ENG5220:Real Time Embedded Programming

Project Report

**Team Number: team 16**

**Project Title:** Fun Door Security System

**GitHub Link of the project:**

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**Introduction**

People often have the need of installing an effective security system to protect their private spaces and to grant access to themselves and their family or friends. Following this clue, our team thought about developing a raspberry-pi-based real-time security system and using face recognition to control the opening of the door lock. Face recognition is a quick and accurate way to distinguish between authorized hosts and unwelcomed people. This report will first demonstrate few points should be considered before we start our programme, including problems may encountered, how our system is supposed to work and what hardware we should prepare.

**Problems May Encountered**

1. How to ensure the performance of camera in abnormal circumstance (e.g., too light or too dark, camera angle)
2. How to upload and save face data to database easily and quickly. The form of face data saved.
3. What methods could be applied to matching the scanned face and face data.

**How this system works**

When the whole system is activated, all events start, which include face recognition, motor, LED strip, sound detection, LED bubble. The camera for face recognition is always activated and the LED bubble is on for face recognition only when detecting a sound (somebody approaching the door). If the face captured by the camera can match any faces in the pre-created facial recognition library, a motor connected to the door lock will unlock the door and the light strip inside the house turns green, otherwise, the motor will not turn and keep the door locked. There is also a light strip put inside the door. If someone comes and tries to unlock the door but fails, the light strip will turn red, which alarms the host in the house that an unauthorised visitor is outside. The flow chart of overall system working logic is shown in Figure .1.

Fig .1 The flow chart of overall system working logic

图示

描述已自动生成

**Devices used in this project:**

1. Raspberry Pi 3B
2. Sound Sensor
3. 8MP Auto Focus Camera Module
4. Digital Programmable LED Strip
5. SG90 Micro Motor
6. Breadboard, Dupont Lines, etc.

**Conclusion**