International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Humanely - A Social Media Platform for Emergency Alerts

Pranjal Chaudhari[1], Abhishek Gupta[2], Rupal Handoo[3], Garima Gupta[4], Manish Parmar[5]

[1]Young Professional, Sardar Patel Institute of Technology, Andheri West, Mumbai, India

[2]Young Professional, Sardar Patel Institute of Technology, Andheri West, Mumbai, India

[3]Young Professional, Sardar Patel Institute of Technology, Andheri West, Mumbai, India

[4]Student, Sardar Patel Institute of Technology, Andheri West, Mumbai, India

[5]Profseeor, Teaching faculty, Sardar Patel Institute of Technology, Andheri West, Mumbai, India

Email: [1]pranjalchaudhari99[at]gmail.com, [2]abhishekgupta97023[at]gmail.com, [3]rupalhandoo[at]gmail.com, [4]garima.gupta[at]spit.ac.in, [5]manish_parmar[at]spit.ac.in
Contact:[1]7506133234,[2]8286540972, [3]9971556906, [4]8291403220,[5]9769113373

Abstract: ***Natural disasters have impacted more than 2.9 billion people and cost close to $1.7 trillion in the last ten years. Apart from such natural calamities, we have observed that in recent times there also exists a disregard for a variety of socioeconomic challenges. As a result, we've encountered several tragic cases of severe emergencies that have had a significant impact on the environment as well as human lives. The management of these emergencies is the responsibility of numerous public and commercial organizations. Thus it's a tough job for government authorities to reach out to every person who might be a victim of any of the above situations. To tackle this problem, via this paper, we propose an app/web-based social media platform dedicated to resolving a social issue in the event of any serious (and often dangerous) situation requiring immediate action and assistance. We have implemented this system for quick response time by employing dynamic location-based notifications and effective Machine Learning (ML) image classification for posts.***

Keywords: Sentiment analysis, Machine Learning, Crisis Management, Emergency Alert System

1. Introduction

With an ever-changing landscape of social networking, there are currently over 4 billion social media users and the count is ever increasing. In this era of digitization and urbanization, we witness how social media sites have emphasized and changed how people socialize and connect with others from all over the world in the present modern environment. While their interface and application might be different but the main goal of these platforms has always been to get as many DAUs (daily active users) as possible. Advertisement, as well as consumer validation and support, are the cornerstones of their marketing tactics. Social media platforms have been used for a wide range of applications, including video sharing, photo sharing, micro-blogging, and so on. However, similar platforms could be effectively used for other purposes, such as emergency warnings.

A crucial question arises here as to why use Social Media for Crisis Communications. Well, it is worthwhile to note that citizens not only use social media platforms to pass their time and converse, but they also expect to receive breaking news from around the world. According to Insignia Communications, social media is changing the way customers learn about breaking news because it is typically shared on social media and can reach people in different regions of the world more quickly. It is also commented on by active social media users, who share the content with others. Around 60% of the citizens report that they get their news from social media.

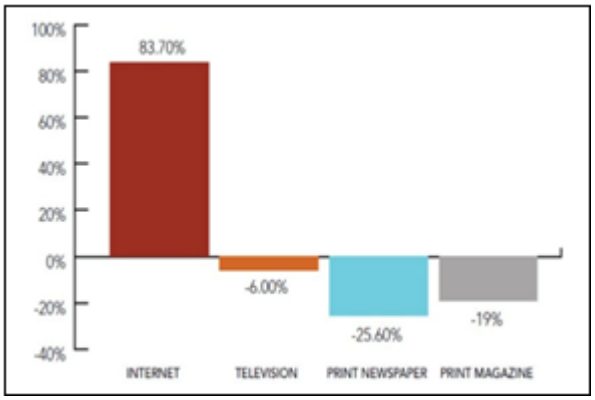

Figure 1: Time spent per day on different media Between 2010-2014 [1]

By observing the overall trends, as displayed above in Fig. 1, we can see that the Internet has become the most widely used of all the selected media. Journalists too are now examining social media news and generating information for their use. According to Insignia Communications (England-based reputed consultancy), 77 percent of journalists believe that social media makes it very easy for them to learn about future trends, and the same percentage believes that social media is essential for faster news coverage. We can't predict disasters, but we can prepare for them ahead of time. By incorporating social media into our emergency alert plan, learning key social networks, and utilizing instruments and technologies to expand multi-channel communications, we will be well positioned to keep users/citizens updated if a disaster and/or an unexpected event occur.

