RV COLLEGE OF ENGINEERING®, BENGALURU - 560059
(Autonomous Institution Affiliated to VTU, Belagavi)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

"Missing Persons Database"

PROJECT REPORT
DATABASE DESIGN LAB(18CS53)
V SEMESTER

2020-2021

Submitted by

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Under the Guidance of

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CERTIFICATE

Certified that the **Mini-**Project work titled "**Missing Persons Database**" has been carried out by Sriram NC (1RV18CS173), Utkarsh Choubey (1RV18CS180) andSimhendra Urs (1RV18CS167) bonafide students of RV College of Engineering, Bengaluru, have submitted in partial fulfillment for the **Assessment of Course: DATABASE DESIGN (18CS53) Laboratory** during the year 2020-2021. It is certified that all corrections/suggestions indicated for the internal assessment have been incorporated in the report.

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DECLARATION

We, **Sriram NC (1RV18CS173), Utkarsh Choubey (1RV18CS180), Simhendra Urs (1RV18CS167)** the students of 4th Semester B.E., Department of Computer Science and Engineering, R.V. College of Engineering, Bengaluru hereby declare that the mini-project titled **"Missing Persons Database"** has been carried out by us and submitted in partial fulfillment for the **Assessment of Course: DATABASE DESIGN PROJECT (18CS53)** during the year 2020-2021.

Place: Bengaluru.

Sriram NC (1RV18CS173)
Utkarsh Choubey (1RV18 CS180)
Simhendra Urs (1RV18CS167)

ACKNOWLEDGEMENT

Any achievement, be it scholastic or otherwise does not depend solely on the individual efforts but on the guidance, encouragement and cooperation of intellectuals, elders and friends. A number of personalities, in their own capacities have helped me in carrying out this project work. I would like to take this opportunity to thank them all.

I deeply express my sincere gratitude to my guide **Poonam Ghuli , Associate Professor Department of CSE, RVCE**, Bengaluru, for her able guidance, regular source of encouragement and assistance throughout this project.

I would like to thank **Dr.Ramakanth Kumar P**, Head of Department, Computer Science & Engineering, R.V.C.E, Bengaluru, for his valuable suggestions and expert advice.

First and foremost I would like to thank **Dr. Subramanya K N**, Principal, R.V.C.E, Bengaluru, for his moral support towards completing my project work.

I thank my Parents, and all the Faculty members of the Department of Computer Science & Engineering for their constant support and encouragement.

Last, but not the least, I would like to thank my peers and friends who provided me with valuable suggestions to improve my project.

Abstract

Most investigating agencies in India use offline records to track missing persons, which involves a lot of manpower and resources. This consumes precious time in which the victims may disappear forever. Missing persons database is a system which is used by detective agencies to find people who have been missing for a long time such as victims of kidnapping or murder. It usually records information about the victims prior to their disappearance due to various possible reasons. Sometimes this can be in the form of an FIR. There is a need for improvement in the current system which should be efficient and reliable which can aid the problem and this is what motivated us to do this project.

We propose an intelligent, online method of investigating people's disappearance in which most of the work is done automatically and the police only need to follow up using the results of our system, which contains a GUI, uses facial recognition, GPS location tagging and tracking, etc. to make an accurate prediction on the location of the victim. The Missing Persons Tracing System is a web application built on Django framework based on python while the frontend is built on HTML, CSS and JavaScript. This uses both RDBMS - MySQL as well as NoSQL - MongoDB. This system is basically a follow-on to the current system of tracking cases of kidnapping, disappearance, etc. It can be seen as an improvement from the current system as it also has room for automation. The main need to make this is to embrace newer technologies for database storages and how they can be seen as better alternatives than the usual databases. It also shows how automation can be incorporated into the system.

As a result of our self-study, we were able to implement the concepts taught to us, along with the materials we found on the web. We successfully created a full-fledged website, using which the user can order, and sell used and new products. We successfully implemented NoSQL integration and the frontend using Django. The whole project was completed after 8 weeks of hard work by the team members. Our gratitude to the faculty who helped us in this process with their valuable guidance and encouragement.

Table of Contents

Chapter 1

Introduction

Missing persons database is a system which is used by detective agencies to find people who have been missing for a long time such as victims of kidnapping or murder. It usually records information about the victims prior to their disappearance due to various possible reasons. Sometimes this can be in the form of an FIR.

1.1 Objective

The Missing Persons Tracing System is basically a follow-on to the current system of tracking cases of kidnapping, disappearance, etc. It can be seen as an improvement from the current system as it also has room for automation. The main need to make this is to embrace newer technologies for database storages and how they can be seen as better alternatives than the usual databases. It also shows how automation can be incorporated into the system.

1.2 Scope

Goal is to build an automated Missing Persons Tracing System. Objectives of the Missing Persons Tracing System are:

1. A system for police officers to digitally investigate missing persons reports and catch the suspects responsible.
2. A face recognition system which will be able to recognise victims via surveillance to track their location faster.

The benefits of this system are :

1. It will be very easy to understand the functionalities and operate upon them.
2. Investigation can be automated to a large extent and will reduce the use of manpower and resources and result in speedy justice.
3. The facial recognition system will mitigate the need for police officers to manually cross- reference pictures in an offline database.

1.3 Proposed System

We propose an intelligent, online method of investigating people's disappearance in which most of the work is done automatically and the police only need to follow up using the results of our system, which contains a GUI, uses facial recognition, GPS location tagging and tracking, etc. to make an accurate prediction on the location of the victim.

1.4 Societal Concern and Innovative Component

Our concern is improvement of law and order to ensure that people who are missing for any reason can be found easily and the perpetrators can be caught and punished accordingly. We are using technologies like facial recognition to track the last known location of the victim as well as surveillance footage of the possible criminal involved. We can also use social media for NLP to analyse mysterious cases of disappearance.

Chapter 2

Requirement Specification

The purpose of the S.R.S. is to present a detailed description of the software for the tracing of missing persons. It will explain the purpose and features of the software, the interfaces of the software, what the software will do and the constraints under which it must operate. This S.R.S. is intended for users of the software and also potential developers. This will also provide a reference to verify whether the developed software meets the intended objectives, at any phase of development.

2.1 Hardware Specification

- Pentium IV or higher, (PIV-300GHz recommended)
- 256 MB RAM
- 1 Gb hard free drive space
- Network card for internet connection

2.2 Software Specification

- Django
- HTML
- CSS
- Web Browser: Microsoft Internet Explorer, Mozilla Firefox, Google Chrome
- MySQL and MongoDB (NoSQL db)
- Operating System: Windows, Linux

2.3 Functional Requirements

A. Police

- Login- Police should be able to login using a username and password inside their designated police station.
- Register- Police or detectives who have recently joined must be able to create a login system for themselves. This needs a highly secure yet convenient way

of verification so that only authorized users have access to highly sensitive information.

- Database entry GUI- Once logged in, officers must be able to easily enter the appropriate details for the victim, suspect, etc. and must also be able to quickly access them for offline investigation.

B. Surveillance

Footage from CCTV, traffic cameras etc. must be compiled and connected to MongoDB database of existing victim photos for the facial recognition to work.

C. Victim's relatives

There should be a GUI for relatives to seamlessly update information about the missing person such as ransom calls, photos which weren't present earlier etc. so that all the information is in one place, rather than the police doing this manually.

D. Output

Once all the information is collected, our system must automatically predict the location of the missing person as well as the probable suspect. Finally, the databases should be updated if and when the victim is found

Chapter 3

ER Diagram

ER Diagram stands for Entity Relationship Diagram, also known as ERD is a diagram that displays the relationship of entity sets stored in a database. In other words, ER diagrams help to explain the logical structure of databases. ER diagrams are created based on three basic concepts: entities, attributes and relationships.

