

Savitribai Phule Pune University

सावित्रीबाई फुले पुणे विद्यापीठ



A PROJECT REPORT ON

**“FIND MISSING PERSON USING
ARTIFICIAL INTELLIGENCE”**

SUBMITTED TO THE SAVITRIBAI PHULE PUNE
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THE REQUIREMENTS FOR THE AWARD OF THE
DEGREE OF

**BACHELOR OF ENGINEERING
(Computer Engineering)**

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CERTIFICATE

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**“FIND MISSING PERSON USING ARTIFICIAL
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Sincerely,

- Sanskar Pawar
- Lalit Bhadane
- Amanullah Shaikh
- Atharv Kumbhejkar

ABSTRACT

Face recognition is a biometric-based technology that mathematically maps a particular person's or individual's facial features and stores all that data as a face print. By using this technique, the information of the face of a person is saved mathematically or in the format of graphs in the database, which is used for detecting that particular face. Face recognition model in our system will find a match of that person in the database. If a match is found, it will be notified to the police and the guardian of that person.

The face recognition model in our system will try to find a match in the database with the help of TensorFlow Face recognition algorithm. It is performed by comparing the face encodings of the uploaded image to the face encodings of the images in the database. If a match is found, it will be notified to the police and the people related to that person along with the location of where the person is found.

Face recognition models in Deep and Machine Learning are primarily created to ensure the security of identity. There are several frameworks used in building a face recognition model and one of them is TensorFlow. The TensorFlow face recognition model has so far proven to be popular.

Using TensorFlow to build face recognition and detection models might require effort, but it is worth it in the end. As mentioned, TensorFlow is the most used Deep Learning framework and it has pre-trained models that easily help with image classification.

Key Words: *TensorFlow Face recognition, Face Recognition, missing person, Recognition.*

CONTENTS

I.	List of Figures	1
II.	List Tables	2
III.	Technical Keywords.....	3
1.	Introduction	4
	1.1 Introduction	4
	1.2 Motivation	5
2.	Problem Definition and Scope	7
	2.1 Problem Definition	7
	2.2 Project Scope	7
3.	Project Plan.....	9
	3.1 System Implementation Plan	9
	3.2 System Plan	10
4.	Software Requirement Specification.....	11
	4.1 Functional Requirements	11
	4.1.1 System Feature 1.....	11
	4.1.2 System Feature 2.....	11
	4.1.3 System Feature 3.....	12
	4.1.4 System Feature 4.....	12
	4.1.5 System Feature 5.....	13
	4.2 Non-Functional Requirements	14
	4.2.1 Performance Requirements.....	14
	4.2.2 Safety Requirements.....	14
	4.2.3 Security Requirements.....	14
	4.2.4 Software Quality Attributes.....	15
	4.3 System Requirements.....	15
	4.3.1 Database Requirements.....	15
	4.3.2 Software requirements.....	16
	4.3.3 Hardware requirements.....	17
	4.3.4 Technology Details.....	17
	4.4 Analysis Models: SDLC Model to be applied	21
5.	Methodology and Algorithms	24
	5.1 Methodology.....	24
	5.1.1 User Classes and Characteristics.....	24
	5.1.2 Assumptions and Dependencies.....	25
	5.2 Algorithms.....	26
	5.2.1 Sign In.....	26

5.2.2	Sign Up.....	26
5.2.3	Report Case Activity.....	26
5.2.4	Delete Case Activity.....	27
6.	High Level Design Document.....	28.
6.1	System Architecture	28
6.2	Data Flow Diagrams	29
6.2.1	DFD Level 1.....	29
6.2.2	DFD Level 2.....	30
6.2.3	DFD Level 3.....	31
6.3	ER Diagram	32
6.4	UML Diagram	33
6.4.1	Class Diagram.....	33
6.4.2	Use Case Diagram.....	34
7.	Experimentation and Results.....	35
7.1	Experimentation.....	35
7.2	Results.....	38
8.	Summary and Conclusion.....	44
8.1	Summary	44
8.2	Conclusion.....	45
9.	Annexure.....	46
9.1	Annexure A.....	46
9.2	Annexure B.....	47
9.3	Annexure C.....	58
9.4	Annexure D.....	59

I. LIST OF FIGURES

Dig. No.	Figure Name	Page No.
Fig 4.4.1	Agile Model	22
Fig 6.1	System Architecture	28
Fig 6.2.1	Level 1 DFD	29
Fig 6.2.2	Level 2 DFD	30
Fig 6.2.3	Level 3 DFD	31
Fig 6.3	ER Diagram	32
Fig 6.4.1	Class Diagram	33
Fig 6.4.2	Use Case Diagram	34

II. LIST OF TABLES

Table No.	Figure Name	Page No
Table 3.1	Work Distribution	9
Table 3.2	System Plan	10
Table 4.3.3	Hardware Requirements	17
Table 7.1.1	Sign up activity	35
Table 7.1.2	Viewing missing persons list	35
Table 7.1.3	Adding or Reporting case	36
Table 7.1.4	Police Locator Activity	37
Table 7.1.5	Detect Face Activity	37

III. TECHNICAL KEYWORDS

No.	ABBREVIATION	ILLUSTRATION
1.	TF	Tensor Flow
2.	AI	Artificial Intelligence
3.	KNN	K-Nearest Neighbours
4.	HTML	Hypertext Markup Language
5.	CSS	Cascading Style Sheets
6.	XML	Extensible Markup Language
7.	IDE	Integrated Development Environment
8.	SQL	Structured Query Language

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In the world, a countless number of people are missing every day which includes kids, teens, mentally challenged, old-aged people with Alzheimer's, etc. Most of them remain untraced. This paper proposes a system that would help the police and the public by accelerating the process of searching using face recognition.

Face recognition technique can be used for many things and finding the missing person is a biggest advantage for any face recognition technique. To make the task of finding the missing person easier we are planning to make an application which will be accessed by some volunteers through which we can find missing person in short span of time. This will make the work of police to find a particular person easier.

Meanwhile, there is a need of automation for automating the task of finding the particular person by recognizing particular image and comparing that image with other image in order to check whether both images has same characteristics or not. By doing this we will come to know whether the missing person in the image clicked from particular location is correct or not, and if it is correct then police can start their next steps to find the person from that area.

Here in our Android application we have built face detection system where if match found volunteer will be redirected to the missing persons profile where user will be able to get exact location of missing person with Google map integration also user can chat with the person who posted that profile and get the update from him as well.

TensorFlow is an end-to-end open-source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries and community resources that lets researchers push the state-of-the-art in ML and developers easily build and deploy ML powered applications.

Using TensorFlow to build face recognition and detection models might require effort, but it is worth it in the end. As mentioned, TensorFlow is the most used Deep Learning framework and it has pre-trained models that easily help with image classification. The

images are classified using CNN. In most cases, to generate a model means the classification of the images only needs to provide a similar image which is the positive image. The image is then trained and retrained through a process known as anchoring or Transfer Learning.

Years back, finding that model for training and retraining was difficult. Now, TensorFlow has simplified the process.

In our application there will be the feature of saving all the data of the missing person so that system can detect that image data and trace the missing person.

We have created an Android Application for finding out the missing persons more efficiently. In our application we have implemented functionalities like login with Authentication where user will require the email-id and password for log in into our application also we have firebase verification for email authentication. We can report the missing person along with its particular locations with the help of Google Map Integration as well as the locations of the nearby Police stations and the location from where the missing person is reported will also get visible on the Map. Our application will maintain a list of the missing persons as well. Matching up of the various faces will also be done in our application with the help of the ‘Tensor library’.

1.2 MOTIVATION:

Physically it takes huge time, as it is lengthy procedure for finding missing person as it increases time to launch an FIR in police station. Also during handy process workforce for searching missed person is not so great and due to this half of the cases remain mysterious.

An alarming fact about India’s missing children is that 296 children go missing every day on average. And every month, that is a disturbing number of 9,019, half of them remain untraceable.

Shockingly, when India was dealing with the Covid-19 pandemic in 2020, the total number of children missing across India was 1,08,234 according to the National Crime Records Bureau data. 33,456 girls were reported missing, and 15,410 boys were missing, and 43,661 of them remained untraceable till the end of the year.

However, the statistics are indicative of the absence of a national Missing Children's repository. "There are no budgets earmarked for tracking missing people," said an official source.

CHAPTER 2

PROBLEM DEFINITION AND SCOPE

2.1 PROBLEM DEFINITION:

Manual System for finding missing person has very long procedure and takes more time. More time is requiring for launching an FIR (First Information Report) in police station.

Also, time required for finding lost person is more. Also, during manual process number of manpower for searching lost person is less. Some existing application does not show the proper information about the Missing person, which is difficult to find out missing person

Few existing applications does not convey the proper information about the lost person, which is, they only give the database of missing person. In some amusement parks and other public places, they use RFID chip for searching people. To overcome from this, we have proposed new application in which we will also add image of person so that it will be easy to find.

Our proof of concept which uses TensorFlow for facial recognition. The picture of a missing person will be uploaded to the application.

In TensorFlow firstly, the images are classified using CNN. In most cases, to generate a model means the classification of the images only needs to provide a similar image which is the positive image. The image is then trained and retrained through a process known as anchoring or Transfer Learning.

Years back, finding that model for training and retraining was difficult. Now, TensorFlow has simplified the process.

2.2 PROJECT SCOPE:

In layman terms, the purpose of this project is to help in solving the cases and to find the victims as swiftly as possible. Hence, time is of essence here.

The objective of this project is to help Police and higher authorities to track down missing people quickly. The usual process to track a person is using investigation which

requires time and experience (to ask right questions). Most of the time, investigation method works pretty well but it is time consuming and can be unsuccessful if the person (missing) has been shifted/moved to different location (city/country).

In such cases, the ideal approach is to go through CCTV footages and evidence. Again, this can be very time consuming and given the number of people that go missing every day, it can be a challenge to keep up with it.

Nowadays finding a missing person is very hard task, although we all are updated by social media, it requires numerous paperwork to be done and it is time consuming process and also after doing this hard work, there are not many chances of proper result.

This project gives out a system, which helps both police department and public by speeding up the process of searching using face recognition. Therefore, how this system works is that when the person goes missing a person can register the complaint on our application and upload the image to the application, which then will get stored in our database. Next is, the face recognition model in our system will find a match of that person in the database. If a match is found, then it will display the details of that missing person.

Hence, the task at hand gets easier due to the reductions in cost, capital, and labour and time consumed. The reasons which are noteworthy for the reduction are given below,

- The time to locate the missing person's decreases drastically.
- Reduction in direct costs.
- Reduction in indirect costs. Through this procedure we try to understand pattern of each information given independently and then try to overcome irregularity if any. The results are also very good when the data is limited.

CHAPTER 3

PROJECT PLAN

3.1 SYSTEM IMPLEMENTATION PLAN:

Work Distribution:

SR.NO.	WORKING	NAME
1.	Information Gathering	Sanskar Pawar Lalit Bhadane
2.	Data Analysis	Sanskar Pawar Amanullah Shaikh
3.	Module Design	Atharv Kumbhejkar Amanullah Shaikh Sanskar Pawar
4.	Database Design	Atharv Kumbhejkar Lalit Bhadane Amanullah Shaikh
5.	Coding	Sanskar Pawar Atharv Kumbhejkar Lalit Bhadane Amanullah Shaikh
6.	Reporting	Lalit Bhadane Amanullah Shaikh
7.	Testing & Implementation	Sanskar Pawar Lalit Bhadane Amanullah Shaikh Atharv Kumbhejkar

Table 3.1 Work Distribution

3.2 SYSTEM PLAN:

SR.NO	PHASE	DESCRIPTION	START DATE	END DATE
1.	Requirement Analysis	We defined and gathered the expectations of the users for an application that was to be built or modified.	09-12-2021	15-01-2021
2.	Designing	We designed all the activities and fragments firstly and then will start working on it.	15-01-2022	31-01-2022
3.	Coding	Coding is most important part in our project so we gave it brief time after designing.	31-01-2022	01-03-2022
4.	Testing	After the Coding part of the project, we worked on testing all the functionalities of the project thoroughly.	02-03-2021	29-03-2022
5.	Debugging	We found out various bugs and errors in the debugging phase and worked towards solving them.	29-03-2022	15-04-2022

Table 3.2 System Plan

CHAPTER 4

**SOFTWARE REQUIREMENT
SPECIFICATION**

4.1 FUNCTIONAL REQUIREMENTS:

4.1.1: System Feature 1:

Sign In/Sign Up Activity:

- User will first go to sign in fragment if he/she has not created profile then user will go to sign up.
- In Sign Up user will have to enter username, email and password.
- After entering this user will receive verification link on email and user will have to click on that link to get verified.
- After authentication user's profile will get created.
- Police also sign up using same method just they need to enter their location(Google map integrated) with mobile number so that their profile will get created to that specific location on Google map.
- User can sign in into the account.