During an emergency, because of the vast number of people who are involved and affected, a social media site may help broaden the scope of an outgoing message as a result of continued sharing. The proposed system can be used for answering, asking, and providing updates as an open communication tool for residents. During an unprecedented emergency, social networking environments will aid emergency response management to monitor and track what is happening in real-time during an occurrence via social media comments.

2. Literature Survey

Currently, the preexisting emergency applications have been developed only on android-platform which have features like SOS contacts, emergency helpline numbers, GPS-based tracking systems, sim card detection, and hardware-incorporated alert systems. In the US, the only security app that gives you instant access to authenticated 911 information is an application called 'Citizen' where you are informed on what's going on as it happens i.e. real-time information sharing of fires and thefts to lost animals and natural disasters [2]. Other such platforms built in China include 'Emergency help-seeking, risk early warning, and one-touch SOS platform based on the mobile terminal,' which have inspired us to follow the ideology of 'Two-way interaction and support,' which allows the end-user to release help-seeking information to seek or provide help [3]. There also exist apps like ReachICE (an Australian app) that include a function where if the user has set up Facebook and push notifications via ReachICE, the system will also publish a message on the user's Facebook wall asking for help along with specifying the location [4]. All social media platforms now employ the most advanced false news detecting algorithms and security mechanisms. Fake news has had such an impact on society that it even influenced the 2016 US presidential election. There is our project, a Machine Learning model was used to classify bogus news using a combination of sentiment analysis and network metadata. Conversely, social networking sites such as Twitter, Reddit, and others may be able to construct prediction models by detecting trends in the sentiment of comments and real-world situations. Using a POS (Part of Speech) tagger and comparing its output to the complete corpus, it is possible to train classifiers based on POS tags such as adjectives, adverbs, and verbs. [5]

3. System Requirements

Having done our literature survey of existing models and apps in this domain, we moved on to creating our system. In this, a user will access the platform using a mobile application that will be developed using Flutter. Flutter is a reactive cross-platform application development framework developed by Google. The application program is written in dart when using Flutter in contrast to Java or Kotlin when developing native apps using Android SDK.

Flutter was chosen as it considerably reduces the time to develop apps that are mostly UI-based that don't need a lot of on-device processing like games or native APIs such as Bluetooth, accelerometer, etc. Using platform channels supported by flutter, the minimal native features that are still needed can be programmed. Flutter was a good fit for us because our app operates as a thin client to the back-end, which conducts the majority of the work. Flutter appeared to be the most adaptive cross-platform API when compared to other cross-platform APIs like React Native.

To construct our application, we are making use of Clean Architecture, which incorporates excellent software techniques such as dependency inversion. This gives software applications the freedom to change dependencies like the libraries, classes being used to be easily swapped, and so on over the entire life cycle of the software.

4. Proposed Solution

Based on the specified system requirements we moved on to the creation of a software application for users of social networking sites in case of serious incidents. This solution comprises the following:

1) Provision to seek help from people nearby their location:
   a) Posting a help-seeking request on the platform that includes any serious, unexpected, and often dangerous instances that need immediate action and help. The requesting post may include:
      - A short description
      - Location in real-time
      - A multimedia attachment in any format and/or
      - Any extra details that are required to prove the authenticity of a help-seeking request
   b) Sending a notification to the neighboring system users in a specified Geo-fenced radius via an SMS or real-time notification
2) Provision of providing help to help seekers/people in need
   a) Reading help-seekers posts from feed, notifications, or by any other means (forwarded/shared post of the app)
   b) Hinting a willingness to provide aid wherein users can signal their approval or support for a post
3) Provision for checking the authenticity of posted news
   a) Local Users can support a post or signal their approval utilizing up-votes, comments, or any additional attachments
   b) Posted information can be classified as real or fake based on the sentiments shown by the users. The analysis of this can prove to be a support system for news agencies and authorities as well.