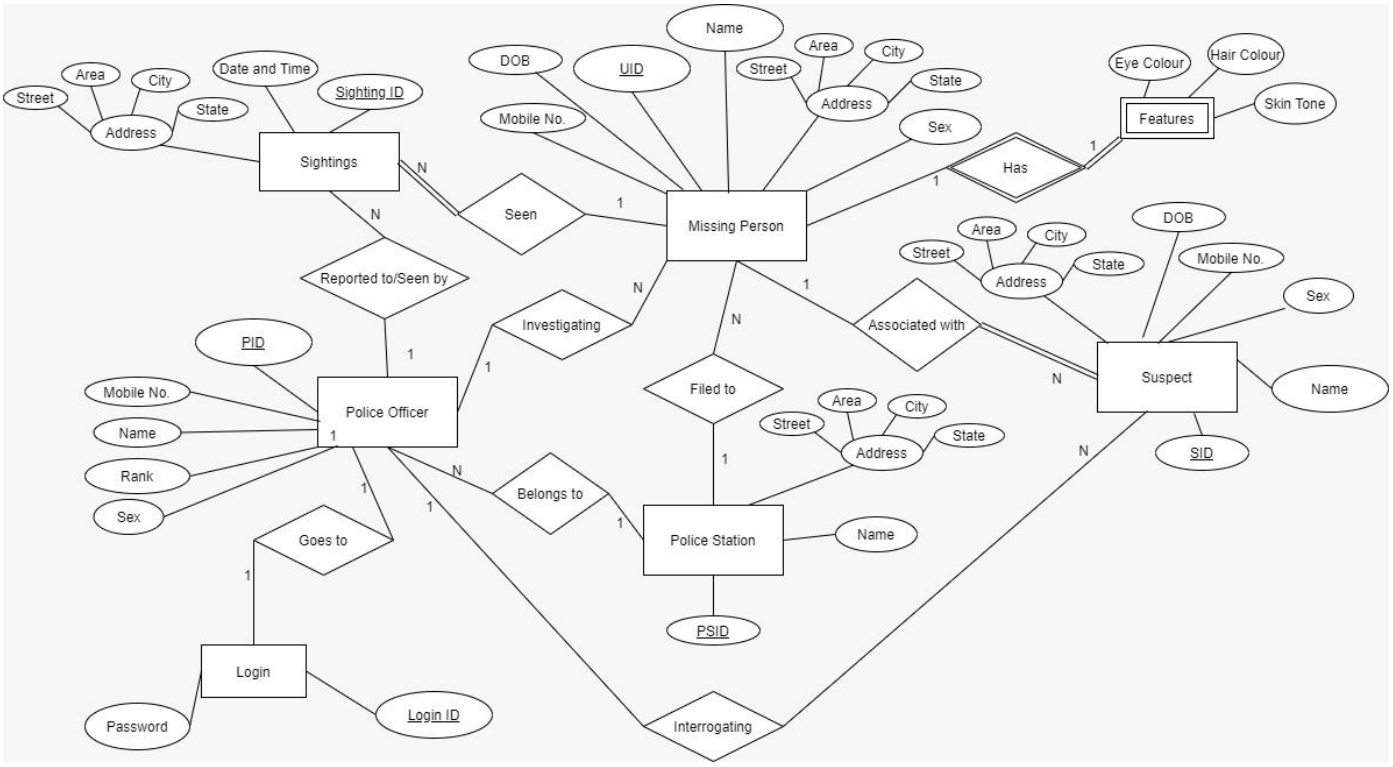

Fig 3.1. ER Diagram of the project

In our project, we have a victim related to the missing person(PK:UID) who was seen many times in different places and associated with multiple suspects(PK:SID) investigated by the assigned police officer(PK:PID).
Every police officer belongs to one police station (PK:PSID) and has a login ID for our Django web application.

Chapter 4

Detailed Design

DFD is the abbreviation for **Data Flow Diagram**. The flow of data of a system or a process is represented by DFD. It also gives insight into the inputs and outputs of each entity and the process itself. DFD does not have control flow and no loops or decision rules are present. Specific operations depending on the type of data can be explained by a flowchart. Data Flow Diagrams can be represented in several ways. The DFD belongs to structured-analysis modeling tools. Data Flow diagrams are very popular because they help us to visualize the major steps and data involved in software-system processes.

4.1 Level 0 DFD

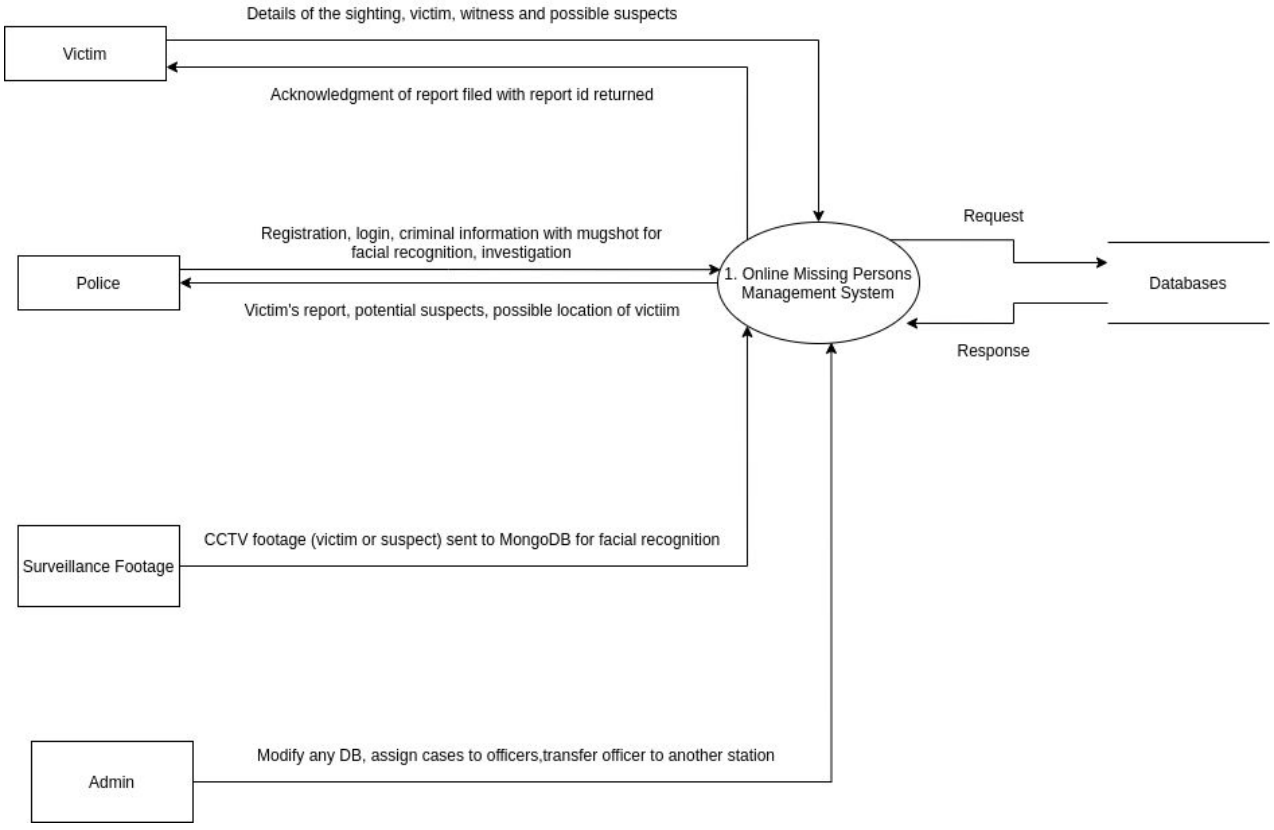

Fig 4.1. DFD Level 0

Our system has 4 types of users- victim, police, surveillance footage and admin who use this online system and each feature involves either reading from or writing to our database.

