

# GoSafe: A Safety and Real-time Emergency mediator System between Police officials and Citizens of India

Shreyas Patil<sup>1</sup>, Piyush Rajput<sup>2</sup>, Jagruti Patil<sup>3</sup>, Manisha Yemul<sup>4</sup>, Prof. A. J. Patankar<sup>5</sup>

<sup>1-5</sup>Department of Information Technology Engineering, D. Y. Patil College of Engineering, Akurdi, Pune-44, Maharashtra, India

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**Abstract** - Nowadays, if we ever caught in a dangerous or emergency situation there is no system for real-time crime reporting in India as in the existing system we need to dial a call (100 or 112) to report the crime. This system has more disadvantages as it does not guarantee the authenticity and perfection of information. Though it's not much helpful. We have proposed a solution by which citizens can raise issues in real-time and also can know about the availability of security assets in the nearby area. Thus, users will not need to dial phone call instead they can report status with a single click. The aim of this project is to provide hassle-free services to citizens as well as police by providing them with an easy user interface by which they can interact with each other. Thus, this solution will overcome the problems which are faced by the existing system.

**Key Words:** Online Police, Realtime System, Emergency Alert, Emergency Report, Crime Management, Safety system, Incident report, GIS

## 1. INTRODUCTION

The population of India is rapidly increasing and simultaneously crime rate is also increasing. Nowadays, crime is one of the biggest issues for a country like India. In India, Rape is one of the most common crime against women[1]. Also, crimes like Murder, Robbery, etc are common scenarios. After the occurrence of crime, lodging a complaint is also a hectic process. Before filing an FIR (First Information Report), GD (General Diary) entry is made when any kind of complaint is lodged which is an internal police record. If any kind of crime occurs, a citizen needs to visit a nearby area's Police Station to lodge a complaint which is very time-consuming for the complainant as well as the Police officer[2].

In 2019, a 23-year-old physiotherapy student was raped and murdered by five men[3]. There are so many such cases that happened and still growing in India where no rescue provided to the victim. In some cases, even cases or filed complaints got closed due to the lack of evidence. This is because no real-time mediator was available between the victim and rescue providers. In the existing system, citizens are provided with emergency helpline number but in the above practical situations, it's not possible to dial the number when a condition is really dangerous or crucial.

Even if the victim makes a call, still it's not traceable for the Police force to find out the exact location of the incident.

Notable previous work has been done to overcome these issues. Many authors have proposed their optimized way for rescue system and complaint management by building a dashboard[4]. But this system uses a Web-based interface which is not convenient to use as compared to the native applications. Also, a real-time crime reporting system was proposed[5][6] which has drawbacks like lacking information genuineness and capturing media from the device.

Smartphones are among the most common and popular computers available nowadays. The usage of the smartphone along with the internet is widely increasing. That's why Cell coverage is also increasing and trying to cover each and every corner of the areas, villages and cities. So the mobile application can be the seamless bridge between citizens and Police stations. Users would include Smartphones in their daily routine due to their portability and convenience of use [7]. In the country, Smartphones are getting within everyone's reach due to the growing affordability of smartphones. The usage of Information Communications Technology has been promoted by different Governments organizations to promote participation with citizens.

The study proposes the use of a mobile-based application *GoSafe*. It provides the immediate data needed by the dispatcher to respond to an emergency without directly asking it from the user or a victim. By means of the Geolocation capabilities, it can provide the dispatcher accurate location of the user. Along with real-time support, this system provides information about the victim's nearby situation (by secretly capturing a photo from a camera and recording a voice from the mic) without asking it explicitly from the user or a victim. Thus, this system provides information genuineness and helps the rescuer to know about the situation. For making the complaint procedure easier, this system helps to optimize the overall process by providing a simple user interface. This system guarantees the authenticity of the victim or a user who reports a complaint or raises an emergency alert since authentication is the first and most important step for accessing this system. Before allowing the user to use the application, we will collect all required information from the user (for authenticity) like Full name, Aadhaar Number[8] (UIDAI -

which is the unique identification number assigned to every citizen of India). Thus whenever the user uses the application and performs an action, he'll not need to enter commonly required details every time and this will result in saving the time of a user.

