INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 5, Issue 3)
Available online at: www.ijariit.com

Longitude and latitude based travel route recommendation and disaster management system

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ABSTRACT

The development of the travel industry gradually fosters personalized requirements of tourists, such as setting the start place, exploiting interesting activities and organizing the travel route and also natural disasters. Natural Disaster has threatened mankind since history started. Due to the geographic position and climate change, India is one of the most vulnerable countries to natural disasters. The country also lacks an effective disaster preparedness system to confront natural disasters. Timely disaster warning and evacuation guideline can save the lives of the people. In addition, a tourist may face difficulties in finding the best scenic spots on travel time and a safe area or shelter place prior to the occurrence of natural disasters. For this reason, proposed a location-based early travel route recommendation and disaster warning and evacuation system. The system is implemented as a desktop application. Here propose a system which takes advantage of online website to collect information of both scenic spots and real-world local activities, and proposed methods to recommend travel routes for tourists and also develop a disaster management system, which can take their instant location into account and satisfy their personalized demands. Specifically, extract scenery spots dataset from the shared dataset and popular activities from the online website. Then process these items and take the filtering results as the recommendation for tourists. And user registers on the server to get automatic notification of upcoming disaster otherwise user gets a manual notification. The user gets the updated data by the current position obtained by longitude and latitude. When our application recognizes the user in probable disaster zone then the application will disseminate visual disaster warning and evacuation guideline including the shortest path of shelter or safe zone on the map of the application.

Keywords— *Longitude, Latitude, Places of interest, Disaster management, Evacuation alert*

1. INTRODUCTION

Nowadays travel route recommendation and disaster management play an important role in the day to day life of tourists. Here focus a trip planning and intend to discover travel route with respect to the photos shared or comments provided in the social media (example: Facebook, Flicker). And also a disaster management and evacuation system by using the longitude and latitude of the user's current location.

Travel route planning is an important step for a tourist to prepare his/her trip. Route recommendation has to take several factors into consideration to emphasize the unique travel factors of travel routes, the user POI [1], cost, seasonal preference, time preference of visiting locations such details are combined and the package is mined results is given to the Users and in addition, refine the results and rank according to Personalized Recommendation system. With the popularity of social media (example: Facebook and Flicker), users can easily share their check-in records and photos during their trips. In view of the huge number of user historical mobility records in social media, the aim is to discover travel experiences to facilitate trip planning. When planning a trip, users always have specific preferences regarding their trips. Instead of restricting users to limited query options such as locations, activities, or time periods, consider arbitrary text descriptions as keywords about personalized requirements. Moreover, a diverse and representative set of recommended travel routes is needed. Prior works have elaborated on mining and ranking existing routes from check-in data. To meet the need for automatic trip organization, claim that more features of Places of Interest (POIs) should be extracted. Therefore an efficient Travel Route Recommendation framework that uses users' historical mobility records and social interactions.

Natural Disasters have threatened mankind since history started. Due to the geographic position and climate change, India is one of the most vulnerable countries to natural disasters. The country also lacks an effective disaster preparedness system to confront natural disasters. Timely disaster warning and evacuation guideline can save the lives of the people. In addition, a tourist may face difficulties in finding a safe area or shelter place prior to the occurrence of natural disasters. In disaster-prone areas Early Disaster Warning and Evacuation System is very common disaster management approach. Now a day's mobile phones play an important role for disaster management in many ways: monitoring, communication, warning dissemination, evacuation and rescue and relief

aid. Moreover, the approach of smartphones supporting GSM [10] functions beneficial in disaster management. Until now many researchers have conducted a decent number of researches about early disaster management system.

2. RELATED WORK

Yu-Ting Wen, Kae-Jer Cho, Wen-Chih Peng, Jinyoung Yeo and Seung-won Hwang proposed a Keyword-aware Skyline Travel Route system [1]. This system develops a Keyword-aware Skyline Travel Route framework to retrieve recommended travel route where keyword means the personalized requirements for the users have for the trip. The travel trajectories are related to all or partial user preference keywords and are recommended based on the attractiveness of the POIs, visiting the POIs at their corresponding proper arrival time and the route generated by influential users. Here a novel keyword extraction module to identify the semantic meaning and match the measurement of routes and design a route reconstruction algorithm to aggregate trajectory segments into travel routes in accordance with query range and time periods. Leverage score functions for the three-dimensional features and adapts skyline search for travel route recommendation instead of the traditional top-k system. In Diversified Trajectory Pattern Ranking in Geo-Tagged Social Media [2] extract trajectory pattern from geo-tagged photos proposes a ranking strategy considering trajectory, location and user and using sequential pattern mining. Here to discover the representative trajectory patterns it uses an exemplar-based algorithm. In this Zhijun, Liangliang, Jiawei, Jiebo and Thomas investigate how to rank the trajectory patterns from uploaded photos with geo-tags and timestamps. Here ranking the mined trajectory patterns and diversified the ranking result and finally, use an exemplar-based algorithm to diversify the results to discover representative trajectory patterns.