5. Functionalities

Having done all the necessary groundwork for survey and solution creation and modification we moved on to building our application. In this section, we will look at an app created in a screen-wise manner i.e. go through a user journey while noting it is working and understanding the different features presented.

a) Login:

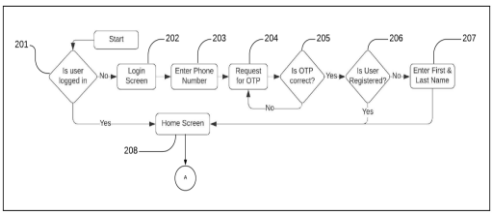

Figure 2: Login Flowchart

A user must be logged into the app to access the contact logger and authentication services. Because privacy is a primary concern in such applications, the user is only requested to provide minimal information. The user's name and phone number are used as input credentials and they are safely kept on the Firebase authentication service.

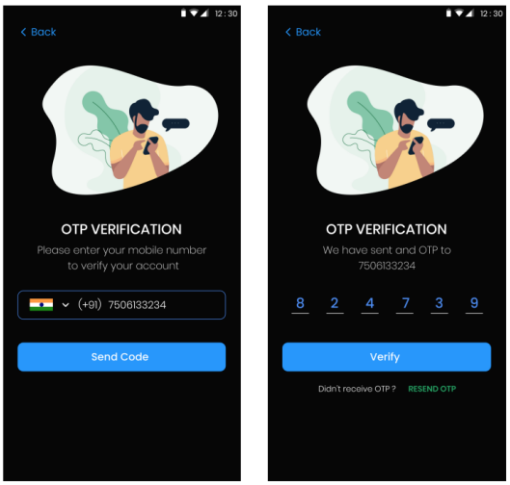

Figure 3: Left: Enter phone number.
Right: Enter OTP

b) Home Screen:

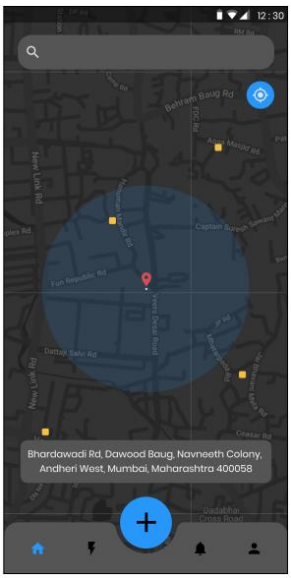

Figure 4: Home Screen: Google Map

- Geo-fence: This allows users to see what's happening around them along with where it's happening in their vicinity.
- All the help-seekers would be visible on the map in one's region about a particular radius.
- Feature to turn on protection alerts where when someone matters to the user, the user can get alerts in real-time.
- Contribute to help fix a crisis, when one can.

c) Explore:

App Users can post here with the following fields:

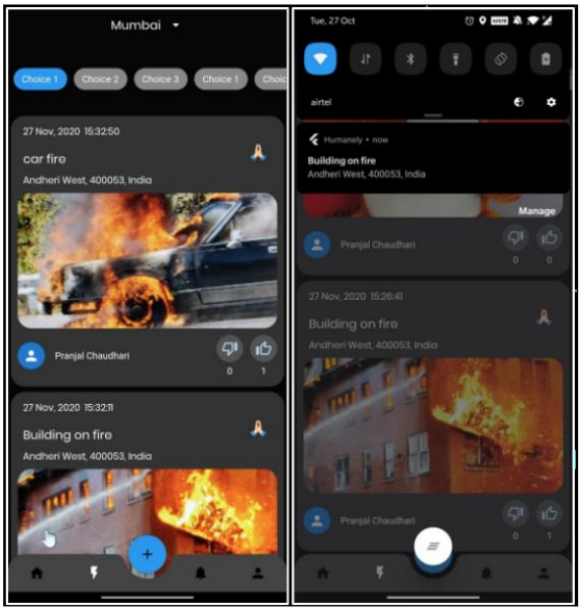

Figure 5: Explore Screen

- The help-seekers according to the category (through tags) of the emergency can click and post a request for help.
- The post shows the distance from their location to the spot where the unfortunate incident occurred.
- The help provider can also notify the people in their area (either their contacts or anyone in an area while traveling or so) to save their time and life.

d) Profile

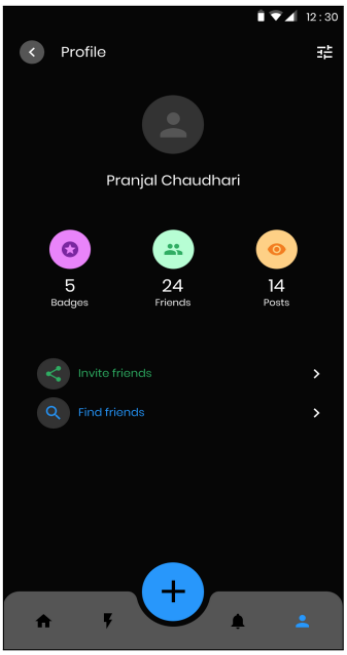

Figure 6: Profile Screen

Via this, a user can connect, keep an update, or notify their family members, friends, and acquaintances of whatever situation they may be facing. This can be done in either one of the three ways available, namely:

a) Friends: The people who are already connected in the user's network to whom they can send notifications in times of emergencies.
b) Connect: The user can connect with other people on the application who are users; irrespective of the location the user currently is in.
c) Add Friend: The user can invite contacts on their phone to download the application.0

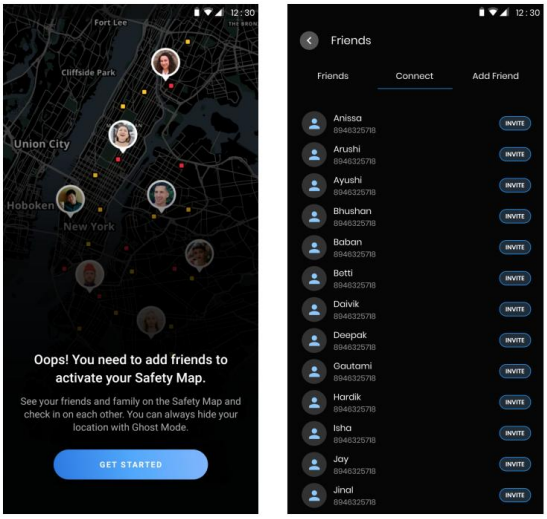

Figure 7: Left: Getting Started to add friends. Right: To all contacts using Humanely and be able to invite the non-users

e) Add post:

Firebase ML Kit, Image Labeling: Using the inbuilt labels for image classification provided in the ML kit of the Firebase, images clicked during the post can easily identify the objects in the image taken by the user through the application. All the captured image tags with maximum accuracy are taken to ensure that the text description and title match the image.