4.1.2 System Feature 2:

Add Report/Case Activity:

- Here anybody will be able report the missing person.
- User need to enter missing person's details like name, age, height etc. with the location.
- User can select exact location with Google map integration.
- Also need to upload image of missing person for face detection.
- This will create missing persons profile and it will get added in missing persons list.
- Police can also chat with the Relatives in the chat section to give an update about the person.

4.1.3 System Feature 3:

Detect Face Activity:

- In this activity user will be able to match the faces.
- User need to hold the camera in front of suspicious person who he thinks that is missing.
- If the match found in cloud database that is firebase then that user will be redirected to profile of that missing person.
- On profile there is location of that person with reporter's mobile number and other details.

4.1.4 System Feature 4:

Police Locator Activity:

- When police sign up through the app they need to provide their location (Google map integrated).
- On that exact location in this activity map is marked with that police profile.
- User/Volunteer will be able to easily find and contact police authority with this feature.

4.1.5 System Feature 5:

Chat Activity:

- In this activity volunteers are able to chat with each other.
- When someone reports the case there profile gets attached to that case and now anybody can chat with them regarding that particular case.
- In the chat activity there you can send text message and images as well.
- All standard chat app feature is there like message is delivered, seen and next user is typing when he was last online etc.
- When you sent chat to anybody they will get notified as well.

4.2 NON-FUNCTIONAL REQUIREMENTS:

4.2.1 Performance Requirements:

- Response Time: Response time is the amount of time from the moment that a user sends a request until the time that the application indicates that the request has completed. In that we're going to test various test cases and we will try to analyze that how much time is needed to do various things in our application.
- Workload: We are going to complete a workload specification a check to ensure that all relevant functions have been covered. This will not include just the obvious user workloads but special cases such as adding information of more than one missing person at a time, backups and error scenarios/handling.
- Scalability: The purpose of Scalability testing is to ensure that the system can handle projected increase in user traffic, data volume, transaction counts frequency, etc. It tests system ability to meet the growing needs. We're definitely going to test out software with increasing numbers of clients at a time.

4.2.2 Safety Requirements:

If there is extensive damage to a wide portion of the database due to catastrophic failure, the recovery method restores a past copy of that particular data.

4.2.3 Security Requirements:

Security is the major concern in our project that's why we've maintained a login page. So that only trusted people like police and NGO's can access the data stored.

4.2.4 Software Quality Attributes:

- CORRECTNESS: The information of missing person and the images of that particular person should be correctly attached with that particular person only while storing in the database.
- MAINTAINABILITY: The data entered by the user should be safely maintained by the database.
- USABILITY: The software should satisfy a maximum number of customer's need.

4.3 SYSTEM REQUIREMENTS:

4.3.1 Database Requirements:

Google Firebase:

Firebase is a Cloud-hosted, NoSQL database that uses a document-model. It can be horizontally scaled while letting you store and synchronize data in real-time among users. This is great for applications that are used across multiple devices such as mobile applications. Firebase is optimized for offline use with strong user-based security that allows for serverless based apps as well.

Firebase is built on the Google infrastructure and is built to scale automatically. In addition to standard NoSQL database functionality, Firebase includes analytics, authentication, performance monitoring, messaging, crash reporting and much more. Because it is a Google product, there is also integration into a lot of other products. This includes integration with Google Ads, AdMob, Google Marketing Platform, the Play Store, Data Studio, BigQuery, Slack, Jira, and more.

The Firebase APIs are packaged into a single SDK that can be expanded to multiple platforms and languages. This includes C++ and Unity, which are both popular for mobile development.

A Firebase project is a pool of resources that can include a database as well as items such as user accounts, analytics, and anything that can be shared between several client applications. A Firebase application is a single application that can be backed by the Firebase Project. A Firebase project can have multiple Firebase applications within it.

4.3.2 Software Requirements

1. Operating System - Windows 10
2. Coding Language - Java, XML, Kotlin
3. Database - Google Firebase
4. Tool - Android Studio, Neotron

4.3.3 Hardware Requirements

Criterion	Description
OS version	64-bit Microsoft® Windows® 8/10.
RAM	8 GB RAM recommended: plus 1 GB for the Android Emulator
Disk space	8 GB of available disk space minimum (IDE + Android SDK + Android Emulator)
Screen resolution	1280×800 minimum screen resolution

Table 4.3.3 Hardware Requirements

4.3.4 Technology Details

Android Studio:

Android Studio is the official integrated development environment (IDE) for Android application development. It is based on the IntelliJ IDEA, a Java integrated development environment for software, and incorporates its code editing and developer tools.

Android Studio uses an Instant Push feature to push code and resource changes to a running application. A code editor assists the developer with writing code and offering code completion, refraction, and analysis.

The software was first announced at Google I/O in May 2013, and the first stable build was released in December 2014. Android Studio is available for Mac, Windows, and Linux desktop platforms. It replaced Eclipse Android Development Tools (ADT) as the primary IDE for Android application development. Android Studio and the Software Development Kit can be downloaded directly from Google.

In Android Studio, Kotlin is an open-source, statically typed programming language that supports both object-oriented and functional programming. Kotlin provides similar syntax and concepts from other languages, including C#, Java, and Scala, among many others. Kotlin does not aim to be unique—instead, it draws inspiration from decades of language development. It exists in variants that target the JVM (Kotlin/JVM), JavaScript (Kotlin/JS), and native code (Kotlin/Native).

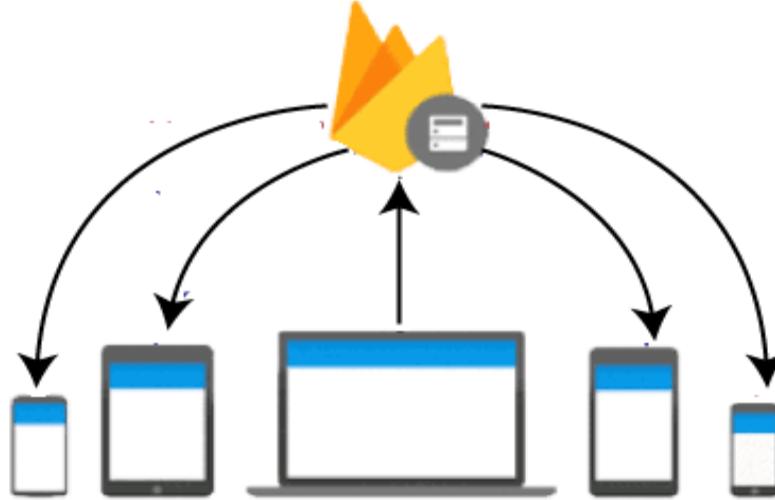
Google Firebase:

The Firebase Realtime Database is a cloud-hosted database in which data is stored as JSON. The data is synchronized in real-time to every connected client. All of our clients share one Realtime Database instances and automatically receive updates with the newest data, when we build cross-platform applications with our iOS, and JavaScript SDKs.

The Firebase Realtime Database is a NoSQL database from which we can store and sync the data between our users in real-time. It is a big JSON object which the developers can manage in real-time. By using a single API, the Firebase database provides the application with the current value of the data and updates to that data. Real-time syncing makes it easy for our users to access their data from any device, be it web or mobile.

The Realtime database helps our users collaborate with one another. It ships with mobile and web SDKs, which allow us to build our app without the need for servers. When our users go offline, the Real-time Database SDKs use local cache on the device for serving and storing changes. The local data is automatically synchronized when the device comes online.

Firebase Realtime Database



A Real-time database is capable of providing all offline and online services. These capabilities include accessibility from the client device, scaling across multiple databases, and many more.

TensorFlow Library:

TensorFlow is an open-source library developed by Google primarily for deep learning applications. It also supports traditional machine learning. TensorFlow was originally developed for large numerical computations without keeping deep learning in mind. However, it proved to be very useful for deep learning development as well, and therefore Google open-sourced it.

TensorFlow accepts data in the form of multi-dimensional arrays of higher dimensions called tensors. Multi-dimensional arrays are very handy in handling large amounts of data.

TensorFlow works on the basis of data flow graphs that have nodes and edges. As the execution mechanism is in the form of graphs, it is much easier to execute TensorFlow code in a distributed manner across a cluster of computers while using GPUs.

TensorFlow compiles many different algorithms and models together, enabling the user to implement deep neural networks for use in tasks like image recognition/classification and natural language processing. TensorFlow is a powerful framework that functions by implementing a series of processing nodes, each node representing a mathematical operation, with the entire series of nodes being called a "graph".

Image recognition: It refers to the task of inputting an image into a neural network and having it output some kind of label for that image. The label that the network outputs will correspond to a pre-defined class. There can be multiple classes that the image can be labelled as, or just one. If there is a single class, the term "recognition" is often applied, whereas a multi-class recognition task is often called "classification".

Feature Extraction: In order to carry out image recognition/classification, the neural network must carry out feature extraction. Features are the elements of the data that you care about which will be fed through the network. In the specific case of image recognition, the features are the groups of pixels, like edges and points, of an object that the network will analyse for patterns.

Feature recognition (or feature extraction) is the process of pulling the relevant features out from an input image so that these features can be analysed. Many images contain annotations or metadata about the image that helps the network find the relevant features.

4.4 ANALYSIS MODELS: SDLC MODEL TO BE APPLIED:

We have studied and researched related to various Software Development Life Cycle (SDLC) Models which will be aligned with our project. In which we studied about detailed plan describing how to develop, maintain, replace and alter or enhance the application. The life cycle defines a methodology for improving the quality of software and the overall development process, so it is important to select SDLC Model accordingly.

So, we studied the SDLC Models like

- Waterfall Model
- Iterative Model
- Spiral Model
- V-Model
- Big Bang Model
- Agile Model

And found a specific model matches our requirement specification.

That is, Agile Model.

We have mentioned the details about these models in brief below.

SDLC - Agile Model:

Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product. Agile Methods break the product into small incremental builds. These builds are provided in iterations. Each iteration typically lasts from about one to three weeks. Every iteration involves cross functional teams working simultaneously on various areas like –

- Planning
- Requirements Analysis

- Design
- Coding
- Unit Testing and
- Acceptance Testing.

At the end of the iteration, a working product is displayed to the customer and important stakeholders.

What is Agile?

Agile model believes that every project needs to be handled differently and the existing methods need to be tailored to best suit the project requirements. In Agile, the tasks are divided to time boxes (small time frames) to deliver specific features for a release.

Iterative approach is taken and working software build is delivered after each iteration. Each build is incremental in terms of features; the final build holds all the features required by the customer.

Here is a graphical illustration of the Agile Model:

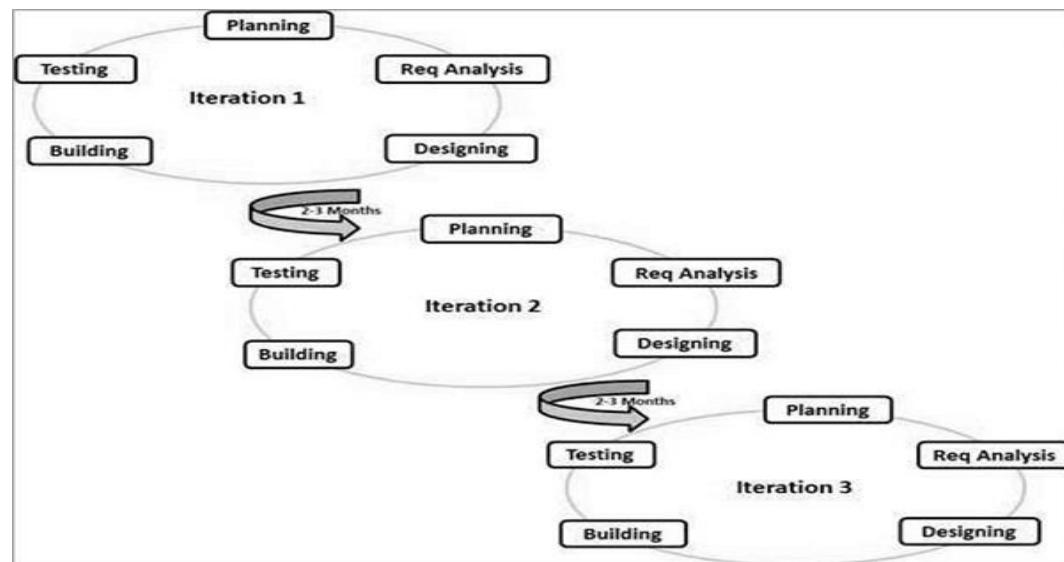


Fig 4.4.1 Agile Model

The Agile thought process had started early in the software development and started becoming popular with time due to its flexibility and adaptability.

