

Automated Gate Security

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Abstract: *IoT is the key idea of this security system. In IoT world, to communicate with the visitor even when not in a particular place, a Raspberry Pi is installed, so other people get connected through the audio and video. This comes possible, for the visitor and admin to have a conversation through the video with the help of IP camera, we also provide a button to take the snaps of the visitor's ID proof which will be mailed to sender, by this, it even makes easier for the admin to keep the track of date and time. For a supplementary, we also provide, a button to access the gate from indoor. In future, as we like to extend this project as an absolute warehouse automation, we have attached a fire alert along with an extinguisher. Finally, after all such security pass, when the admin is satisfied, he can open the gates for the visitor from his remote place.*

Keywords: RASPBERRY PI CAMERA, WEB CAMERA, FIRE SENSOR, PIR SENSOR, IOT

1. Introduction

This As per the year 2008, there were only one IoT device per person in this world. According to Cisco reports, 50 billion objects has been populated in the IoT market by the year 2020. At that time, the population was 7 billion. Contributing to the fast-growing factor, connected or smart homes would be the largest market for the IoT space in the year 2019. Also, industrial IoT makes up 17 percent of all global IoT projects. Due to massive growth as well as we are in the need to replace human source, IoT plays a major role. This brought me to develop a project on gated security. So, this can reduce man power which helps in COVID times and saves time and money.

Many aspects of the world's security situation today leave a lot to be desired. The prevalence of armed robbers and other groups that are a nuisance to society, has resulted in the loss of lives and property worth millions of dollars. Many of the attacks that resulted in the loss occurred in people's homes or in heavily guarded compounds, despite the presence of seemingly impregnable security gates designed to keep intruders out. As a result, there is a demand for electronically regulated gates with better security features than manually operated gates, which has been increasing in recent years.

With the development of a computer-controlled security gate system, privileged users can gain access to a keyless door using smart card authentication. It is true that smart cards can be stolen, jeopardizing the system's security. To gain access through the door, an intruder only needs to obtain a valid smart card. A low-cost private office access control device allows a person to gain entry by manipulating an electromagnetic door lock with the correct password entered on a keypad. One of the system's main drawbacks is that passwords belonging to one person can be learned by another without the owner's permission: the rogue can use the stolen password to gain access to the system. Microcontrollers and radio

frequency identification (RFID) have been used to operate gates.

This system is only used to close and open gates, and it has very little security. Surveillance cameras are used to record and replay the driver's face as well as vehicle plate numbers. These details are saved in a database for potential comparison with tourists, who will only be allowed to access a compound via gates if the information matches. The device has the drawback of requiring users to be fully documented in order to move through the doors. In the past, standard tags were superior to RFID due to their lower cost, but nowadays, RFID is more readily accessible and more convenient.

As a result, an intelligent gate controller based on pattern recognition and a personal computer is being built to prevent unwanted people or elements from gaining vehicular access to protected areas. With this detailed introduction, Section II describes the related study, Section III describes the system model and results followed by conclusion in Section IV.

2. RELATED STUDY

S. Akter, R. A. Sima, M. S. Ullah, S.A. Hossain [1] proposed Smart Security Surveillance using IoT, in this work, with the help of sensor and camera, the system detects motion in front of the door and captures a picture which is sent to the user's cell phone along with the picture in the email inbox and a detection message.

R.P. Santhosh, R. Shankar, V.J. Silvester Noel, R. Reuben Jebakumar [2] proposed PIP IN THE TV SCREEN, A method to attain PIP in the TV screen for automated wireless home security

P. Kumari, P. Goel, S. R. N. Reddy [3] proposed PiCam: IoT Based Wireless Alert System for Deaf and Hard of Hearing, When the visitor presses the doorbell, captured image is transferred to the wearable device which helps to know the right person at the door or intruder. After transferring image, wearable device vibrates to notify. Also, the message is sent to the owner through GSM.