4.2 Level 1 DFD

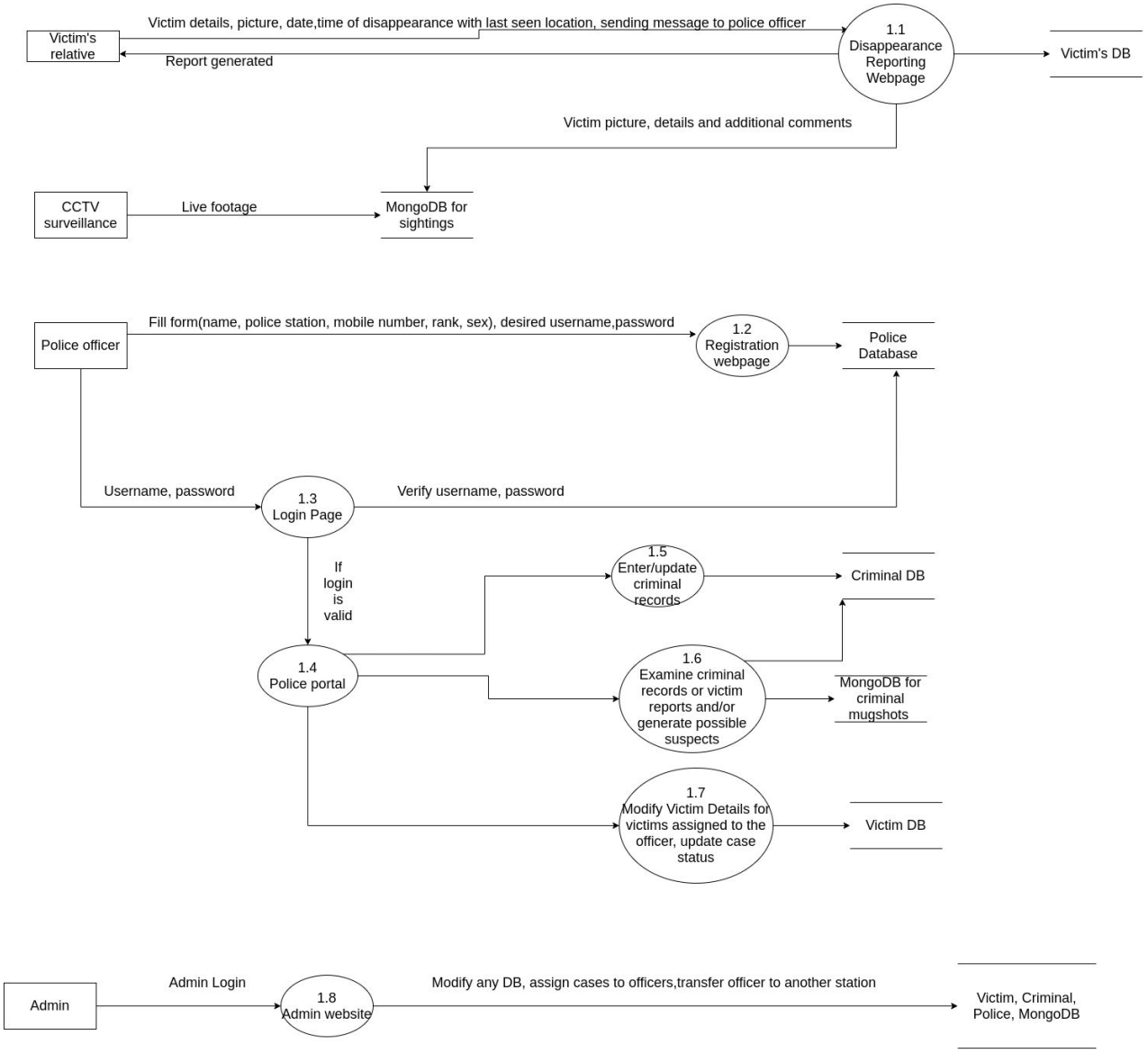

Fig 4.2. DFD Level 1

The admin has the highest privilege. He can read, modify, add or delete any record in any database and can also assign cases to the right officer or transfer them where necessary and also maintain the security of the DB.

The police officer (who is not an admin) has to register with his details, verify the OTP and then login through the police portal's login page to read or modify criminal records or those of victims' assigned to him by the admin. The officer can also upload images to MongoDB or perform facial recognition with a given piece of CCTV surveillance footage. Finally, the officer can update the case status or close the case. All operations are logged on the server and can be seen by the Admin.

The victim's relative or the police can register a case or FIR of a missing person online and can also view the case status or send messages to the police officer assigned. The message is logged in the database with the victim's IP address to check authenticity.

Chapter 5

Relational Schema and Normalization

5.1 Relational Schema

Relation schema defines the design and structure of the relation like it consists of the relation name, set of attributes/field names/column names. every attribute would have an associated domain.

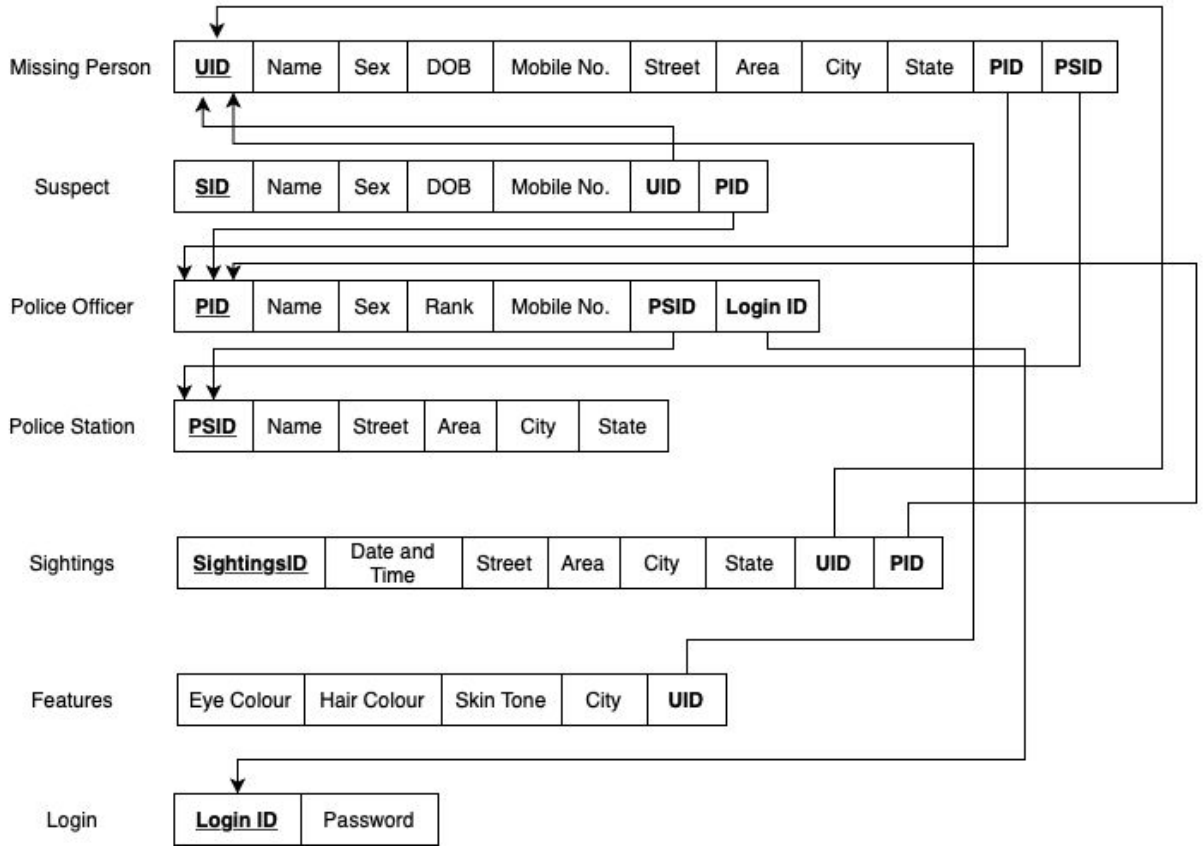

Fig 5.1. Schema Diagram

Here Police Officer references the Police station by PSID since every officer belongs to a station. Sightings refer to police officers by PID and the victim by UID. The suspect references both police officers and victims by PID and UID respectively since we can find out to which victim the suspect is accused of kidnapping and which officer is investigating him.

