

# SMART POLICE NAVIGATOR

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**Abstract:** In recent years, mobile technology has permeated all aspects of human interaction with the world. In this paper we have discussed how to overcome the problem of communication gap between the police during their investigation. We have also discussed solution to bridge the communication gap between police and general user. We have tried to minimize the down time. This paper explains GIS based Robust Mobile application for Emergency Response System to respond to citizens under security threat with an intelligent system that can Identify the location of citizen and automatically send emergency request to nearest Policemen who has authority to resolve request falling in that area.

**Keywords:** Public safety, Emergency response system, Cloud, GIS.

## 1. INTRODUCTION

In the past couple of years we have witnessed tremendous growth in mobile users all over the world as the entry of smartphones in the market at affordable prices has triggered their usage. We have experienced a major shift in the way we access the internet today with mobiles becoming the primary access point for internet usage. This latest technical advancement in the field of networking revolving around internet can be utilized to bridge the communication gap between the law enforcement agencies like police and the end users like citizens.

GIS stands for Geographical Information System. It is used for mapping, analyzing, manipulating and storing geographical data in order to provide solutions to real world problems and help in planning for the future. In this paper GIS is used to get locations and distance between co-ordinates which comes under category of analyzing GIS.

For better performance of the whole emergency system, we are using cloud for backend and database. Cloud also provides some additional benefits like security, replicas.

There are many mobile apps available for emergency response system such as "VicPD". It is one of the most successful apps for emergency response. But according to the app users there is a major fault in this app i.e fake reporting of crime. To overcome this issue we are using Aadhaar id.

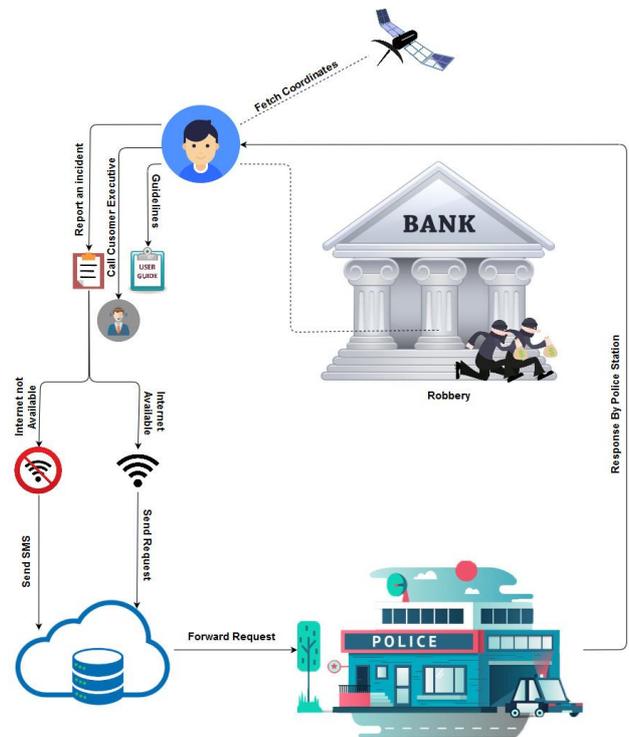


Fig-1 Idea Of Approach

Location of user and police officials can be determined by three methods.

1. Mobile phone network: - The current cell ID can be used to identify the Base Transceiver Station (BTS) that the device is communicating with and the location of that BTS<sup>[2]</sup>.
2. Satellites: - Global Positioning System (GPS) determines the device position. For using this method mobile device must be equipped with a GPS receiver<sup>[2]</sup>.  
Assisted-GPS (A-GPS) is a technology which shows more accurate position with consuming less battery. But disadvantage of this technology is high cost of A-GPS enabled handsets<sup>[3]</sup>.
3. Short-range positioning beacons: - It is used for small areas such as a single building etc<sup>[2]</sup>.

