A Mini Project Synopsis on

CRIMINAL FACE RECOGNITION (CRIMINAL EYE)

S.E. – Computer Science and Engineering-Data Science

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CERTIFICATE

This to certify that the Mini Project report on **CRIMINAL FACE RECOGNITION** has been submitted by **Sonal Sonarghare** (21107033) ,**Harsh Shelke** (21107022),**Meghraj Padwal** (21107025) and **Swapnil Rathod (**21107064) who are a Bonafede students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Computer Science and Engineering (Data Science)**, during the academic year **2022-2023** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ACKNOWLEDGEMENT

CHAPTER 1

INTRODUCTION

The escalation of criminal activity and the growing number of offenders have become major concerns for ensuring public safety. Police personnel face the daunting tasks of preventing crimes and identifying criminals, as protecting lives and property remains their core responsibility. However, with limited resources, law enforcement agencies are increasingly turning to security technology such as CCTV cameras, which are now common place in both public and private areas. These cameras provide surveillance footage that can be used to identify suspects on the scene. One such application is real-time criminal identification systems based on facial recognition, which rely on fully automated algorithms to match suspects captured on camera with existing databases of known offenders.

Criminal face recognition, also known as facial recognition technology, is a biometric technology that uses algorithms to match a person's facial features with a database of images to identify individuals. The criminal face recognition system is an initiative to develop a technology that can aid law enforcement agencies in identifying individuals who have been accused or convicted of a crime. The project involves creating a program that can analyze Real-Time footage and images of a suspect's face and compare it to a database of known criminals to identify a match based on specific facial features and characteristics.

Our aim, which we believe we are reaching, was to develop a system that can be used by police or investigation department to recognize criminal from their faces. The method of face recognition used is fast, robust, reasonably simple and accurate with a relatively simple and easy to understand algorithms and technique.

1.1. PURPOSE

CRIMINAL EYE primary purpose of a criminal face recognition system is to help law enforcement agencies identify suspects or persons of interest in criminal investigations. By comparing images of an individual's face captured by surveillance cameras, body-worn cameras, or other sources against a database of known faces, the technology can help law enforcement agencies quickly identify individuals who may have committed a crime.

In addition to identifying suspects, criminal face recognition systems can also be used to track the movements of individuals who are already under investigation, to help locate missing persons, or to prevent crime by identifying potential threats before they can act.

Criminal face recognition systems can be particularly useful in cases where other identifying information, such as a name or address, is not available. The technology can also help law enforcement agencies solve cold cases by identifying suspects from old surveillance footage or other sources of images.

1.2. OBJECTIVES

The primary objective is to accurately identify suspects in Real-Time thus reducing the risk of false positives and minimizing the chances of innocent individuals being wrongly accused. By identifying criminals and preventing future crimes, criminal face recognition can enhance public safety and security in communities. Automate and streamline the process of identifying suspects, saving time and resources. By automating the identification process, criminal face recognition can reduce the potential for human error or bias in suspect identification. The system is cost-effective, with minimal hardware and software requirements, and affordable for law enforcement agencies. This application is fast, robust, reasonably simple and accurate with a relatively simple and easy to understand GUI.

1.3 SCOPE

The scope of criminal face recognition system can vary depending on the specific application and context in which it is used. In general, criminal face recognition systems can be used in a variety of ways to support law enforcement and public safety efforts. Some of the key areas where criminal face recognition systems can be used include: Criminal face recognition systems can be used to quickly identify suspects or persons of interest in criminal investigations. By comparing images of an individual's face against a database of known faces, the technology can help law enforcement agencies to narrow down their search and focus their investigation on individuals who are most likely to have committed a crime.

Criminal face recognition systems can also be used to track the movements of individuals who are already under investigation or who are known to be a threat to public safety. This can help law enforcement agencies to locate and apprehend individuals who may be involved in criminal activity or who pose a risk to public safety. Criminal face recognition systems can be used to identify potential threats before they can act, helping to prevent crimes from occurring in the first place. For example, the technology can be used to monitor public spaces and alert law enforcement agencies to individuals who are behaving in a suspicious or threatening manner. Criminal face recognition systems can also be used to solve cold cases by identifying suspects from old surveillance footage or other sources of images. This can help to bring closure to families and victims of unsolved crimes.