## 2. System Development

### 2.1 Architecture

Fig 1 depicts the System Architecture of the proposed system i.e. GoSafe. It gives a short idea about the types of users and corresponding modules.

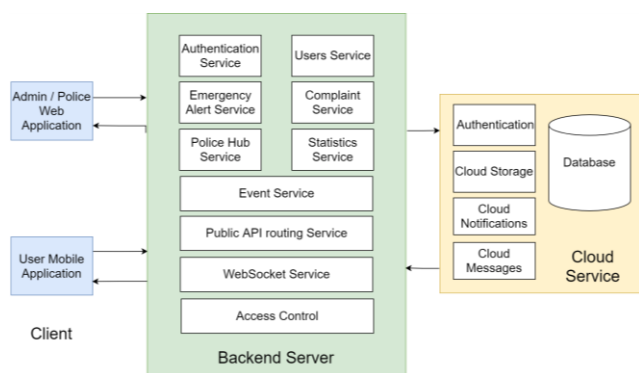


Fig -1: GoSafe System Architecture

The GoSafe application includes three systems. The first part is the client application which again has two sub-systems. One includes a Web dashboard for the Police hub/station and the second is a mobile application for citizens. This is a graphical user interface layer where information is presented and an interface for actions is provided.

The second part of the system is the Backend server application which will comprise core business logic for managing the flow of the data and implementation of algorithms. This layer will serve as a single point of contact between clients. This part exposes a Public REST API endpoint for communication and actions. It'll also handle triggered events by cloud and will emit WebSocket[9] events so that the client module will consume events for real-time purpose.

The third part is the Cloud Service[10] where the system is deployed and will execute on. This part is responsible for Authentication / User management, Data Storage, File Storage and messaging between different services. This will trigger backend service on events such as File upload, Database value add/update, complaint reported, emergency alert raised, etc which will allow the real-time flow of the application based on certain events or actions.

### 2.2 Use Case

Fig 2 shows the Use cases of the proposed system for the GoSafe application and demonstrates different types of actors involved in this system and actions associated with them.

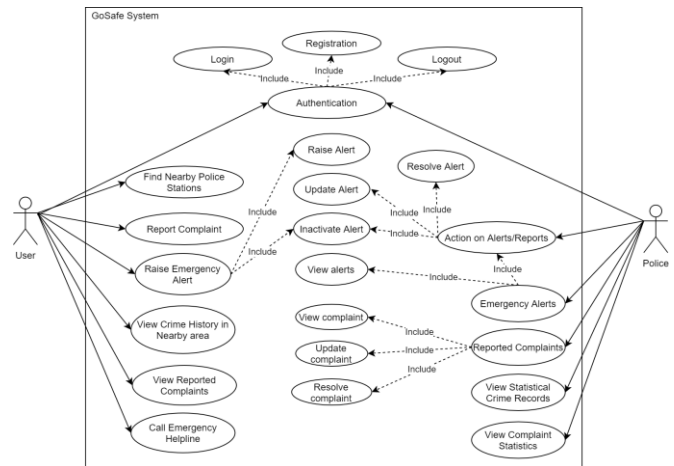


Fig -2: GoSafe System Use Case

While using the GoSafe application, all the actors (i.e. Police and User) should be authenticated first and then only they can use the application features or perform actions. Police can view Real-time raised alerts, Reported complaints and can act on them after verifying them. Also, Police can see the statistical analysis of the complaints or crime incident records. User can report complaints, raise emergency alert in case of emergency, view crime history in nearby area range, call emergency helpline.

### 2.3 Features

#### A) Authentication

Authentication is the first and required step for accessing user mobile application and police web dashboard application.

