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Detection of Missing Persons Using Mobile App

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***Abstract*— The number of missing persons cases in India are growing by the day. These problems tend to occur in public places such as railway stations, bus stops, and retail malls. It is very difficult and complicated to find a lost person in a huge and busy environment. The missing individual's information is entered to the missing person database, which provides extensive information on missing people (eg: Name, Images, Contacts, Address etc). Finding a missing individual can be a challenging effort, but if you know where to search, it is frequently lot simpler. Simply follow a few easy steps to locate a missing individual in our application. Our application acts as interface between police and public to find out the missing people. Our application serves as a bridge between the police and the general public in the search for missing individuals. Our app offers a list of missing persons as well as their contact information. In our app , cops will enter information about missing people into a database. Both the general public and the police may find information on missing people by searching by name, age, gender, and complexion. We have call and share features in our app, which allow you to contact the missing person's family and share the missing person's information with others. If the missing individual is recovered, the police will remove the related person's information from the database. So, by using our application, we can quickly and precisely detect the missing person.**

Keywords*— *Android Studio, Firebase, Mobile Application, Police, Public.

I. INTRODUCTION

Numerous complaints of missing individuals are sent to police stations around the nation every year[12]. All ages and genders have reported missing individuals in these reports. A missing person is defined as "a person who has vanished and whose status as living or dead cannot be confirmed as their location and destiny are unknown" in Wikipedia. Fortunately, a lot of people who are reported missing to the police are found quickly. However, some people are never discovered or end up being recognised as victims of crime or unfortunate circumstances. Additionally, there are those who are missing but have not been reported to the police or looked into. Some young kids flee their homes because of intolerable abuse and neglect. They become more susceptible to hazards of exploitation and criminal activity, such as prostitution, drug addiction, trafficking, and violence. Numerous missing people have perished tragically in acts of violence, suicide, or accidents. Many missing people become victims of trafficking. It is not always simple to determine if a person's disappearance was done intentionally or not.

We decided to create an app that would serve as a bridge between the police and the general public. For this reason, We are integrating the missing individual database into our app. Police and the general public can retrieve missing person information by name, age, and location. We also supplied call and share options, allowing you to call missing person relatives and share missing person data via WhatsApp, Facebook, Mail, Message, and so on. So, by including a missing people database in our application, we can correctly trace the lost individual.

A. Basic Concepts

1) Android Studio

The sole purpose of Android Studio is to create Android apps. To design, create, maintain, test, debug, and publish our applications, it includes all Android SDK tools. It has IntelliJ IDE, which is used to show potential methods, classes, and built-in functions as we type. It is simple to incorporate all Java files and layout files (for design) into a single project. After the project is finished, the entire application may be submitted as an, APK (Android Package) file, which we may use to start the app on any device.

2) Android Emulator

Without having to own every real device, you may test your application on a range of devices and Android API versions using the Android Emulator, which mimics Android devices on your PC. The emulator offers virtually all of the features that a genuine Android smartphone would have.

Fig. 1. Android Emulator

You can imitate incoming calls and texts, the device's location, different network speeds, rotation and other hardware sensors, access to the Google Play Store, and a tonne of other things. Testing your software on an emulator can often be quicker and easier than testing it on a real device.

3) Firebase Realtime Database

The Firebase Realtime Database is a database stored in the cloud. Every connected client receives real-time synchronization of data saved as JSON. All of your clients share a single Realtime Database instance and are immediately updated with the most recent data when you develop cross-platform apps using our JavaScript, Android, and Apple platforms SDKs. By enabling safe access to the database directly from client-side code, the Firebase Realtime Database enables you to create robust, collaborative apps. Data is locally stored, and real-time events continue to happen even while the system is offline, providing the end user with a responsive experience. When the device regains connectivity, the Realtime Database immediately merges any discrepancies between the local data changes and the remote updates that took place while the client was offline.

Fig. 2. Realtime Database

B. Motivation

Persons with psychological illnesses, older individuals suffering from Alzheimer's disease, and others go missing on a daily basis. It's estimated that more than 400 missing person inquiries go unresolved each day in India. It is nearly impossible for authorities and the general public to find a missing individual in a dense, busy place. Finding a missing person can be challenging, but it is usually a lot simpler if you know where to begin and how to seek. Our efforts are intended to lessen their difficulties. This initiative will assist the public and police in tracking down a lost individual.

