AI-based Cyber Threats Intrusion Detection With Hyper parameter Optimization

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Abstract
Many technologies have presented security frameworks to society of which IoT-based security is more demanded. Camera and Sensors act as the backbone of the system to get security. We are implementing a crime detection Surveillance system by using an IoT module and PIR Sensor. IoT plays an important role in the automatic process and helps people to work smarter. In this system sensor named PIR is used for motion detection when an unauthorized person enters the protected area. The PIR sensor and camera are combined in such a way that when any action happens in the area, automatically it switches on the camera. The authorized person can view the IoT data which is the action of an unauthorized person inside the protected area. A mail-services is included in this to notify them regarding the stranger's action to the owner. The proposed method provides a smart surveillance security system for Intruder detection.
Keywords—Internet of Things (IoT); Passive Infrared Sensor(PIR); Intruder Detection System (IDS); Infrared(IR) rays ; complementary metal-oxide semiconducto(C-MOSS)

1. Introduction

In this contemporary world, security and surveillance are major issues. Recently, The Action of Crimes spotted the vital need for efficient smart surveillance and instant alert message of ongoing theft to the respective owners. A huge number of solutions regarding surveillance were available in a market like CCTV camera and Video Recorder are the available solution were available. But Video Recorder has one disadvantage which cannot differentiate between human and non-human actions. Nowadays, Crimes were increasing mainly in jewelry shops and banks. Though they have surveillance systems[1] [3] it is not effective to capture stranger's faces because they wear masks. Recently, the proportion of Crimes was increased enormously due to a lack of awareness and less availability of smart gadgets. The difficulty facing face detection and recognition of strangers is a tough task when the stranger hides the face using material like fabric, plastic, or leather. This systems neither provide the notification of real-time theft to the authorized person nor detect the partially or fully covered faces. Detecting the stranger without night visibility is a challenging one for olden times[1].The concerned owner cannot stay for a whole day in a protected area and also it is not impossible to have manual video surveillance. Added to that, it is a deadly task to look through all the recorded video clips after a possible theft has occured. So, capturing images and sending them to the owner can be the finest way.Furthermore to avoid the escape of robber the system can produce the irritating sound and harmful gas that makes stranger not to escape from the protected area. This paper overthrown the above mention drawbacks.

2. Proposed Methods

In the proposed method, it will do manual surveillance in the bank, shop or any protected area with the help of a Camera during business hours. During the closing time of the bank or shop, the

respective owner can turn on the security mechanism through the IoT website. If the security system is switched on, then the microprocessor will stimulate the PIR sensor for detecting any human presence in that area and if any misdeed action is detected, then the camera will capture the image of the person entered. Then the image of the person will be sent to the owner and police through email and also alert message will be sent with the help of IoT [5]. Before intruder get away from authorized area, the microprocessor will produce an annoying sound and the harmless gas to assure that the person doesn't escape. The security system will be switched off by the empowered person when the police arrive then the Exhaust Fan will release the chloroform gas from the area so that the gas will not harm the police. Then the police can arrest the thief. By implementing this method, we can stop the crime from happening.

2.1 Block Diagram

Fig.1. provides an intruder detection system by making use of a PIR sensor, Arduino UNO based Atmega328p, solenoid valve, buzzer and IoT. This system will do normal surveillance during business hours in the bank or shop with the help of a normal camera and during the closing time, the system will turn on the security mechanism through the website. if the security system is switched on, then the microprocessor will activate the PIR sensor [11] for detecting any human presence in that area and if any human presence is detected, the camera will capture the image of the person entered with the help of MATLAB.
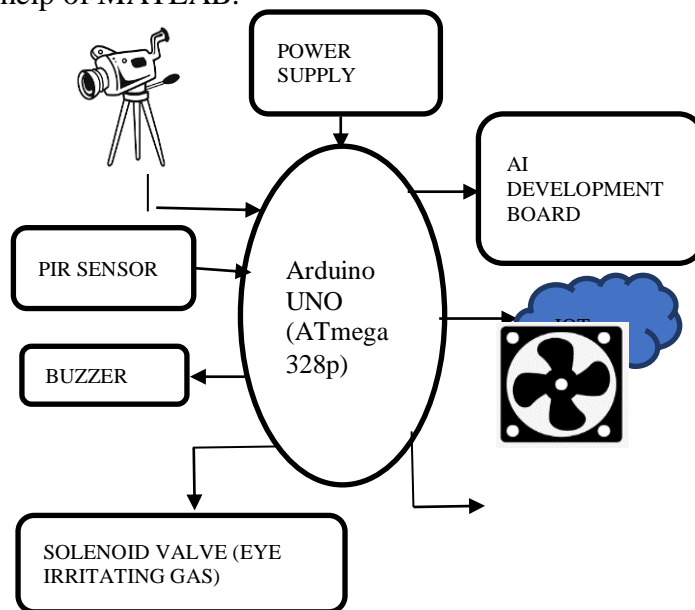