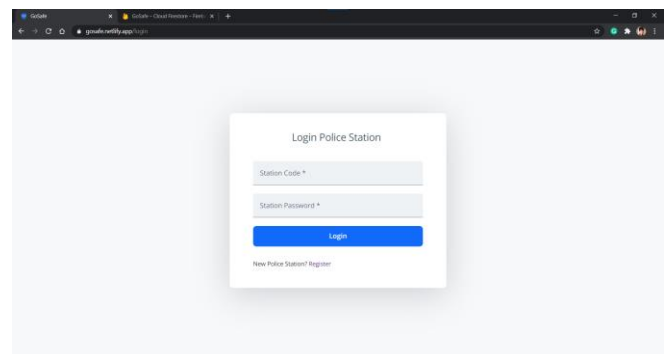


Fig -3: GoSafe Police App Login

As shown in Fig 3, Police user needs to login using Station code and Password. By using police hub credentials, police user can enter into the police web dashboard. After successful login, the police user will be navigated to the main dashboard as shown in Fig 4.

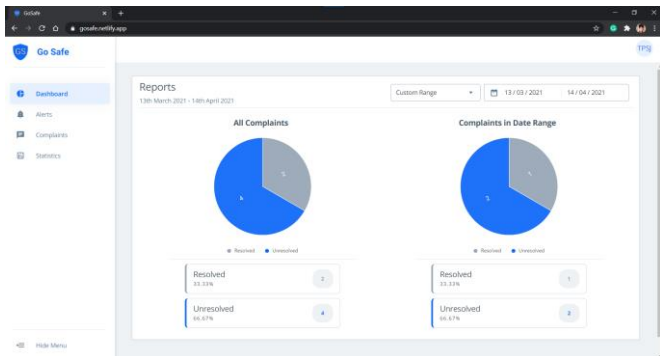


Fig -4: GoSafe Police App Dashboard

As in Fig 5, the User will be provided with the Login screen on the application launch. Phone authentication is used here for accurate authenticity. After logging in, we can ask the user to provide required details such as full name, UID number, etc. After successful authentication, a user will be navigated to the main dashboard as shown in Fig 6.

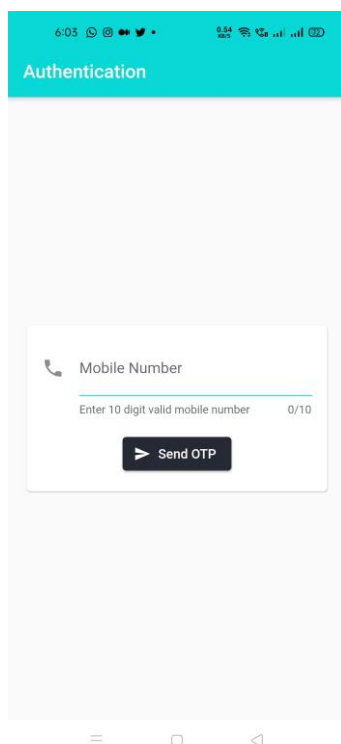


Fig -5: GoSafe User App Authentication

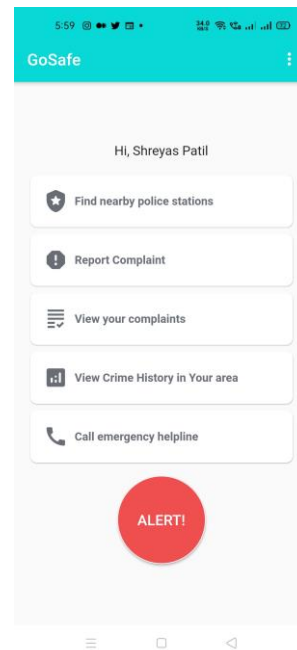


Fig -6: GoSafe User App Main Menu

### B) Report Complaint

As in Fig. 7, the user can report a complaint with a simple interface. By default, the user's current address will be automatically added there but a user can select the address of the incident wishes to change it. User can also attach an image for evidence purpose. When a user reports a complaint, the nearest police hub is retrieved by calculating the police hub location with respect to the incident location coordinates and then the complaint is assigned to the nearest police hub. Once a complaint is reported successfully, an informative message is displayed along with details.