C. Problem Statement

Finding a missing person can be a challenging effort, but if you know where to search and how to look, it can be a lot simpler. We decided to create an app that would serve as a bridge between the police and the general public. For this reason, we are integrating a missing individual database into our app. Police and the general public can retrieve missing person information by name, age, and location. We also supplied call and share options, allowing you to phone missing person relatives and share missing person data via WhatsApp, Facebook, Mail, Message, and so on. So, by including a missing people database in our application, we can correctly trace the lost individual.

D. Scope of the project

Currently, only the Penamaluru police station is included in the initiative. In response to the feedback given by police and public, we will expand the scope of our application.

E. Objectives

1. To create an app that ameliorate the search for a missing individual for both the public and the police.
2. We need our app to provide accurate and precise results

F. Advantages

1. Through easy authorizations, the public may be able to access missing persons data from our app.
2. You can call to the family of the missing person and share the information of the missing person with others using our app's call and share features**.**

II. Literature Survey

The majority of this part is devoted to the literature reviews we used as sources.

The process outlined in [1] explains how to manage mobile applications using Cloud - based Messaging. Firebase Cloud Messaging enables the sending of data messages as notifications to mobile applications, which may then be leveraged to modify their behaviour in smartphone-installed apps. This system was built so that it can manage various Firebase programs at once and deliver the messages that the programmer has intended, either by manually creating the data or by obtaining the data from another environment.

Advantages:

Using Firebase Hosting, we can rapidly construct a single-page, mobile home page, web page, or dynamic web page. Web apps and static content can both be deployed by developers utilizing CDN (Content Delivery Network). The content could be quickly delivered anywhere using the internet or mobile technology.

Disadvantages:

A small number of tools and libraries, a large download size, poor iOS feature compatibility, and no support for password managers.

The methodology described in [2] describes that the internet services like giving an online complaint through online have been increased because it is very safe, convenient and saves time of an individual. This communication gap between the police and the people can be filled by an internet application that allows people to transmit reports or other necessary information. Additionally, the technology enables users to file complaints and assists the police department in locating perpetrators. The application's primary goal is to enhance the efficacy and efficiency of the processes used in interactions between police officers and regular citizens. A complete data base of details relating to crime would be a magnificent tool for keeping track and tracing criminals all across country.

Advantages:

- Very simple to use and does not require paper.
- Provides greater security than an offline system.

- Enables individuals to keep track of their grievances.

Disadvantages:

The current scope of the project is limited to Riyadh City. And also, it is not an app, it's a website.

The methodology described in [3] describes that

Every time a crime is committed in the city on a person, That person must first call the police station. Due to the fact that police stations in the city still file First Information Reports (FIRs) manually on paper, there is a possibility that some records will be misplaced. The proposed online system for police stations, called Intellectual and Enhance Digital Solutions (IEDS), will assist the user and officers in digitization their work. The database records will be maintained by this system. IEDS integrate a number of the city's police stations. Police officers could use their phones to access records such like information on missing people, murder investigations, photo reports, etc. from their pockets. IEDS includes a user component for checking the status report that is more securely accessed by a One-Time-Password (OTP). By giving access to the papers that the police have uploaded, this system will also aid the lawyer in communicating with the victim and the police. Additionally, it will reduce paperwork, which will help conserve trees.

Advantages:

- Work is digitalized, which reduces paper work.
- Provides more security than the prior offline paper-based approach.
- Covers the majority of Mumbai's cities.
- Provides a variety of services such as missing person, missing vehicle, and so forth.

Disadvantages:

This application necessitates a large quantity of data storage. This application is not a mobile app, but rather a website.

According to the methods outlined in [4], the growth of the smartphone software industry has been propelled by the creation of new mobile technologies. It is widely agreed that Android OS—a collection of operating systems that also includes iOS, Symbian OS, Blackberry, and others—is the most popular, well-liked, and user-friendly mobile platform. Applications for Android are created in Java. The Google Android SDK offers a cutting-edge software stack, giving developers a simple environment to create android applications. With a cross-platform strategy, an application may be distributed across many platforms without requiring coding modifications. There is a security risk associated with every Android device since every Android developer has the opportunity to post their application to the Android Market. Strict security checks are not applied to these programmers. This article discusses a multi-layered methodology for creating mobile applications as well as numerous cross-platform techniques.

