Disaster Management Using GeoFencing and Datamining

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Abstract: Due to the lack of effective and coordinated disaster management system which consists of the stages like disaster mitigation, preparedness, response, and recovery has led to both the increase in the loss of both life and property. Disaster management deals with the issue of planning abstraction coordinative and communication. The system proposes an effective disaster information system which uses the geofencing technique so as to detect the movement of users. This technique creates a geofence around the user and thus monitors the user's entry and exit from the fence. For crowd disaster mitigation and real-time alert to avoid an occurrence of a stampede, this android application is an easily deployable context-awareness mobile Android Application Package. This application is very user friendly for user for accseing it properly. The application provides high accuracy when the user is in the fence. Disaster is a sudden event that suddenly occur in community and in a society. It is very important to people knowing the step to take during the disaster. Natural and Man-made disasters are proven to be devastating for both human life and property. The major cause is that neither the people were aware of it nor any effective measures were taken by them. Thus, there arises a need for proper mitigation and preparedness measures. And because of this need, a functional disaster information system is developed which will let people have prior knowledge in the times of disaster. This model aims at delivering risk information to the users directly in order to reduce the damage The system is proposed to be of a client-server. the client server architecture permits to use simultaneously by different user. While safety planning is familiar to schools, disaster planning is relatively new to the education sector. Such contingency planning may be seen as an extension of the risk assessment procedure.

Keywords: Client server architecture, Geo-fence, Client activity, Notification alertness, disaster management.

I. INTRODUCTION

Natural and Man-made disasters are proven to be devastating for both human life and property. The major cause is that neither the people were aware of it nor any effective measures were taken by them. Thus, there arises a need for proper mitigation and preparedness measures. And because of this need, a functional disaster information system is developed which will let people have prior knowledge in the times of disaster. Now a days it is very important to stay inform and we have to plan for evacuation .This model aims at delivering risk information to the users directly in order to reduce the damage. Avoid unnessasry risk .In this system, geofencing is used to detect the movement of users and directly deliver the risk information to them. Using the geofencing technology on the user's Android mobile phone, the area around the user is dynamically defined as a geographic area of interest. The system is proposed to be of a client-server architecture where the server collects disaster information from various information sources and the client watches the user notify the information as the need arises. Thus, the system can deliver warnings and advice timely to specific users in danger directly to the users. Disaster management is very important to survive in the case of a natural or a major man-made disaster and can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular, preparedness, responses. They also pointed out that the first task, immediately after a Disaster is to understand the actual Hazard, its impact at Disaster location, its surroundings and damages occurred. This point of view has been taken forward in this research work. They further suggested that thereafter, the plan has to assess - what are the different types of Resources required and to generate their mobilization plan to respond to the Disasters. Here it may be noted that it would take a considerable amount of time and would in turn make the Disaster Management slow.

II. LITERATURE SURVEY

This part describes the base of knowledge which is used towards the research. In this part, disaster mitigation, geofencing theories, and recommended communication infrastructure to support the system is discussed. A. Disaster Mitigation Disaster mitigation is defined as a set of activities to reduce the risk of disasters by building the physical disaster resistant building, socialization to increase the residents' awareness, and the enhancement of capability against disaster. According to Ministerial of Indonesia Regulation No. 33 2006about disaster mitigation, there are four important points in disaster mitigation such as:
• The availability and the map of disaster-prone areas
• The socialization towards the enhancement of knowledge and awareness of disasters

• The knowledge about things to do and prevent, and also how to be safe
• The management and governance of disaster-prone area to reduce the disasters

Disaster Mitigation and Management activities, around the globe, have been of great concern for long time. It has been evolving over time due to experience gained and the development of newer equipment & technologies. Researchers have been looking for innovative methodologies.The recent study for IT-Based Disaster Mitigation IT has been growing rapidly. It helps human to reach the goal or even replace human to do something. Pertaining the disaster mitigation, IT can be engaged such as

• The use of sensors, editable website, the data mining application to catch, analyze, and spread the lesson-learned
• The use of database, website, call center technology in order to provide the information about equipment, volunteers, and material.
• The use of planning, scheduling, task allocation, and resource management applications to formulate the disaster management plan and track down the execution.
• Deploy the cell phone technology to provide a standalone communication in emergency situation where all local infrastructure is down.

In this research, we build a mobile-based disaster mitigation information system. This system aims to provide information about the mitigation routes, safe points, standardized emergency actions, etc.