The most popular agile methods include Rational Unified Process (1994), Scrum (1995), Crystal Clear, Extreme Programming (1996), Adaptive Software Development, Feature Driven Development, and Dynamic Systems Development Method (DSDM) (1995). These are now collectively referred to as Agile Methodologies, after the Agile Manifesto was published in 2001.

Following are the Agile Manifesto principles –

- **Individuals and interactions** – In Agile development, self-organization and motivation are important, as are interactions like co-location and pair programming.
- **Working software** – Demo working software is considered the best means of communication with the customers to understand their requirements, instead of just depending on documentation.
- **Customer collaboration** – As the requirements cannot be gathered completely in the beginning of the project due to various factors, continuous customer interaction is very important to get proper product requirements.
- **Responding to change** – Agile Development is focused on quick responses to change and continuous development.

CHAPTER 5

METHODOLOGY AND ALGORITHMS

5.1 METHODOLOGY

5.1.1 User Classes and Characteristics:

Users of the system should be able to upload the missing person details. Users should be able to access missing person information between two given police stations with the given date/time of missing person from the database. A volunteer can upload image and location details of the missing person in the application. The system will support two types of user privileges, Volunteer, and Police/Authority. Volunteers will have access to Volunteer functions, and the Police/ Authority will have access to both Volunteer and management functions. The user should be able to do the following functions:

- POLICE/ AUTHORITY FUNCTIONS

- Login User
- Register as Police.
- Register complaint
- Access complaint
- Upload details/ image of missing person
- Check with existing images
- Delete complaint
- Mark complaint as resolved.
- Keep track on the list of missing persons.
- Can register the specific locations as Police station in our Map.
- Can view all the requests.

The Volunteer should have following management functionalities:

- VOLUNTEER FUNCTIONS.
 - Register As Volunteer
 - Upload missing person details/ image
 - View Status of the request about missing person
 - Chat with the Police officers registered with our application.
 - Can call the nearby police officers by finding them on Map.
 - Can find out nearby police stations in our application's map and can visit them.

5.1.2 Assumptions and Dependencies:

Let us assume that this is a complaint management system, and it is used in the following application:

- A request for complaint registration or deletion from police/ authority into the system with all the details of the missing person and contact person, missing location, last seen by, parents.
- Accessing all respective complaints from the police/ authority login for updates of respective complaint.
- Updating of image of suspected missing person from volunteer login.

Assuming both the situations we have designed an application, which will be geographically distributed at different police stations.

5.2 ALGORITHMS:

5.2.1 Sign In:

Step 1: Start
Step 2: Enter Email and password.
Step 3: Click on Sign in.
Step 4: If User is present in firebase present redirect to dashboard activity.
Step 5: If User is not present in firebase show toast: there is no user record.

5.2.2 Sign Up:

Step 1: Start
Step 2: Enter username, valid email and password.
Step 3: Click on Sign Up.
Step 4: If Email is valid send verification link.
Step 5: If user click on link; user is verified.
Step 6: New user created.
Step 7: If user has not clicked on verification link, it will expire in 10 min.
Step 8: End

5.2.3 Report Case Activity:

Step 1: Start
Step 2: Enter Name, Last Name, Height, Age, Place and contact number.
Step 3: click on Select location.
Step 4: Redirect to Google map integration.
Step 5: Select location and click on confirm.
Step 6: Click on upload button.
Step 7: Select take picture or choose from gallery.
Step 8: if take picture open camera.

Step 9: If choose from gallery redirect to gallery.
Step 10: Image ready the preview image in preview section
Step 11: Click on create case button.
Step 12: End

5.2.4 Detect Case Activity:

Step 1: Start
Step 2: First select image to recognize in viewpager.
Step 3: hold camera on face.
Step 4: If match found between selected image redirect to recognized Profile.
Step 5: If match not found show toast: unknown person.
Step 6: End

CHAPTER 6

HIGH LEVEL DESIGN DOCUMENT

6.1 SYSTEM ARCHITECTURE:

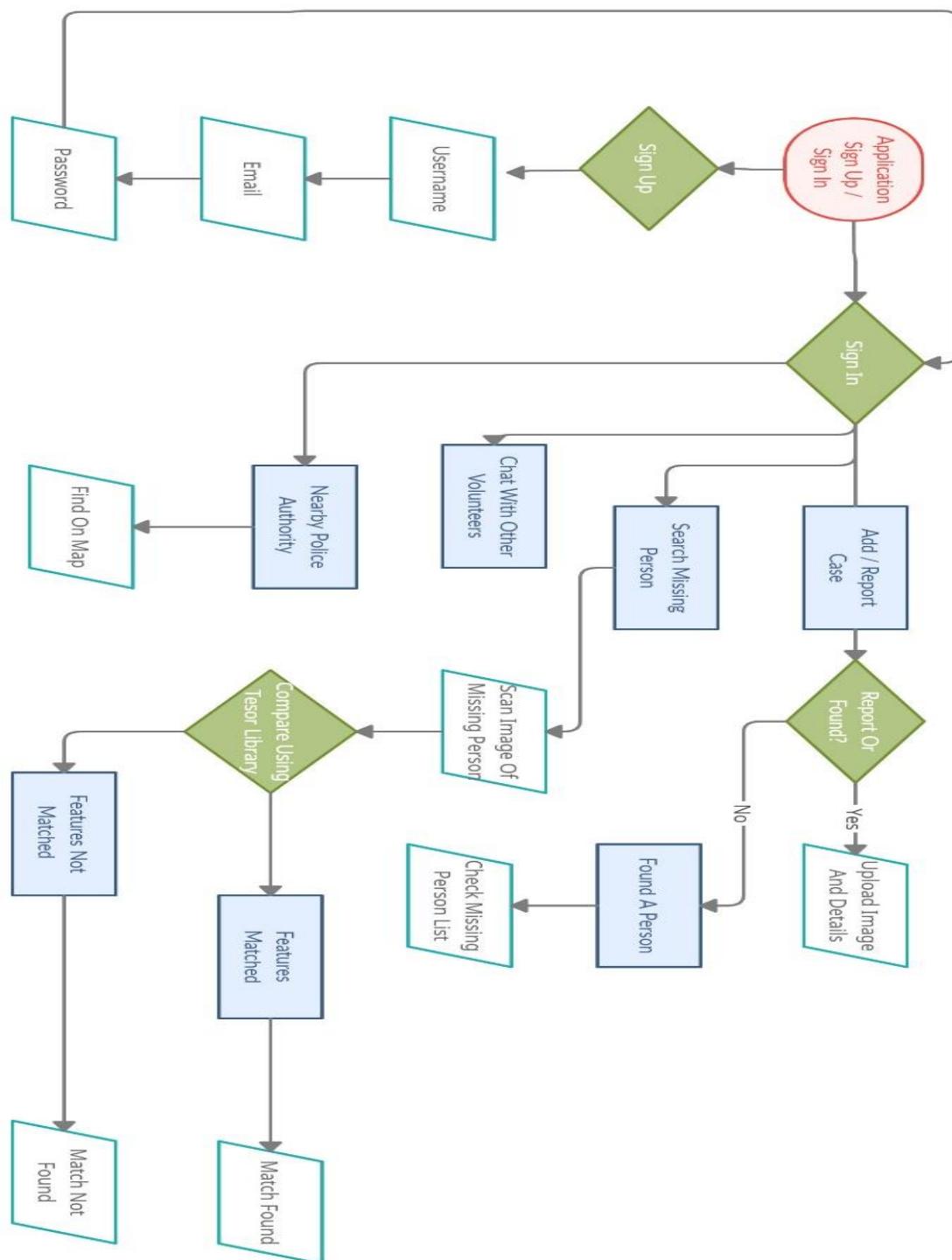


Fig. 6.1 System Architecture

6.2 DATA FLOW DIAGRAM:

6.2.1 DFD Level 1:

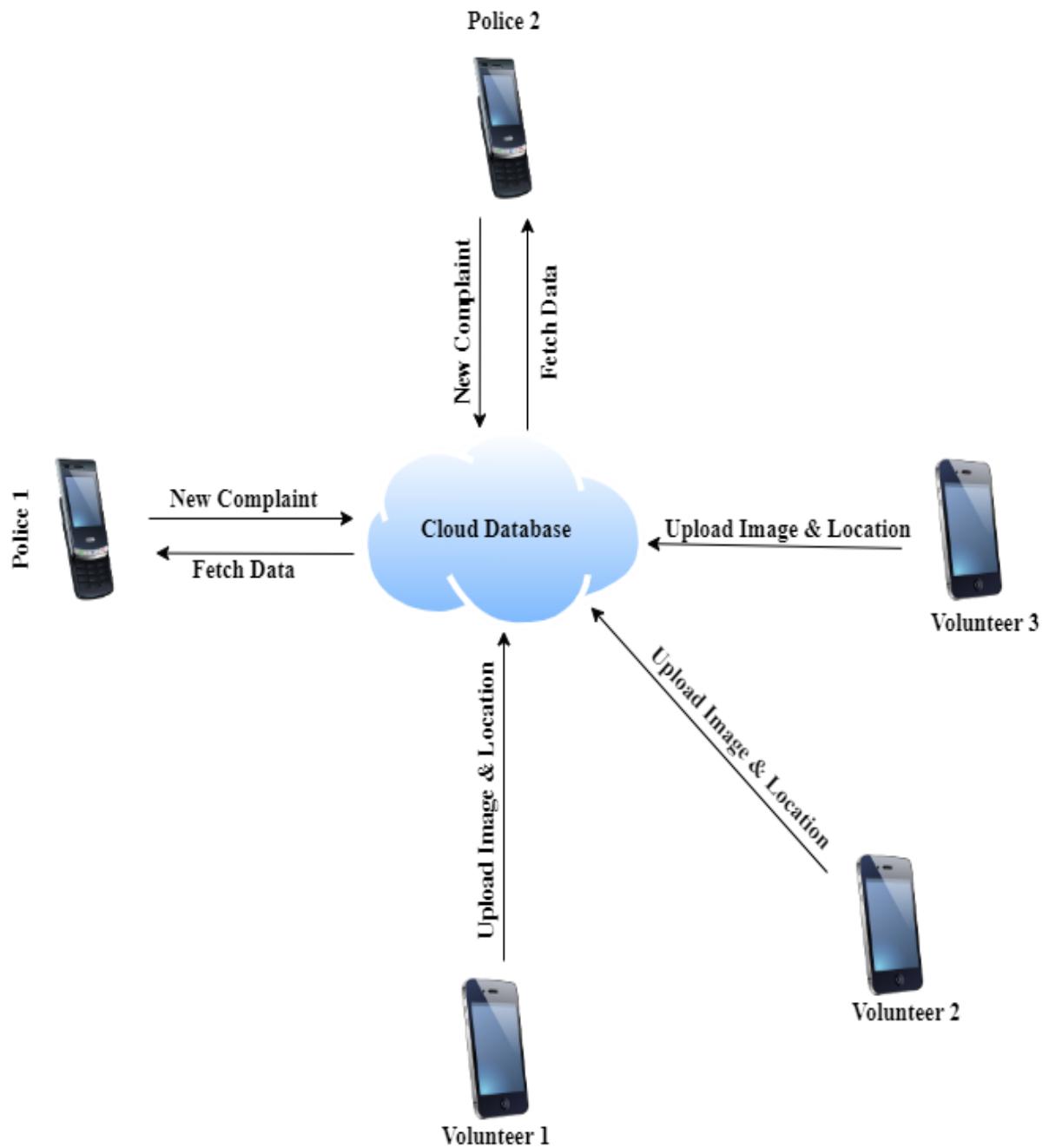
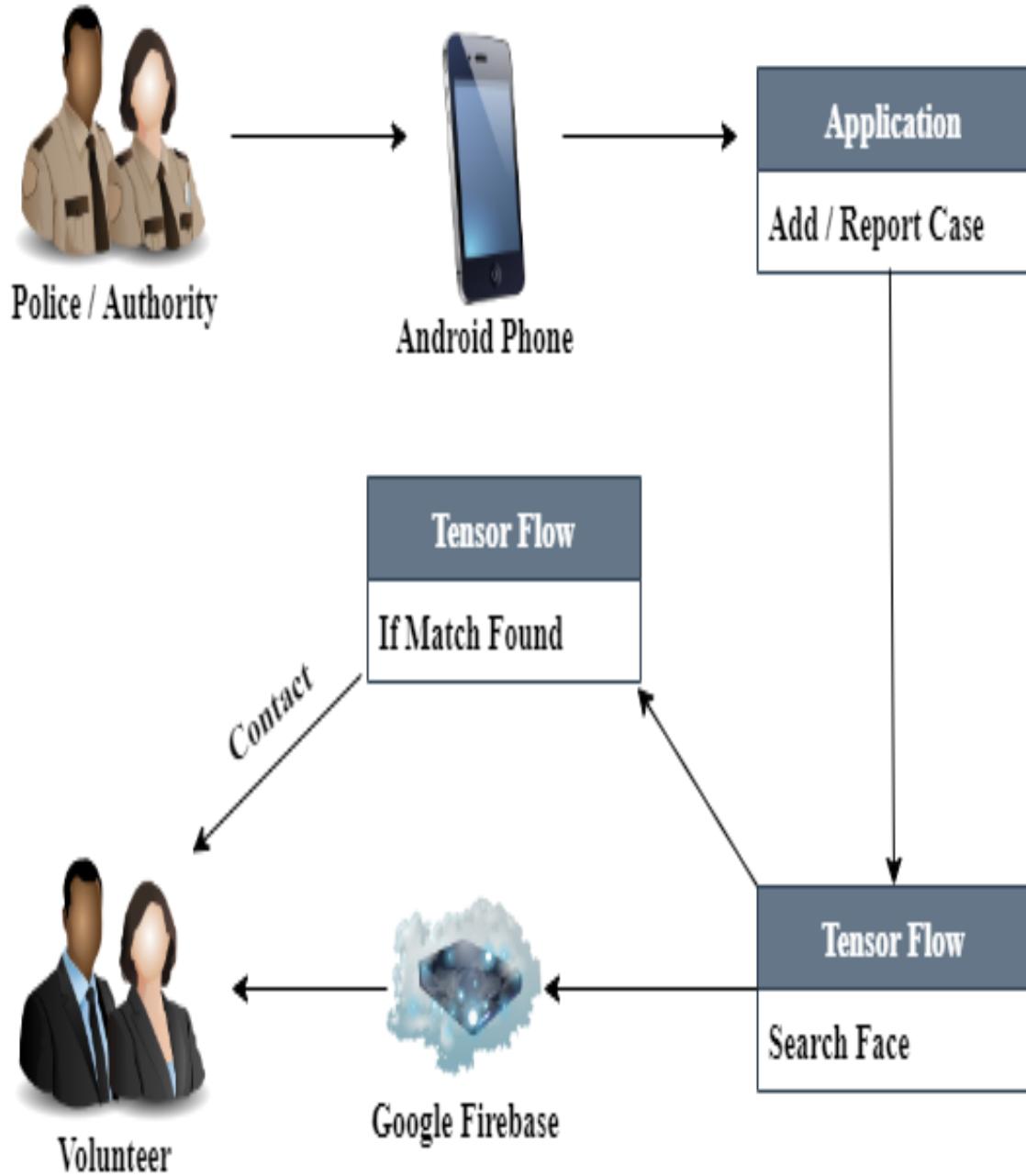