Fig.1 Block diagram

PIR sensor, Buzzer and Exhaust fan are connected to 5V DC Relay to open and close the circuit at the time of detection. PIR sensor can work in a 5-meter range. if intruder detected within that range, then PIR sensor shows logic 1 (HIGH). This digital signal is given to UART board to transmit signal to MATLAB. The Buzzer will alert the security mechanism and it diffuse the harmless gas to assure the person doesn't escape from the room. Then the image of the person will be sent to the authorized person and also to police through email. The security system will be switched off by the respective owner when the police arrive. With the help of an exhaust fan, gas will be released from the area so that the police can capture the thief.

2.2 Flow Chart

Fig.2 describes the workflow of different activities performed by an intruder enters the authorized area. The components used in the system are a PIR sensor [1], Web Camera, Mobile Phone, and a Solenoidal Valve. The PIR sensor detects the intruder entering the Secured Zone. A web camera is

used to keep track of any activities performed in the room. It records the activities of burglar and sends them to the authorized person.

The authorized person looks at the image through the mobile phone or any device and able to observe the activities of the stranger. If any illegal activities performed by the stranger, the system automatically switch on the solenoid valve to exhaust chloroform gas to make the stranger unconscious.

After inhaling the harmless gas, the strangers lose his consciousness. The live streaming of the stranger's action is watched by the respective owner. After the intruder loses consciousness, the sub motor value will be switched off by the authorised person through IoT website to avoid instability situation. The instability situation arises, if a large amount of Chloroform gas is sprayed into the room so the owner can control the level of gas emitted by solenoid valve. Thus the mechanism provides monitoring and controlling the activities in the protected area even though the owner is absent.
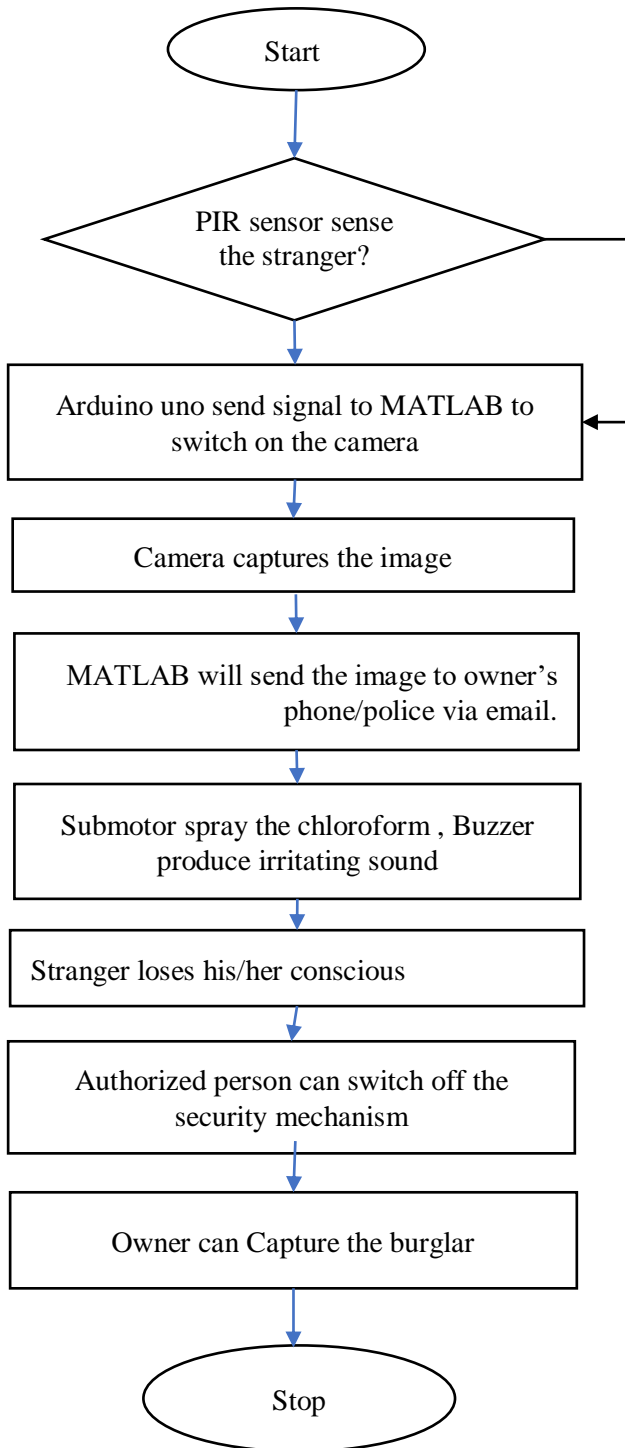
```
                    ┌───────────┐
                    │   Start   │
                    └───────────┘
                          │
                    ◇ PIR sensor sense
                      the stranger?  ──────┐
                          │                │