According to Higashida et al., information processing is a very important task in any emergency situation. It is not sufficient to gather information and data but the challenge is in extracting intelligence and knowledge out of these. They also pointed out that the first task, immediately after a Disaster is to understand the actual Hazard, its impact at Disaster location, its surroundings and damages occurred. This point of view has been taken forward in this research work. They further suggested that thereafter, the plan has to assess - what are the different types of Resources required and to generate their mobilization plan to respond to the Disasters. Here it may be noted that it would take a considerable amount of time and would in turn make the Disaster Management slow. The paper also emphasised the role and continuous training of human Resource in the decision and execution process, as interdepartmental coordination is a critical issue for the effective Disaster Management. This aspect of coordination needs to be systematized properly.
IDB technical report highlights the needs and methods to assess the risk management capabilities at national level by way of various parameters. This may help policymaker to evaluate the effectiveness of their policies and investments, particularly in terms of risk management capacities. This methodology provides a way to measure key elements of vulnerability prevalent in the country facing natural Hazards.

III.PROPOSE SYSTEM

Geofencing is a mechanism that makes a virtual fence in a specific area. The application sets a geofence at a dangerous area and gives disaster information to the user. Geofencing combines awareness of the user's current location with awareness of the user's to locations that may be the area of interest. In order to define a fence, the coordinate (latitude and longitude) of the place are required. A circular area is defined by the coordinate and radius. A geofence is set to the circular
area [1]. You can limit the duration of any geofence by specifying an expiration duration in milliseconds. After the geofence expires, Location Services automatically removes it.
Geo fencing will integrate the awareness of the user's current location with awareness of the user's
proximity to locations that may be of interest. To mark a location of interest, its latitude and longitude need to be specified. To adjust the proximity for the location, a radius is added. Thus, the latitude, longitude, and radius define a geofence, creating a circular area, or fence, around the location of interest.

The Android program is developed using Android Studio. The user's location is accessed using Google API to use the Maps JavaScript API, an API key is required which is then added to the mobile app. While safety planning is familiar to schools, disaster planning is relatively new to the education sector. Such contingency planning may be seen as anextension of the risk assessment procedure. It is the key to reducing the management of a disaster to a system for makingdecisions at a time when decision making is difficult. As with all RoSPA guidance, this should be used in conjunction with LEA advice, and any other specialised guidance from professional bodies.
Nikam et al. elaborate the management cycle of the Disaster by the various phases that is - prevention, preparedness, response, recovery, mitigation and risk reduction, and also the preliminary efforts made, use of web based application for Resource networking with limited access to equipment, human Resources and supplies. However this would call for an integration of services

IV.SYSTEM ARCHITECTURE

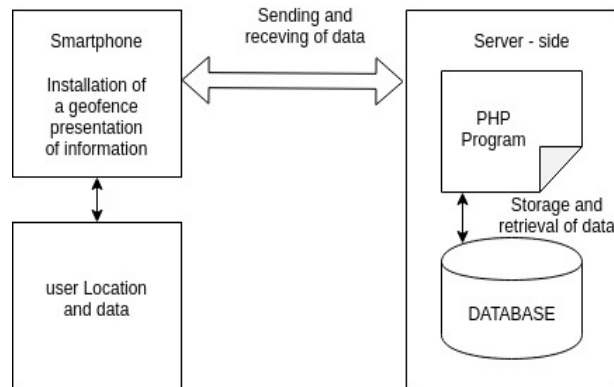Following diagram is our system's architecture diagram:

Figure 1: system architecture

Smartphone:
Geofencing will integrate the awareness of the user's current location with awareness of the user's proximity to locations that may be of interest. To mark a location of interest, its latitude and longitude need to be specified.

Database:
Database architecture focuses on the design, development, implementation and maintenance of computer programs that store and organize information for businesses, agencies and institutions. A database architect develops and implements software to meet the needs of users. The design of a DBMS depends on its architecture.

Working :
The system is designed to find the users in disaster area to mange all the related task to save people lives with help of hospital, ambulance, police, fire safety management. The admin create the geofence in a disaster area to calculate the count of current users present into it. Then the relevant operation need to perform in that situation to save the people life with the help of government system. Geofence need gps tracking system to create circle on google map.

V. CONCLUSION

Realizing the need for an effective application for disaster information management. This application can be a useful medium of mitigation, preparedness and response in a disaster scenario. This system presents the disaster information based on a person's movement was proposed. We implemented an experimental system by using geofencing and evaluated the system in an urban area. Further study is necessary to evaluate the system in case of larger fence sizes. Improvement of the location accuracy is also very important to deliver risk information timely to users. This disaster information system helps the people while entering in the disaster area and makes them aware of using their Android Smartphone and with the help of geofencing for their information.

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