## 2. PROPOSED SOLUTION

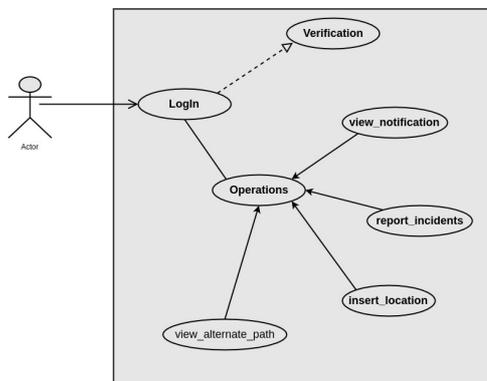
In order to implement architecture that can facilitate information flow between end user and police officials along with a centralized supervision. We must provide two

front-end interfaces in form of android application to police officials and end user<sup>[1]</sup>.

This solution consists of four modules.

1. General User Application
2. Police Application
3. Web Portal(Admin)
4. Cloud
5. SMS BOT

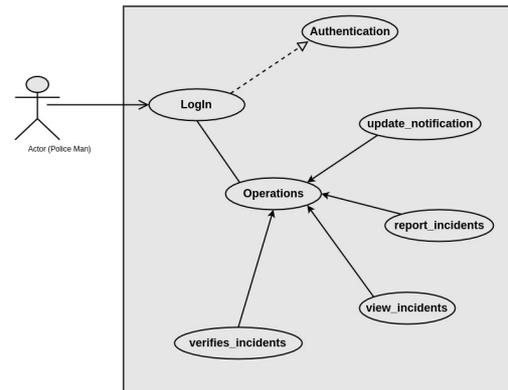
**a. GENERAL USER APPLICATION**



*Fig-2 General User Application Used Case Diagram*

First and foremost, the users will need to do one time registration before using the application and need to provide Aadhaar ID to avoid fake calls/request. After registration, user will be provided with the facilities like report incidents, view the notifications and popups that will contain the information such as telephone number and address of the nearby police station. Moreover, choice to view the alternate path will be provided by the police officials. User will not be given any privilege to make changes in the database but can update the action taken by the police officials. User will need to keep the GPS activated always. Physical location of the user will be tracked with the help of GPS which is inbuilt in the cellular phone. The location will be saved in the database along with the incident reported by the user. Location of the user will be tracked with the help of GPS or else we can also use google maps API<sup>[5]</sup>.

**b. POLICE APPLICATION**



*Fig3 Police Application Used Case Diagram*

First and foremost, the police needs to do one time registration before using the application. After registration, the police can login with the username and the password provided, as this application won't be publicly available for the general users. After logging into the application, police will be provided with the features like view user reported incidents. After the verification of the incident, the database will be updated and the notification will be broadcasted to all the users who will be using this application. Police will be given privilege to do the incident related database manipulations.

**2.3 WEB PORTAL**

The web app is made for police stations. It is used by station in charge to enrol all the policemen working in that station. So that in case of area problem like a policeman cannot take any actions in any other's police station area. So to resolve this issue this portal has been made. It will let us know about police man station and then he will only get request from his area.

**OTHER NEEDS OF WEB PORTAL**

1. It forwards the Requests to centralized backend.
2. It also acts as a repository for all the Requests made through that station.

**2.4 CLOUD**

In this application, cloud will be used for storing the database to provide the facility of remote access. As mentioned in the police user application, the username and the password used by the police and users will be cross-verified with the ones stored in the database.

There are a few applications of cloud computing as Follows<sup>[4]</sup>:

1. Cloud computing provides dependable and secure data storage center.
2. Cloud computing can realize data sharing between different equipments

3. The cloud provides nearly infinite possibility for users to use the internet.

4. Cloud computing does not need high quality equipment for the user and it is easy to use.

### 2.5 SMS BOT

This SMS BOT is actually a GSM module connected on Raspberry pi. This GSM Module will work when there is no internet connectivity. It will receive a request from a user in case of no internet connectivity from user end and will transfer that request to server and after the computation of nearest policeman in that area, Server will transfer that request to nearest 5 policemen.



Fig-4 GSM Module With Raspberry pi 3.

Apart from this GSM Module there are more methods to receive request offline.

- 1. Offline SMS API's
- 2. Web scraping free virtual number

### 2.5.1 OFFLINE SMS API'S

There are many third party companies which provide API's for sending and receiving SMS from server But they are not that much efficient because these API's are not sending sms to server. They are actually providing the address to our server and our server is going to that address and taking that information.