   ┌──────────────────────────────────┐    │
   │ Arduino uno send signal to MATLAB │◄───┘
   │ to switch on the camera           │
   └──────────────────────────────────┘
                          │
   ┌──────────────────────────────────┐
   │ Camera captures the image         │
   └──────────────────────────────────┘
                          │
   ┌──────────────────────────────────┐
   │ MATLAB will send the image to     │
   │ owner's phone/police via email.   │
   └──────────────────────────────────┘
                          │
   ┌──────────────────────────────────┐
   │ Submotor spray the chloroform,    │
   │ Buzzer produce irritating sound   │
   └──────────────────────────────────┘
                          │
   ┌──────────────────────────────────┐
   │ Stranger loses his/her conscious  │
   └──────────────────────────────────┘
                          │
   ┌──────────────────────────────────┐
   │ Authorized person can switch off  │
   │ the security mechanism            │
   └──────────────────────────────────┘
                          │
   ┌──────────────────────────────────┐
   │ Owner can Capture the burglar     │
   └──────────────────────────────────┘
                          │
                    ┌───────────┐
                    │   Stop    │
                    └───────────┘
```

Fig.2 Work flow for an Intruder

2.3 MATLAB Processes

When the input for the PIR sensor is high the microcontroller will send a digital signal to interface with the MATLAB with the help of the UART board. To capture the image of the burglar the supported package for the MATLAB needs to be installed to interface the webcammer with the MATLAB.The MATLAB code is programmed in a way to send the mail to a registered mail id. after

detecting the intruder.

3.Results and Discussion

A.Movement Detected

Once the PIR sensor is activated then it starts to sense the intruder who is passing over there.

B.Alert message send to Registered Mail Id

After detecting any human presence, the system will give signal to the system to run the Matlab code. The camera will turn on automatically to capture the image of the person entered then the image will be sent to the Registered mail Id. Fig.3 shows the display of Alert Message.
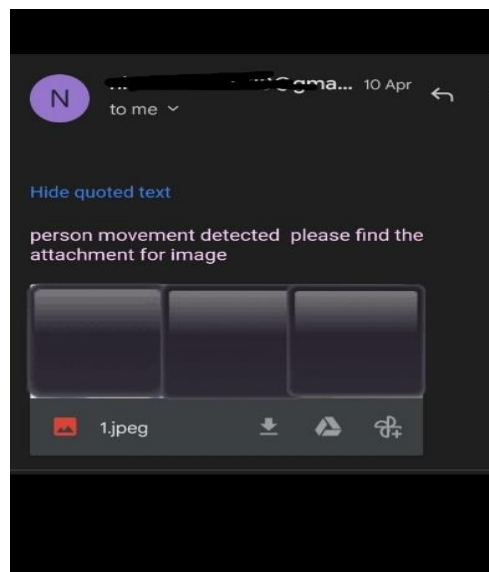

Fig.3 Alert Message

C.Chloroform will be sprayed to make the burglar unconscious.