Imran, Ling, Abdul, Mingqi, Ibrar and Gencai [3] recommendation for tourist locations from geotagged social media for travel recommendation. This method applies a collaborative filtering and context rank by obtaining tourist preference with user's publically contributed photos and take current user for recommendation system for tourists. Exploiting Geographical Influence for Collaborative Point-of-Interest Recommendation [4] aim to provide a point-of-interest recommendation for location-based social networks. For deriving user preference based on user-based collaborative filtering and exploring social influence from friends then a special emphasis on geographical influence due to the spatial clustering exhibited in user check-in activities of location-based social networks. Here a collaborative recommendation algorithm based on geographical influence based on naïve Bayesian is introduced and a unified POI recommendation framework fuses user preference to point-of-interest with geographical and social influence. Yu-Ting, Po-Ruey, Wen-Chih and Xiao [5], a social influence-based user recommendation framework is used to discover the potential value from reliable user and claim to capture the interaction among virtual communities, mobility activities and time effects to infer social influence between users and model a diffusion-based mechanism and design a dynamic fusion framework to integrate features mined into a united follow probability score. The SIR provides personalized top-k user recommendation for individuals.

Photo2Trip: Generating Travel Routes from Geo-Tagged Photos for Trip Planning [6] is used to leverage existing travel clues from geo-tagged photos to suggest a customized travel route depending upon the user's preference. Based on the information gathered from geo-tagged photos it is easy to provide a customized trip plan for travellers. Travellers are also enabled to specify personal preference in an interactive way to guide the system. T.Siva Sankar, Dr.N. Kotheswaramma and B. Lakshmi [7] proposed an efficient keyword-aware representative travel route recommendation system. This system focuses on trip planning and to discover travel experiences from shared data in location-based social networks. In this the user can provide the total travel time and also can submit the query and the user's preference is based on the keyword. The KRTR system is used to retrieve recommended routes. The route dataset is built from low-sampling check-in records. K-Zin and Myint proposed an effective evacuation route strategy during a natural disaster [8]. This system is developed to solve the problems faced by the rescue teams during a disaster. In this system which verifies the location of the disaster area and locates the nearby rescue team and the safe evacuation route from the disaster location to safe places. Khandaker, Tauhidul and Mahfuzulhoq develop a location-based early disaster warning and evacuation system on mobile phones using OpenStreetMap [9]. This system is developed as a mobile application. This disaster management system provides audio and visual disaster warning and evacuation route map if the user is on the disaster-affected area. The visual and audio disaster warning helps both the normal and the blind people to go to the safe area. Disaster Management System on Mobile Phones using Google Map developed by Varsha [10] is a disaster management system developed as an Android application which uses google map. This system provides an evacuation help if the user is in disaster-affected area considering the user's current location.

3. PROPOSED SYSTEM

Travel route recommendation and disaster management and evacuation system play an important role in tourists. The proposed system consists of the administrator and the user. The administrator has the power to add tour packages, gallery, and an important is to provide a travel route based upon the photos liked and commented by the user. The route recommendation is based on the current longitude and latitude of the user when he/she is currently logged in. The travel route is provided from the current location. The next important advantage of the proposed system is the disaster management and evacuation system. The administrator provides a detailed warning and the details about the disaster area and also the evacuation route for the users who are currently logged-in from the disaster area. The disaster warning is sent as an SMS to the registered users. The user can log-in and view the evacuation route from the current location. The travel route and the evacuation is based on the longitude and latitude provided by the user. The distance calculator is used to find out the distance from the users current location and based upon the evacuation route is provided. The user can provide the longitude and latitude at every time he/she is logged-in. Then the user can find friends, send requests, share photos, like and comment on the photos shared by his/her friends. Based upon this, the administrator provides or recommend the nearby travel location. And also if any disaster occurs in the current location of the user administrator provide an evacuation alert and nearby evacuation route.