CHAPTER 2

PROBLEM DEFINITION

2.1 EXISTING SYSTEM

The existing system for managing and tracking criminals relies on traditional methods such as record-keeping and databases, which have limited effectiveness in finding and apprehending criminals. While applications and software can help law enforcement agencies to store and manage data related to criminal activity, they do not provide a means of actively finding and tracking criminals in real-time.

Historically, criminal details were managed through manual record-keeping, such as books or paper files. Over time, these records were digitized and stored in databases, which allowed for easier access and management. However, these methods are limited in their ability to help law enforcement personnel find and apprehend criminals.

When a criminal is found guilty, their picture may be taken and stored in records, but these pictures are not helpful in actively finding them. The existing methods mainly serve to manage criminal records, but do not provide a means of locating or tracking criminals in real-time.Therefore, there is a need for a more advanced system that can effectively identify, track and apprehend criminals using advanced technology such as artificial intelligence, machine learning, and real-time surveillance.

2.2 PROBLEMS IDENTIFIED

1. Limited effectiveness in finding and apprehending criminals.

2. Reliance on traditional methods such as record-keeping and databases, which may not be adequate for identifying and tracking criminals in real-time.

3. Lack of integration with advanced technologies such as artificial intelligence and machine learning.

4. Dependence on manual methods for managing criminal records, which can be time-consuming and prone to errors.

5. Inability to provide real-time tracking and surveillance of criminals, making it difficult for law enforcement agencies to respond quickly to criminal activity.

6. Crowded places can limit visibility, making it difficult for law enforcement officers to get a clear view of the suspect.

7. Physical evidence, such as fingerprints or DNA samples may be difficult to obtain.

CHAPTER 3

PROPOSED SYSTEM

Criminal face recognition using the 'face_recognition' library is a proposed system that aims to identify and track criminal offenders using facial recognition technology. The 'face_recognition' library is a popular open-source Python library that provides face recognition capabilities using deep learning models. The proposed system would involve capturing images of suspects and feeding them into the 'face_recognition' library to create a database of criminal faces. The images could be captured from surveillance cameras, crime scene photos, or other sources.

This library uses a pre-trained deep learning model to extract facial features from the images and then compares them to the faces in the database to find a match. The library can also perform face clustering, which groups similar faces together to help identify individuals who may have altered their appearance.

To improve accuracy, the system may also incorporate additional data such as height, weight, and other physical characteristics of the suspects. This data can be used to narrow down the search results and increase the chances of identifying the correct individual. The proposed system would have numerous benefits, including faster and more accurate identification of criminal offenders, reduced workload for law enforcement agencies, and increased public safety.

3.1 FEATURES AND FUNCTIONALITY

Using advanced algorithms and artificial intelligence to identify criminal face in real time. Can quickly and accurately identify suspects based on their facial features, providing law enforcement agencies with a powerful tool to identify criminals. This involves collecting images of suspects and storing them in a database. Requires minimal human intervention, making it faster and more reliable. Scan large databases in a matter of seconds, making it easier to identify suspects in real-time. Can enhance safety and security in communities, making it easier for law enforcement agencies to apprehend suspects and prevent future crimes.