5.2 Normalisation

Normalization is the process of minimizing **redundancy** from a relation or set of relations. Redundancy in relation may cause insertion, deletion and updation anomalies. So, it helps to minimize the redundancy in relations.

Authentication System

LoginID	Password
A	B

Police Officers

PID	Name	Sex	Rank	Mobile Numbe	PSID	LoginID
A	B	C	D	E	F	G

Police Stations

PSID	Name	Street	Area	City	State
A	B	C	D	E	F

Suspects

SID	Name	Sex	DOB	Mobile Numbe	UID	PID
A	B	C	D	E	F	G

Sightings

Sighting ID	Datetime	Street	Area	City	State	UID	PID
A	B	C	D	E	F	G	H

Missing Persons

UID	Name	Sex	DOB	Mobile Numbe	Street	Area	City	State	PID	PSID
A	B	C	D	E	F	G	H	I	J	K

Features

Eye colour	Hair colour	Skin Tone	UID
A	B	C	D

	Functional Dependency	Candidate Key	1NF	2NF	3NF	BCNF	mincover
Authentication System	A->B	A	Y	Y	Y	Y	A-->B
Police Officers	A->B,C,D,E,F,G	A	Y	Y	A->G	A->G	A->G
	G->A,B,C,D,E,F	G			G->B,C,D,E,F	G->B,C,D,E,F	G->B;G->C;G->D
							G->E;G->F
Police Stations	A->B,C,D,E,F	A	Y	Y	Y	Y	A->B;A->C;A->D;A->E;A->F
	BCDEF->A,B,C,D,E,F	BCDEF					BCDEF->A
Suspects	A->B,C,D,E,F,G	A	Y	Y	Y	Y	A->B;A->C;A->D;A->E;A->F;A->G
Sightings	A->B,C,D,E,F,G,H	A	Y	Y	Y	Y	A->B;A->G;BG->A;BG->C;BG->D;BG->E;BG->F;BG->H
	BG->A,B,C,D,E,F,G,H	BG					
Missing Persons	A->B,C,D,E,F,G,H,I,J,K	A	Y	Y	Y	Y	A->B;A->C;A->D;A->E;A->F;A->G;A->H;A->I;A->J;A->K
Features	D->A,B,C	D	Y	Y	Y	Y	D->A;D->B;D->C

Fig 5.2 Normalisation

All relations except police officers are already in 3NF.

Chapter 6

NoSQL Component

A NoSQL originally referring to non SQL or non relational is a database that provides a mechanism for storage and retrieval of data. This data is modelled in means other than the tabular relations used in relational databases. A NoSQL database includes simplicity of design, simpler horizontal scaling to clusters of machines and finer control over availability. The data structures used by NoSQL databases are different from those used by default in relational databases which makes some operations faster in NoSQL. The suitability of a given NoSQL database depends on the problem it should solve.

We have used MongoDB for the NoSQL component of the project. MongoDB is a cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas.

As searching and dynamic real time operations are faster in NoSQL and are widely used for these operations in hybrid databases, in our project we have implemented the same. We have used MongoDB for facial recognition functionality of the backend where the missing person's picture is being searched in the database and looked for a match. We have used GridFS since the images can be stored as binary data online in chunks.

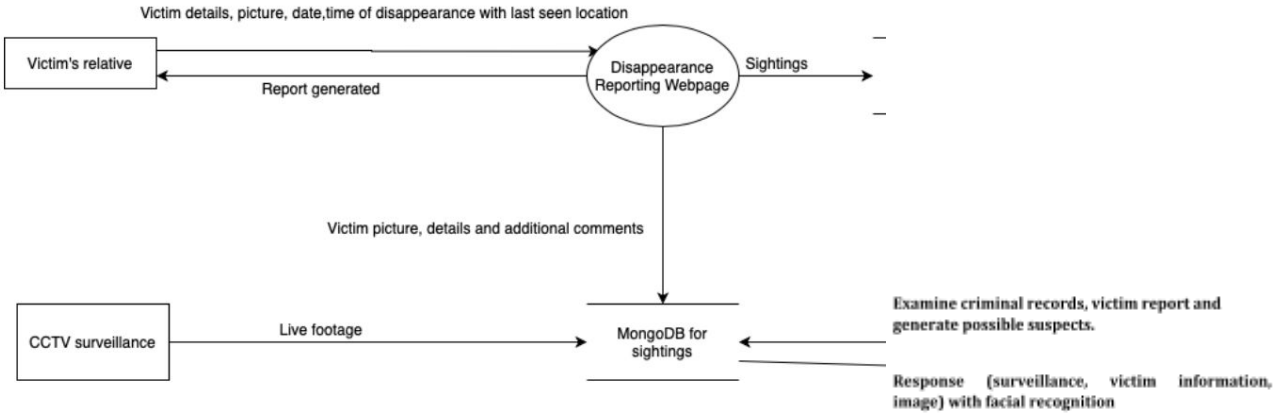

Fig 6.1. Diagram illustrating the work of MongoDB

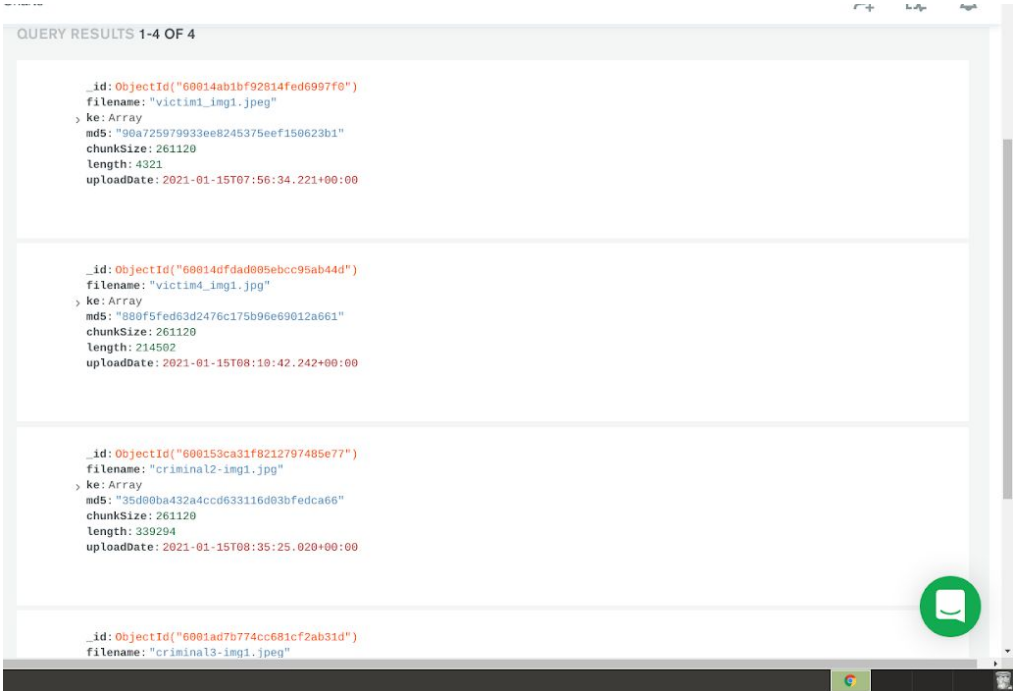

Figure 6.2 MongoDB database storing both victims and criminals (see filenames).

