technologies and applications that are sold in the market at affordable rates have given a big impact to the rise of citizen volunteers to share their location based data.

Therefore, to tackle the aid and relief coordination issues among citizens volunteers and non-profit organization (NGOs) volunteers and authorities, there is a need to centralized all the data and information related to the aid and relief distribution into one stop web mapping platform. Although there are several web and mobile applications that have been developed, however it is still difficult to efficiently managed and coordinate the aid and relief actions from various parties including ad-hoc community and individuals. The aim of this paper is to demonstrate the use of mobile and Web based neogeography platforms to centralized the data and information related to post-disaster relief and aid shared among flood victims, citizen volunteers and authority. This study proposed the use of mobile and web based mapping platform to enrich the shared information with location based data and the use of geospatial visualization.

2 The Proposed Mobile and Web Mapping Platforms

This study is motivated by the vision that the use of map and location based data through low cost neogeography platforms could add extra details and enhance how plan and decisions could be made by the authority. Therefore in this study, a free and open source platform, Ushahidi is used to develop the proposed mobile and web mapping applications. The mobile and web mapping applications, namely Op Prihatin Banjir were developed using the tools and APIs provided by the Ushahidi platform [8]. The proposed application was developed using Ushahidi version 2.7.1. This application was introduced and used by several citizen volunteer teams during the recent post flood disaster recovery. Figure 1 shows the architecture of the proposed application.

The proposed application follows multi-tier architecture following a mix of client/server and web service model. In the presentation tier, end users could access, view, reports and upload data to the centralized Op Prihatin Banjir application through specialized reporting tool for Android and iOS based smartphone, send messages to the centralized database through emails, SMS and Twitter services using hash tag #Op Prihatin Banjir. In the middle tier, the Ushahidi APIs proxy was used to perform the detail processing be-

tween client and data tier. In the data tier, MySQL database was used to store and manage the data. The application provides a gatekeeper tool for the system administrator to verify and validate the data supplied by the citizen volunteers. A user rating tool is provided to control the credibility of information that supplied to the centralized database. The end users also able to view the reported locations using integrated open source navigator application including Waze and Google Map navigators.
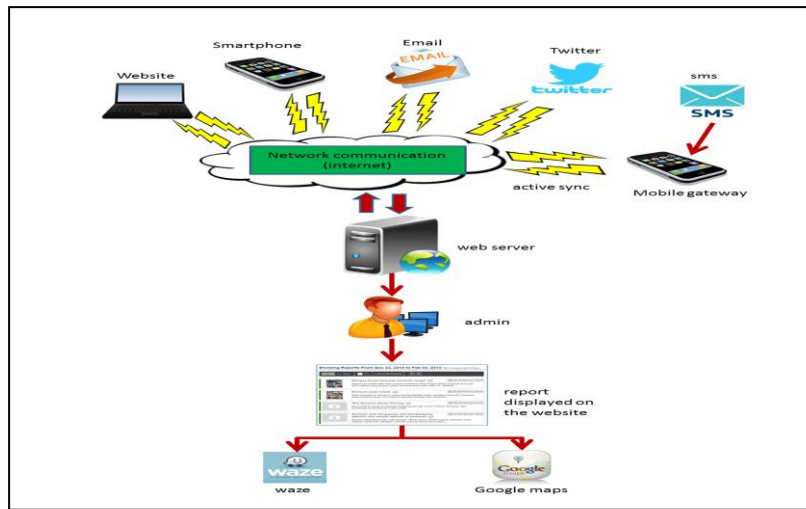

Figure 1: The architecture of the proposed mobile and web mapping applications for centralize the aid and relief data among citizens and volunteers

Figure 2 depicts the reporting tool for mobile client to submit information. The reporting tool is able to detect the user's current location. Hence, volunteers do not need to key-in the address of the reported event. This function is able to reduce the steps for volunteers to make a report. However, this automated location detection is not suitable for volunteers that do not situated at the reported area.
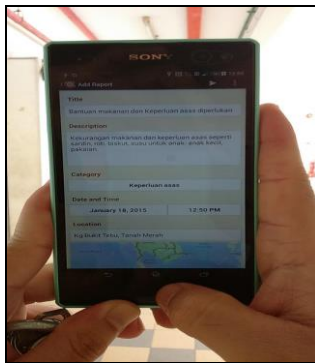