Following is the Waterfall model describing the flow of the project:
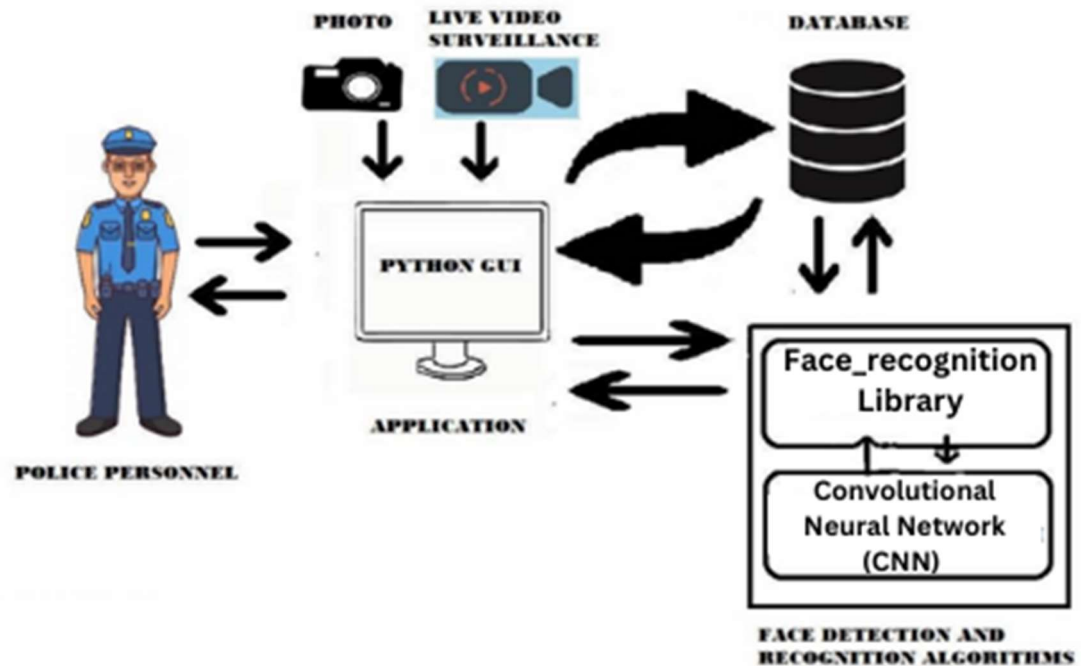
Figure 3.1: WATERFALL MODEL

Here are some of the typical features and functions of criminal face recognition:

1. USER: The criminal face recognition system is typically designed to be used by law enforcement agencies, security personnel, or other authorized personnel who have a legitimate need to identify criminals.

2. REGISTRATION: The system typically allows authorized users to register and create an account to access its features.

3. HOME: The system typically has a home page that provides an overview of its features and functions.

4. CREATE DATABASE: One of the main features of a criminal face recognition system is the ability to create a database of criminal faces. This database can be used to identify criminals who have been previously identified, or to help identify suspects in ongoing criminal investigations.

5. DETECT CRIMINAL BY UPLOADING IMAGES: The system typically allows users to upload images of suspects, and then uses facial recognition algorithms to compare the facial features in those images to the faces in the database to find a match.

6. DETECT BY REALTIME: Another feature of a criminal face recognition system is the ability to detect and identify criminals in real-time. This can be done using cameras that are connected to the system, which capture images of people in public places or other areas where criminal activity may be taking place.

7. VIEW DATABASE: Authorized users can typically view the criminal face recognition system's database of criminal faces, search for specific individuals, and view detailed information about their criminal history.

CHAPTER 4

PROJECT OUTCOMES

This Criminal Face Recognition will make it easier for law enforcements to find appropriate Criminals, Time, Place etc. with best identifying facilities for the Police Dept upload the image of the criminal and link it to the database. It will save resources for searching the criminal. It will also save the physical hard work and invaluable time to find the matching faces among common people. Our system will be a service which help trace criminals for Police Dept.

Here are some potential outcomes that a criminal face recognition project may aim to achieve:

1. Increased accuracy of criminal identification: One of the main goals of a criminal face recognition project is to improve the accuracy of criminal identification. By using advanced algorithms and sophisticated technology, criminal face recognition systems can analyze facial features and match them to a database of known criminals. This can help law enforcement agencies to identify and apprehend criminals more effectively.

2. Faster and more efficient criminal investigations: Criminal face recognition can help speed up criminal investigations by enabling law enforcement agencies to quickly identify suspects and gather evidence. This can help to bring cases to a close more quickly, and can also reduce the workload of law enforcement personnel.