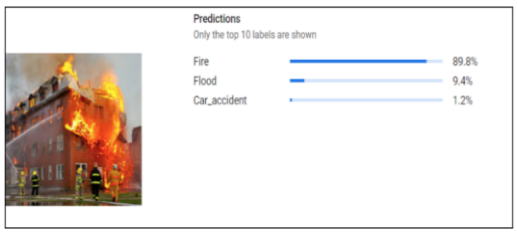

Figure 8: Firebase Auto-ML for Multiclass Image Classification

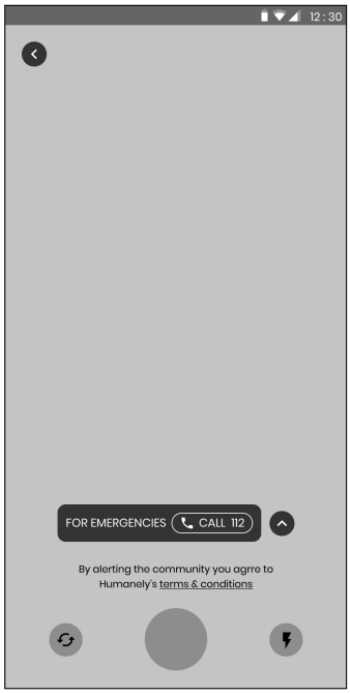

Figure 9: Camera Screen: To add a new post

6. Privacy & Security

The program and software were created to place a high priority on user security and privacy. The application communicates with the back-end using HTTPS protocol, which implements HSTS [19] for an extra degree of protection. The application allows users to log in using a One-Time Password (OTP), intending to reduce attack vectors by invalidating OTPs over time and enforcing API call restrictions. Sanitizing all user requests further reduces the possibility of remote code execution and injection. To reduce the danger of Broken Access Control, the program also enforces object-level access rights throughout the system [17][18]. The Firebase ML Kit Image Labeling functionality provides a feature to add tags and identify objects in the image and thereby preventing fake and random spam posts. An SHA 256 hash is used to keep the user's location history without referencing the user and is used to confirm the user's promise to update the location history object in the future. The software created strictly implements a tamper-resistance feature for the posts backed by secure GCP cloud services used.

7. Experimental Analysis & Results

The two major reasons for developing the app in the dark theme are as follows.

Firstly, Battery Saving:By using Dark Mode, the battery life of smartphones can be improved. Google figures have shown that the battery life on OLED screens has been a big help. For example, the dark theme YouTube app saves about 15 percent screen power at 50 percent brightness compared to a flat white backdrop. OLED displays are primarily used by Android phones and iPhone users have also received positive news recently. Since Humanely is a social media platform for emergencies requiring communication protocols, Location, and notification services, battery saving

is one of the important concerns too. Hence, the dark mode was chosen for the UI and better UX (User Experience).

Secondly, Amazing UI (User Interface): The dark mode looks amazing and has been in trend. It offers something distinct and enticing that feels mysterious and fresh. It offers great opportunities for graphic content such as graphs, images, dashboards, pictures, and the use of bright colors to be displayed.

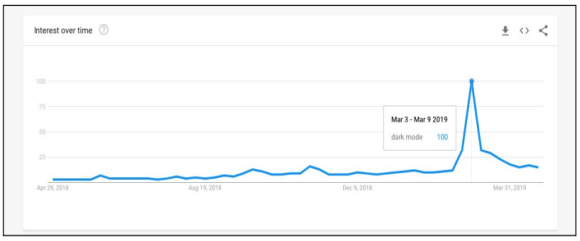

Figure 10: Interest in "Dark mode" over time
As per Google Trends, 2019

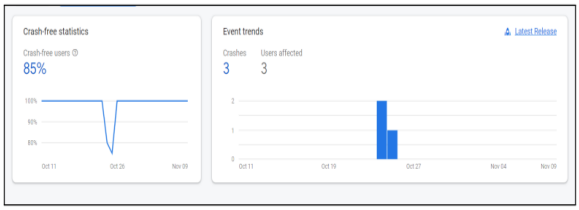

Figure 11: Firebase Crash Analytics

8. Future Scope

Today, social media is one of the most creative technologies. For each of us, it has become extremely necessary and ingrained in our lives, with a unique blend of benefits and drawbacks. Today fake news is prevalent and a major subject that causes concern all over the world. Therefore, designing an algorithm with the highest possible accuracy would be a revelation and it would have a significant impact on both the prevalent social issues and the current political scenario. Since social media can be conveniently approached, has a subsidized cost, and is easily accessible—only a click away, social media along with online news articles act as a significant source of news and data for individuals. However, it also has some detrimental consequences, such as no oversight over the source or the credibility and validity of the opinions being advocated. The app created (Humanely) will help to prove the authenticity and truthfulness of a posted news on our platform using sentiment analysis i.e. by user's comments and the number of up-votes and down-votes gained as the locals are the ones to witness the news and prove its authenticity in real-time.

