Criminal Face Detection System

1. Introduction

1.1 Purpose

The purpose of this document is to outline the requirements for the development of a criminal face detection system using Raspberry Pi. This system aims to detect faces of known criminals using a Raspberry Pi camera module and perform real-time recognition.

1.2 Scope

The criminal face detection system will be developed to run on a Raspberry Pi device equipped with a camera module. It will capture images, detect faces, compare them with a database of known criminals, and trigger alerts if a match is found.

1.3 Intended Audience

This project is a part of lab work and resist under the college premise

1.4 Product Scope

The criminal face detection system will be developed to run on a Raspberry Pi device equipped with a camera module. It will capture images, detect faces, compare them with a database of known criminals, and trigger alerts if a match is found. It will notify the nearby police stations for further investigation.

2. Overall Description

2.1 Product Perspective

The criminal face detection system will be a standalone application running on the Raspberry Pi device. It will interact with the camera module to capture images and perform face detection and recognition.

2.2 Product Functions

- Capture images using the Raspberry Pi camera module.

- Detect faces in the captured images.
- Compare detected faces with a database of known criminals.
- Trigger alerts if a match is found.

2.3 User Characteristics

The system is designed for law enforcement personnel or security personnel who need to identify known criminals in real-time.

2.4 Operating Environment

The system is intended for indoor and outdoor environments where raspberry pi can operate effectively. It is compatible with standard cameras.

2.4 Constraints

The accuracy of face detection and recognition may vary depending on environmental conditions and image quality.

2.5 Assumptions and Dependencies

- It is assumed that the Raspberry Pi device is properly configured and connected to the camera module.
- The system depends on the availability of a database of known criminals for comparison.
- It depends on stable internet connection for database access.

3 External Interface Requirements

3.1 User Interfaces

The system shall provide a user friendly command-line interface for configuration and operation.

3.2 Hardware Interfaces

The system shall interface with the Raspberry Pi camera module to capture images.

3.3 Software Interfaces

The system relies on the raspberry pi OS and associated libraries for general functionality. It utilizes OpenCV and face recognition libraries for image processing and face detection.

3.4 Communication Interface

The system communicates securely with the criminal record database, integration with alert system

4. System Features

4.1 Image Capture

The system shall be able to capture images using the Raspberry Pi camera module.

4.2 Face Detection

The system shall detect faces in the captured images using a face detection algorithm.

4.3 Face Recognition

The system shall compare detected faces with a database of known criminals using a face recognition algorithm.

4.4 Alerting

The system shall trigger alerts (e.g., sound alarm, notification) if a match is found with a known criminal.

5. Non-functional Requirements

5.1 Performance

The system shall be capable of real-time face detection and recognition with minimal latency.

5.2 Security

The system shall ensure the privacy and security of captured images and criminal databases.

5.3 Reliability

The system shall be reliable and robust, capable of operating in various environmental conditions.

5.4 Usability

The system shall have a user-friendly interface for easy configuration and operation.

6. Appendices

6.1 Glossary

Raspberry Pi: A small, affordable single-board computer developed by the Raspberry Pi Foundation.

Face Detection: The process of locating and identifying human faces within an image or video stream.

Face Recognition: The process of identifying or verifying a person from a digital image or video frame.

6.2 References

OpenCV Documentation: https://docs.opencv.org/

Raspberry Pi Documentation: https://www.raspberrypi.org/documentation/