Fig. 6.2.1 DFD Level 1 Diagram

6.2.2 DFD Level 2:**Fig.6.2.2 DFD Level 2 Diagram**

6.2.3 DFD Level 3:

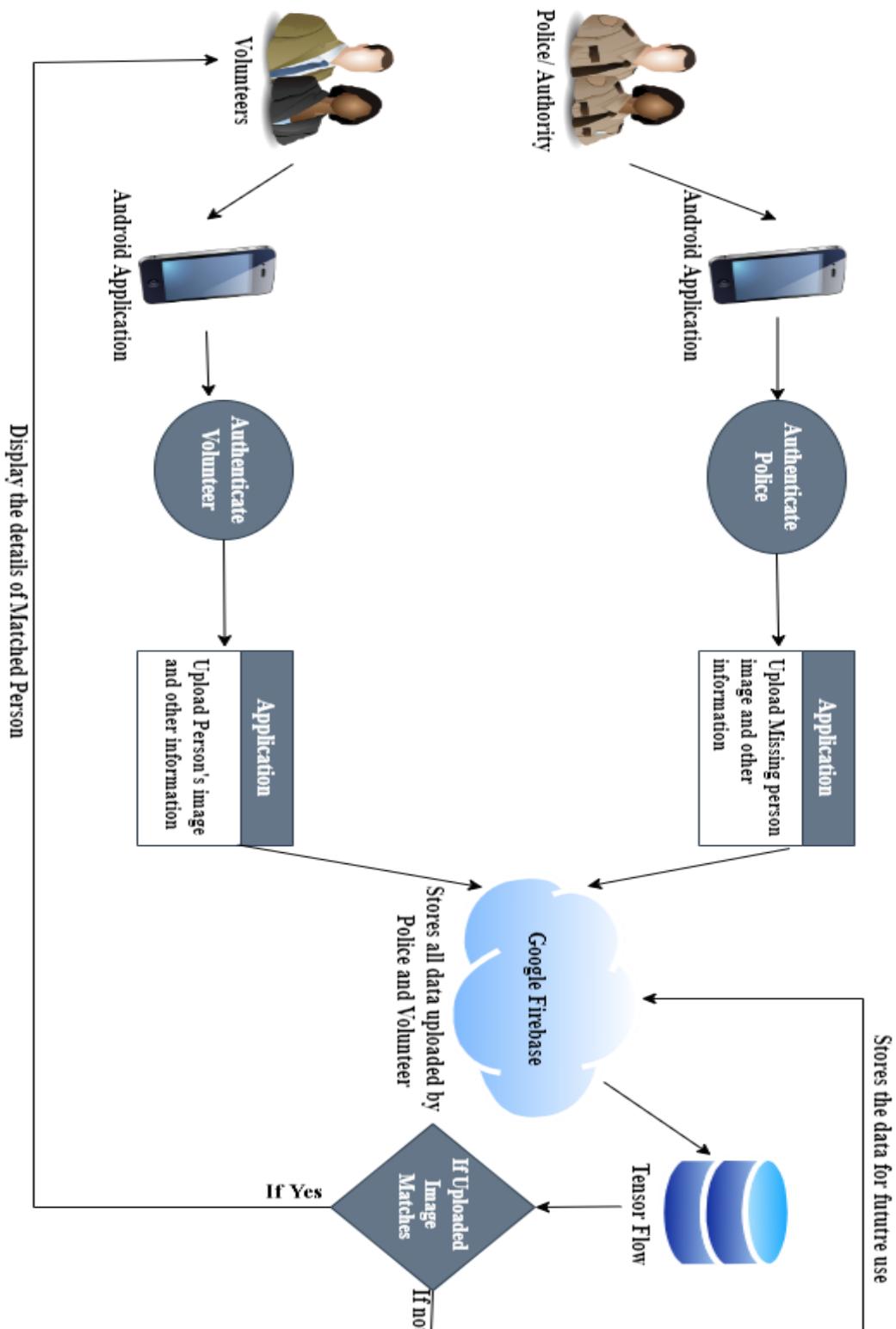


Fig.6.2.3 DFD Level 3 Diagram

6.3 ER DIAGRAM:

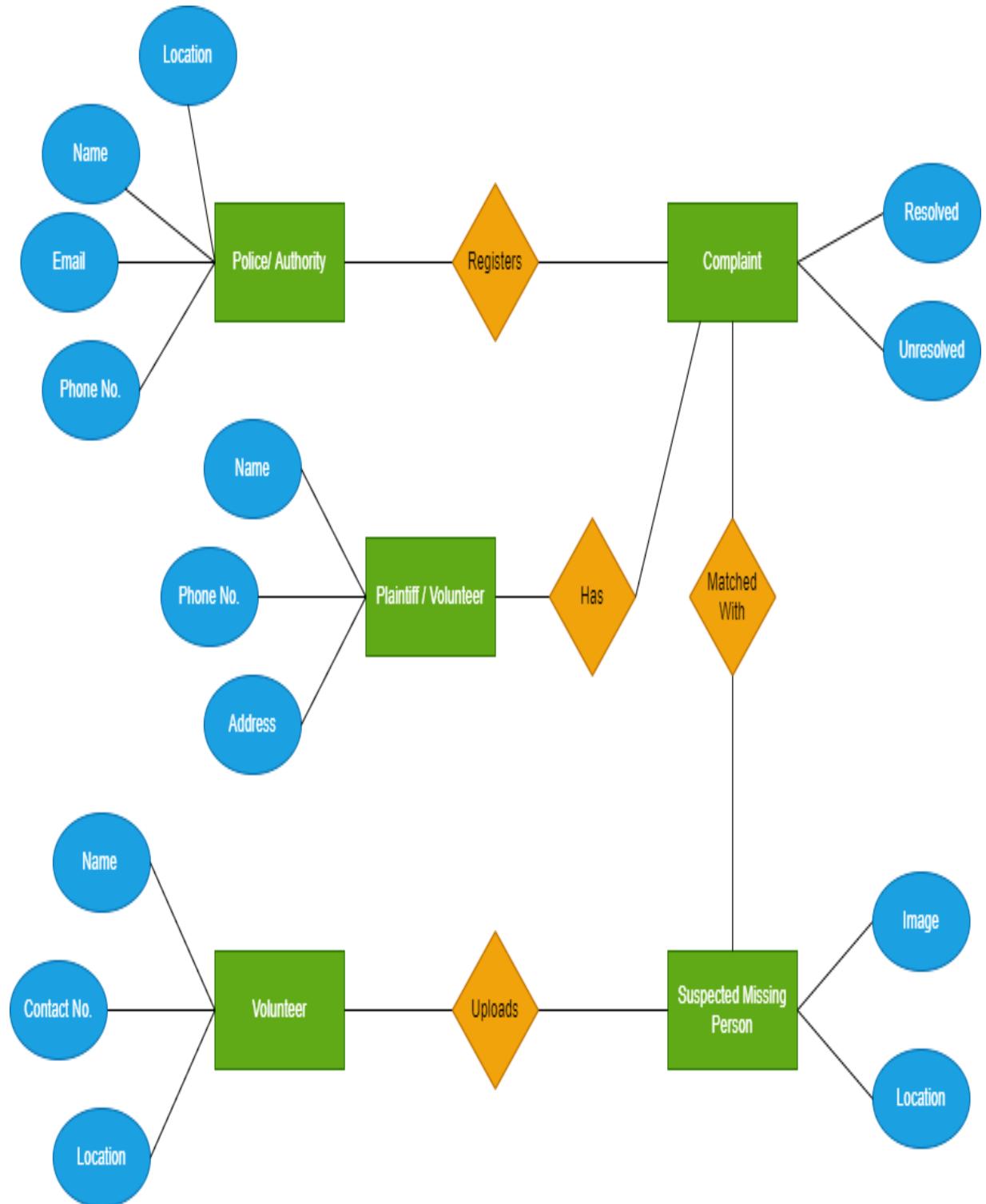


Fig. 6.3 ER Diagram

6.4 UML DIAGRAMS:

6.4.1 Class Diagram:

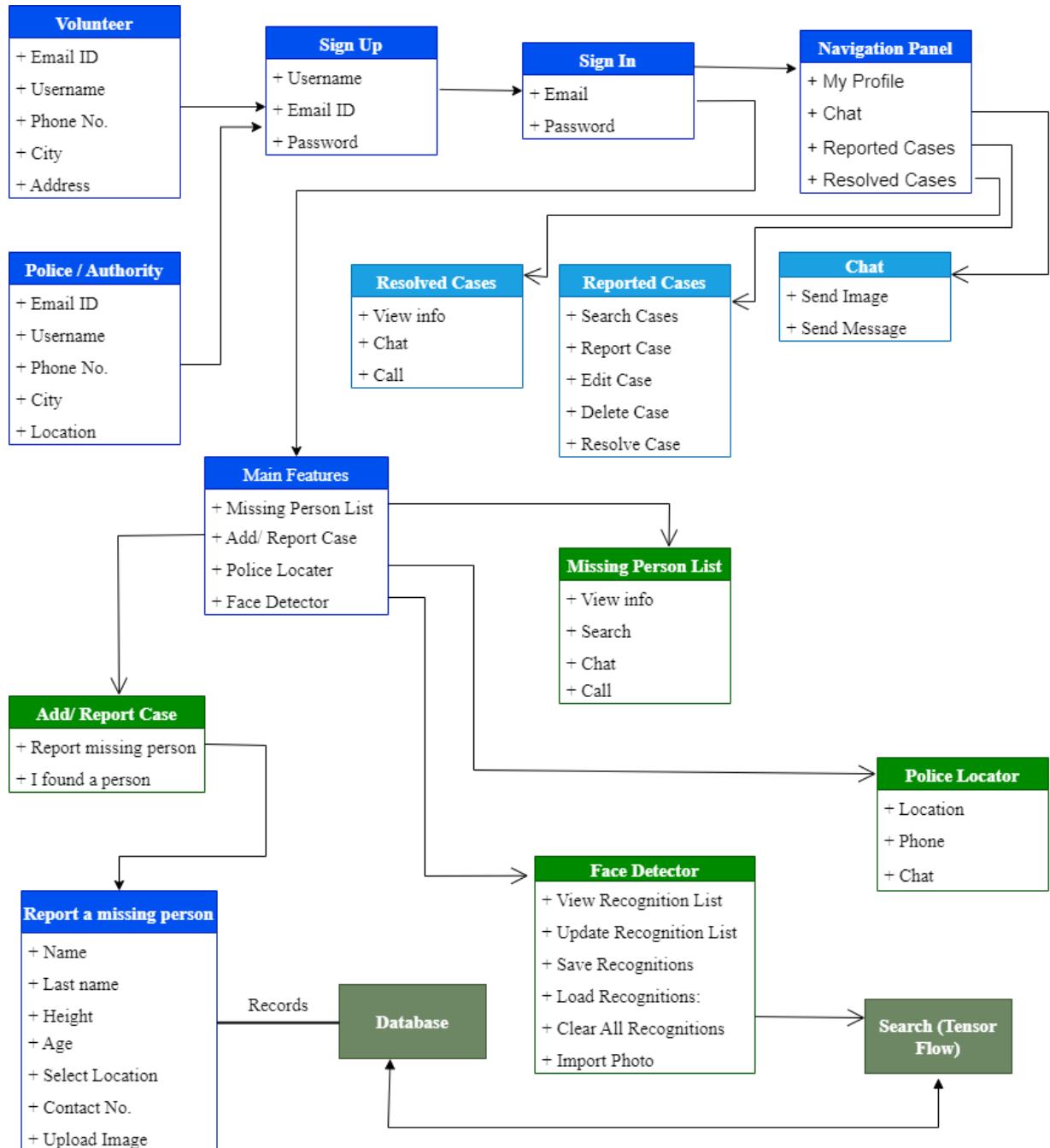


Fig.6.4.1 Class Diagram

6.4.2 Use Case Diagram:

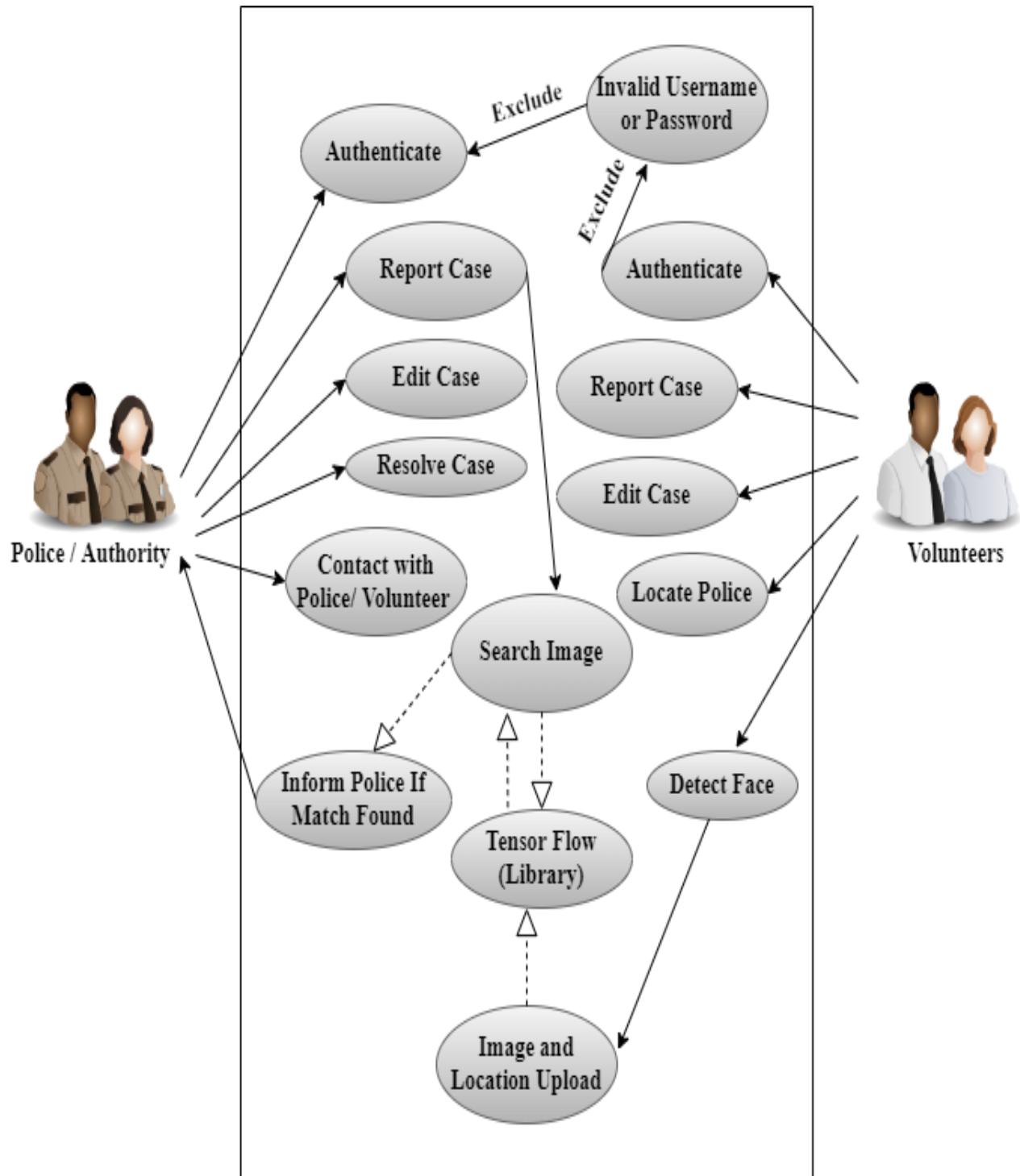


Fig.6.4.2 Use Case Diagram

CHAPTER 7

EXPERIMENTATION & RESULTS

7.1 EXPERIMENTATION:

7.1.1 Sign up Activity:

Sr. no	Test case ID	Test case Objectives	Prerequisites	Steps	I/P Data	Expected Result	Actual Result	Status
1.	TC-1	Enter the valid email Id and Password	Verification Activity opens	1) Click on enter your email. 2) Select a strong password. 4) Click on sign up button. 5) Open your email and click the link to verify.	User email And Password	Sign up successful.	Sign up successful.	Pass

Table 7.1.1 Sign up Activity

7.1.2 Viewing missing persons list:

S r. n o	Test case ID	Test case Objectives	Prerequisites	Steps	I/P Data	Expected Result	Actual Result	Status
1.	TC-2	Missing persons list should be displayed.	Some missing person's records must be present in the database.	1) Touch on the 'Missing persons list' tab. 2) Explore the various missing persons reports present in the database.	Touching on the Tab.	Missing persons list displayed.	Missing persons list displayed.	Pass

Table 7.1.2 viewing missing persons list

7.1.3 Adding or Reporting case:

Sr. no	Test case ID	Test case Objectives	Prerequisites	Steps	I/P Data	Expected Result	Actual Result	Status
