

# Disaster Management System on Mobile Phones Using Google Map

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**Abstract—** Natural Disasters have threatened mankind since history started. Due to geographic location and environment change, there are many vulnerable countries to natural disasters. The countries also lacks effective disaster preparedness system to confront natural disasters.. In addition, a tourist may face difficulties in finding safe area or shelter place prior to the occurrence of natural disasters. For this reason, we have proposed a disaster management system and evacuation system for people using GoogleMap (GM). The system is implemented on android mobile phone because of the burgeoning growth of smart phones in world . Android device with our application installed on it and user.user can register the multiple receiver or family member or friends to send SMS at a time to send notification for help. By sending the current position obtained by GPS and including shortest path of shelter or safe zone on the map of the application.

**Keywords** Natural Disaster, Google Map, Disaster Warning, Evacuation Guideline,Android.

## I.INTRODUCTION

Natural Disaster is the consequence of natural hazards such as cyclone, storm, earthquake, tsunami, flood etc. This earth has already observed the vicious mode of nature which has taken millions of lives. The 2011 Japan earthquake and tsunami, the 2010 Haiti earthquake, the 2008 cyclone Nargis, the 2004 Indian Ocean Tsunami, the 1991 Bangladesh cyclone are some current examples of deadliest natural disasters [1]. Natural hazards generally end up with disasters where the precious areas are susceptible. The report of United Nation's International Strategy for Disaster Reduction (UNISDR) on Mortality Risk Index (MRI) ranks the Bangladesh no. 1 among 200 countries most at risk from earthquakes, floods, tropical cyclones, and landslides [2]. Since in world there are most of the natural disaster-prone country, so prevention is necessary for shielding lives and properties. Sometimes people may be unaware about the upcoming natural hazards. Lack of awareness of people causes the major damage during disaster. So, sufficient prior disaster warning and effective evacuation system can save noteworthy number of lives in the country prone to frequent disasters. A new comer or a visitor in a particular area may face the problem in finding safe area from his current stay during disaster. Hence, we have projected a location based disaster system on mobile phones using Google Map which is mainly utilized to messages on the map. GoogleMap (GM) is a rapidly growing open source map of the world because of the availability of map information across the world and the advent of low-cost convenient GPS devices [3] So, the popularity to using

Google map. The demand of location based services is also increasing day by day with the burgeoning growth of smart phones. Our location based system is also an android platform based smart phone application to render location based services showing the warning of upcoming disasters (tsunami, cyclone, and flood etc.) if the user is in the possible disaster affected area or near to that area and demonstrating nearest safe zone or shelters on the map of the application. Our proposed system is developed for the normal people. The usability of google tMap (GM) is ensured for all users as it is free. Users of our application will send text message along the direction on the map to one or more family member which number user register in that application. The rest of the paper is organized as follows. In Section II, we discuss about some related works and their shortcomings in brief. Then we present the description of our proposed location based system in Section III. In Section IV, system implementation details are described. In Section V, we have discussed the experimental result. Finally, we conclude this paper stating the future plan in Section VI.

## II. LITERATURE SURVEY

Natural Disaster Monitor (Developed by Dominic925):This Android app gives you real-time updates on any global natural calamities like earthquake, tsunami, cyclone, floods, and volcano eruptions on the back drop of a Google earth map. The app makes use of the alerts published by the Global Disaster Alert and Coordination System (GDACS), a joint initiative of the United Nations Office for coordination if Humanitarian Affairs (OCHA) and the European Commission.

The app shows icons on the map with colours- green, orange and red, each indicating the severity of the calamity. On clicking the icons, the drop-down list shows date and time, region, disaster type and other related details.

Disaster Alert (Developed by PDC- Pacific Disaster Center):This app boasts of 'Active Hazards', an interactive map which shows real-time alerts collected from authoritative sources with details such as potential threats to people, property or assets via PDC DisasterAWARE application.The application covers global Earthquake, floods, Tsunami, Volcano, Storm,Marine and even manmade disasters. The company says the upcoming update will include wildfire alerts as well.