Chapter 7

Conclusion and Future Enhancement

As a result of our self-study, we were able to implement the concepts taught to us, along with the materials we found on the web. We successfully created a full-fledged website, using which the police officers and victims can properly interact with the application to locate Missing Persons and bring the criminals to justice.
We successfully implemented backend web application on Django Framework - (Python), NoSQL (MongoDB) and MySQL databases and the frontend using
HTML/CSS/JavaScript. The whole project was completed after 8 weeks of hard work by the team members. Our gratitude to the faculty who helped us in this process with their valuable guidance and encouragement.

There is a room for a lot of enhancement in this project. The web application UI/UX can be made even better by using standard libraries and the facial recognition feature could be made faster with the help of the cloud. Moreover, the bugs can be removed and the application can be made even better and complete with a better backend which is scalable, reliable and sustainable.

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Appendix

Source Code

Github Link - https://github.com/sriramcu/MissingPersonsTracing
In the above link, we have put the snapshots and README for all features, including the ones that have been developed since the completion of this report.

Snapshots

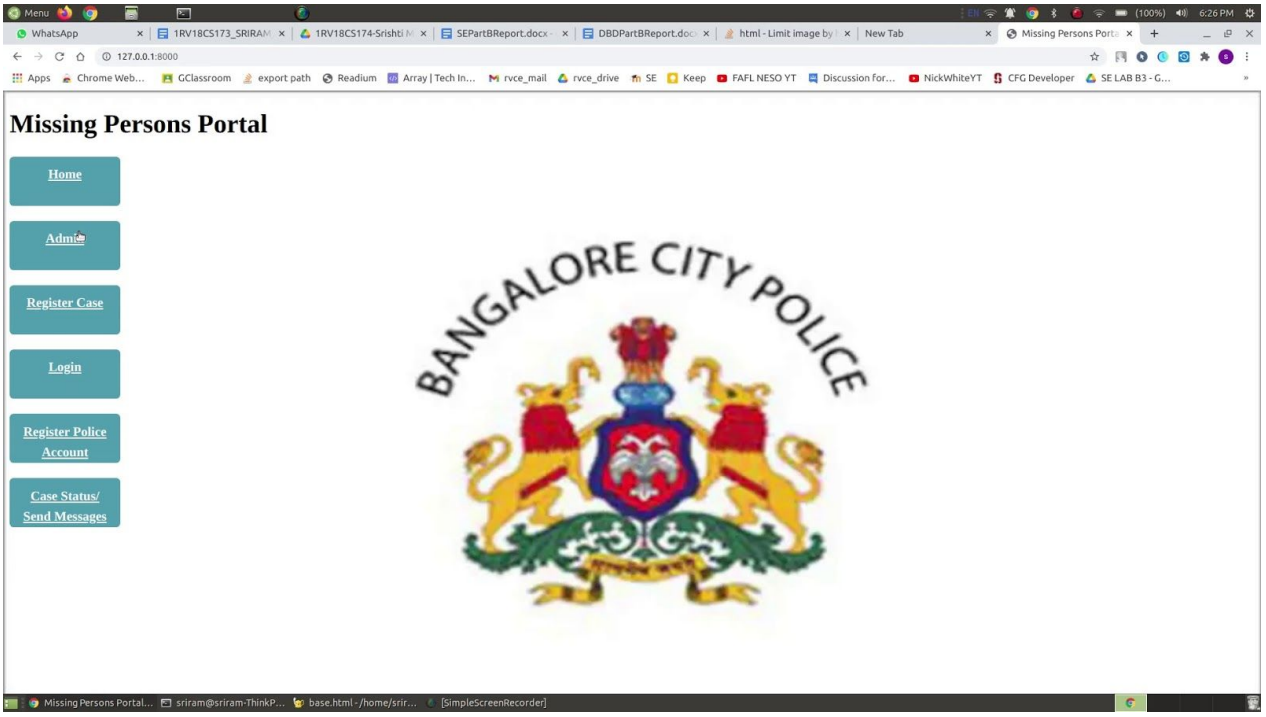


Fig B.1 Portal Home Page

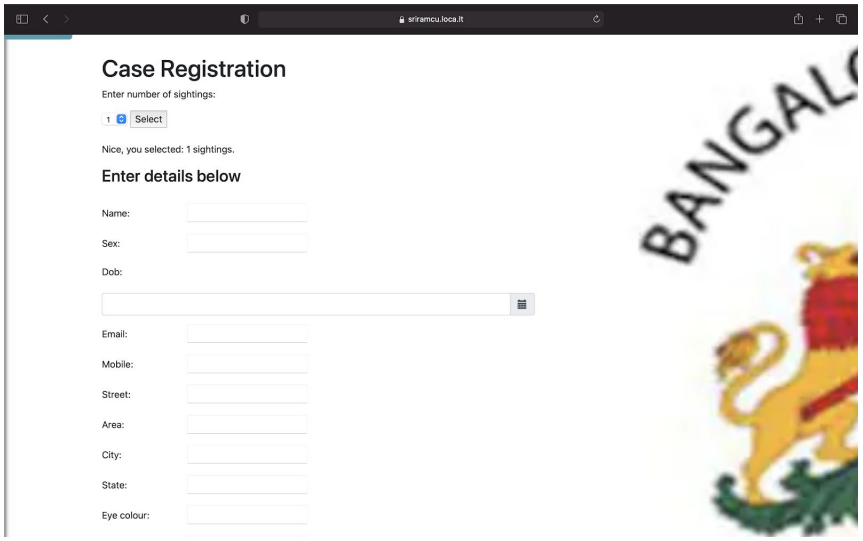


Fig B.2 Victim Case Registration

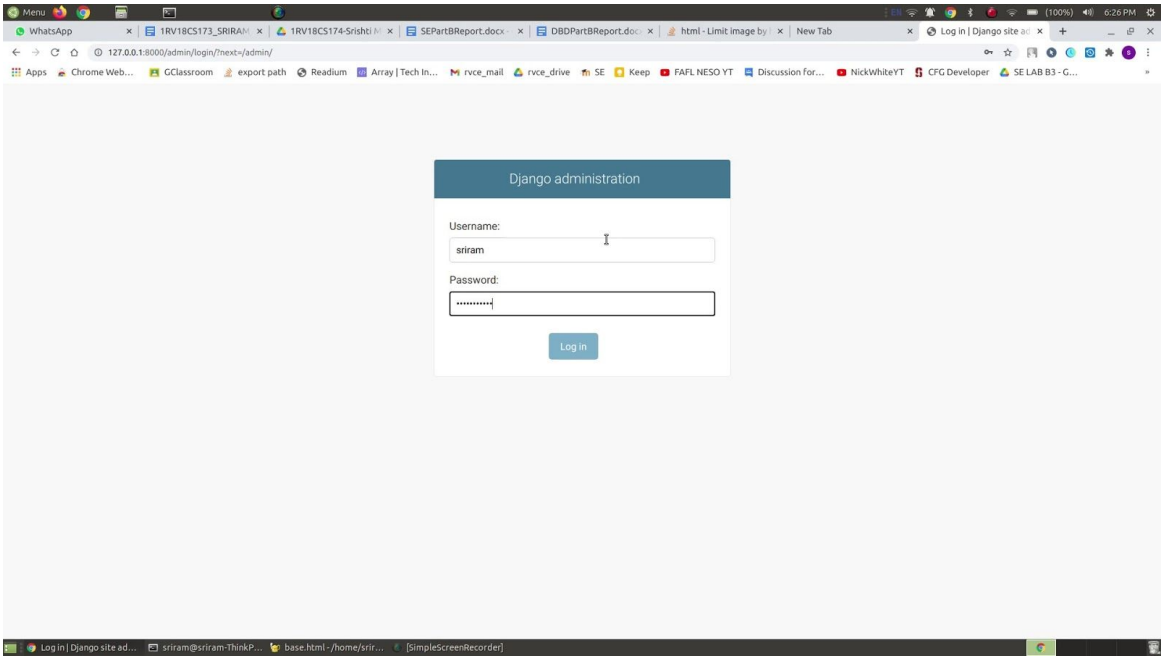


Fig B.3 Admin Login Page

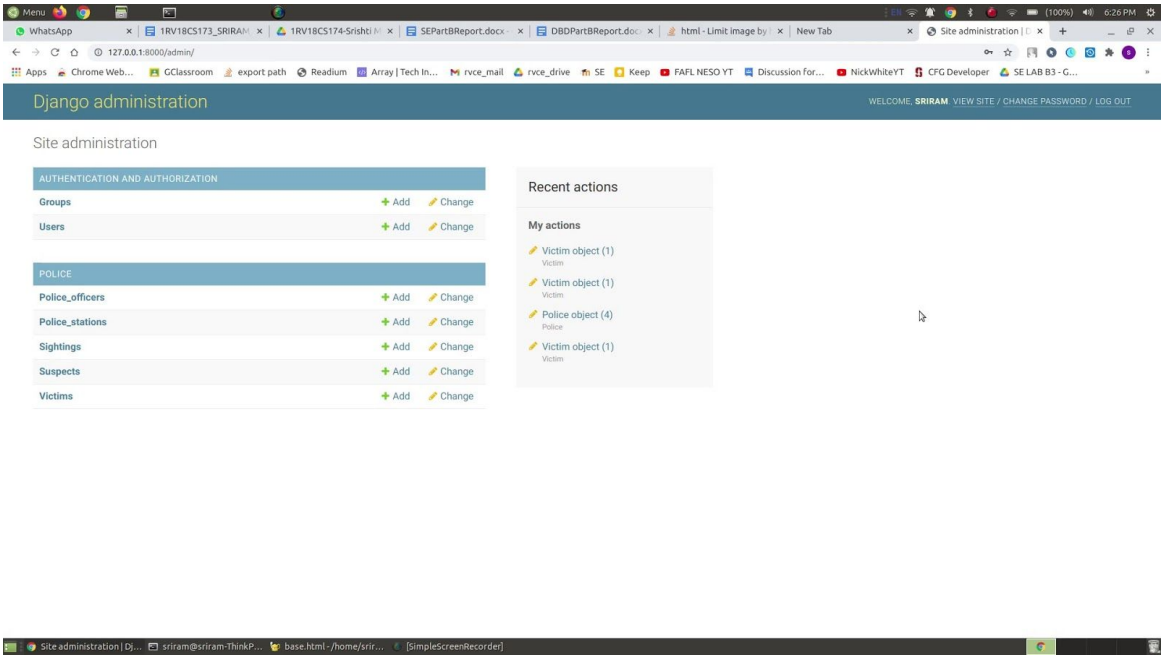


Fig B.4 Admin home page

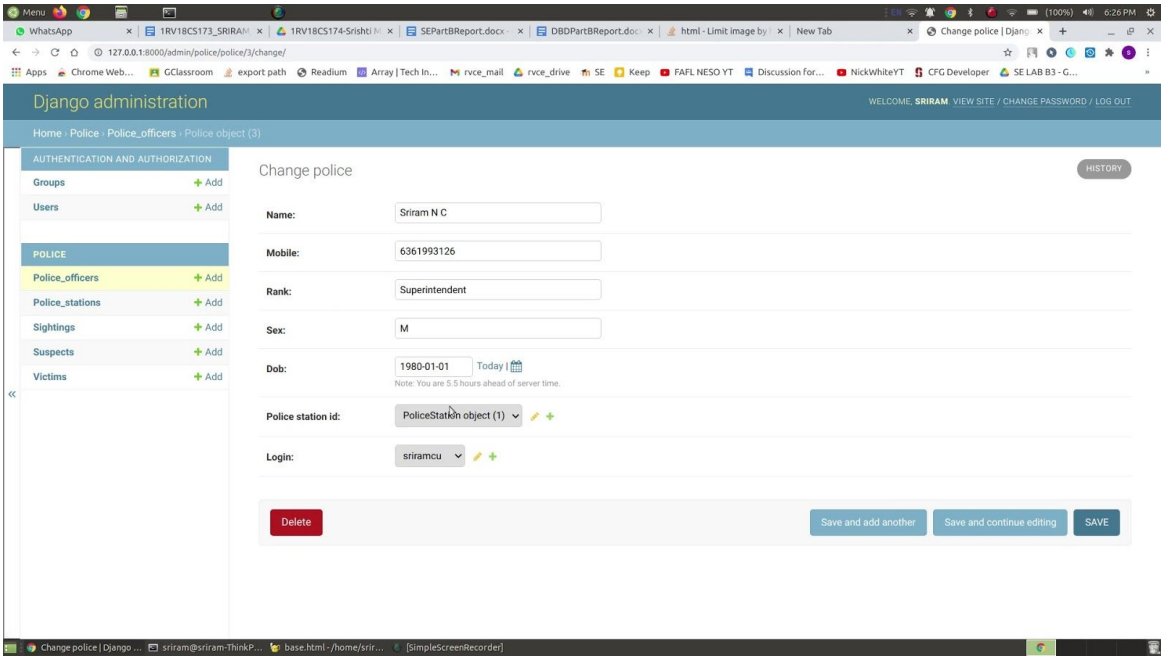


Fig B.5 Editing police officer's station from 1 to 2.