Advantages:

This paper Provides a complete overview of Android applications, platform dependant apps, and so on.

Disadvantages:

This did not cover all aspects of security.

The methodology described in [5] describes that India is witnessing a dramatic increase in criminal behaviour. These activities are often not reported. The majority of FIRs are still written by hand as is the custom, despite the police having access to an internet site where they may store FIRs and NCRs. In order to report a cognizable offence, the complainant normally has to be present at the police station. The nation's efficient e-governance system, the Crime and Criminal Tracking Network and Systems (CCTNS), was created in 2009. But it is a state-specific, centralised system. To ensure that there isn't a single point of failure and that complaints are handled securely and safely to avoid unauthorised access, a completely decentralised system is thus necessary. Before being transferred to the blockchain network, the police department's FIR will be hashed, encrypted, and saved in IPFS. The complaint and its timestamp were kept on the blockchain network, giving the complainant substantial proof if the police refuse to submit the FIR under duress or claim they never received the complaint. If all the entries were stored in an immutable database, there would be less possibility that the FIR/NCR would be altered and get undetected.

Advantages:

- This application is accessible as a website as well as a mobile app.
- This Application uses Block Chain Technology.

Disadvantages:

Fake compliances can be recorded, and this application necessitates a large amount of data storage

According to the methods outlined in [6], recognition is a biometric-based system that mathematically maps a person's facial traits and saves the information as a face print. It applies machine learning to the picture and creates a feature vector that associates a set of integers with each object in the image. This initiative suggests using this technology to locate fugitive offenders based on their prior histories. According to a research by the NCRB (National Crime Records Bureau), the same perpetrators perpetrate 70% of crimes. Face recognition software may be used to recognise these offenders from an image or video frame taken by a camera deployed in a variety of locations. This software can also be used to locate missing children. Each face is given its own template, which is then used to compare each one to the other photos in the collection. If a match is made between the input face and the corresponding image, the information will be shown. This technology will make our society more secure while reducing crime.

Advantages:

Computation time is low. Searching is done quickly and accurately.

Disadvantages:

The main disadvantage is this application cannot recognize blurred, low clarity images.

Using an automated security camera, real-time facial recognition is explained in [7]'s methods. The suggested method entails four steps: real-time picture training, Haar-classifier face identification, comparison of trained real-time

images with images from security camera, and result based on comparison. Automated surveillance, whose goal is to identify people on a watch list, is a significant application of interest. The goal of this study is to compare a given image to a set of previously trained images. In this article, we offer a robust face detection algorithm for real-time environments. One of the face detection methods is called Haar cascading. To track faces on the OpenCV platform in this case, we employ classifiers similar to Haar. Results from the facial recognition technology are quite accurate. The suggested system accurately recognises a variety of faces and has a minimal calculation time, making it handy for swiftly looking into alternatives.

Advantages

- Face recognition technology is incredibly accurate.
- Due to the system's rapid computation times, it can correctly distinguish several faces, which is helpful for swiftly looking for suspects.

Disadvantages:

- This application requires huge storage space.
- It takes some time and effort to recognise an object that has been rotated.
- This is not an android application.

According to the methodology described in [8], mobile apps make up a rapidly growing portion of the global mobile market in today's technologically advanced globe. Mobile applications are being created in a small space with the only purpose of giving users a rich and effective experience. The application described in this article for an institution's Android base mobile application will provide excellent products and comprehensive data about an institute. The administration, accounts, students section, student, and many other modules of an institute are all connected by this straightforward yet effective application. Over time, we have seen that manually publishing essential academic bulletins to notice boards wastes both time and is ineffective. We can receive emails from the institute notifying us of announcements using this app.

Advantages:

- Java was used to construct this simple app.
- The SQL lite is used as back end for the project.

Disadvantages:

- No particular algorithm is used.
- Scope is restricted to the institution.

III. PROPOSED SYSTEM

A. Architecture

The architecture of the suggested system and the adopted approach are both described in this section. Figure 3: represents the proposed system model for police in detection of missing person application.

