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Natural Disaster Management using Android Application

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Abstract: Communication during natural calamity time is very crucial for both rescue team or volunteers and victim. Emergency never comes with prior intimation. The System in our country is planned to work if there should be an occurrence of crises in the public. The crises incorporate Fire, Medical Emergencies, mishap and natural disasters like Earthquake, Floods, Strom. Due to this reason, there is a requirement for a system that will help in the effective arrangement of salvage and alleviation to natural disaster influenced regions. In this paper we present an android application that enables victims to communicate at disaster times over the Internet. The person who stuck in natural disaster site will be able to send message or call rescue team via our android application . Location of the victim can be traced using Global Positioning System(GPS).
Keywords: Disaster management, android, disaster management cycle, google map, volunteer, victim

I. INTRODUCTION

In India, from many years, people had suffered from earthquakes, floods, tropical cyclones, and landslides. Indeed, through the years, its geographic location has been devastated by several natural disasters. Natural disasters had affected a huge number of individuals and harmed billion worth of property. Indeed, during natural disasters, there is still the absence of an efficient disaster management system that will help the people that are suffering during the occurrence of calamities. Disaster management is a very complicate and interesting domain. The requirements of disaster circumstances are very different from those found in normal life and the domain provides unique imperatives which are both interesting and challenging to work with. In this, we utilize the imperatives of the disaster management area to guide an exploration of the possibilities for new digital technologies to help out when natural disaster occurs. It is possible to use modern smartphones and applications in order to assist those attempting to deal with a disaster to better do the tasks that the circumstance pushes onto them. Mobile phones are a relatively new class of devices which have been created by the converting the wireless networking technology advances and proceeded with scaling down of PCs. They are easy to port, multiple sensor technologies, and multiple networks capable of exchanging data that could be used to assist people when disaster strikes. There are no standardized rule defining the different phase of the disaster management cycle. phase of the disaster management cycle are:

1) *Prevention and Mitigation:* Any activity that reduces either the chance of a hazard taking place or a hazard turning into disaster. Mitigation includes steps to reduce vulnerability to disaster impacts such as injuries and loss of life and property. This might involve changes in local building codes to fortify buildings; revised zoning and land use management; strengthening of public infrastructure; and other efforts to make the community more resilient to a catastrophic event.
2) *Preparedness:* Plans or preparation made to save lives or property, and help the response and rescue service operation. This phase covers implementation/operation, early warning system and capacity building so the population will react appropriately when an early warning issue. Preparedness centers around seeing how a natural calamity may affect the people and how education, effort and training can make people to react to and recover from a calamity. This may contain rescue team, pre-disaster strategic planning, and other logistical preparedness activities. The calamity preparedness activities control gives more data on how to better prepare an organization and the business community for a disaster.
3) *Response:* This phase include action to save lives and prevent property damage, and to preserve the environment during emergencies or disasters. the response phase is the implementation of actions plane. Response addresses immediate threats presented by the disaster, including saving lives, meeting humanitarian needs (food, shelter, clothing, public health and safety), clean up, damage assessment, and the start of resource distribution. As the response period progresses, focus shifts from dealing with immediate emergency issues to directing fixes, restoring utilities, establishing operations for public services (including permitting), and finishing the cleanup process.
4) *Recovery:* This include action that assist a community to return to a sense of normalcy after disaster. Natural disasters often occur with little or no warning, and the damage can be staggering. In addition to the dramatic social and humanitarian consequences a disaster can cause, communities can also experience sudden economic losses and dislocation. In disaster-impacted communities, economic development organizations (EDOs) and chambers of commerce often lead economic recovery efforts by helping local businesses respond to impacted employees, facilities, customers, and supply networks. They have the existing relationships with

local businesses, which are crucial during and after a major event as communication channels have become disruptive and chaotic. They can also facilitate a strategic planning process for economic recovery and work on recovery actions by coordinating involvement and leverage resources from the business community.