3. Improved public safety: By helping law enforcement agencies to identify and apprehend criminals more effectively, criminal face recognition can improve public safety. This can help to reduce crime rates and increase feelings of safety and security within communities.

CHAPTER 5

SOFTWARE REQUIREMENTS

The Software Requirements Specification is produced at the culmination of the analysis task. The function and performance allocated to software as part or system engineering is refined by establishing a complete information description, a detailed functional and behavioural description, an indication of performance requirements and design constraints, appropriate validation criteria, and other data pertinent to requirements.

The proposed system has the following requirements

1. System needs store information about new post of criminal.

2. System needs to maintain time, date, place records.

3. System needs to keep the record of all criminals.

4. System needs to update and delete the record.

5. System also needs to capture a search area.

6. It also needs a security system to prevent data loss.

SOFTWARE REQUIREMENTS

Operating system: Windows7/8/10/11

Coding Language: Python

Data Base   :   MYSQL Server

Tools   :   Pycharm, Tkinter,

Software Development Kit: Python 3.8

CHAPTER 6
PROJECT DESIGN

In this phase, a logical system is built which fulfils the given requirements. Design phase of software development deals with transforming the user's requirements into a logically working system. Normally, design is performed in the following in the following two steps:

- Primary Design Phase: In this phase, the system is designed at block level. The blocks are created based on analysis done in the problem identification phase. Different blocks are created for different functions emphasis is put on minimizing the information flow between blocks. Thus, all activities which require more interaction are kept in one block.

- Secondary Design Phase: In the secondary phase the detailed design of every block is performed. The general tasks involved in the design process are the following:

1. Design various blocks for overall system processes

2. Design smaller, compact, and workable modules in each block

3. Design various database structures.

4. Specify details of programs to achieve desired functionality

5. Design the form of inputs, and outputs of the system.

6. Perform documentation of the design.

7. System reviews

6.1 DESIGN STANDARD

The system is designed with several interaction on each page that makes up the criminal face recognition. These cues are well-defined such as to make several functionalities that the system exposes to collect, process and output data. Access to these functionalities is made possible by the well-designed user interface which embodies several technologies to process data. The system is built in a modular form where these functionalities are built into modules.

Some of the modules are as follows:

1. Create Criminal Database.
2. View Criminal Database.
3. Detect Criminal by Image.
4. Detect Criminal Real Time.

6.2 OUTPUT SPECIFICATION

The system is designed in such a way that it efficiently provides output to the user promptly and in a well-organized manner. The format for the several outputs is made available on the output pages. Output can be relayed using the following page modules:

1. View Database: This displays the criminal databases (Name, Crime committed, Last Place Found.

2. Detect Criminal by Uploading Image: This Recognizes faces of criminals by giving the name.

3. Detect Criminal Real Time: This Recognizes face of criminals realtime/live proving us with details of the criminal.

6.3 INPUT SPECIFICATION

The system is designed to accept several input details efficiently through input forms and user clicks. The data captured through the user keystrokes and clicks are received by specific modules on the system and relayed to the back end of the system for processing. Input is collected using the following page modules:

1. Register:

2. Login:

3. Criminal Database

GRAPHICAL USER INTERFACE (GUI):