The proposed system lays out everything that would happen in the application from beginning to end. Police officers can register by submitting their personal details.

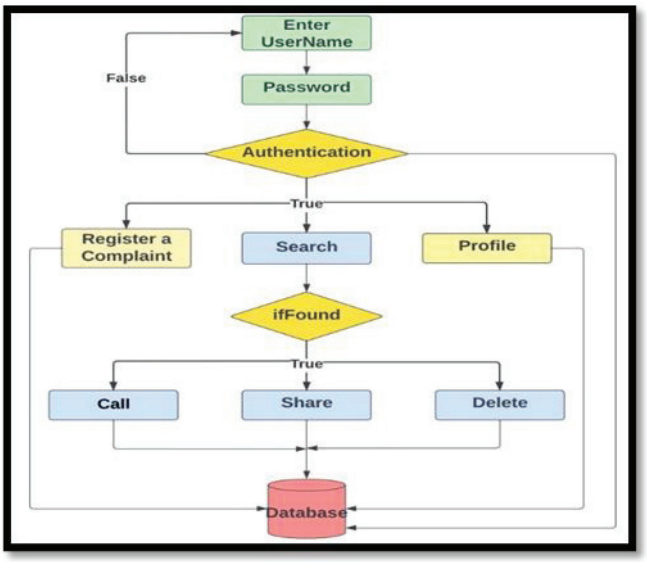

Fig. 3. Proposed System Model for police in detection of missing person app.

After successfully registering, police officers can log in to our application using authentic credentials. Police can submit a missing person complaint and search for a missing individual based on name, location, age, and other factors. If the missing person is discovered, police can remove the related person's information from the database. We also gave call and share choices for contacting the missing person's relatives or sharing the missing person's information.

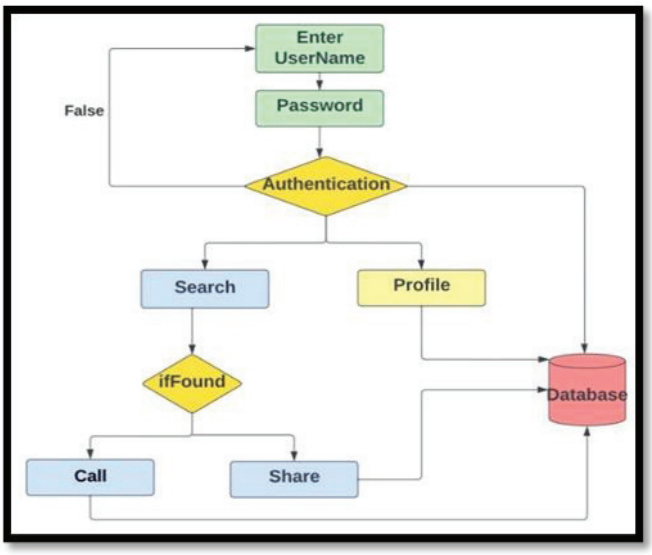

Fig. 4. Proposed System Model for public in detection of missing person app.

The suggested system describes every step of what would take place in the application from beginning to end. The general public can register by inputting their personal information. After successfully registration, the general public can use valid credentials to log in to our application. The general public can look for a missing person by name, location, age, and other criteria. We also provided call and share options for contacting the missing individual's family or sharing information about the missing person.

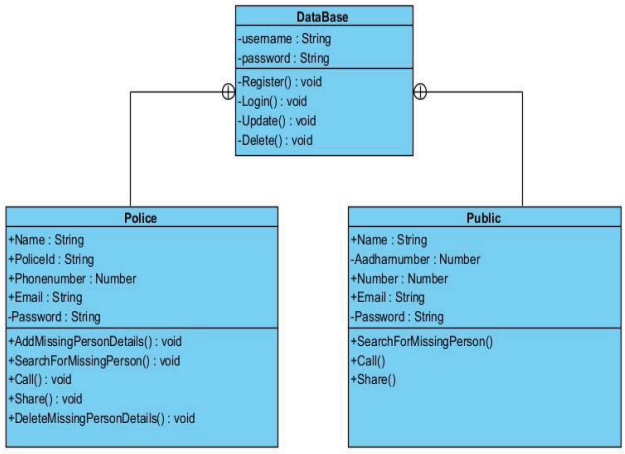

Fig. 5. Class Diagram for Detection of Missing person application.