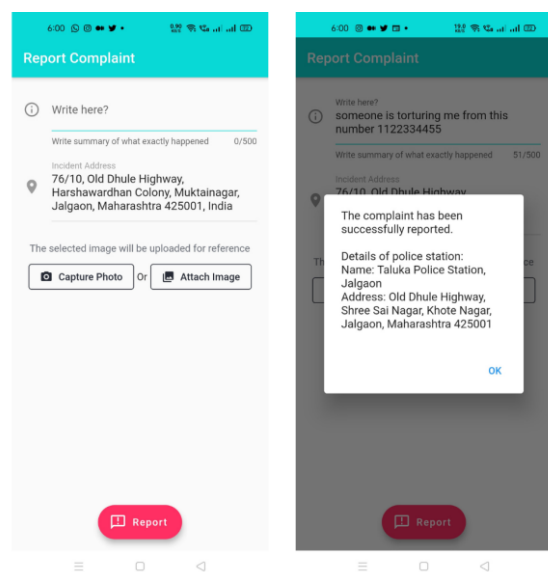


Fig -7: GoSafe User App: Report Complaint

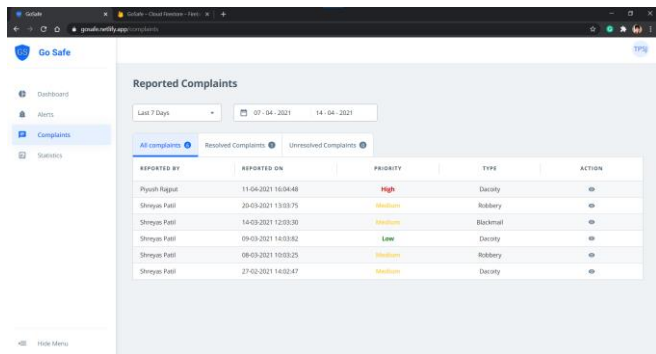


Fig -8: GoSafe Police App: All complaints

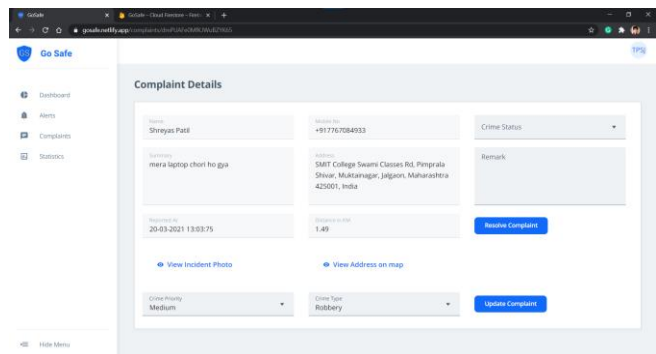


Fig -9: GoSafe Police App: Complaint Detail

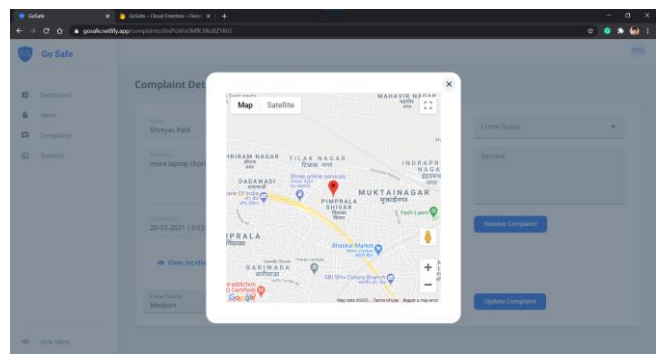


Fig -10: GoSafe Police App: View Incident Location of a complaint

As in Fig. 8, the police user can see all complaints reported and assigned to that police hub. In detail (as shown in Fig 9), police can see complaint details. Police can resolve or reject the complaint by adding remarks and can update the complaint information i.e. crime type and priority. Police can see attached image as well as the incident location in Map view (as shown in Fig 10).