There are some services which are actually good but they are not providing services to Indian numbers. Till there is no availability of good third party service, So GSM module is better option.

### 2.5.2 WEB SCRAPING FREE VIRTUAL NUMBER

There are many websites which provides free virtual numbers. By using those virtual numbers we can send messages. But we cannot receive the sms to our server. In order to get message to our server we need to create scraper which will scrape that website and we will get sms on our

server. If the view of website changes then scraper will not work. And data is less secure in this case. That's why we are not using this approach for sms service.

### 2.6 WORK FLOW

First of all, User will send a request. Which will go to the backend and backend will send request to database and take the acknowledgement. Then in backend current district of user will be found and after that all the stations will retrieve which comes under that district. Then forward request id to police station, because all police officials should know that any person is busy from their department. This portal will contain the status of policemen. Now from portal request will further go to backend. Then it will broadcast request to the nearest five policemen who will be able to handle the issues in that particular area. This will be done by the help of records inserted by police officials in web portal. And for the police app we will fetch the co-ordinates of the police under that police station which is nearest to the crime spot.

If form five nearest policemen any one rejected before accepting of that request then the request will automatically formulated to sixth nearest policeman. Like this, it will go on till the request does not get a positive response. If no policeman is taking or responding to request then a dialog box will appear which will deliver call 112. If request is accepted then It will disappear from other police officials.

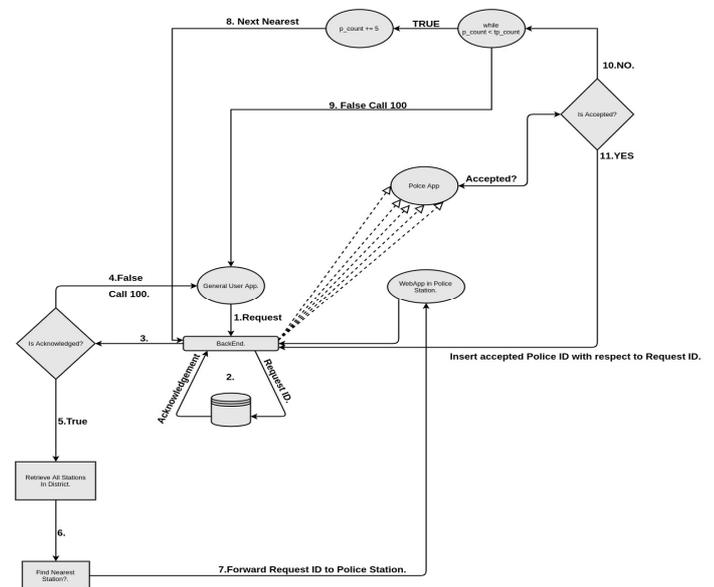


Fig5 Workflow

### 2.7 PREFERRED TECH-STACK

*Frontend* – Android Studio using Java(Mobile App) and Html/css/Javascript and Materialize css (Web Portal).

*Backend* – Django / Django rest framework and GSM Module with Raspberry pi.

*Database* – Postgres-XL , Redis.

*Computing: The Future of Cloud*’, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 1, Issue 3, September 2012.

[5] Google Maps Api By Google <http://maps.google.co.in>

## 2.8 ISSUES FACED

1. Fake Calls.
2. Database crash or Database downtime.
3. Policemen area.

### 2.8.1 FAKE CALLS

It was one major of the issue and to resolve this issue we are using Aadhaar Id of each citizen while registration to this app.

### 2.8.2 DATABASE CRASH AND DOWNTIME

To resolve the issue of database crash we need to have replicas of database and for that replicas we are using cloud.

### 2.8.3 POLICEMEN AREA.

For this issue, We have created a web portal so that we will get all the details of each policeman with their respective stations. And now request will only forwarded to the selected policemen who can handle it.

## 3 CONCLUSION

In this paper we have overcome the problem of communication gap between the police during their investigation. We also provide solution to bridge the communication gap between police and general user. The problem of reporting fake crimes will be overcome as this application will need the verification through Aadhaar card. Cloud service will allow to access data remotely which will be helpful for the investigations carried by police department.

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