1.	TC-3	Adding report.	Touching on report a missing person.	1) Touch on 'Report a missing person' Tab. 2) Add the information related to missing person. 3) Touch on submit to add report.	Information related to the missing person.	Missing person's report should be Added	Missing person's report added successfully .	Pass
2.	TC-4	Informing the missing person.	One should know one of the missing persons	1) Touch on 'I found a person' tab	User input i.e. Touch on the particular tab.	All the missing people's reports should be displayed along with contact information.	All information regarding missing persons displayed successfully	Pass

Table 7.1.3 Adding or Reporting case

7.1.4 Police locator activity:

Sr. no	Test case ID	Test case Objectives	Prerequisites	Steps	I/P Data	Expected Result	Actual Result	Status
1.	TC-5	Police should be displayed on Map.	Police must be register on our app.	1) Touch on the police locator tab. 2) Navigate on your location. 3) Search for nearby Police.	User input i.e. Touch on the particular tab.	Police should be located on the Map.	Police is located successfully on the Map.	Pass

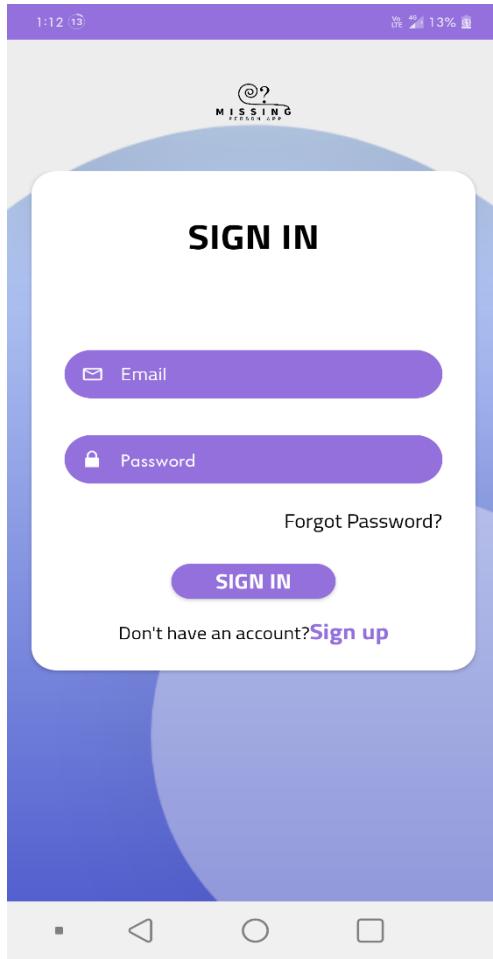
Table 7.1.4 Police locator activity

7.1.5 Detect face activity:

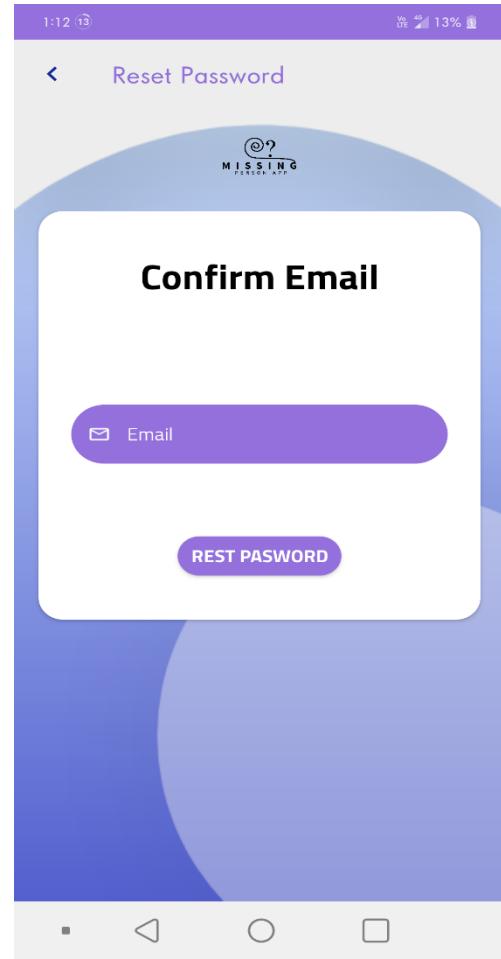
Sr. no	Test case ID	Test case Objectives	Prerequisites	Steps	I/P Data	Expected Result	Actual Result	Status
1.	TC-6	Captured face should be recognized	Required data should be present in our apps database.	1) Click on 'Detect face' tab. 2) Capture the specific person in Apps camera. 3) Or select the image of specific person.	Image of the missing person.	Should redirected to the missing person's report.	Successfully redirected to the missing persons report if data is present in the database	Pass

Table 7.1.5 Detect face activity

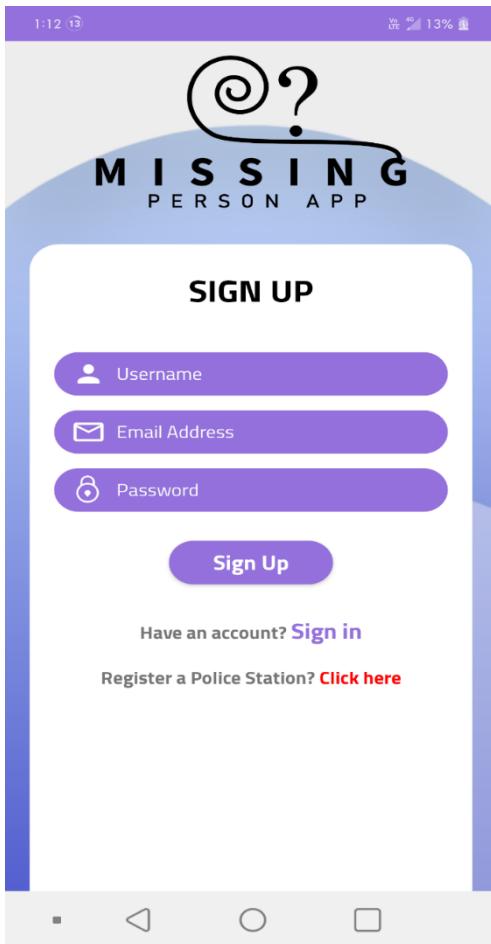
7.2 RESULTS:



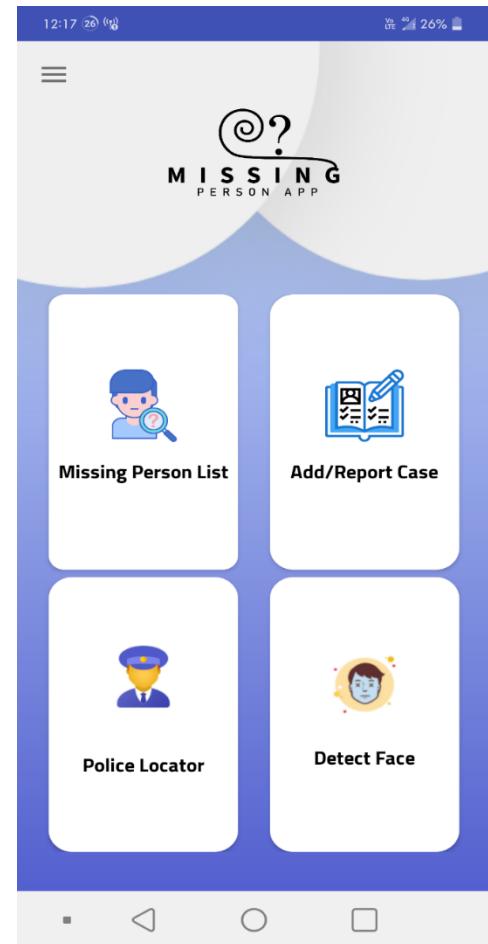
Sign In with Email and password



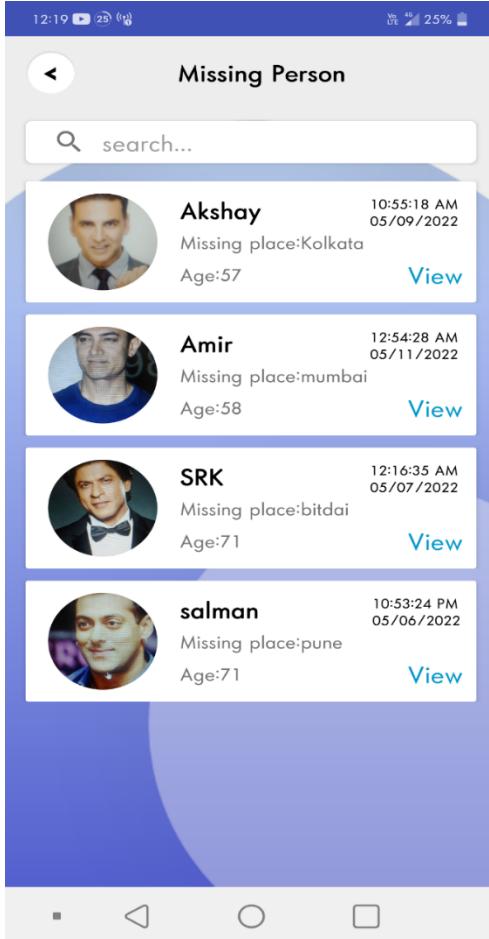
Reset Password



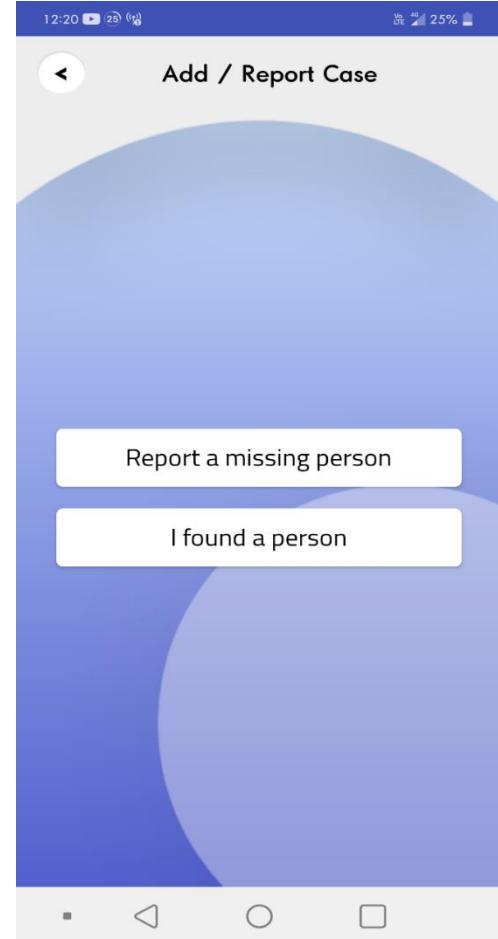
Sign Up with email password



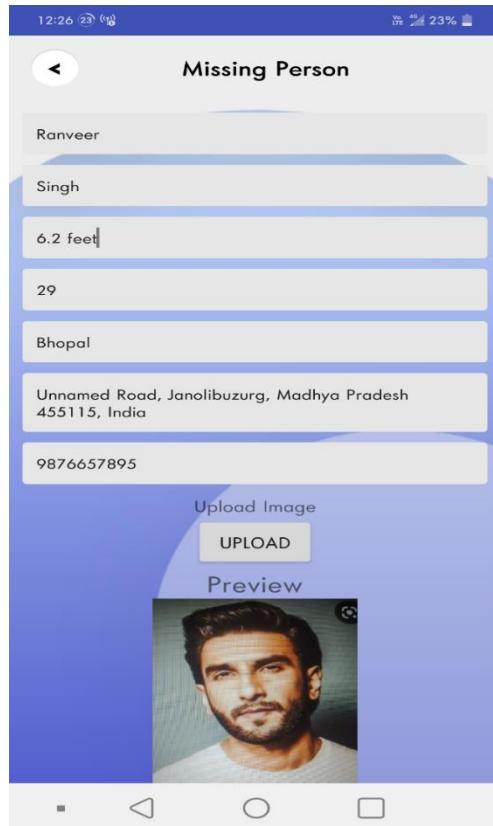
Dashboard



Missing Person Lists



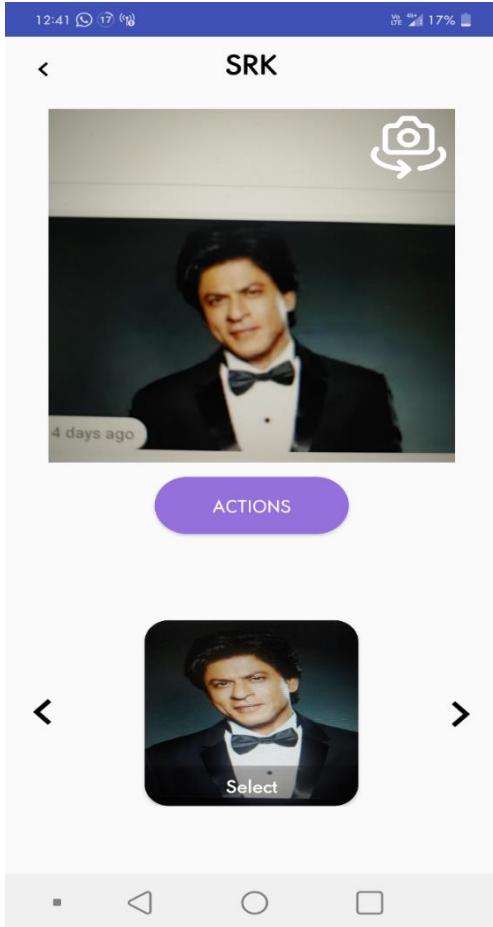
Add/Report Case



Upload Case with details



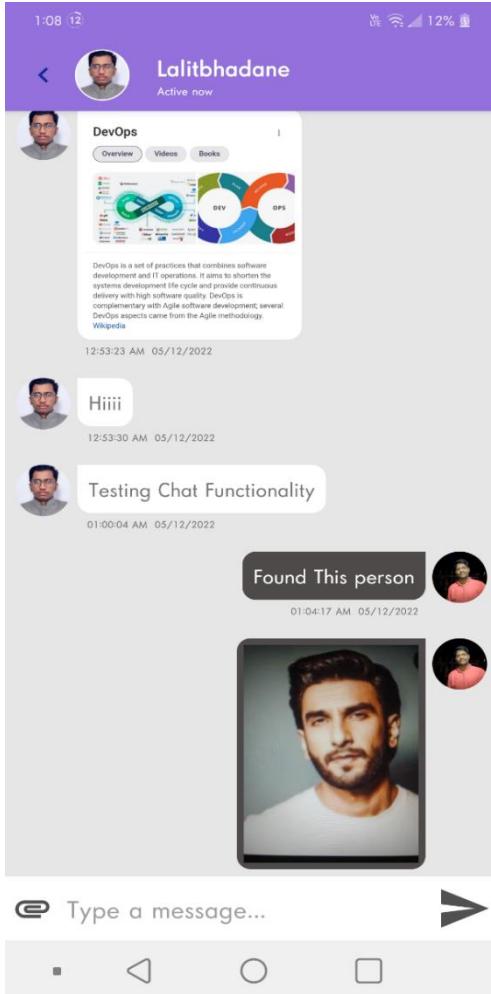
Police Station Locator



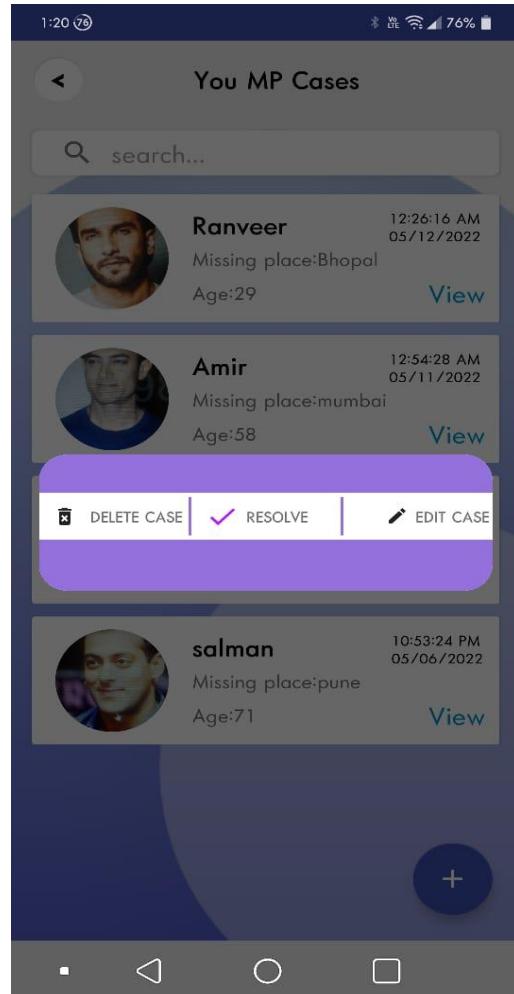
Face Detection Activity



Detected Profile



Chat with Reporter



Delete, Resolve, Edit Case

CHAPTER 8

SUMMARY AND CONCLUSION

8.1 SUMMARY:

In the world, a countless number of people are missing every day which includes kids, teens, mentally challenged, old-aged people with Alzheimer's, etc. Most of them remain untraced. Our project proposes a system that would help the police and the public by accelerating the process of searching using face recognition.

The Aim of our project is to make task of finding missing person easy and automated. Physically it takes huge time, as it is lengthy procedure for finding missing person as it increases time to launch an FIR in police station. So here we have introduced our android application to find the missing person in short span of time. This will make the work of police to find a particular person easier.

In our application firstly you need to authenticate yourself to create profile. While signing up you will receive verification link on email you entered. After authentication you can sign in with same email and password.

In application you can report/add the case where you need to fill details of missing person like name, age, height and select exact location using google map integration also need to upload the image of missing person.

Volunteer will go in Detect face activity and when he will hold camera on particular persons face our tensor flow model start working and if that person found in the cloud database app will redirect user to that profile where there is location of missing person and also will be able to chat with the volunteer who reported the case.

In police detector activity user will be able to find the location of police station registered on application. User will also be able to chat and call the police as well.

The main objective of finding missing person using artificial intelligence was achieved through our project.

8.2 CONCLUSION:

This report has discussed the development of an android application “Find Missing Person Using AI” for finding missing person with ease.