A use case diagram Figure 6 is used to convey specifics about needs. It focuses on two primary actors(Police and Public) ,one secondary actor(admin) and ten use cases that match to the activities .The class diagram shown in Figure 5: contains three classes .They are database ,police and public classes .The following is the technique for detecting a missing person .Police and the general public can log in using a legitimate Login ID and password .The following activities might be undertaken:1.When a missing person report is received, police can create an online case.2.Police and the general public can search for missing people based on their name, location, and age.3.If the missing individual is recovered, police can remove the missing person information from the database.4.Police and the general public can utilise the call and share options to contact the missing person's relatives and share the missing person's information with others.

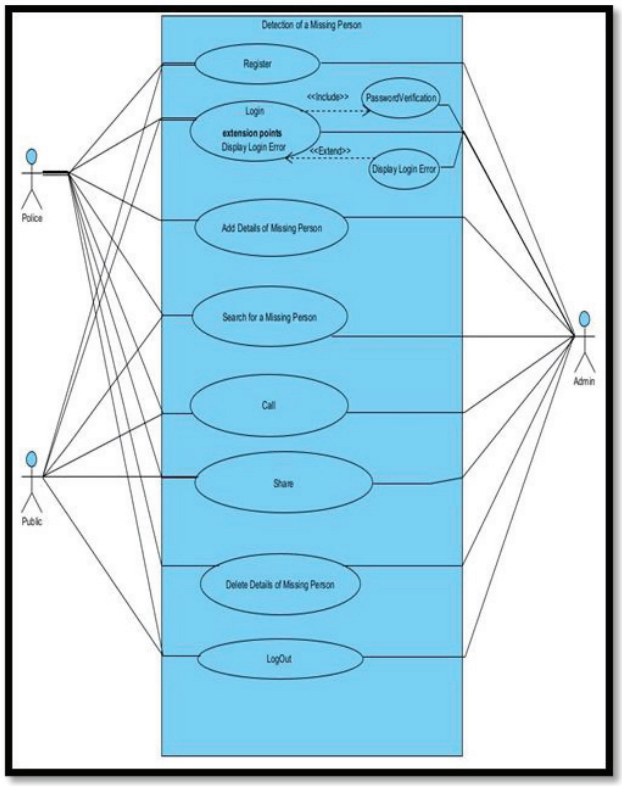

Fig. 6. The UseCase Diagram for Detection of a missing person application

B. Methodology:

This chapter describes various modules of the project, including the registration module, in which both the police and the general public register to the application, providing various information required for building profiles, The login module is necessary for general authentication and the searching module, which deals with searching for a missing person based on name, location, and age. The complaint module is responsible for filing a missing person's report. The deletion module handles the removal of missing person information from the database.

1) Registration Module

In this module, the police and public register into the application by providing personal details that are used later for authentication also they were asked to provide details about various parameters that were considered later for building the profile of the police and public. All of the data is kept in the Firebase database, where each police record is kept as a child of the police record and each public record is kept as a child of the public record.

2) Login Module

This module now has an authentication wrapper that uses Firebase author to determine if a user (Police or Public) is signed in or not. If the user is not logged in, they are sent to the Login Page where they can sign in using the provided credentials, either by police or the general public. Users (Police/Public) are sent to the Home Page if they are signed in. After successfully logging in, the user is taken to the home page, where they can choose from a variety of options such as home, search, profile, logout, etc.

3) Searching Module

Police and the general public can use this Searching module to look for missing people based on their name, location, age, colour, and other criteria. When the police/public click on the specific missing person card, more information such as the missing person's details, contact person details, and police station data are supplied. We also included phone and share options, allowing you to contact the missing individual's family and share information about the missing person with others.

4) Complaint Module

The police will file a report about a missing person in this module. The general public does not complete this module; only cops do. Personal information about the missing person (such as name, age, height, complexion, location, photo, face and eye types, etc.), Contact person details, and details about the police station where the complaint is filed are the fields in registering a missing person complaint. The police must submit the complaint registration form after filling out all the required information. Upon successful submission of the complaint registration form, the database is updated with the missing person's information.