Figure 6.1: REGISTRATION PAGE

Figure 6.2: LOGIN PAGE
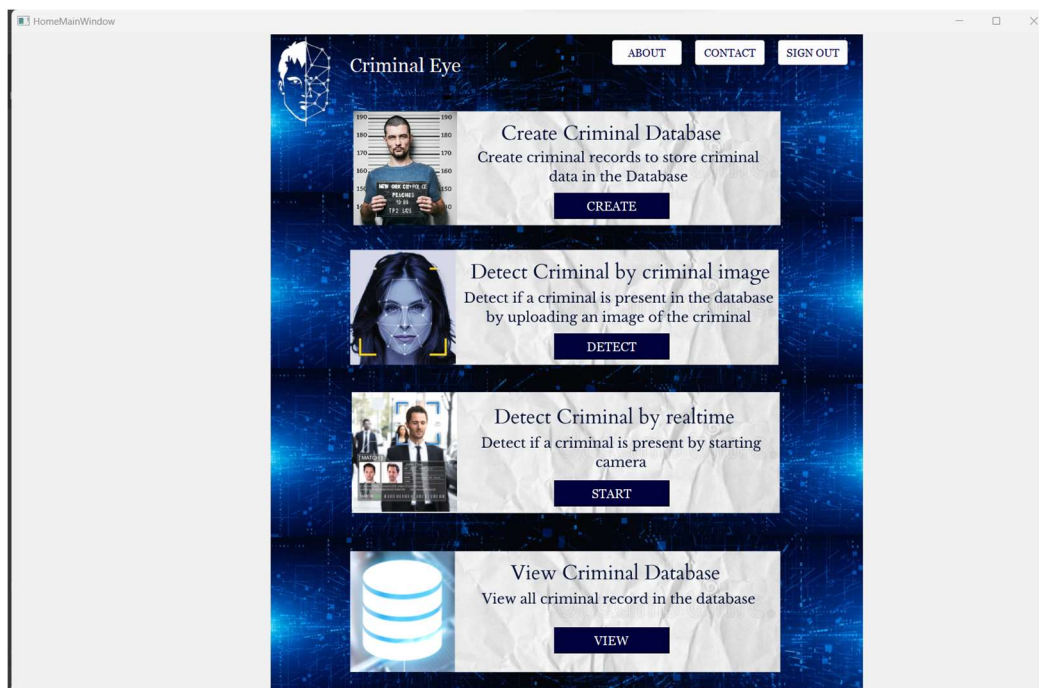
Figure 6.3: HOME PAGE

Figure 6.4: CREATE CRIMINAL DATABASE PAGE

Figure 6.5.1 IMAGE DETECTED

Figure 6.5.2 IMAGE STORED IN DATABASE

Figure 6.5: DETECT CRIMINAL BY UPLOADING IMAGES

Figure 6.6.1 CRIMINAL DETECTED   Figure 6.6.2 IMAGE STORED IN DATABASE

Figure 6.6: DETECT CRIMINAL IN REALTIME

6.4 DATABASE SPECIFICATION

The database system used to implement the back end of the Criminal Face Recognition is Mysql. Access to the system was made possible by a graphical interface Tkinter with Python 3.8.

The structure of the database is as follows:

1. Login

2. Register

3.Create

Login

FIELD	TYPE	LENGTH
UserName	varchar	45
Password	varchar	45

Register

FIELD	TYPE	LENGTH
Name	varchar	45
UserName	varchar	45
Password	varchar	45
Email	varchar	45
Mobile	int	
Designation	varchar	45

CHAPTER 7

PROJECT SCHEDULING

Scheduling in this project management is the listing of activities, deliverables, and milestones within a project. A schedule also usually includes a planned start and finish date, duration, and resources assigned to each activity. Effective project scheduling is a critical component of successful time management, especially for professional service businesses. It is the core of the project plan used to show the organization how the work will be done, commit people to the project, determine resource needs, and used as a kind of checklist to make sure that every task necessary is performed.

The process for building a schedule is referred to the first six processes of time management:

1. Plan schedule management

2. Define project activities.

3. Sequence activities

4. Estimate resources.

5. Estimate durations.

6. Develop the project schedule.

A Gantt chart is a type of bar chart that illustrates a project schedule. Modern Gantt charts also show the dependency relationships between activities and the current schedule status. This chart lists the tasks to be performed on the vertical axis, and time intervals on the horizontal axis. The width of the horizontal bars in the graph shows the duration of each activity. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements constitute the work breakdown structure of the project.