StormTracker (Developed by WSI-Weather Service International Corporation): This application makes use of the NOWrad (National Operational Weather radar) which gives one of the best resolution cloud imagery with colour codes. It also gives 10-day forecasts with both daily and hourly details. Users can also lock their favourite locations to keep track of the local area.

Tsunami Alert (Developed Palta Software): This application is certain to help people living along the coastal lines across Pacific and Indian Ocean, who witnessed the large scale devastation by the 2004 Tsunami. The main feature of the application is that a user will get real time updates from US government owned NOAA (National Oceanic and Atmospheric Administration) Tsunami warning centres in every five minutes. It will also give details about the area affected, location of earth quake and also provide with tips on how to react to impending danger. In Tsunami Alert app, the user will have the option to select 5 main regions- one US and Canada, Pacific, Hawaii, Indian Ocean and Caribbean Sea.

ubAlert-Disaster Alert (Developed by ubAlert): This application is created by social network website ubAlert, which gathers verified accounts of the people who were present at ground zero and witnessed the natural disaster before any media organisation reported it. Once the person informs a calamity in his/her area, the network will authenticate the news with multiple sources so that there is no scope for false panic. People can upload pictures and videos of the event from the app to social networks like Facebook and Twitter and alert.

Global disaster alert and coordination system:

Disaster response stakeholders GDACS is a cooperation framework under the United Nations umbrella. It includes disaster managers and disaster information systems worldwide and aims at filling the information and coordination gap in the first phase after major disasters. Predictable information of predictable quality at a predictable time GDACS is a of of existing disaster information management applications. Early information is expected to be uncertain and is refined as better information becomes available:

- Near real-time alerts or early warnings about sudden onset disasters, delivered by email, fax or SMS
- Near real-time automatic situation reports based on modelling and a priori information
- On-line discussion forum for emergency responders (including Search and Rescue teams and humanitarian aid donors)
- Rapid situation reports based on field information
- Full integration with established news services
- New mapping products based on post-disaster satellite imagery GDACS provides real-time access to web-based disaster information systems and related coordination tools. GDACS is managed by a Steering Committee, currently chaired by the European Monitoring and Information Centre (MIC) in DG ECHO.

The Emergency Relief Coordination Centre (ERCC) in the United Nations Office for Coordination of Humanitarian Affairs (OCHA) in Geneva acts as GDACS Secretariat. Annual stakeholders meetings are attended by disaster managers, scientists, map experts, computer scientists and other professionals, to define standards for information exchange and a strategy for further development of its tools and services.

#### IV. PROPOSED APPROACH

The disaster management consists of four fundamental steps such as mitigation, preparedness, response, and recovery. Among these steps, the emphasis of our work is the preparedness which is the development of a system for the action plan of disasters.

Preliminaries

The environmental location of Bangladesh, a South Asian country, situated as it is between the Himalayas and the ocean, on the delta of wide rivers, means that the country is very vulnerable to flooding [14]. The people of coastal areas in Bangladesh have to face several storms each year and cultivable lands disappear in river due to river erosion. Bangladesh is also one of the most vulnerable countries to the planet's climate changes [14]. Climate change is producing a growing number of cyclones, and paradoxically, there is a greater risk of drought, as well. The country is also surrounded by the Bay of Bengal which is indeed north-eastern part of

