Smart Door System

CSC/CSE 299: Hardware Projects for the Raspberry Pi

Presented by: Matthew Reyes, Brandon Berry

Project Overview

Our project aims to use facial recognition technology to lock and unlock doors based on seeing faces.

Purpose: To provide door access without the need for physical keys.

Project Objectives

- Develop a reliable door locking system that uses facial recognition.

- Integrate hardware and software components to achieve real-time face detection.

- Unlocking and Locking door

Hardware Components

- **List of Hardware**:
  - Raspberry Pi 4
  - Camera module (for facial recognition)
  - Servo motor (to control door lock)
  - Door lock mechanism
  - Power supply

- **Brief Explanation**: The Raspberry Pi controls the system, while the camera captures real-time images. The servo motor locks or unlocks the door based on facial recognition.

Software Components

- **Technologies Used**:
  - GitHub Repo: Found and used for image processing and facial recognition
  - Python: Programming language for controlling the system logic.
  - Facial Recognition Library: From in Github repo and our own python library.

Project Approach

- **Development Process**
  - Researched hardware and software components suitable for facial recognition.
  - Set up the Raspberry Pi and connected the camera and servo motor.
  - Configured code and facial recognition libraries for real-time processing.
- **Challenges Faced**
  - Ensuring accurate recognition under different lighting conditions.
  - Integrating hardware to function seamlessly with the software.

Demonstration & Results

VIDEO DEMONSTRATION:

RESULTS: THE SYSTEM SUCCESSFULLY LOCKS AND UNLOCKS THE DOOR BASED ON FACIAL RECOGNITION.

KEY OBSERVATIONS: ACCURACY IMPROVED AFTER ADJUSTING LIGHTING.

Conclusion

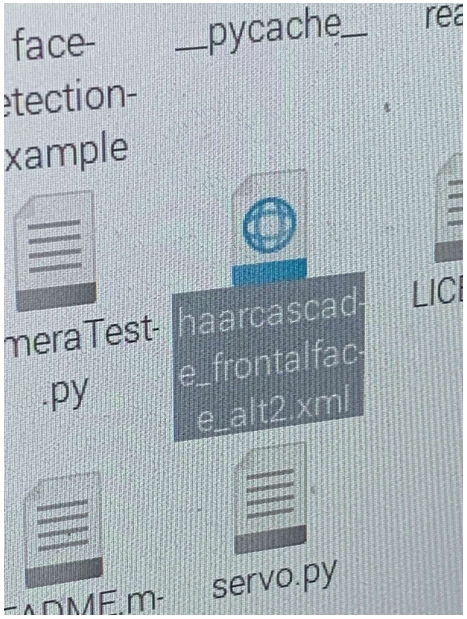
Summary of Objectives: Developed a secure, efficient facial recognition system using key hardware and software components.

Project Success: Successfully implemented real-time recognition with a high accuracy rate and robust performance.

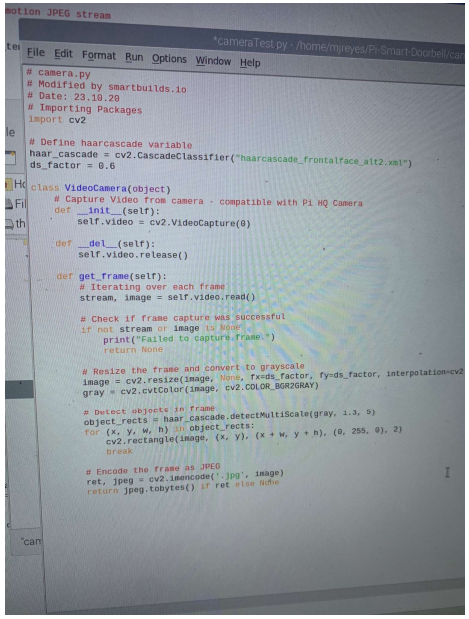
Future Potential: Opportunities to improve accuracy and expand applications in different security settings.

Codes

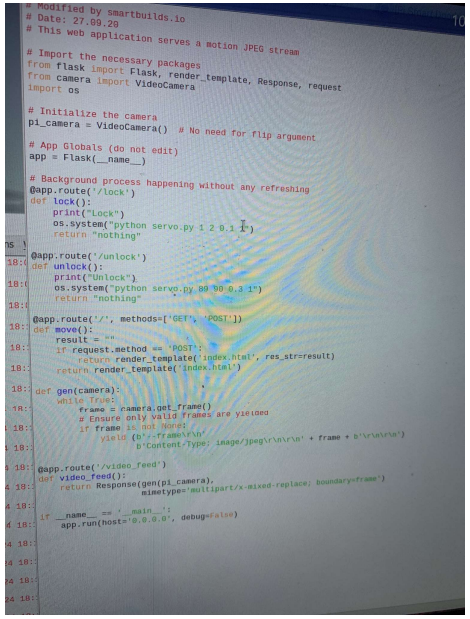
Facial recognition code



Camera Code



Main code



Q&A