User can track the status of reported complaints and check remarks given by police hub user (as shown in Fig 11).

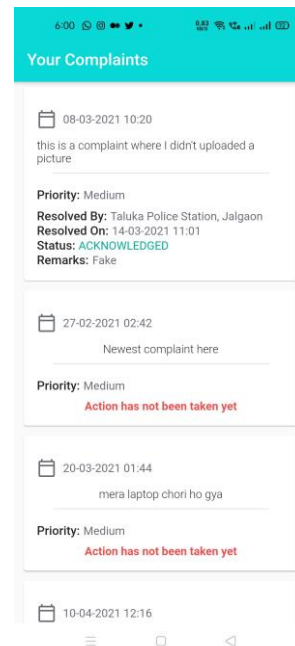


Fig -11: GoSafe User App: View complaint status

### C) Emergency Alert

In the main screen of a user application (In Fig 6), the user is provided with a red button 'ALERT!'. On pressing that button, an alert is raised and a live location of the user is reported at specific intervals. Also, user can write message (which is optional). Then alert is assigned to the nearest police hub based on the current location of a user. Also, the image is captured secretly from the rear camera of a device and a voice recording of fifteen seconds is recorded secretly from the mic and sent along with the alert. On the police hub application (as shown in Fig 12), emergency alerts are shown in real-time. In details (as shown in Fig 13), alert details are displayed. In the map view, user's live location and path is reported. The user's image can be displayed (as in Fig 15) and the police user can also listen to the voice recording. By this media, police can know the genuineness of an emergency alert. Police can resolve an alert by adding remark, turn off the alert (if looks spam), update the crime type and set if the alert is genuine or not (As in Fig 14).