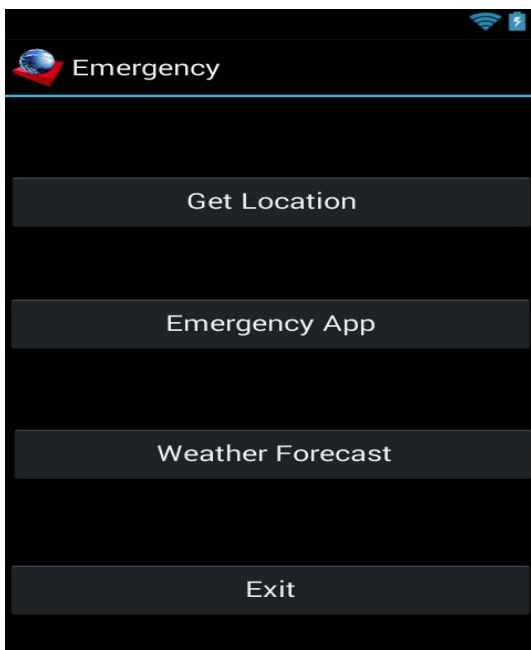
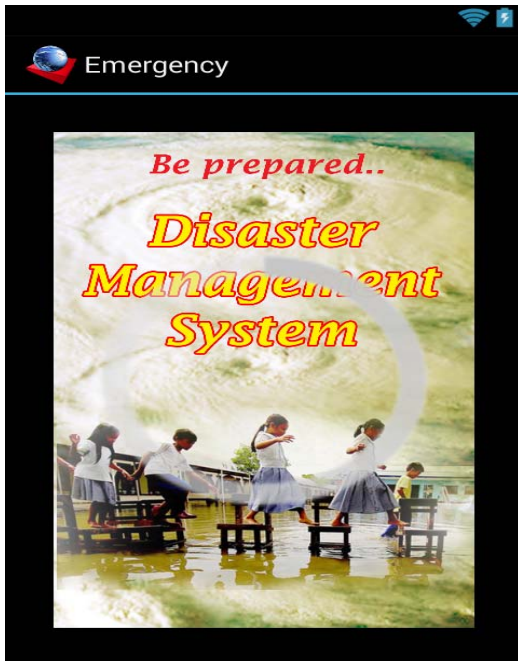
Indian Ocean [14] and can ravage the country, particularly the coastal belt sternly. Hence, there is also the risk of Tsunami in this country. However, our disaster preparedness system protects the people of this country from these disasters and uses GoogleMap (GM) because the development of GM is very rapid. It is dedicated to encouraging the growth, development and distribution of free geospatial data and to providing geospatial data for anyone to use and share [3].

Google Map is one of the projects employing their developed map of the many countries. This proposed work is also implemented on android mobile phones. Android is an operating system for mobile devices such as smart phones and tablet computers developed by Open Handset Alliance led by Google. Android is more open and comprehensive than other mobile operating systems. So, it is the best-selling smart phone platform worldwide. It also allows the developers, wireless operators and handset manufacturer to make new applications and products at lower cost [15]. The outcome is more personal and more interactive experience to the users. So, the android mobile platform has been used in our proposed disaster preparedness system.

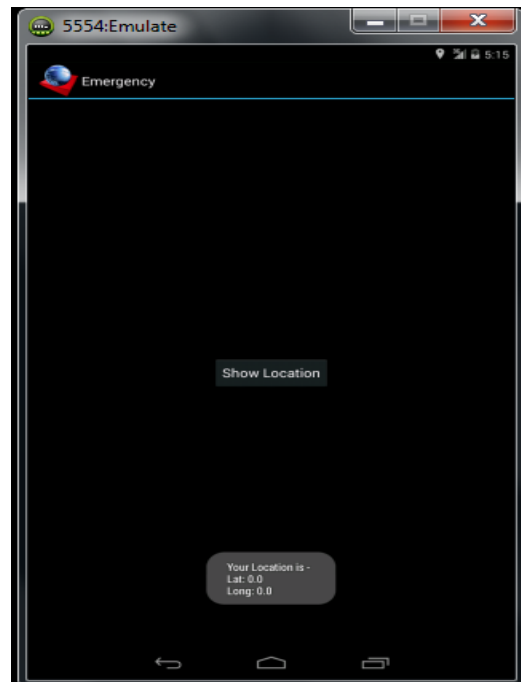
Proposed System

Our proposed location based disaster preparedness system consists of a GPS supported android mobile phones with our proposed application installed on it and users having national id. The user of our proposed android application can also register the number of family members, relative, friends to send message for help. Through network provider or GPS provider, mobile phone gets the current

location of its user and sends it to register member by the user in its application. Using this current position The user of our proposed application message .