5) Deletion Module

In this module police is going to delete/remove the missing person details from the database. Public participation is not allowed in this module. Only police have the authority to remove a missing person's information from a database once they have been located. The police may remove the information about the missing person from the database if the FIR status of the missing person is traced, the action is withdrawn, etc. Police must click on the delete button next to

the missing person in order to remove them from the database. The missing person's information will be deleted from the database after the police click the delete button.

IV. RESULTS AND DISCUSSIONS

Some output screens that demonstrate how app works are provided in this section.

Fig. 7. Welcome page

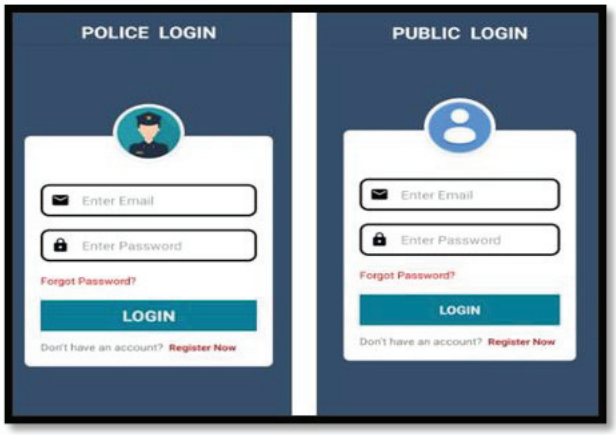

Fig. 8. Police and Public Login Pages

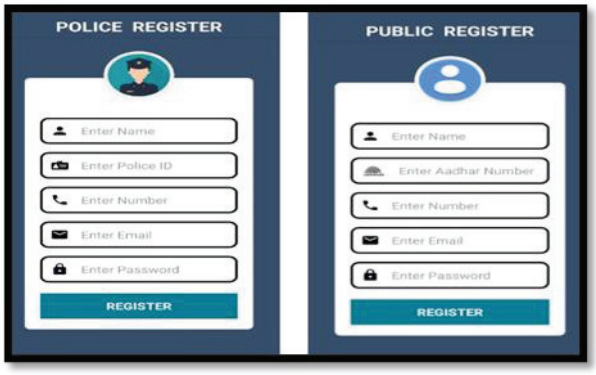