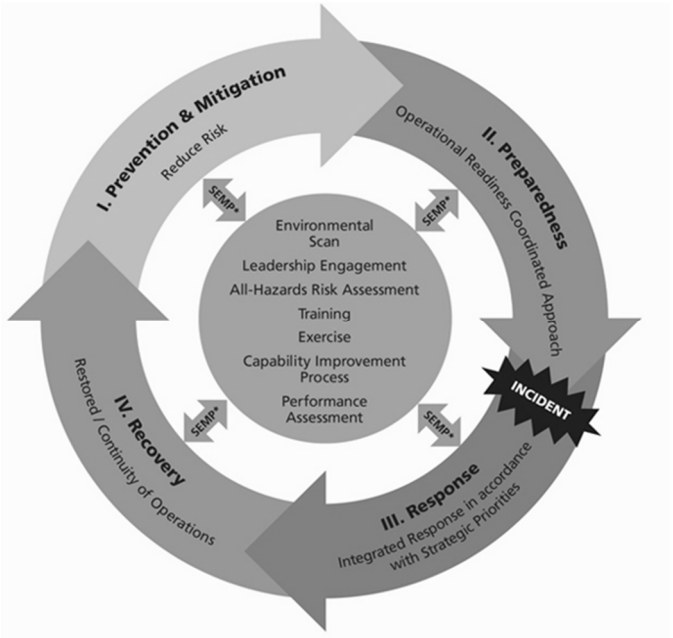

Fig 1. Disaster Management Cycle

II. SURVEY

The following table describes the overall evaluation of disaster management system in Assam in 2019 on the basis of 200 people feedback :

Table 1. Evaluation of disaster management system

Area of concern	Very effective	Effective	Moderate effective	Slightly effective	Non effective
Prevention and Mitigation	09%	34%	12%	10%	35%
Preparedness	13%	08%	16%	23%	40%
Response	30%	25%	10%	17%	18%
Recovery	24%	23%	30%	16%	07%

Mr machining time per unit for radically change merchandise (unit time per unit product) P10 percentage of merchandise rejected as terrible first- rate in section 1

P11 percentage of merchandise licensed as correct super in phase 1

P21 percentage of merchandise certified as pinnacle superb in segment 2 P20 percentage of merchandise rejected as bad fine in part 2

P1r percentage of merchandise redesign in a position in part 1, QP1r=Q(P20+P21) Pb percentage of horrific high-quality merchandise at the provide up of cycle Tc cycle time

Tp total processing time

T average manufacturing time for every product item Cm cost of uncooked fabric per unit ($/unit of product) Cp cost of buy per unit of time ($/unit of time)

Cs cost of setup per unit of time ($/unit of time)

Ci cost of inspection per unit of time ($/unit of time)

Cwip work in method defending price per unit of time ($/unit of time) Ch inventory keeping rate per unit of time ($/unit of time)

Ct total fee per unit of time ($/unit of time) I average storage inventory

W average monetary fee of the WIP stock ($)

i inventory defending cost per unit of time ($/unit of time)

c average unit value of each product price (unit of money ($) per unit)

R rate charged per unit of mobile manufacturing time collectively with all overheads, moving cost, loading/unloading cost, etc.(unit of money ($) per unit of time)

A. Cost Calculation

The model will developed by the cost calculation. All cost will be calculated for the lot size (Q) and Back Order (B). The GTOQIR Model will be extended with the backorder cost.

1) Purchase Cost

$$C = \frac{(€m * Q)}{p \quad Tc}$$

2) Setup Cost

$$C = \left(\frac{Æ}{s \quad Tc}\right)$$

3) Inspection Cost: Most of the applications available for the people on disaster management are educational based applications. The applications such as disaster and crisis management, disaster management and others provide detailed information about disasters. These applications provide information about various man-made disasters such as fire, nuclear disasters, industrial and chemical disasters, biological disasters. Also, these applications provide information about various natural disasters such as earthquakes, floods, landslides, cyclones, tsunamis, drought, urban floods, and heatwaves. Such types of applications also provide guidelines to the users about what they should do and what they should not do when any disaster occurs. It provides information about what they should keep in their emergency kit and after disaster how to recover from it. These applications also provide helpline numbers for victims.

In our android application, we are also providing helpline numbers for the victims. Also, we are providing text message facilities if the victim is not able to contact through helpline numbers. The applications which are mentioned earlier do not provide a geo-visualization system that is these applications can not trace the locations of the natural calamity victims. In our application, we can trace victim location using Global Positioning System (GPS). The android application which we are developing allows users to donate clothes, food to the victims. Also, the user of our application can become a volunteer if they want to help victims. The volunteers which are nearby disaster occurred area can go there immediately to help the victims. We will also providing emergency kit to the volunteers . The volunteers can do first aid of the victims. They can also provide information to the high authorities or administrators of the applications about how many people are stuck in that area, how many volunteers more are required, how many donated items are required and so on.