Figure 2: The reporting tool for mobile client that able to detect the user's current location
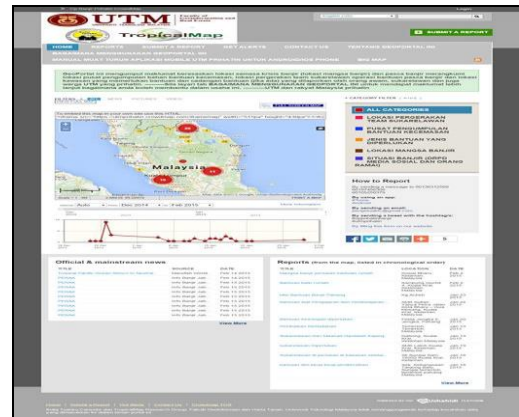

Figure 3: The web based mapping that visualize the data submitted by volunteers
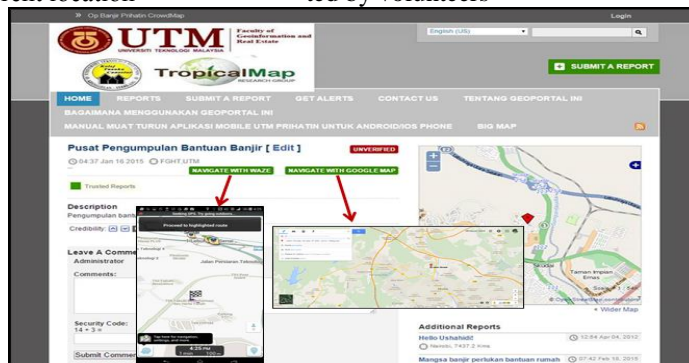

Figure 4: The shared data could integrate with Waze and Google Map navigator applications

For the end users who located outside the reported event, they could use the web based mapping version to submit their activities. Figure 3 shows the web based mapping version that is able to visualize the reported events. A tool for end users to report when are not located at the reported event is provided. They could key-in the information via street address or by zooming in the map to the exact location.

The proposed application also offers one important tool to guide volunteers to the reported location as in Figure 4. The navigation tool allows end-users to use the available free navigator application in the smartphone (i.e. Waze and Google Map navigator) to navigate them to reported location. This automated integration could reduce the steps for volunteers to identify the exact reported location.

This application has been tested to a sample group of end users that consists of citizen volunteers and flood victims. The flood victims were introduced to use the mobile and web version to report if they required assistance and aid supplies from the volunteer community. The ad-hoc volunteer communities were introduced to report their aid and relief movements including the activities, locations and the aid and relief supports that had been given. There are several challenges to successfully engage the flood victims and the citizen volunteers to use the proposed application. The price for the internet mobile that is still high, the average speed limits and limited mobile coverages particularly at remote area hinder some flood victims and volunteers to timely report the data to the centralized database. The potential end users particularly at remote area that are not familiar using mobile technology might step back to use a technology in reporting data. The issue of neogeography platform that typically uses a free online map such as OpenStreetMap and Google Map facing with the incomplete village and street maps and this issue become worst particularly at rural and remote area. The unavailability of these data affected the positioning accuracy of the data reported to the system. The coordinate accuracy error of the built-in GPS smartphones to record the current user's position also influences the reported data.

3   Conclusion

This paper presents a proposed mobile and web mapping system to centralize the information related to the flood aid and relief actions that supplied by flood victims and citizen volunteers. The centralized platform has been tested to several ad-hoc communities that actively involved the volunteerism activities in the recent flood recovery stages. Several challenges have been identified to engage the end users to use the proposed system successfully. The proposed system could be used to effectively coordinate and manage aid and relief efforts and supports that involving various groups of flood community volunteers. The proposed application could be integrated with the TogetherWithU mobile platform that has been developed by the Malaysian government to assist in the current post flood recovery.

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