3.1 System model

The system framework mainly consists of the two parts, the administrator and the user. All the actions are controlled by the administrator. The administrator has the power to approve the registered user and only the approved user can further logged-in. The

administrator provides the route recommendation and the evacuation route. The evacuation alert is provided as an SMS format to the registered mobile number of the user. The figure 1 shows the general architecture of the proposed system.

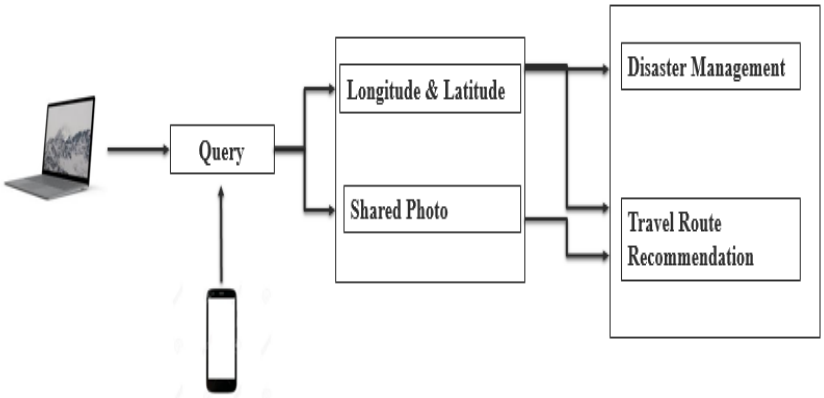

Fig. 1: General architecture

The user can log in through the computer or through mobile. It can be used as a computer application as well as a mobile application. Depending upon the query provided the user can log in and at the same time the current location of the user is sketched and depending upon the location the longitude and latitude is identified and also the comments and likes of the shared photo, the administrator can recommend the travel route from the current location and the disaster warning and the evacuation route is provided.

The proposed system is intended to provide the best travel route and evacuation route for people during travel. According to the complex structure and absence of the best evacuation route guiding system, there are many difficulties in many developing countries. A system is important for evacuation processes and travel route, to provide the emergency facilities and the best scenic spot, to bring the people from different places and the disaster-affected area to the safe places. To provide the best scenic spot and save valuable lives and properties, the emergency alert and route are needed to reach from the hazard area as fast as possible. Effective respond actions and evacuation processes are a vital role during a natural disaster. The proposed system will provide the longitude and latitude based travel route recommendation and hazard location and the best evacuation route calculation by using our proposed modified method. Overview of the proposed system is described in figure 2.

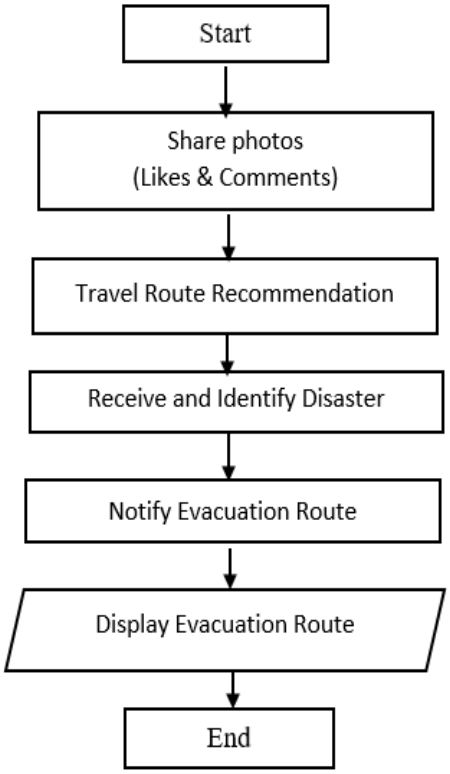

Fig. 2: System overview

4. EXPERIMENTAL RESULT

The system is implemented using Java which is both a programming language and a platform. It is a web application which has a user module and admin module. The graph given below is drawn based on the number of users logged at a different time and the authentication of the admin. In the x-axis denotes login time and in y-axis denotes the number of users who are entered in different login time. The authenticated user can log in to the corresponding login page. The non-authenticated users cannot access the user profile. When a user registered then the details sends to the admin, the admin has the power to approves or reject or pend the user request. If the admin accepts the request then the user login to the user profile. If the admin rejects or pend the request then the user cannot log in to its profile. The figure 3 shows the status of the user.