Project Scheduling

Sr. No	Group Member	Time duration	Work to be done
1	Sonal Sonarghare Harsh Shelke Swapnil Rathod Meghraj Padwal	2nd week of January	Implementing Chapter 1
2	Sonal Sonarghare Harsh Shelke Swapnil Rathod	3rd week of January	Testing Chapter 1
3	Sonal Sonarghare Harsh Shelke Swapnil Rathod Meghraj Padwal	1st week of February	Implementing Chapter 2
4	Sonal Sonarghare Harsh Shelke	2nd week of February	Implementing Chapter 3
5	Sonal Sonarghare Harsh Shelke	1st week of March	Implementing Chapter 4
6	Sonal Sonarghare Harsh Shelke	2nd week of March	Implementing Chapter 5
7	Sonal Sonarghare Harsh Shelke	By the end of April	Implementing Chapter 6

7.1 GANTT CHART

GANTT CHART TEMPLATE

PROJECT TITLE: CRIMINAL FACE RECOGNITION SYSTEM

PROJECT GUIDE: Prof. Vaibhav Yavalkar

INSTITUTE & DEPARTMENT: AP SHAH INSTITUTE OF TECHNOLOGY/Information Te...

DATE: 20.04.2023

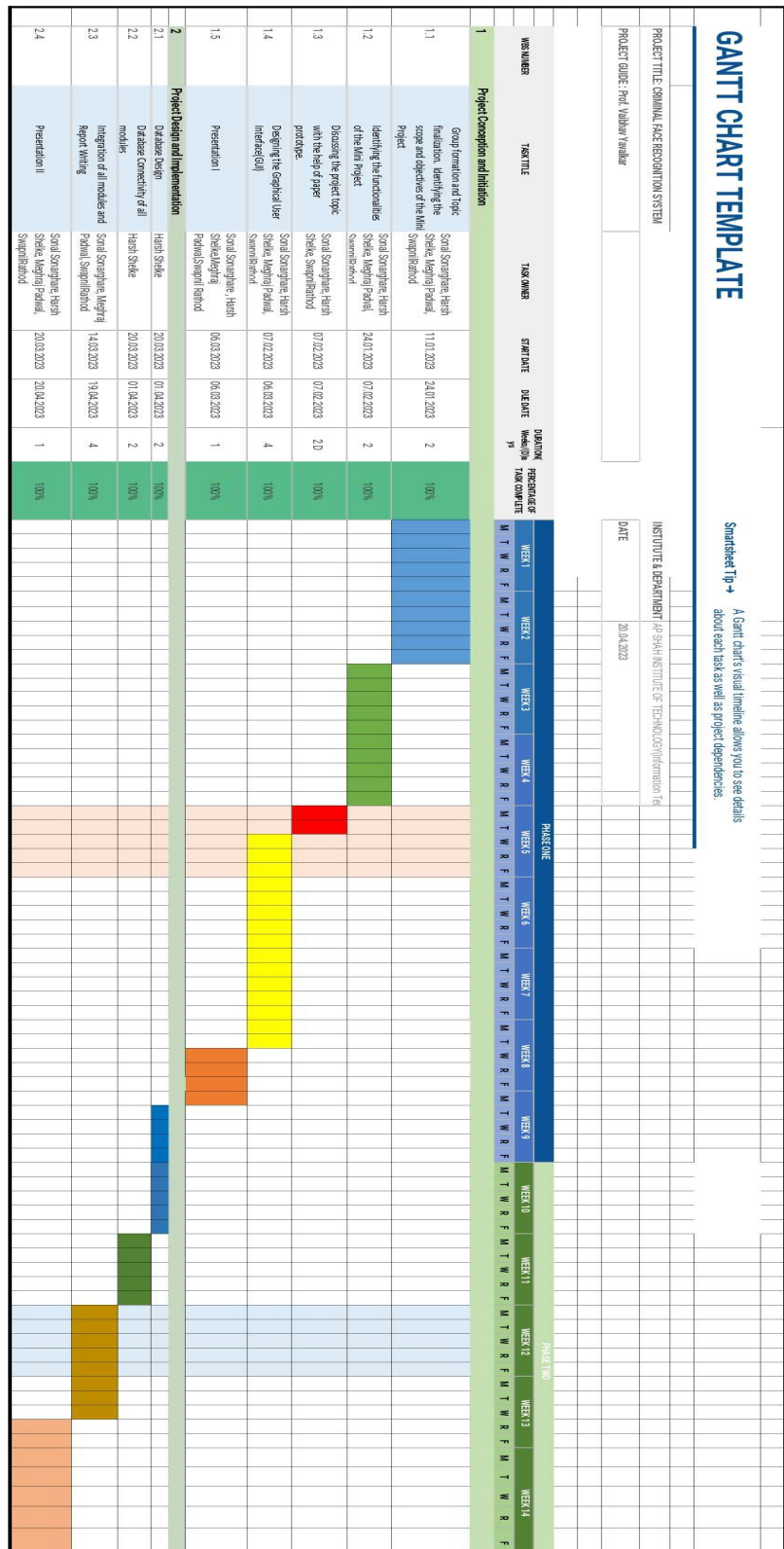| WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION Weeks/Days	PERCENTAGE OF TASK COMPLETE
1	**Project Conception and Initiation**					
1.1	Group Formation and Topic finalization, identifying the scope and objectives of the Project	Sonal Sonarghare, Harsh Shelke, Meghna Padwal, Swapnil Rathod	11.01.2023	24.01.2023	2	100%
1.2	Identifying the functionalities of the Mini Project	Sonal Sonarghare, Harsh Shelke, Meghna Padwal, Swapnil Rathod	24.01.2023	07.02.2023	2	100%
1.3	Discussing the project topic with the help of paper prototype.	Sonal Sonarghare, Harsh Shelke, Swapnil Rathod	07.02.2023	07.02.2023	2.0	100%
1.4	Designing the Graphical User Interface(GUI)	Sonal Sonarghare, Harsh Shelke, Meghna Padwal, Swapnil Rathod	07.02.2023	06.03.2023	4	100%
1.5	Presentation I	Sonal Sonarghare, Harsh Shelke,Meghna Padwal,Swapnil Rathod	06.03.2023	06.03.2023	1	100%
2	**Project Design and Implementation**					
2.1	Database Design	Harsh Shelke	20.03.2023	01.04.2023	2	100%
2.2	Database Connectivity of all modules	Harsh Shelke	20.03.2023	01.04.2023	2	100%