Image recognition with the use of one-shot learning has become very powerful. This technology when put into good use, can be beneficial. It can even be used in Hotels, Hospitals, etc., to find criminals instantly.

Process of identifying the missing people is fastened. Our system replaces the manual scanning process through the databases for each picture to check the match, by an efficient face recognition method which finishes the work in no time.

It will be useful to get exact location of the person if match detected with the Google maps integration which also makes police job easy. It will be helpful to contact police quickly as well.

By using the TensorFlow Face recognition we are trying to achieve almost 77.99% accuracy with the help of pre-trained model.

In the future, there is a scope to extend this system further by connecting our system to public cameras and detect faces real-time. The frames will be continuously sent by the public cameras to our system where our system will be continually monitoring the frames. When a lost person is identified in any of the frames, it will notify the concerned authorities, the method that finishes the work in no time.

CHAPTER 9

ANNEXURE

9.1 ANNEXURE A: PROJECT PLANNER

SR. NO.	TASK NAME	STATUS	START DATE	END DATE
1	PROJECT CONCEPTION AND INITIATION	Complete	1-Sep-21	10-Nov-21
1.1	– Requirement Analysis	Complete	1-Sep-21	15-Oct-21
1.2	– Research	Complete	16-Oct-21	26-Oct-21
1.3	– Projections	Complete	26-Oct-21	31-Oct-21
1.5	– Guidelines	Complete	1-Nov-21	5-Nov-21
1.6	– Project Initiation	Complete	5-Nov-21	10-Nov-21
2	PROJECT DEFINITION AND PLANNING	Complete	11-Nov-21	25-Dec-21
2.1	– Scope & Goal Setting	Complete	11-Nov-21	20-Nov-21
2.2	– Budget	Complete	20-Nov-21	5-Dec-21
2.3	– Communication Plan	Complete	5-Dec-21	15-Dec-21
2.4	– Risk Management	Complete	16-Dec-21	25-Dec-21
3	PROJECT EXECUTION	Complete	1-Jan-22	10-Apr-22
3.1	– Status & Tracking	Complete	1-Jan-22	15-Jan-22
3.2	– Designing	Complete	15-Jan-22	15-Feb-22
3.3	– Coding	Complete	16-Feb-22	28-Mar-22
3.3.1	— Testing	Complete	29-Mar-24	15-Apr-22
4	PROJECT PERFORMANCE / MONITORING	Complete	16-Apr-22	30-Apr-22
4.1	– Project Objectives	Complete	16-Apr-22	18-Apr-22
4.2	– Debugging	Complete	19-Apr-22	22-Apr-22
4.3	– Effort & Cost Tracking	Complete	24-Apr-22	26-Apr-22
4.4	– Project Performance	Complete	26-Apr-22	30-Apr-22

9.2 ANNEXURE B: PUBLISHED PAPER, CERTIFICATES OF PUBLICATION



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FIND MISSING PERSON USING ARTIFICIAL INTELLIGENCE

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Abstract - Face recognition is a biometric-based technology that mathematically maps a particular person's or individual's facial features and stores all that data as a face print. By using this technique, the information of the face of a person is saved mathematically or in the format of graphs in the database, which is used for detecting that particular face. Face recognition model in our system will find a match of that person in the database. If a match is found, it will be notified to the police and the guardian of that person.

In this paper we will use the ideas of the Tensor Flow which is based on Machine Learning (ML) and will detect faces with the maximum accuracies to find the missing person.

Key Words: Tensor Flow, Google Cloud Firebase, Face Recognition, missing person, Google maps, Activity.

1. INTRODUCTION

In the world, a countless number of people are missing every day which includes kids, teens, mentally challenged, old-aged people with Alzheimer's, etc. Most of them remain untraced. This paper proposes a system that would help the police and the public by accelerating the process of searching using face recognition.

Face recognition technique can be used for many things and finding the missing person is a biggest advantage for any face recognition technique. To make the task of finding the missing person easier we are planning to make an application which will be accessed by some volunteers through which we can find missing person in short span of time. This will make the work of police to find a particular person easier.

Meanwhile, there is a need of automation for automating the task of finding the particular person by recognizing particular image and comparing that image with other image in order to check whether both images has same characteristics or not. By doing this we will come to know whether the missing person in the image clicked from particular location is correct or not, and if it is correct then police can start their next steps to find the person from that area.

Here in our Android application we have built face detection system where if match found volunteer will be redirected to the missing persons profile where user will be able to get exact location of missing person with Google map integration

also user can chat with the person who posted that profile and get the update from him as well.

Using Tensor Flow to build face recognition and detection models might require effort, but it is worth it in the end. As mentioned, Tensor Flow is the most used Deep Learning framework and it has pre-trained models that easily help with image classification. The images are classified using CNN. In most cases, to generate a model means the classification of the images only needs to provide a similar image which is the positive image. The image is then trained and retrained through a process known as anchoring or Transfer Learning.

1.2 MOTIVATION

Physically it takes huge time, as it is lengthy procedure for finding missing person as it increases time to launch an FIR in police station. Also, during handy process workforce for searching missed person is not so great and due to this half of the cases remain mysterious.

An alarming fact about India's missing children is that 296 children go missing every day on average. And every month, that is a disturbing number of 9,019, half of them remain untraceable.

Shockingly, when India was dealing with the Covid-19 pandemic in 2020, the total number of children missing across India was 1,08,234, according to the National Crime Records Bureau data. 33,456 girls were reported missing, and 15,410 boys were missing, and 43,661 of them remained untraceable till the end of the year.

However, the statistics are indicative of the absence of a national Missing Children's repository. "There are no budgets earmarked for tracking missing people," said an official source.

2. EXISTING SYSTEM

When we went through the website, we immediately understood the issue. The process to submit pictures of a child (you find suspicious) in your area is tricky and not anonymous.

People who employ these children are powerful people nobody wants to mess with; this is why the user prefers anonymous submission.



The initiative wasn't using the power of machine learning. Since it is happening on a large scale, there should be an automated solution.

As shown in below image we can access all information of missing person under the tab of 'Photographs of Missing persons' as well as we can access the photographs of recovered children under the tab of 'Photographs of Recovered children'.



By clicking on 'Photographs of Missing children' we can get all information as well as photographs of missing persons as shown below:



They have published it for peoples that really want to help police for finding the missing persons. But if people who employ these children as child labors or any dangerous purpose got that particular person's information on the website then those people will definitely make things difficult for that person. In this way the information present on website can be misused by such peoples.

3. LITERATURE SURVEY

We did lot of survey and summed up following regarding literature survey so firstly, S. AYYAPPAN and his fellow mates from IFET College of Engineering have presented a paper which deals with a similar problem statement and

objective. The system proposed by them makes use of Deep Learning based Facial Feature Extraction and matching with stacked convolutional auto encoder (Scae). The images of missing Persons are stored in a database. Faces are detected from those images, and a Convolutional Neural Network learns features. These learned features were utilized for training a multi-class SVM classifier. They used this method to identify and label the kid correctly. The main difference between their work and ours is that we are going to create a dataset of lost persons with the help of people who want to contribute to society (voluntary work). And their system involves complex algorithms which make the process of extraction and classification slower [1].

Previously, Shefali Patil and his fellow mates from SNDT Women's University, Juhu, Mumbai have presented a paper which deals with a similar problem statement and objective. The system proposed by them uses KNN Algorithm which makes use of $136 * 3$ data points to recognize Face. The main disadvantage of using the KNN method is its accuracy 71.28%. The main difference between their work and ours is that here we are going to create a dataset using a mobile application with voluntary work of people. we are going to use Tensor Flow with trained model for face recognition. Also, our dataset is going to be stored in the cloud database e.g firebase.[2]

In August 2016, Rohit Satle and his team presented a paper which addresses the face recognition system built by using Principal Component Analysis (PCA) method. The two main drawbacks of applying the PCA method are that computational complexity is high, and it can only process faces with similar facial expressions. The main difference between their project and ours is that in we are using android application for to create voluntary database of missing person with our android application. Also we are going to use tensor flow for face recognition.[3]

According to the research paper presented by Birari Hetal and her fellow mates from Late G.N. Sapkal College of Engineering, who had also deal with the similar problem statement and objective. They have made the Android application for making the task of missing person easier. The Android Application proposed by them makes use of SWF-SIFT algorithm for comparing two images. In their application, only Admin and some trusted people like police, etc., can update the data set continuously. The main difference between their system and our system is that we are going to allow application users for uploading images (update data sets) of suspicious peoples like child beggars whom they think that they are missing. Although the images uploaded by that particular user is not viewed on our application. So we are trying to keep that data in safe hands.[4]



4. PROPOSED SYSTEM

The proposed system makes use of various methods for finding missing people.

The system structure is presented in **Fig.1**.

Overall Structure of Proposed System to prevail over the drawbacks of previous systems. In which you can add the case easily and detect the face on your fingertips and get the result if the match found. You will get exact location of the matched person with volunteers contact details.

The face recognition model in our system will try to find a match in the database with the help of Tensor Flow. It is performed by comparing the face encodings of the uploaded image to the face encodings of the images in the database. If a match is found, it will redirect user to that person's profile where location and volunteer mobile no is mentioned to contact.

The proposed system contains the following Modules:

Sign In/Sign Up Activity:

- User will first go to sign in fragment if he/she has not created profile then user will go to sign up.
- In Sign Up user will have to enter username, email and password.
- After entering this user will receive verification link on email and user will have to click on that link to get verified.
- After authentication user's profile will get created.
- Police also sign up using same method just they need to enter their location(Google map integrated) with mobile number so that their profile will get created to that specific location on Google map.
- User can sign in into the account.

Add Report/Case Activity:

- Here anybody will be able report the missing person.
- User need to enter missing persons details like name, age, height etc. with the location
- User can select exact location with Google map integration.
- Also need to upload image of missing person for face detection.
- This will create missing persons profile and it will get added in missing persons list.

Detect Face Activity:

- In this activity user will be able to match the faces.
- User need to hold the camera in front of suspicious person who he thinks that is missing.
- If the match found in cloud database that is firebase then that user will be redirected to profile of that missing person.
- On profile there is location of that person with reporter's mobile number and other details.

Police Locator Activity:

- When police sign up through the app they need to provide their location (Google map integrated).
- On that exact location in this activity map is marked with that police profile.
- User/Volunteer will be able to easily find and contact police authority with this feature.

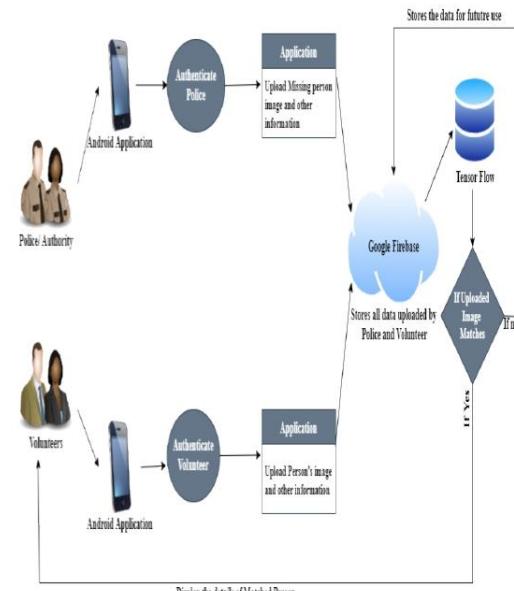
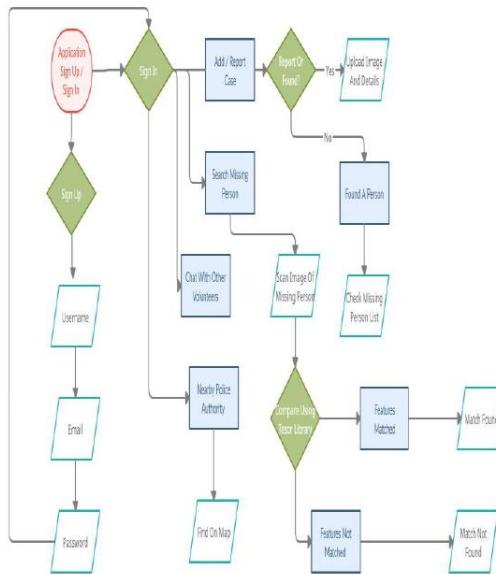
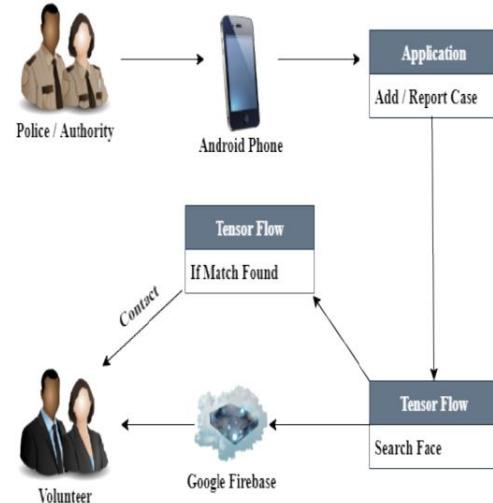


Fig -1: Flow

**Chat Activity:**

- In this activity volunteers are able to chat with each other.
- When someone reports the case there profile gets attached to that case and now anybody can chat with them regarding that particular case.
- In the chat activity there you can send text message and images as well.
- All standard chat app feature is there like message is delivered, seen and next user is typing when he was last online etc.
- When you sent chat to anybody they will get notified as well.