The chloroform gas is pre-filled. When the relay is in the open condition the gas will be released at the time of detection to avoid the stranger's escape with help of a solenoid valve.

D.Authorized person can control the device.

Fig.4 shows the control buttons of this device. To unrelease the harmless gas the exhaust fan

is placed and to stop the buzzer sound, the owner can manage this device by switching on/off these buttons.
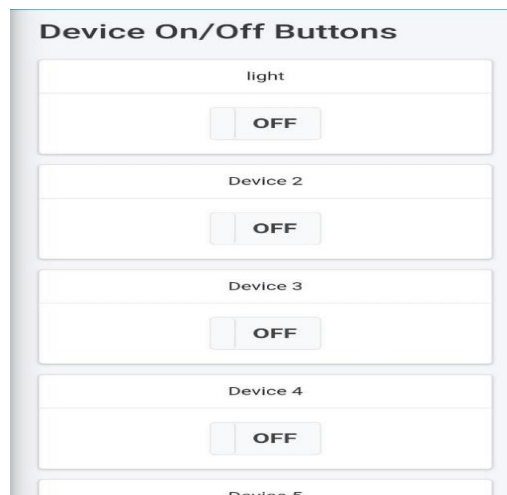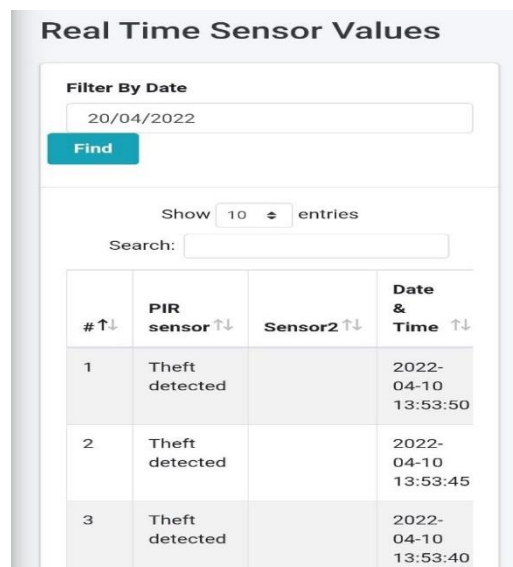
Fig.4 Load Control

E.Information Storage

Fig.5 shows the exact timing of detection of the thief. This IoT data makes an authorized person know the accurate timing of thief detection.

Fig.5 IoT Data

F. Prototype

As shown in the Fig.6 the project set up is fixed any place where security is highly essential. If the security system is switched on, then the microprocessor will stimulate the PIR sensor for detecting any human presence in that area and if any misdeed action is detected, then the camera will capture the image of the person entered.
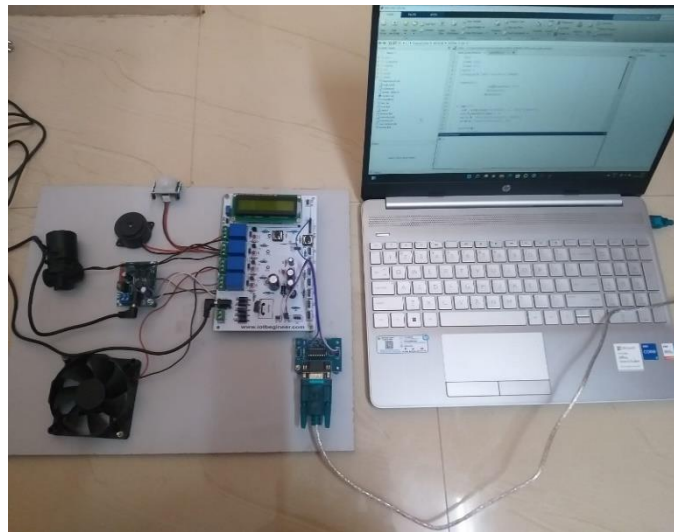
Fig.6 Security System Setup

The image of the person will be sent to respective owners and police through email with the help of MATLAB. This system not only alert the owner but also stop the crime from happening by capturing thief.

CONCLUSION

The system has been designed as a smart surveillance crime detection capable of capturing images, video recording and transferring them to an authorized mail.It is encrypted and authenticated so that only the owner could view the details of Stanger's data. Thus the Intelligent security intruder detection system is implemented where protection is highly essential.

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