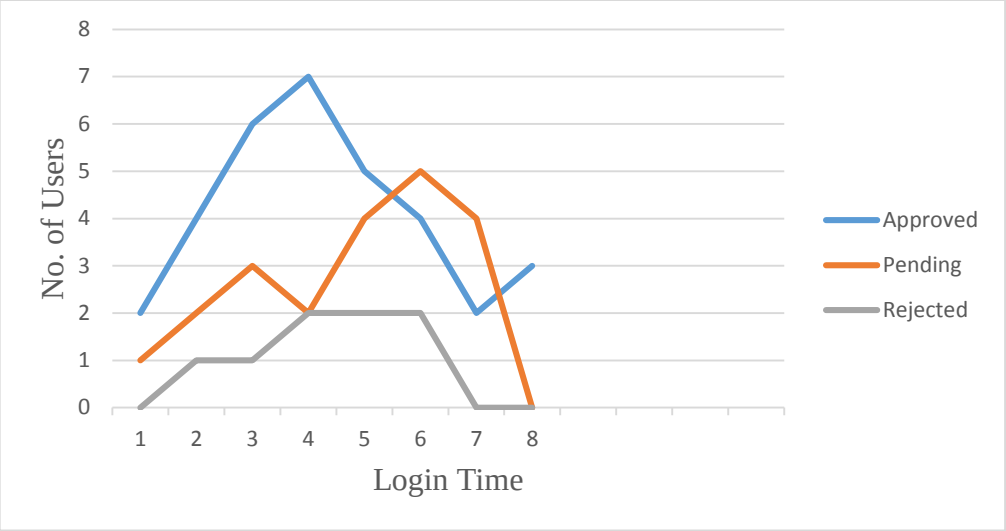

Fig. 3: Status of the user

The blue colour represents the status of the approved user. The orange colour represents the pending user and finally, the grey colour represents the users who are in the rejected state. When the login time is 1, then the number of an approved user is 2, a number of a rejected user is 0 and the number of a pending user is 1. When the login time is 2, then the number of an approved user is 2, a number of a rejected user is 1 and the number of a pending user is 2 and so on.

When an authenticated or approved user is logged-in with the appropriate username and password, he/she can view its own profile page including different operations and the Facebook like a timeline. There the user can share, like or comment different images and based upon this data the user can view the recommended travel place and the nearest route to reach theirs depending upon the current location of the user. The figure 4 shows the recommended travel route of a user based on the comments, shared or liked images.

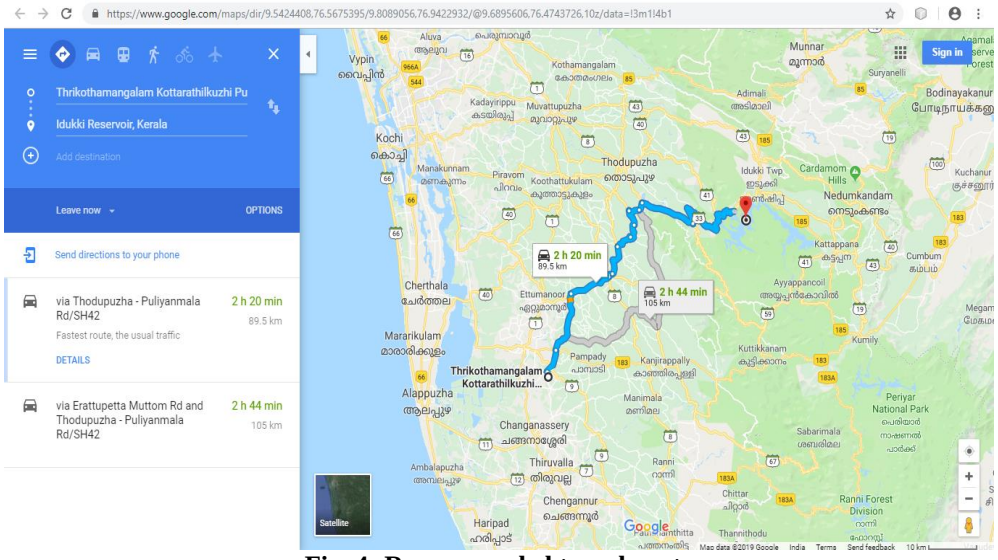

Fig. 4: Recommended travel route

The figure 4 which shows an image of the recommended travel route of a user who is logged in the application from the current location. Here the user's current location is found out using the longitude and latitude. Whenever a user logged-in the latitude and the longitude is changed, which is stored at the database. In the figure above the user is logged-in from the district Kottayam and the shared or commented image is the place which is similar or an image of the place in Idukki. And then click on the recommended travel route link provided in the user's timeline than can reach idukki. The route which is shortest to the user is recommended by this system. The one of the main advantages of this system is the above travel route recommendation and the second is the disaster warning and the evacuation route when a disaster is happened or occurred at the current location of the user.