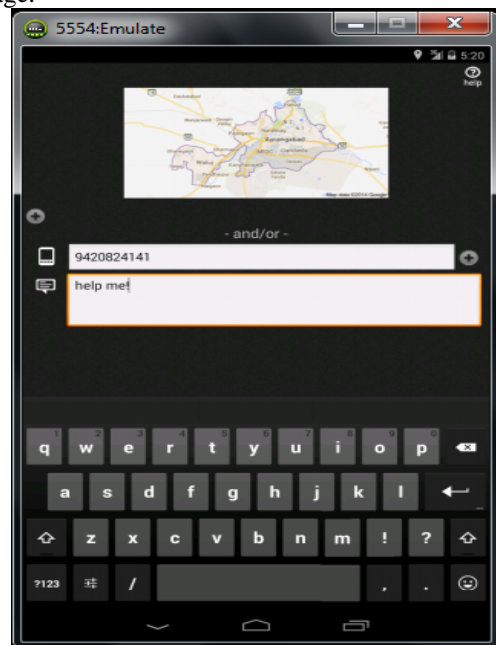


1.Our application gets the current position through GPS or network provider from the user mobile phone send the latitude and longitude of user's current position.

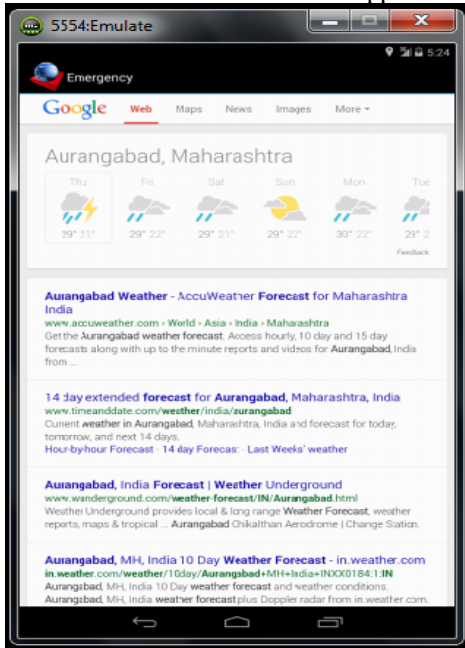


2.When the user in a disaster zone, it will send a message notification along with path to the member who can help.in this message user send text message and path to reach for help.The path contain the distance from helper to the user. The distance can be given with the help of Google Map to show the distance by walk, by railway or by bus

3.When the user in a disaster zone, it will send a text message.



4. weather forecast detection also in this application



5. The application uses GPS to detect the phone’s current position and sends this data through the text messages to the member which user already insert in to the application for help. Our application will run on android 2.3.3 supported mobile phones and upgraded versions. The mobile phone should have GPS supported location identification facility. The application provides disaster warning in *Manual Notification*. The application also has a button which send messages to the member from which user can get help.

**V. EXPERIMENTAL RESULT**

We have tested our system assuming that a flood will hit in the region of Chittagong, India. We have utilized ten users in specified area who have installed the proposed application on their mobile phones. The total scenario is described according to the time in the Table I.

**TABLE I. SCENARIO OF THE EXPERIMENT**

Time	Scenario
9.00	Experiment starts. Every user has started the service of the application on their mobile devices.
9.05	User send a text message to the family member along a path.
9.08	Family member receive a message with the Path
9.5	Family member reach to the affected region by following path with the help of Google Map and user go to shelter area or safe place which is nearer.
9.6	User stop the application

The above table shows how fast and reliably our proposed application has responded to the users.

**VI. CONCLUSION**

Our disaster management system is an android mobile phone application employing GoogleMap (GM), Our application provides evacuation help on the map of the application to user if the device user is in probable disaster affected area considering the user’s current location. This helps people to go to the safe area or shelter place prior to the disaster. Our application also facilitates the work of authority to track his evacuation progress ceaselessly so that they can take immediate steps if needed. Moreover, we have a future plan to implement another application to assist in rescue and relief operation after the disaster and a better server side application to totally automate the system of detecting disaster prone area

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