2.3	Integration of all modules and Report Writing	Sonal Sonarghare, Meghna Padwal, Swapnil Rathod	14.03.2023	19.04.2023	4	100%
2.4	Presentation II	Sonal Sonarghare, Harsh Shelke, Meghna Padwal, Swapnil Rathod	20.03.2023	20.04.2023	1	100%

Figure 7.1: Gantt Chart

CHAPTER 8

CONCLUSION

The criminal face recognition project using Python has demonstrated the potential of computer vision and deep learning algorithms in identifying and tracking criminals. Through the development of a system that can match faces in real-time using live video feeds or uploaded images, the project has shown that Python provides a versatile and powerful programming language for implementing facial recognition algorithms.

The project has highlighted the importance of proper data preprocessing, feature extraction, and model selection in developing an accurate and efficient facial recognition system. Additionally, ethical and privacy concerns associated with the use of facial recognition technology were also considered, and efforts were made to ensure that the system's deployment is subject to appropriate regulation and oversight.

While the project's focus was on criminal face recognition, the techniques and methods used can be applied to a wide range of applications, including security, customer identification, and marketing.

The project's limitations include the need for high-quality data to train the model accurately and the potential for inaccurate results in low-light or noisy environments. Future work could focus on improving the system's accuracy, developing a more efficient face detection algorithm, and addressing the ethical and privacy concerns associated with facial recognition technology.

Overall, the project has demonstrated the value of criminal face recognition technology in law enforcement efforts to identify and track criminals. As the technology continues to evolve, it is likely that facial recognition systems will become increasingly effective and widely adopted in various industries.

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