**Fig -2: Structure of System****Fig -3: Architecture****4.1 TECHNICAL PROPOSITION:**

TensorFlow is an end-to-end open-source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries and community resources that lets researchers push the state-of-the-art in ML and developers easily build and deploy ML powered applications.

Using TensorFlow to build face recognition and detection models might require effort, but it is worth it in the end. As mentioned, TensorFlow is the most used Deep Learning framework and it has pre-trained models that easily help with image classification. The images are classified using CNN. In most cases, to generate a model means the classification of the images only needs to provide a similar image which is the positive image. The image is then trained and retrained through a process known as anchoring or Transfer Learning.

Years back, finding that model for training and retraining was difficult. Now, TensorFlow has simplified the process.

In our application there will be the feature of saving all the data of the missing person so that system can detect that image data and trace the missing person.

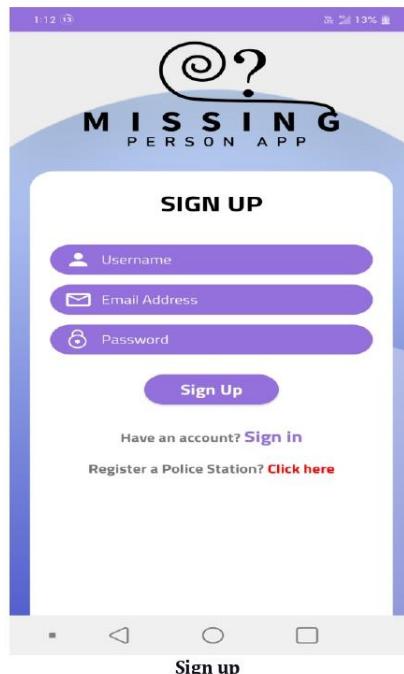
We have also created an Android Application for finding out the missing persons more efficiently. In our application we



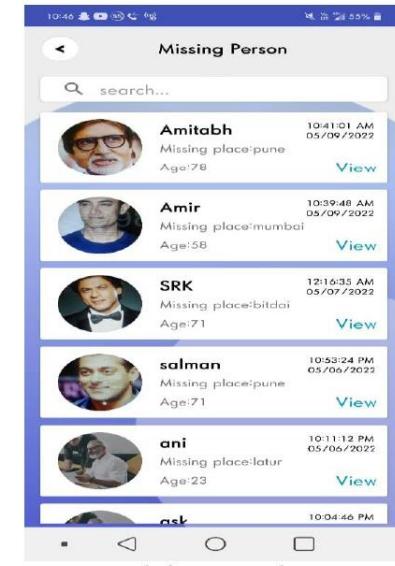
have tried to implement a lot of functionalities like login with Authentication where user will require the email-id and password for log in into our application also we have firebase verification for email authentication. We can also report the missing person along with its particular locations with the help of Google Map Integration as well as the locations of the nearby Police stations and the location from where the missing person is reported will also get visible on the Map. Our application will maintain a list of the missing persons as well. Matching up of the various faces will also be done in our application with the help of the 'Tensor library'. (Ref Fig.3)

5. Results

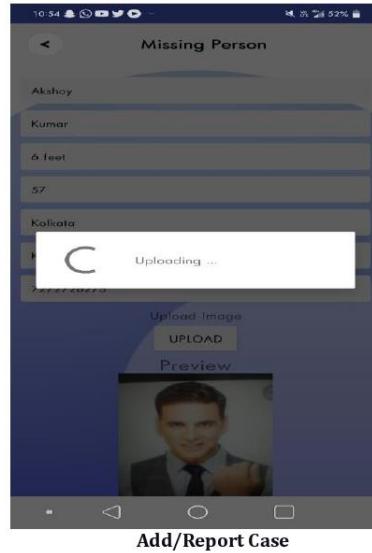
We have made an Android Application that consists of the features like Face recognition that will be used for finding the missing person, Google maps for police location finding etc... Some of the Screenshots of our applications are :-



Dash Board



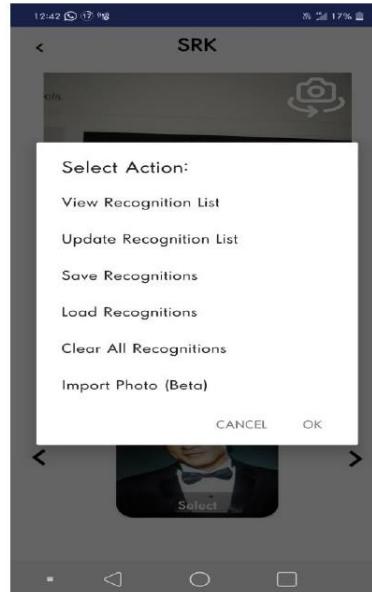
Missing Person List



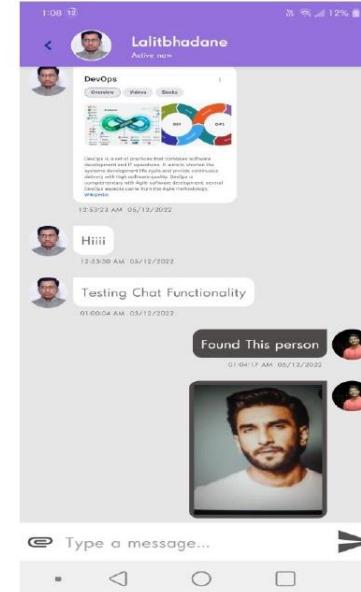
Add/Report Case



Missing Person Scan



Various Actions



Chat With Volunteer

**Police Station Locator**

6. CONCLUSION AND FUTURE SCOPE

Image recognition with the use of one-shot learning has become very powerful. This technology when put into good use, can be beneficial. It can even be used in Hotels, Hospitals, etc., to find criminals instantly.

Process of identifying the missing people is fastened. Our system replaces the manual scanning process through the databases for each picture to check the match, by an efficient face recognition method which finishes the work in no time.

It will be useful to get exact location of the person if match detected with the Google maps integration which also makes police job easy. it will be helpful to contact police quickly as well.

By using the TensorFlow Face recognition we are trying to achieve almost 77.99% accuracy with the help of pre-trained model.

In the future, there is a scope to extend this system further by connecting our system to public cameras and detect faces real-time. The frames will be continuously sent by the public cameras to our system where our system will be continually monitoring the frames. When a lost person is identified in any of the frames, It will notify the concerned authorities, the method that finishes the work in no time.

REFERENCES

- [1] S. Ayyappan and S. Matilda, "Criminals and missing children identification using face recognition and web scrapping" IEEE ICSCAN 2020.
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National government tracking system for missing & vulnerable children.

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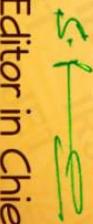
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9.3 ANNEXURE C: POSTER

Project Title: Find Missing Person Using AI



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Introduction

In the world, a countless number of people are missing every day which includes kids, teens, mentally challenged, old-aged people with Alzheimer's, etc. Most of them remain untraceable. This paper proposes a system that would help the police and the public by accelerating the process of searching using face recognition. Face recognition technique can be used for many things and finding the missing person is a biggest advantage for any face recognition technique. To make the task of finding the missing person easier we are planning to make an application which will be accessed by some volunteers through which we can find missing person in short span of time. This will make the work of police to find a particular person easier.

Meanwhile, there is a need of automation for automating the task of finding the particular person by recognizing particular image and comparing that image with other image in order to check whether both images has same characteristics or not.

Here in our Android application we have built face detection system where it match found volunteer will be redirected to the missing persons profile where user will be able to get exact location of missing persons with Google map integration also user can chat with the person who posted that profile and get the update from him as well.

Using Tensor Flow to build face recognition and detection models might require effort, but it is worth in the end. As mentioned, Tensor Flow is the most used Deep Learning framework and it has pre-trained models that easily help with image classification. The images are classified using CNN. In most cases, to generate a model means the classification of the images only needs to provide a similar image which is the positive image. The image is then trained and retrained through a process known as anchoring or Transfer Learning.

Objective

Physically it takes huge time, as it is lengthy procedure for finding missing person as it increases time to launch an FIR in police station. Also during hasty process workforce for searching missed person is not so great and due to this half of the cases remain mysterious. An alarming fact about India's missing children is that 296 children go missing every day on average. And every month, that is a disturbing number of 9,019, half of them remain untraceable.

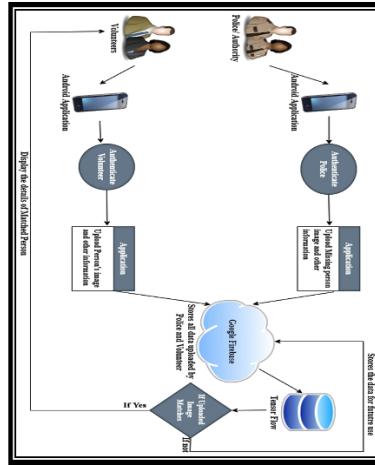
Our objective is to reduce the time which is required to find a missing person with the leverage of machine learning the whole process. It results into reduction in direct and indirect cost which goes into finding the missing person.

The main purpose is to help police authorities and make their work easy with the help of an android application and also public to help in the whole process.

Literature Survey

- We did lot of survey and summed up following regarding literature survey so firstly, S.AYYAPPA and his fellow mates from IFET College of Engineering have a presented a paper[1] which deals with a similar problem statement and objective.(year-2020).
- The images of missing kids are stored in a database. Faces are detected from those images and features are learned by a Convolutional Neural Network.
- In August 2014, Swarna Bal Arniker and K.Sita Rama Rao his team from Research Centre Infrat, Hyderabad, presented a paper which gives use insights of RFID Based Missing Person Identification System. This RFID reading equipment may be maintained at all police stations and public gatherings in the future.
- The main difference between their work and ours is that here we are going to create a dataset using a mobile application with voluntary work of people, we are going to use Tensor Flow with trained model for face recognition. Also, our dataset is going to be stored in the cloud database e.g. firebase

System Architecture



```

graph TD
    Volunteer[Volunteer] -- "Digital Photo/Missing Person" --> IdentificationWearer[Identification Wearer]
    IdentificationWearer -- "Android Application" --> AttentivePolice[Attentive Police]
    AttentivePolice -- "Global Navigation Satellite System and GPS" --> Application[Application]
    Application -- "Upload Photo/Video and other information" --> GooglePhotos[Google Photos]
    GooglePhotos -- "Save all data uploaded by Police and Volunteer" --> Database[Database]
    Database -- "If Yes" --> IfYes{If Yes}
    IfYes --> TeamPolice[Team Police]
    TeamPolice -- "Find and contact" --> PoliceAuthority[Police Authority]
    
```

Features

- The time to locate the mission person decreases drastically.
- Reduction in direct costs.
- Police locator allows you to easily find and contact Police.
- Finding missing person easy and automated.
- Chat feature allow user to instantly contact to Parent/Police.
- Directly give authorized person's location of missing person if found.

Methodology

1. **Sign In/Sign up Activity:**
User will first go to sign in fragment if he/she has not created profile then user will go to sign up.
2. **Add report/case activity:**
After entering this user will receive verification link on email and user will have to click on that link to get verified.
3. **Detect face activity:**
In this activity user will be able to match the faces.
4. **Police/volunteer activity:**
User need to hold the camera in front of suspicious person who he thinks that is missing.
5. **User/Volunteer will be able to easily find and contact police authority with this feature:**
If the match found in cloud database that is firebase then that user will be redirected to profile of that missing person.

Conclusion

- Image recognition with the use of one-shot learning has become very powerful. This technology when put into good use, can be beneficial.
- Process of identifying the missing person is fastened. Our system replaces the manual searching process through the databases for each picture to check the match, by an efficient face recognition method which finishes the work in no time.
- It will be useful to get exact location of the person if match detected with the google maps integration which also makes police job easy. It will be helpful to contact police quickly as well.
- By using the TensorFlow Face recognition we are trying to achieve almost 77.99% accuracy with the help of pre-trained model.

9.4 ANNEXURE D: REFERENCES

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