M. A. Kader, M. Y. Haider, M. R. Karim, M. S. Islam and M. M. Uddin [4], proposed Design and implementation of a digital calling bell with door lock security system using fingerprint, when it detects a home member the entrance door automatically opens. In case, the person categorizes as known guest, the device sounds a tune but doesn't open the door automatically rather people inside home can open the entrance door from anywhere of the home.

D. Hofman, J. Leu, P. Troller [5] proposed Evolution from a Door Bell into an IP Door Phone, The Raspberry Pi computer was chosen for development together with

other suitable hardware to accomplish desired functions.

3. System Model

The proposed security system's main concept is to interact with visitors even when they are not in a specific location. A Raspberry Pi camera is mounted, and other people can be linked via audio and video. This is accomplished by installing PIR sensors, which, as soon as they detect a human, activate the live camera for the administrator through an app. We also have a button to take images of the visitor's id evidence, which will be emailed to the sender, making it even easier for the admin to keep track of date and time. As a bonus, we also add a button that allows you to open the gate from inside. We've installed a fire alarm and an extinguisher in case we want to turn this project into a full warehouse automation in the future. Finally, once the admin is pleased with all of the security checks, he can open the gates for visitors from his remote location.

3.1 Components Used

IP Camera

An IP camera, or Internet Protocol camera, is a type of digital video camera that uses an IP network to receive control data and send image data. They're widely used for surveillance; all they need is a local area network.

Raspberry Pi Camera

The Raspberry Pi Camera Module v2 is a custom-built add-on board for the Raspberry Pi with an 8-megapixel Sony IMX219 image sensor and a fixed focus lens.

Web Camera

A webcam is a video camera that feeds or streams an image or video to or from a device to a computer network, such as the Internet, in real time.

Fire Sensor

A flame detector is a sensor that senses and responds to the presence of a flame or fire, making it possible to detect flames. Sounding an alarm, disabling a fuel line (such as a propane or natural gas line), and activating a fire suppression system are all possible responses to a detected blaze, depending on the installation.

PIR Sensor

To boost noise, temperature, and humidity immunity, the IR sensor is housed in a hermetically sealed metal can. The sensing element is shielded by a window made of IR-transmissive material (typically coated silicon because it is readily available). The two balanced sensors are positioned behind the glass.

MQTT APP

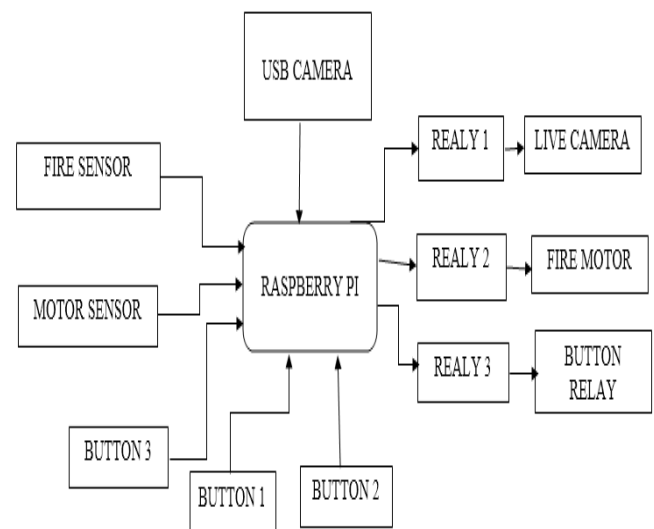
MyMQTT is an Android app that can be downloaded from the Google Play Store. It's a handy app with simple publish and subscribe features.

V380S APP

V380s is a free application for a new generation of intelligent household cloud cameras that allows for easy remote video monitoring and management.

1. This app allows you to view the real-time video process at any time and from any place.
2. Remote PTZ control is supported, with camera rotation direction controlled by touching the screen.