Natural Disasters have threatened mankind since history started. Due to the geographic position and climate change, India is also lacking effective disaster preparedness system to confront natural disasters. Timely disaster warning and evacuation guideline can save the lives of the people. In addition, a tourist may face difficulties in finding a safe area or shelter place prior to the occurrence of natural disasters. In disaster-prone areas Early Disaster Warning and Evacuation System is very common disaster management approach. When a user is logged-in the longitude and latitude are marked or saved in the database. When the system provides a detail of the disaster and the affected region is noted and the kilometres affected is saved. Then the system automatically checks the details of the users who are logged-in around the disaster area. Then the system sends a warning message to the user's profile. The figure 5 shows the warning message.

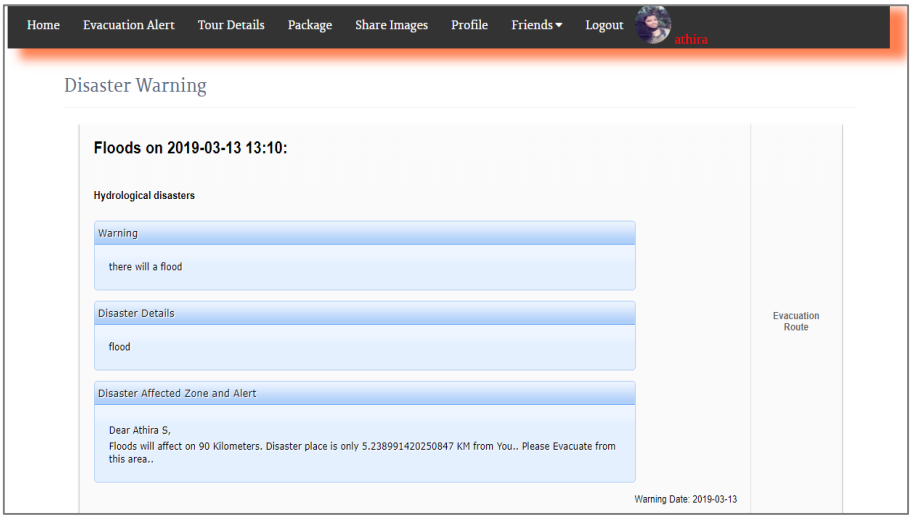

Fig. 5: Disaster warning

The disaster warning which consists of the full details of the disaster which is going to occur. The disaster details such as which type of disaster, disaster occurring time and date, affected area from the current location and the evacuation route link from the current user's location using longitude and latitude. When clicking on the link provided in the warning message it is directed to another page which consists the details of the evacuation route. The figure 6 shows the evacuation route details.