III. METHODOLOGIES

A. Disaster Management System Using Global System for Mobile Communication (GSM)

Right now are utilized, those are point or tilt detecting component which supplies the readings of incline edge if there' s any development due to the avalanche and it's conjointly utilized f or tsunami alarming reason, downpour gage detecting component is utilized to accumulate the profundity of water at the mountains, soil float detecting component is utilized f or discovery of avalanche, seismic tremor detecting components zone unit utilized for quake recognition reason and temperature sensor is utilized f or gathering the temperature.

B. Natural Disasters Alert System Using Wireless Sensor Network

The sensor hubs are exceptionally evolved skim sensors and increasing speed sensors and a low force readout ASIC circuit f or a long life. The accelerometers are utilized to quantify the seismic reaction of the tremor. They recognize vibrations during a seismic tremor occasion and send information to remote base station where numerous sensors information over the town is gathered.

C. Genetic Algorithm For Developing Disaster Management System

Genetic algorithm has been used by application generate initial solution. This algorithm provides the initial solution after taking location as an input for the algorithm. The application works on the basis of concept of geo visualization to provide inputs to the genetic algorithm. It finds points of location, using various tools for sending location via text message. Based on Travelling Salesmen Problem (TSP), distances between locations (from victim to volunteers) are calculated. The application uses genetic algorithm with flow diagram used in it, not having the possibility to detect the failed route in disaster that is a big possibility. It may be possible that any route failure occur by disaster initialization for every disaster. It is sometimes a big problem. So, the application will use genetic algorithm efficiently after removal of possible damaged routes in initial steps before starting the genetic algorithm. In disasters, especially in rainfall triggered type, routes are generally damaged or blocked. These routes are not having important until its re-installation for use.

D. Development of Wireless Sensor Node for Landslide Detection

This framework depends on the remote sensor organize (WSN) that is made out of sensor hubs, entryway, and server framework. Sensor hubs including detecting and correspondence part are executed to recognize ground development. A detecting part is intended to gauge tendency edge and speeding up precisely, and a correspondence part is sent with Bluetooth module to transmit the information to the door. To check the feasibility of this avalanche forecast framework, a progression of exploratory examinations was performed at a little scope earth slant outfitted with a fake precipitation dropping gadget. It is discovered that detecting hubs planted at slant can identify the ground movement when the slant begins to mov

E. Development of Android Application for natural Calamity Management

There are various different types of mobile development environments available in the market. One of which is Android made by the Open Handset Alliance. Android is an open source and comprehensive platform for mobile devices. It is different from other mobile operating systems and designed in such a way that developers, wireless operators, and handset manufacturers will be able to make new products faster and within minimum cost. The final result will be a more easy and more flexible experience to the user. For this reason, the android mobile development environment is used in the implementation of the disaster management system. The people who registered in android mobile app, their information are stored in the database. Once registered, they can view important information in their mobile phones and receive information about the disaster in their area, they can even become volunteer or donate to things to needy people.

IV. JUSTIFICATION

Technology and crowdsourced data have played a role in natural calamity management in multiple instances in India. However, natural calamity management related mobile apps have not yet taken off as a resource among users. Out of 33 freely available natural calamity management related mobile apps in India is very limited. Most of the applications are being educational that is what a person should do when natural disaster occur, a study has said, underscoring the potential of crowdsourcing through Global Positioning System (GPS)-enabled mobile apps in disasters.

Researchers at Keio University, Japan, surveyed the present condition of 33 Android-stage based applications that are explicit to the Indian setting, in view of characterized outreach parameters like the quantity of downloads, client rating, essential and auxiliary capacities among others. The applications are accessible on the official Google play store.

Natural calamities can influence individuals of various districts simultaneously. Most of the humanitarian agencies have thought of getting advantage from the mobiles by presenting natural disasters based applications. These applications are user friendly for different mobile based platforms, including iOS and Android. The applications related to natural disaster, released by the humanitarian agencies, will be very useful to the people and volunteers of the rescue team. The volunteers will get real-time updates on information on the potential natural disaster in a particular area.

When natural disasters occur, the victims can not be able to understand how to tackle such situations. If the people who are suffering got panic, it can increase death rates and injury cases. The disaster management apps have n number of functionalities to help victims.

V. LIMITATION

When ad hoc network is applied for disaster area scenarios then there are some challenges arises. They are modelling mobility, connectivity, broadcasting and routing protocol. Based on the management of routing table, they are categorized in proactive, reactive and hybrid routing protocol. The proactive routing protocols maintain routes to all destinations. The reactive routing protocols maintain only active route means inactive or whose life time is over, route is removed from routing table. Hybrid protocols are combinations of both reactive and proactive. Routing protocol's performance is also measured based on mobility of nodes.

