



AFTER TREMOR

TEAM- AISY

TEAM MEMBERS

ADITYA SHARMA, YATHARTH KATYAL, SIDDHANT VARMA, IKSHIT BHASKER

IDEA SUBMISSION FOR HACKMSIT-2019

Introduction

India has been visited by a number of large magnitude earthquakes and a recent study suggests the NW region (mostly Uttarakhand, Himachal Pradesh and parts of Kashmir) is ripe for one. The following table shows the history of major earthquakes in India .

Date	Event	Time	Magnitude	Max. Intensity	Deaths
16 June 1819	Cutch	11:00	8.3	VIII	1,500
12 June 1897	Assam	17:11	8.7	XII	1,500
8 Feb. 1900	Coimbatore	03:11	6.0	X	Nil
4 Apr. 1905	Kangra	06:20	8.6	X	19,000
15 Jan. 1934	Bihar-Nepal	14:13	8.4	X	11,000
31 May 1935	Quetta	03:03	7.6	X	30,000
15 Aug. 1950	Assam	19:31	8.5	X	1,530
21 Jul. 1956	Anjar	21:02	7.0	IX	115
10 Dec. 1967	Koyna	04:30	6.5	VIII	200
23 Mar. 1970	Bharuch	20:56	5.4	VII	30
21 Aug. 1988	Bihar-Nepal	04:39	6.6	IX	1,004
20 Oct. 1991	Uttarkashi	02:53	6.6	IX	768
30 Sep. 1993	Killari (Latur)	03:53	6.4	IX	7,928
22 May 1997	Jabalpur	04:22	6.0	VIII	38
29 Mar. 1999	Chamoli	12:35	6.6	VIII	63
26 Jan. 2001	Bhuj	08:46	7.7	X	13,805

The Bhuj earthquake was something of a watershed in Indian disaster preparedness. Several state governments, most so in the Northeast, and various central ministries were shocked into a comprehension of the dangers. However, national capital New Delhi, which is under perpetual latent seismic threat, is blissfully unattended. Neither the local nor the Union government has initiated any measures to protect the city.

It is true that Delhi is unlikely to be at the epicentre of a moderate to large earthquake. The highest earthquake magnitude experienced in Delhi in about a century was on July 27, 1960. It registered 5.6 on the Richter scale. Some buildings in the New Delhi area were partially damaged during that quake. A seismic damage survey, by the Central Public Works Department (cpwd), put the damage at about Rs 5 lakh.

Delhi is located within a distance of 200-400 km from different locations of the mbt. An earthquake over 7.0 in the Shimla to Dehradun/Pithoragarh (or western Nepal) ranges will cause tall structures in Delhi to fall like a pack of cards. And the number of multi-storeyed buildings in Delhi has risen sharply in the last three decades or so. Several hundreds of buildings are at risk from surface waves in case of a quake in the mbt. The threat is compounded by fragile geological formations, total non-observance of Bureau of Indian Standards (bis) norms, poor quality control and, of course, the irregular manner in which maps and structural designs are passed at the municipal level.

The question, though, is: can we hope to achieve seismic safety in Delhi?

Idea

An Android / Web-app which detects and navigates the route to the nearest evacuation spots by evaluating the damage caused to nearby buildings using a pre-trained ML Model due to a detrimental earthquake.

Features of the Application:

The app will display-

- Current location of the user.
- Affected areas.
- Nearest evacuation spots.
- Safest spot where they should rush immediately.
- Quickest navigation route towards the “Safe-Zones”.
- A Social-section of Twitter and Newsrooms, exhibiting a real-time outlook of the on-going situation in order to spread quick awareness among the people post the catastrophe.

Implementation

We can split the Implementation section of this Application into two sub-categories – The Machine Learning Model and the Web based Application.

1. Model :

- For the current implementation of the project, we will be using sample dataset from Kaggle pertaining to the Building Damage post an Earthquake predicting the damage grade for each building nearby our location.
- The Model is a deep learning based feed forward Neural Network model trained using the Tensor-flow DL Framework to obtain an acceptable accuracy for the given dataset.
- The Model is deployed on our web-application through Flask as an API.

2. Web Application :

- An online portal that stores the user’s basic information and displays live updates of relevant catastrophe occurrences around the world. We will use Angular for building the frontend of the app and Firebase as backend.
- Intuitive and simple UI/UX designed using MaterializeCSS will be implemented. The portal tracks the user’s real time location and notifies him/her on occurrence of a nearby earthquake along with its magnitude using an open source geo location API.
- The app displays all nearby evacuation spots or ‘Safe-Zones’ and filters them on the basis of damage caused due to the calamity using the dataset provided.
- It then automatically finds the fastest route to the Safe-Zone and navigates the user to that location using the pre trained Machine Learning Model.
- A sidebar with live twitter and newsroom updates on the ongoing situation will be displayed using twitter’s API and the user can tweet or push updates directly from the app in order to spread awareness and help others in need.

- A self learning chat-bot will also be integrated within the app using Google's DialogFlow that will guide the user about the app, provide relevant information on disaster management drills so as to avoid abrupt panic often created in such situations leading to stampede ad havoc.

Future Prospects

Being a basic prototype, we will be demonstrating this project on a small scale. With the help of required funding along with proper guidance and support, we can add more useful features to this prototype so that it can even be used on a very large scale and be beneficial for citizens of our country.