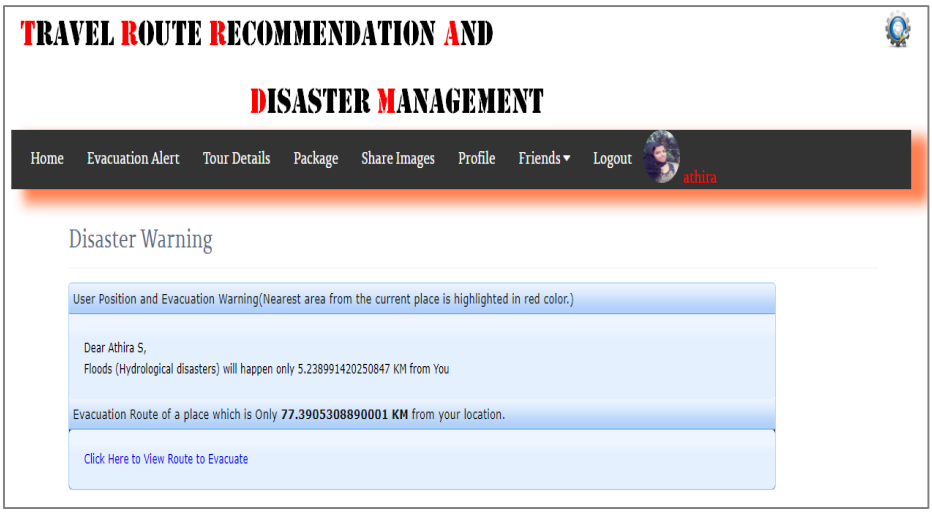

Fig. 6: Evacuation route Details

The evacuation route details which provides the detailed description of the evacuation route map, disaster details such as type and affected region in kilo meters from the user's location and the distance of the evacuation route from the current location and finally evacuation route. The figure 7 shows the evacuation route. The user logged-in from the Kottayam district and the disaster occurred there is a flood. The details about the affected region, date and time are provided. Then the system provides the nearest evacuation place from the current location. Here the evacuation place is at Kollam and the figure which shows the shortest route from Kottayam to Kollam. The route is denoted in blue colour and the destination point is marked as red. And the route description is also provided in the figure.

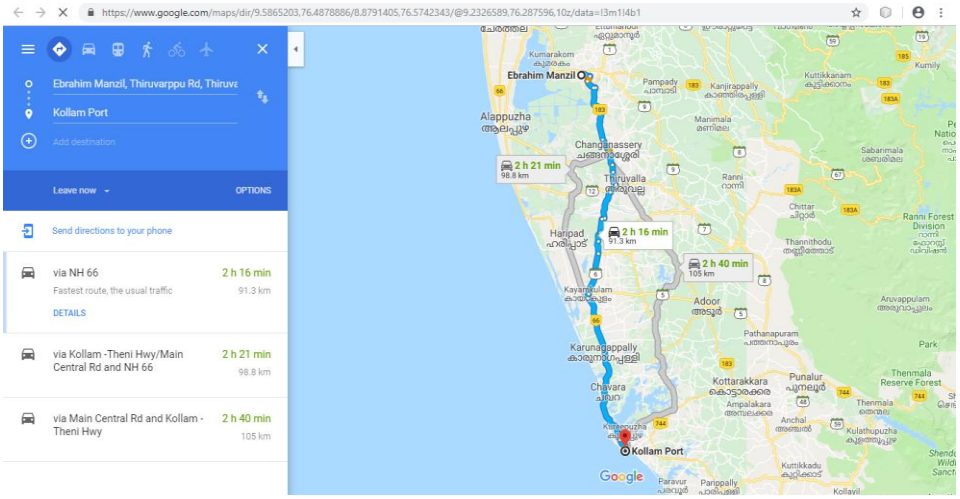

Fig. 7: Evacuation Route

Finally, the system sends a disaster warning to the user's registered mobile number. It is just a text message format. The figure 8 shows the text message format of the disaster alert.

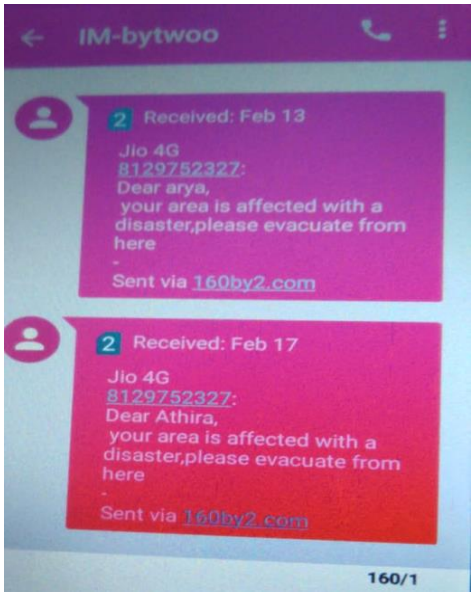

Fig. 8: Disaster alert

5. CONCLUSION

The travel route recommendation and disaster management using longitude and latitude are important for the day to day life of the travellers. This system not only acts as a trip advisor but also provides the travel route recommendation and evacuation alert if any hazards occurred in the user's checked-in place. The recommendation of the travel route is based on the records provided in the user's profile. When a user is logged-in then he/she provide the current location by providing its current locations longitude and latitude, this data is stored in the database and at the time of hazards occurring at that particular place then the system checks whether any user is logged-in that location and send an evacuation alert to the profile and send a text message to the user's registered mobile number. The travel route recommendation in the system is based upon the likes, comments, and the photo's shared by the user in the user's timeline or friend's time. Based upon this the travel route from the user's current location is provided, this is one of the advantages of this system. Another advantage is the evacuation route and the evacuation alert send to the user's profile and the mobile.

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