The nature of MANET (Mobile Ad Hoc Network) is it can be used in the context of emergencies as well as when the existing infrastructure is down or severely overloaded. In emergency cases, Ad Hoc networks can be used to deploy small spontaneous

networks quickly. While the nodes are in mobile, the network topology may change rapidly and randomly. The increasing mobility of terminals makes them progressively dependent on their autonomy from the power source.

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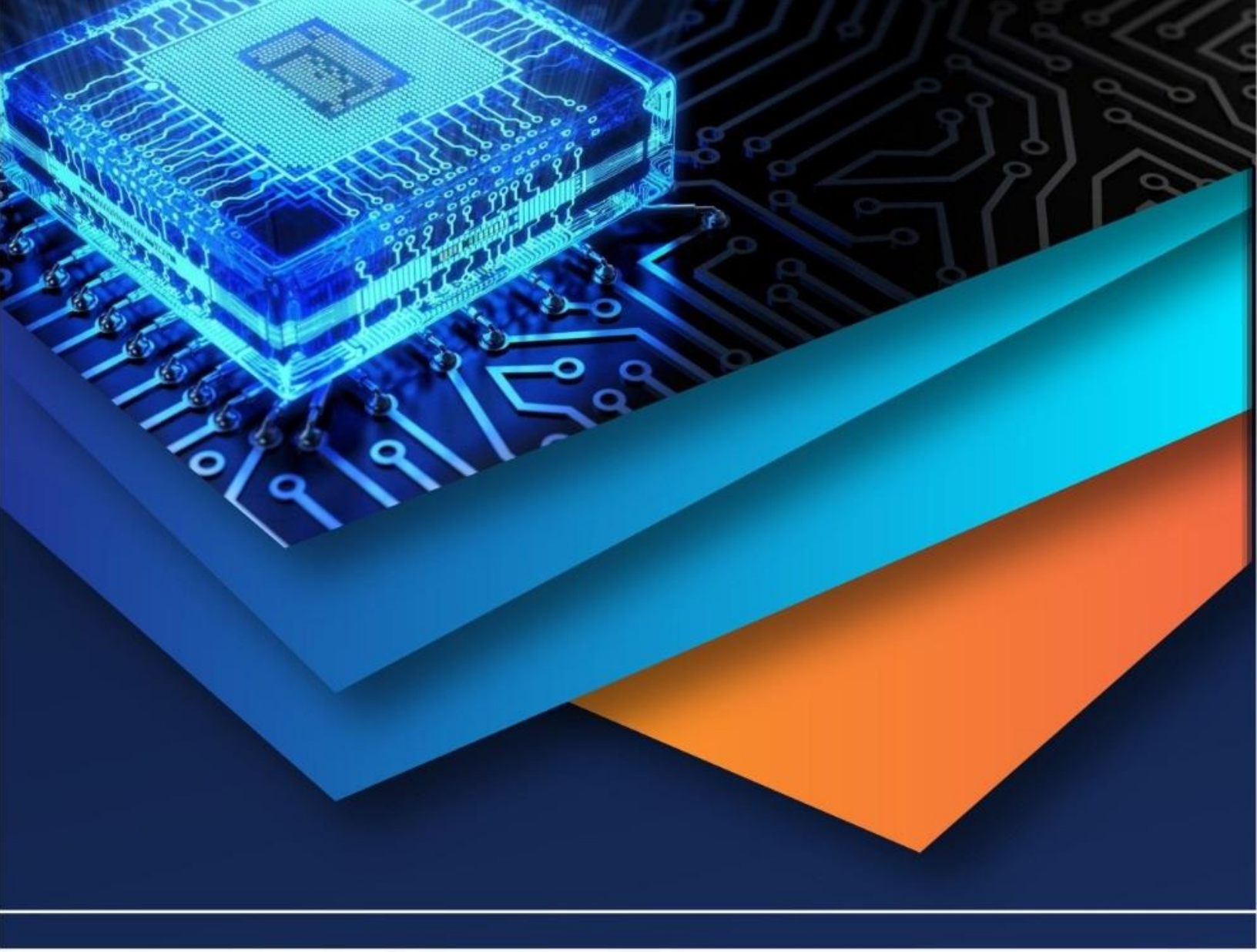

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