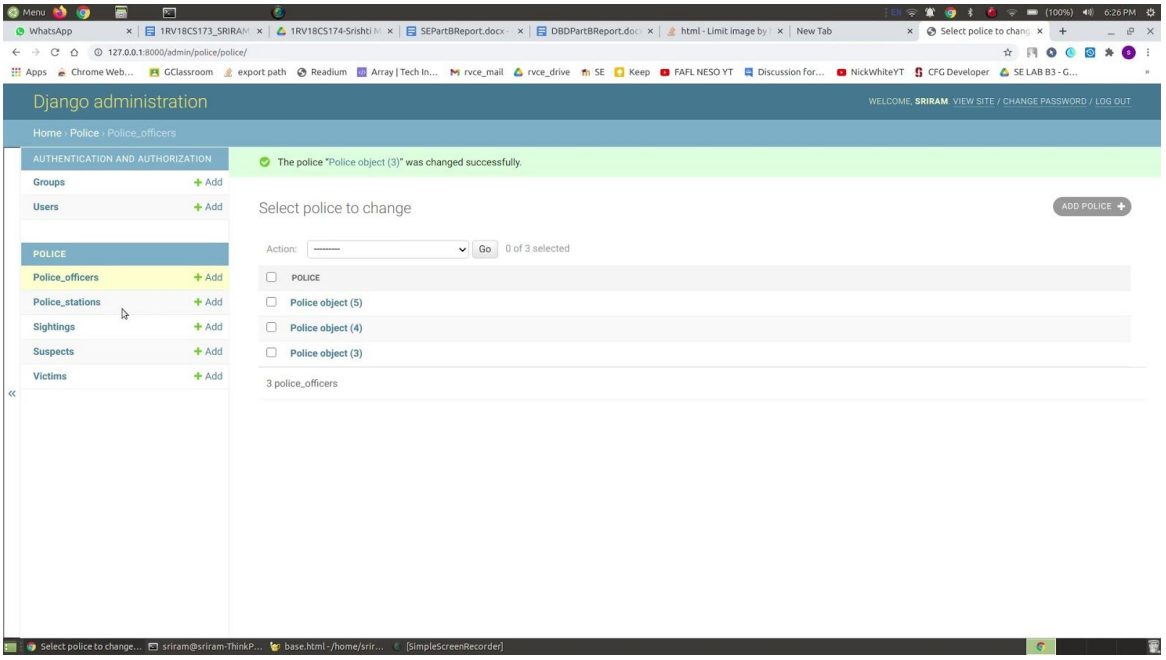


Fig B.6 Success Message after editing police station

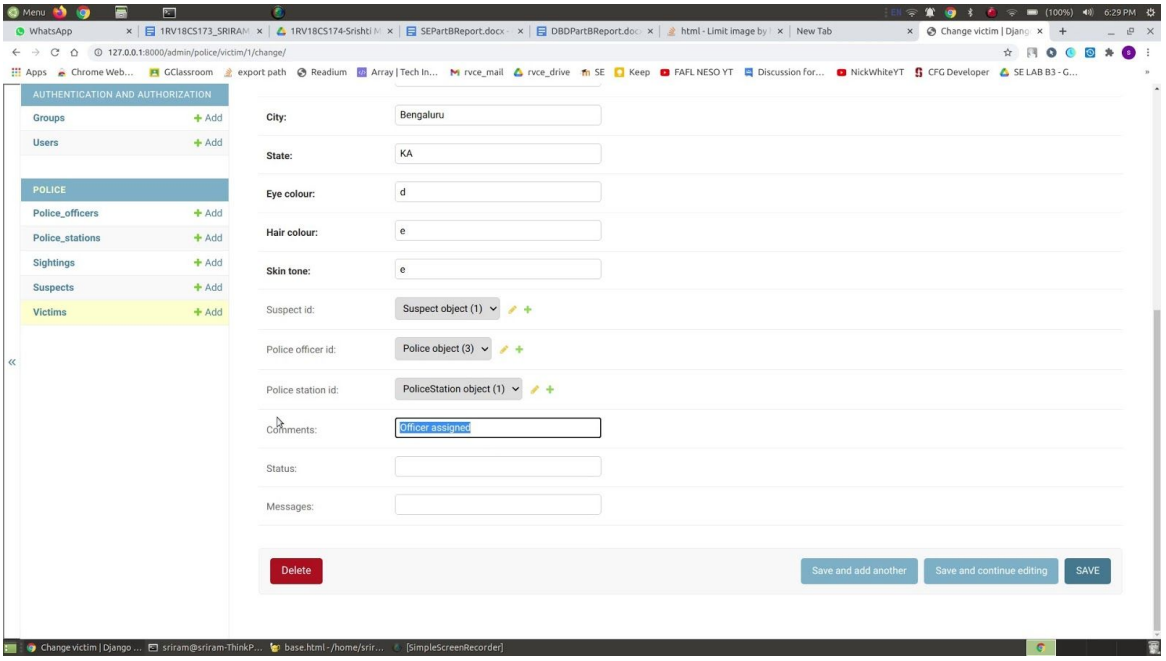


Fig B.7 Editing Victim comments and reassigning the police officer.

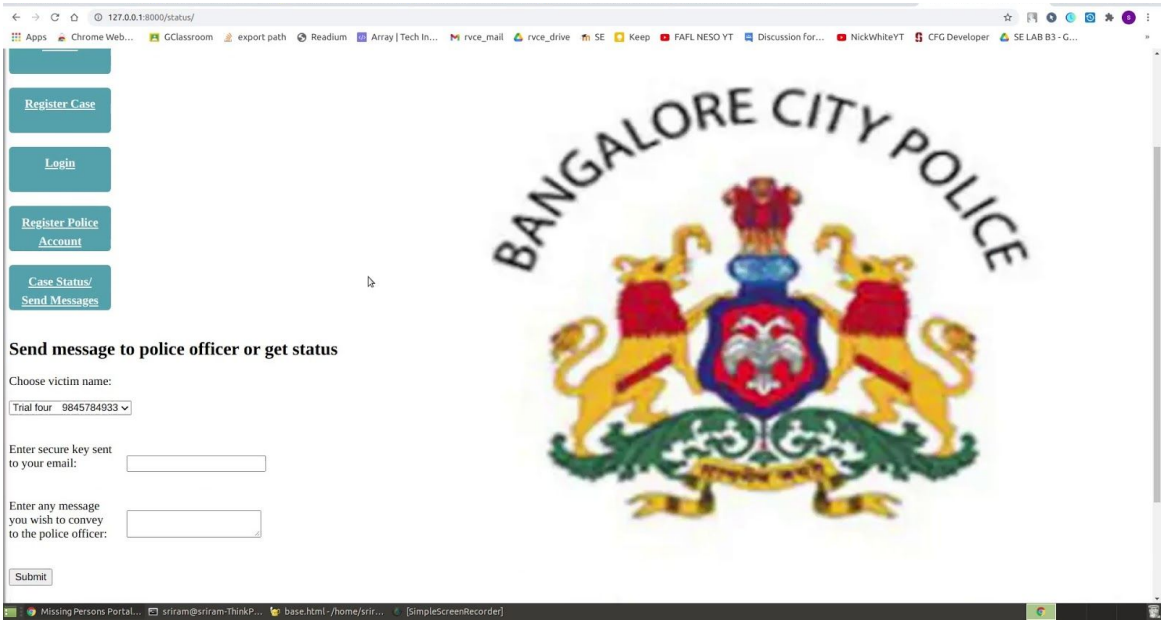
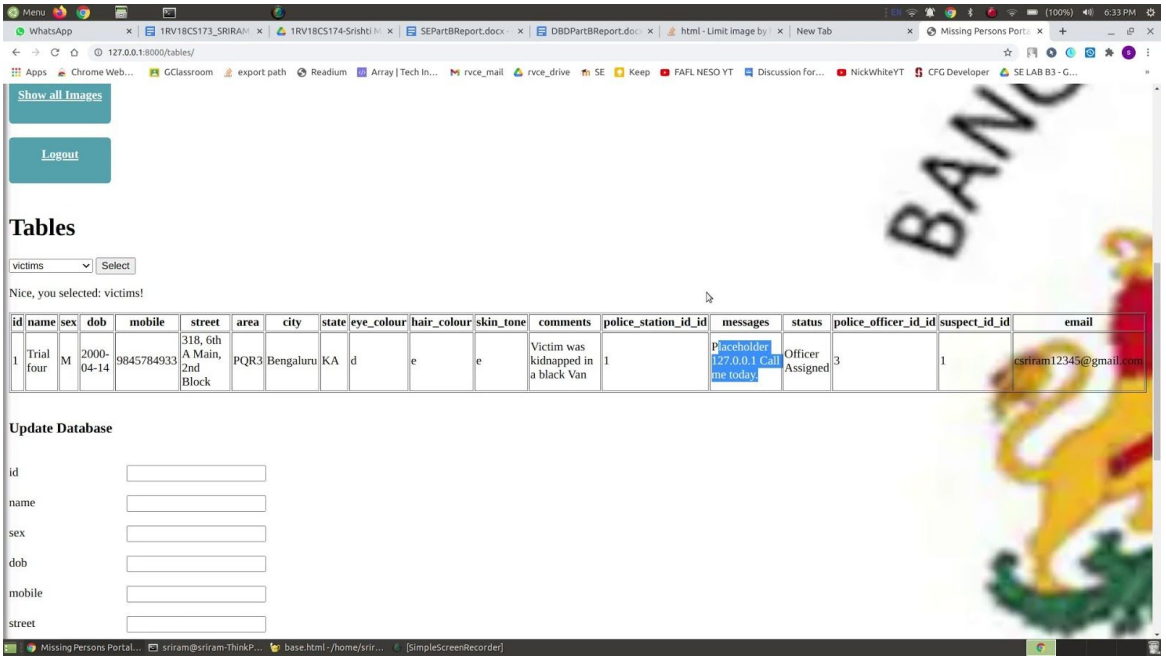


Fig B.8 Getting status and sending a message to officer.



id	name	sex	dob	mobile	street	area	city	state	eye_colour	hair_colour	skin_tone	comments	police_station_id_id	messages	status	police_officer_id_id	suspect_id_id	email
1	Trial four	M	2000-04-14	9845784933	318, 6th A Main, 2nd Block	PQR3	Bengaluru	KA	d	e	e	Victim was kidnapped in a black Van	1	Placeholder 127.0.0.1 Call me today.	Officer Assigned	3	1	csriram12345@gmail.com

Fig B.9 Message received by officer with victim's IP address.