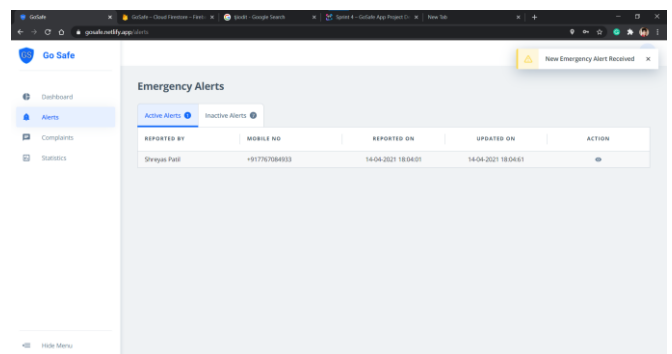


Fig -12: GoSafe Police App: Emergency Alerts

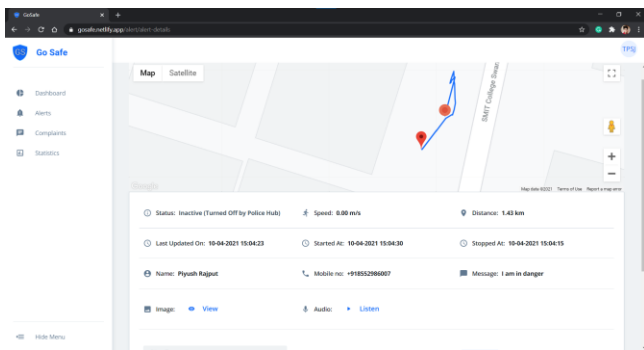


Fig -13: GoSafe Police App: Emergency Alerts Detail

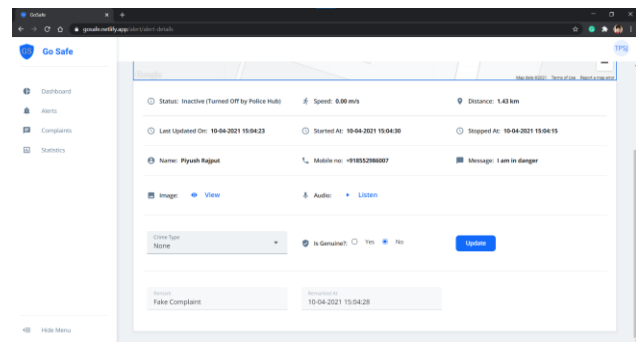


Fig -14: GoSafe Police App: Emergency Alerts Detail Action

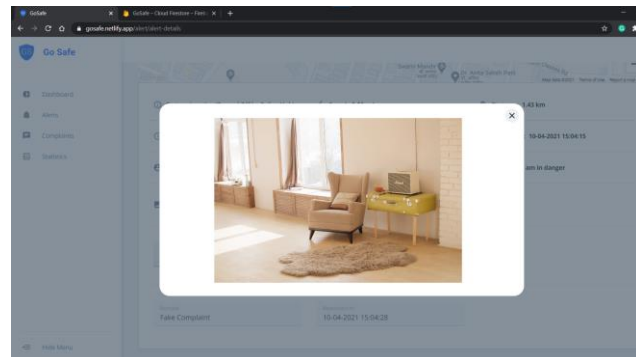


Fig -15: GoSafe Police App: Emergency Alerts Detail – View captured image

**D) Crime history in nearby area of user’s location**

User can see crime incidents occurred in the nearby area of the 10-kilometre range (In Fig 16). These incidents’ statistics are retrieved based on the user’s current location with respect to the complaint and emergency alerts raised in that region. Only genuine complaints and alerts are included in this analysis.

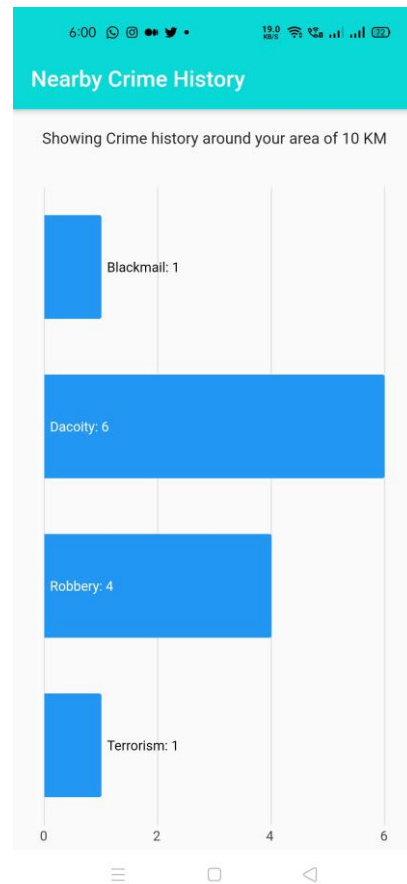


Fig -16: GoSafe User App: View nearby crime history

**E) Crime statistics of a Police Hub/Station**

As shown in Fig 4, police can analyze complaints statistics of resolved and pending complaints with a date filter support. Also, as shown in Fig 17, police user can analyze the type of crime incidents occurred in their region. This statistics is based on the complaints and emergency alerts which are marked as genuine by police user.

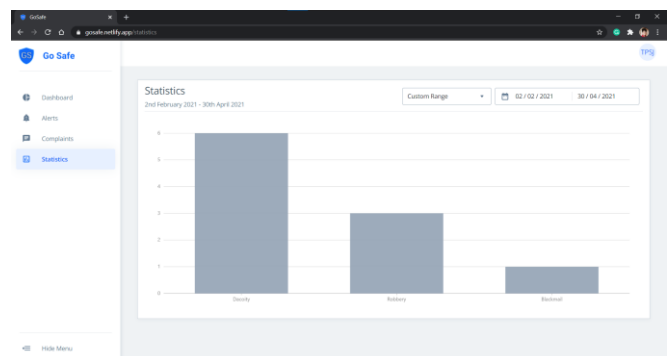


Fig -17: GoSafe Police App Crime Statistics

## 2.4 Scope and Limitations

The GoSafe application mainly focuses on developing a cross-platform user mobile application and police web dashboard application that provides an easy way to report an incident. This is only implied to help citizens as well as police officials to get meaningful details that can be used in an incident report analysis. Also, it provides a robust interface and saves time as well as reduces the efforts which are required in the manual procedure.