Fig. 9. Police and Public Registration Pages

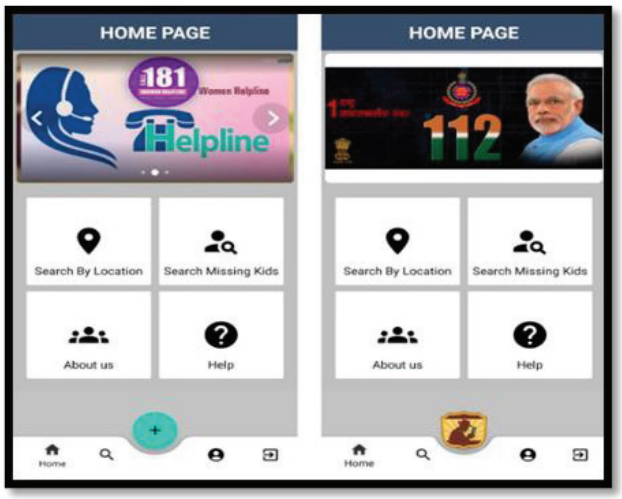

Fig. 10. Police and Public Home pages

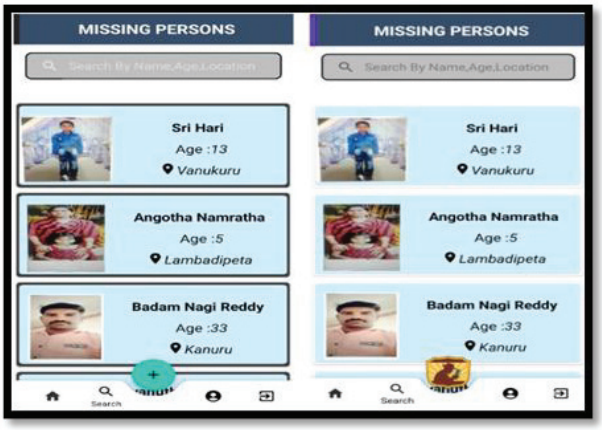

Fig. 11. Search option for police and public

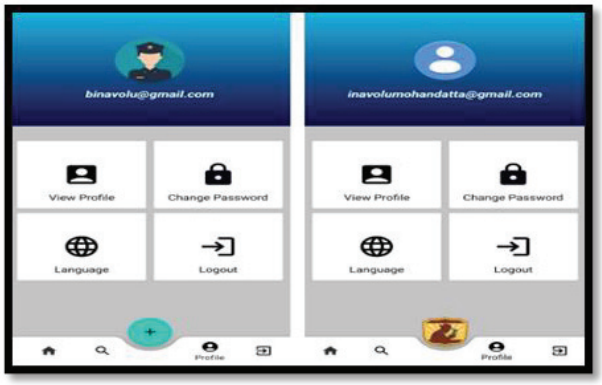

Fig. 12. Police and Public profile pages

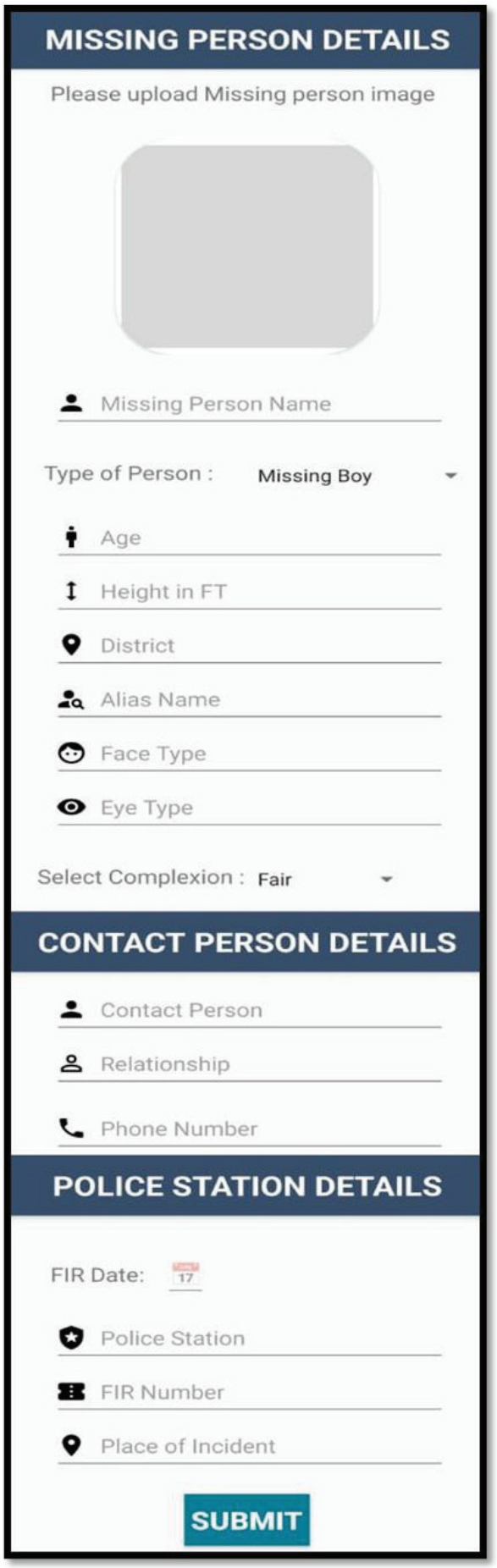

Fig. 13. Complaint registration form filled by police

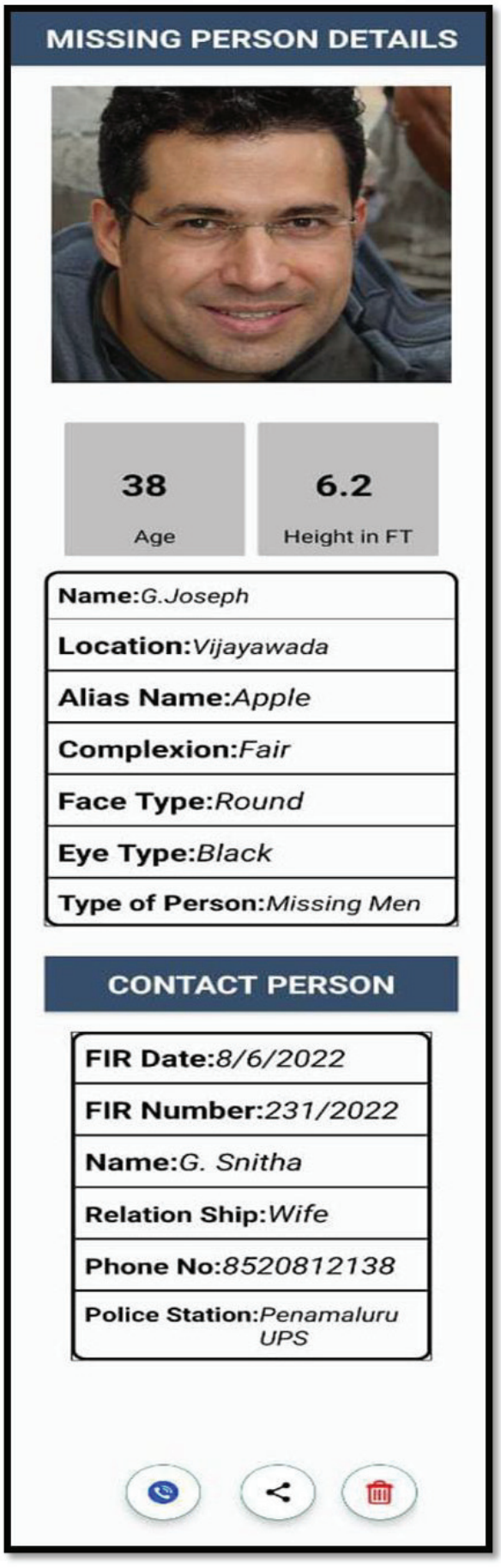

Fig. 14. More Information about missing person

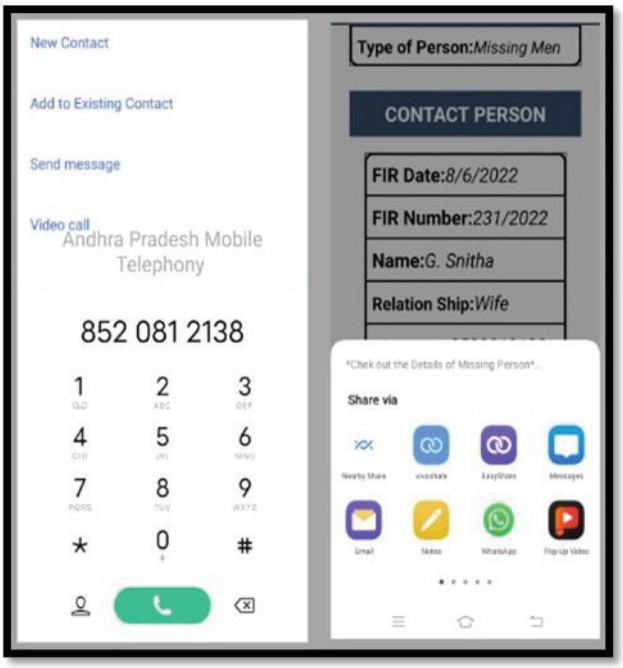

Fig. 15. Call and Share options

V. CONCLUSIONS AND FUTURE WORK

Detection of a missing person application provides simple and user-friendly interface for police and public. This paper mainly discussed about locating a missing individual by following a few easy steps. Our application serves as a bridge between the police and the general public in the search for missing individuals. In our programme, cops will enter information about missing people into a database. Both the general public and the police may find information on missing people by searching by name, age, gender. If the missing individual is recovered, the police will remove the related person's information from the database. Purpose behind picking android OS is that to target more clients .At long last, similar to any product item or configuration, there is still space for improvement. Highlights can be added to upgrade our application, for example, Searching the missing persons through facial recognition, providing more security to the missing individuals data and numerous others. So, by incorporating a missing people database into our application, we can simply and precisely trace down the missing individual. The suggested system will be put into use, carried on, examined, and refined in a subsequent study.

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