3.2 Block diagram and experimental design



- When the visitor enters the door and press the yellow switch, the snap of him gets mailed to the admin
 - After this, the admin contacts the visitor through V380s app by which they can get connected both by video and audio
 - Once the admin verifies the visitor as well as his identity proof, he can open the gates for him through the app Mqtt server. (the motor serves as the gate)
- Finally, when he enters, he gets welcomed by a voice note and light gets switched on automatically
- As I also like to extend this project as automated warehouse, I installed a fire alarm and extinguisher. (Pump serves the extinguisher).

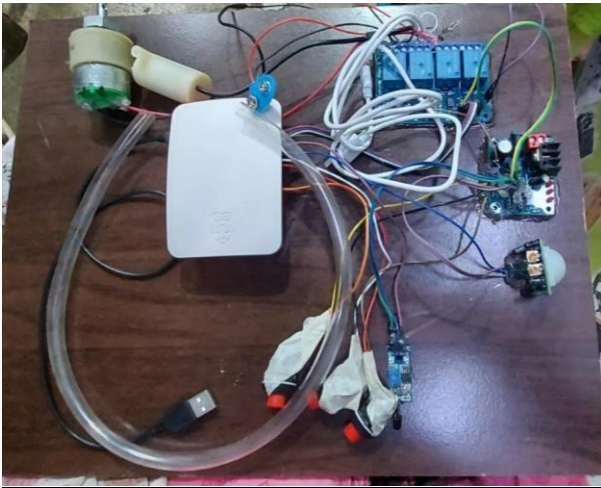


Figure 1. Proposed controller design

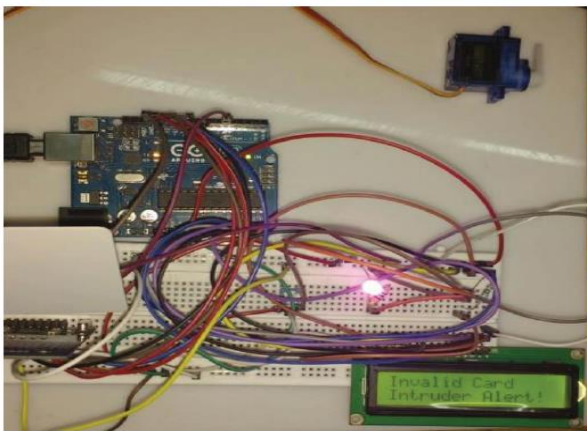


Figure 2. Warning message

- Yellow wire: Takes snap and mails to admin
- Red wire: Access door from inside
- White wire: Gives audio welcome when it detects person through PIR sensor.
- PIR Sensor: Automatic light
- V380s app: Live audio and video communication.
- MQTT app: Gives data through which it can open door

Figure 1 displays all of the components linked to their respective ports, as well as how well the display operates. In this screenshot, we can see all of the components and easily recognize them. Yellow wire takes pictures and sends them to the admin. The red wire is a button that allows you to open the door from the inside. The white wire button plays an audio welcome message. The welcome message is shown on the LCD monitor after the RFID reader detects the valid RFID key card. When the card is detected, a blue LED illuminates, signaling that the user has entered valid data. When a legitimate user key card is identified, a welcome message appears on the monitor, and a blue LED illuminate. From Figure 2, A separate RFID key card is detected by the RFID scanner, which appears to be invalid. As a consequence, a warning message appears on the LCD

monitor. After the card is detected, a pink LED illuminates, signaling that there has been an unauthorized entry. If an invalid key card is found, an alert message appears on the LCD display, and a pink LED illuminate.

4. Conclusions

- You can communicate lively with the visitor though not present in the respective place as well as u can unlock your gates for them, without any manual help.
- For unauthorized persons, you can even take a snap of their id proofs.

When compared to other security and access control systems, such as biometrics, RFID-based security and access control systems are more reliable and responsive. The RFID device has the benefit of being contactless and non-line-of-sight. It is simple to use Arduino and it works quickly when burning the code. It is a Plug and Play system. Using Arduino, users can adjust the function as needed. It is much more user-friendly and precise.

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