If any user wants to report a complaint that is not urgent then this can be done effectively with a simple UI and police can also act on the complaints reported by the citizens. In the emergency alert, you can identify the frequency of the incident in a certain area by analysing the victim's live location, captured image and voice recording.

Currently, the GoSafe application only covers crime-related incidents and can be extended to cover medical and fire emergency incidents. This system is completely based on this GIS and in some parts of India, GIS is not that accurate so this can be a problem. Also, this system can be extended to use the dedicated IoT device which will be connected to the GoSafe application. By using the IoT interface, the feature of raising emergency alert can be improved.

## 3. Recommendations

The GoSafe application system is still under alpha testing; thus the researcher recommends implementing it in beta so that citizens will be able to test it and suggest an improvement or can report bugs. Future researchers may also add new features like offline support (using SMS messaging) or extending it to the IoT based interface or can add more departments in the application which are not present right now in the application.

## 4. Conclusions

The GoSafe application provides a simple and user-friendly interface. This research discussed the development of the interface that will help citizens in India to communicate with the security or rescue services (police departments) quickly and seamlessly. Users can report a complaint and can raise an alert in case of an emergency. The whole solution is based on the GIS system. Along with it, authenticity and genuineness are provided with each complaint and alert which will prevent fake or spam reports. The police officers can view the reports and alerts and can take appropriate action. Also, this provides statistical analysis to the police officials and users. It saves time and efforts of citizens and police officials and becomes a good mediator between citizens and police officials. Thus, this system could be integrated into the actual system of India.

## REFERENCES

- [1] Himabindu, B & Arora, Radhika & Srinivas, Prashanth. (2014). Whose problem is it anyway? Crimes against women in India. *Global health action*. 7. 23718. 10.3402/gha.v7.23718.
- [2] "Why do cops dislike taking FIRs?" article in Times of India, Sep 05, 2004, Press.
- [3] "Telangana doctor rape-murder: Police report reveals how events unfolded on fateful night", story in India Today
- [4] Kakhkashan Tabassum, Hadii Shaiba, Saada Shamrani, Sheikha Otaibi, "e-Cops: An Online Crime Reporting and Management System for Riyadh City", International Conference on Computer Applications & Information Security (ICCAIS), Riyadh, Saudi Arabia, Aug 2018.
- [5] Shallom B. Edillo, Pamela Judith E. Garrote, Lucky Celyn C. Domingo, Arianne G. Malapit, Bernie S. Fabito, "A mobile based emergency reporting application for the Philippine National Police Emergency Hotline 911: A case for the development of i911", International Conference on Mobile Computing and Ubiquitous Network (ICMU), Toyama, Japan, Oct 2017. M. Young, *The Technical Writer's Handbook*. Mill Valley, CA: University Science, 1989.
- [6] Joie Ann Maghanoy, "iReportMo: An Emergency Report Android Mobile Application for Metro Manila", IEEE 11th International Conference on Advanced Infocomm Technology (ICAIT), Jinan, China, Oct 2019.
- [7] Importance of Android Application Development. (2013) [Online] Available: <http://www.slideshare.net/ishackp/importance-of-android-application-development>
- [8] UIDAI (<https://uidai.gov.in/>)
- [9] WebSockets (<https://www.w3.org/TR/websockets/>)
- [10] Abdelzaher, T. F., Shin, K. G., & Bhatti, N. (January 2002). Performance guarantees for web server end-systems: A control-theoretical approach. *IEEE Transactions on Parallel and Distributed Systems*, 13(1), 80-96.