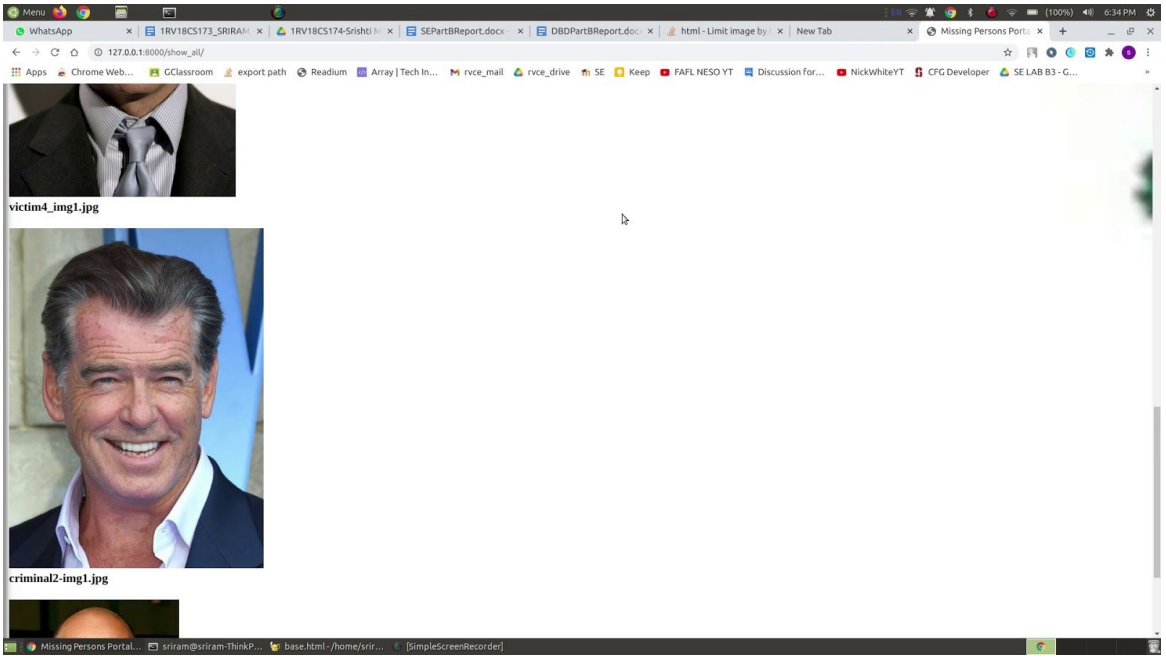


Fig B.10 All images in MongoDB (See Fig 6.2) displayed with the filename.

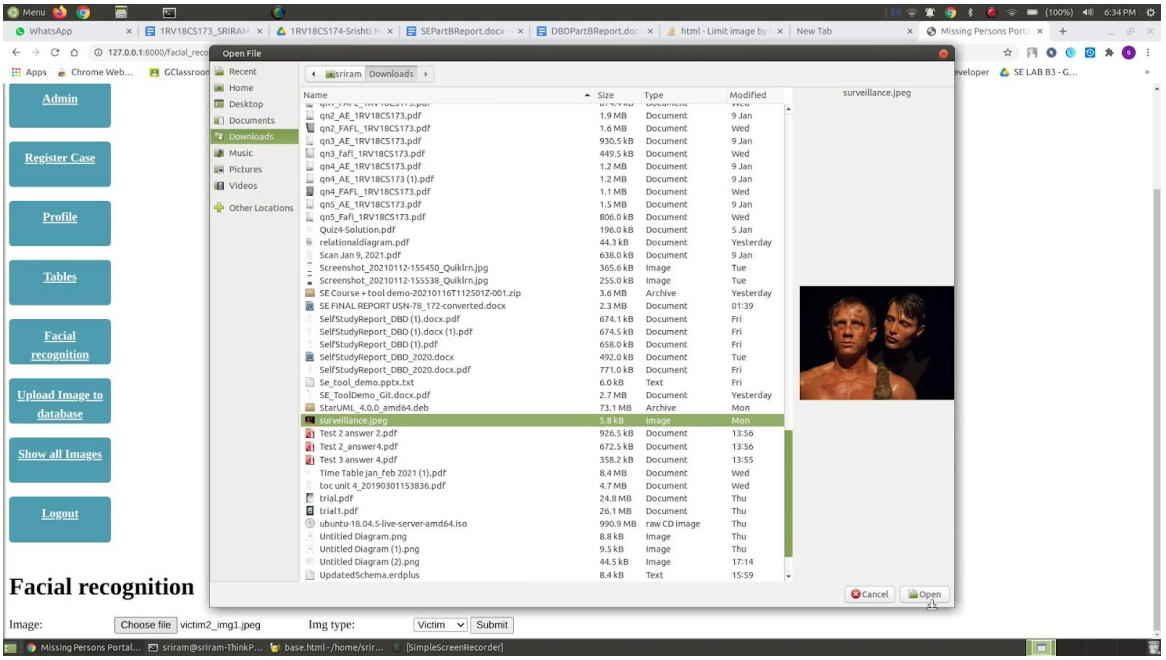


Fig B.11 Facial recognition image chosen

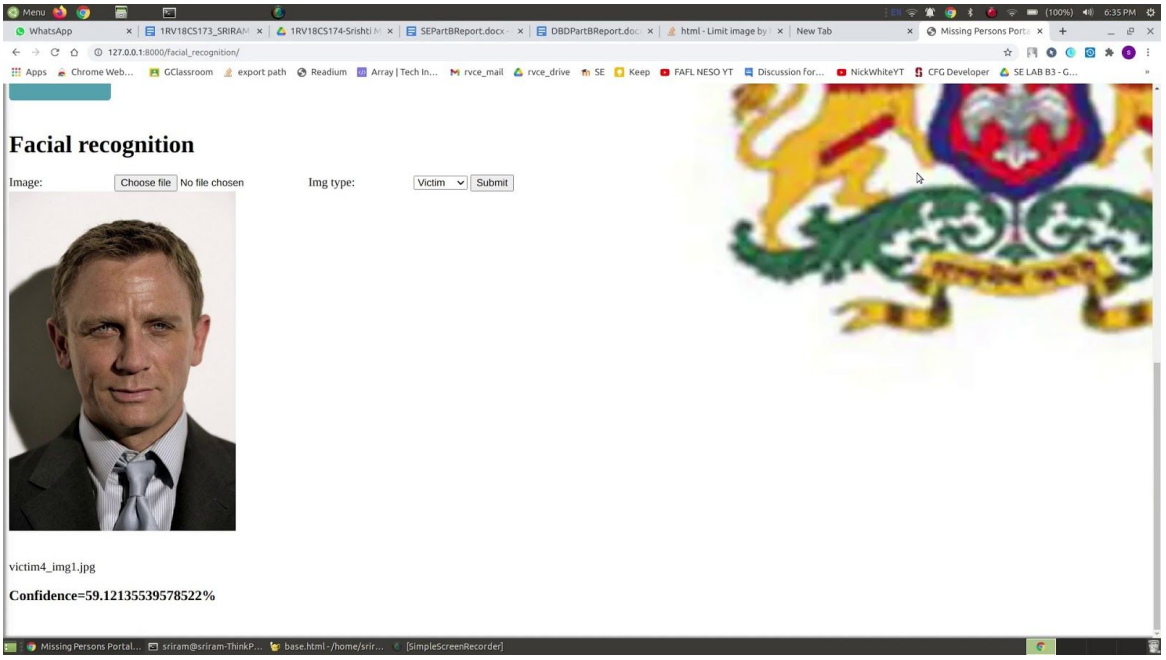


Fig B.12 Closest image returned with confidence score