9. Conclusion

Social networking platforms may have looked like interactive toys for teenagers ten years ago, but today the overwhelming acceptance of social media usage has turned these platforms into a viable contact network for reputable organizations and institutions. There is at least one social networking profile for 81\% of the population as of 2017. Our method will be helpful to locals in case of any critical, unforeseen, and frequently dangerous circumstance demanding immediate action and help as the number of netizens grows day by day.The software offers a variety of use cases and the ability to be integrated with current systems and emergency data sources in the future to keep online users updated on local events and offer assistance.

References

[1] The Importance of Social Media in Crisis Communications (accessed on 10 August 2020) (https://www.civicplus.com/civicready/crisis-communications-guide)
[2] Citizen App (accessed on 2 July 2020) (https://citizen.com)
[3] Emergency help-seeking, early earning, and one-touch SOS platform (published on 25 August 2017) (https://patentscope.wipo.int/search/en/detail.jsf?docId=CN204757074)
[4] ReachICE App patent (published on 24 August 2017) (https://patentscope.wipo.int/search/en/detail.jsf?docId=AU203568462)
[5] Sentiment analysis of Reddit (accessed on 10 August 2020) (https://ehnree.github.io/documents/papers/reddit_sentiment_analysis.pdf)
[6] Government Responses (accessed on 10 August 2020) (https://https://www.loc.gov/law/help/social-media-disinformation/india.php_ftn8)
[7] Schoning J, Rohs M, Kr□uger A and Stasch C. Improving the communication of spatial information in crisis response by combining paper maps and mobile devices. Springer: Berlin, Germany, 2009; Vol 5424, pp. 57-65.
[8] Manoj B.S and Baker A.H. Communication challenges in emergency response. Commun.ACM 2007, 50, 51-53.
[9] Turof M. Past and future emergency response information systems. Commun. ACM 2002, 45, 29-32.
[10] Mills A, Chen R and Lee J. Web 2.0 emergency applications: How useful can Twitter be for emergency response?. J. Inf. Priv. Secur. 2009, 5, 3-26
[11] J. Therese, B. Fajardo, and C. M. Oppus. A mobile disaster management system. International Journal of Communications, vol. 3, issue 3, 2009.18
[12] M. Modsching, R. Kramer, and K. T. Hagen. Field trial on GPS accuracy in a medium size city: The influence of built up. University of Applied Sciences Zittau/G~Arlitz, Germany.
[13] Ualert App patent (published on 10 October, 2016) (https://patentscope.wipo.int/search/en/detail.jsf?docId=CA179265653)
[14] FEMA App (accessed on 12 July 2020) (www.fema.gov/mobile-app)
[15] Emergency Alert App (accessed on 16 July 2020) (http://emergencyalert.alberta.ca/content/about/mobileapp.html)
[16] Emergency and risk management case study (accessed on 18 July 2020) (http://training.fema.gov/EMIWeb/edu/emoutline.asp)
[17] OWASP- The Ten Most Critical Web Application Security Risks (https://wiki.owasp.org/images/7/72/OWASP_Top_10-2017_%28en%29.pdf.pdf)

[18] Attribute-based access control for APIs in spring security (https://dl.acm.org/doi/pdf/10.1145/2613087.2613109)
[19] J. Hodges, C. Jackson, A. Barth, HTTP Strict Transport Security (HSTS), November 2012 (https://www.hjp.at/doc/rfc/rfc6797.html)