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Smart Intrusion Detection System for Home Security

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Abstract

The Internet of Things (IOT) is an ever-growing network of smart objects. It refers to the physical objects capable of exchanging information with other physical objects. Nowadays safety and security has always become a basic necessity for metropolitan society. Our project proposes security system for IOT environment. Which prevent intrusion in Home, Bank, Airports, Offices, University or any location with security system. The primary objective of our project is to reduce human work by designing and implementing a security system. System that offers controllability through a hand held mobile phone and PC by means of IOT.

To detect for malicious activity or policy violation we use Intrusion Detection System (IDS), which detect any intrusion or violation and typically report to the administrator. The project includes Anomaly based technique for intrusion detection and signature analysis using haar algorithm to differentiate between legitimate person and intruder and thus raising accuracy in authorizing the legitimate person and provide access to private/personal zone, therefore risk of sending false alerts/alarm is reduced.

Automation is primary key factor of security we use Raspberry pi3 and relay to control any electric appliances which can be implemented to home, office, bank etc. The administrator can monitor the place through an application with live feedback and control automated environment.

Keywords: Intrusion Detection System (IDS); Internet of Things (IOT); Security.

Introduction

The major aspect of an automation is to provide convenience to the user and efficient use of electricity. It is essential that the different controllable devices be interconnected and communicate with each other[3]. The basic goal of Automation is to control or monitor signals from different devices. A smart phone or a web browser can be used to monitor or control the automation system in the Home or Workplace[6].

In today's world, security plays an important role to prevent intruders from entering into any confidential areas/Home/Workplace and provide access to only legitimate person[4]. Hence an "Intrusion Detection System (IDS)" is needed. Intrusion Detection System is a device which detects any malicious activities in any environment. Intrusion Detection is a challenging task where the risk can be minimized by deploying different techniques i.e. Anomaly and Signature based analysis using different sensors.

Accessing the devices at private or personal places like Home/Workplace/offices over the internet will enhance the scope of automation. Here we develop the system for home and it can be used for any place such as bank, office etc. The development of broadband internet connectivity and wireless technology, the concept of a Smart Home has become a reality where all devices are integrated and interconnected via through the wireless network. These "smart" devices have the potential to share information with each other given the permanent availability to access the broadband internet connection enabling IOT environment.

Background

The system, when it observes a deviation from the normal or expected behavior of the system or the users. The system later compares this model with the current activity. When a deviation is observed, an alarm/GSM based message is generated[1]. It detects the false alarm/message rate of the system, not because the entire scope of the behavior of an information system may be covered during the learning phase.

The system includes a PIR module which constantly monitor the Home or Work space[2] .When the PIR module detects an intruder it sends a signal to the microcontroller and the controller is connected to a module and also to an alarm system. The System transmits an alert signal on the user's mobile phone. The system also employs a thumb print reader which controls the opening and the closing of a safety locker door. Thus the system uses Wi-Fi module and controller to control the security system from the users mobile phone by means of any device with a potential internet connection[5] detects the system will be augmented with the parameter monitoring security subsystem. This will supplement to get information about home monitoring, finger print protection which can give false alarm to nearby resident and the owner of the house in case of theft.

PROPOSED WORK

In our prototype module we will be using different IDS (intrusion detection system) techniques. Anomaly detection, this technique detect abnormal behavior in the system using PIR sensor. The normal usage pattern is base lined and alerts are generated when usage deviates from the normal behavior and then camera is activated. When camera is activated the detected person will be examined, encryption/decryption process to user exceeding authorization by face recognition technique (image processing). Signature analysis, this technique compares the examined data with the specifically predefined defined data (also known as signatures) and provides authorization, thus enabling accuracy in intrusion detection system and lowering the false alarm/message rate. Infrared sensor used to see difference between PIR and Other Obstacles. And Relay, AC device are used to automate home.

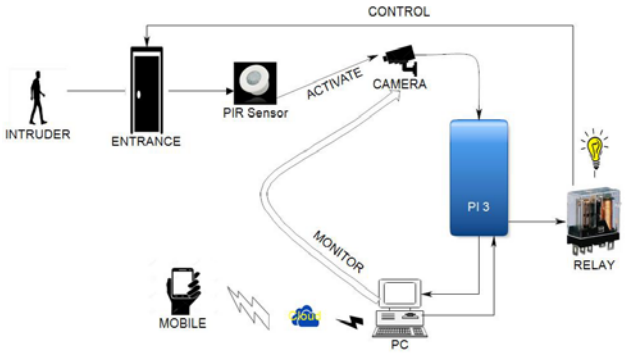

Fig 1: SYSTEM ARCHITECTURE

OBJECTIVES

1)To prevent intruders from entering home and provide access to only legitimate person.

2)We implement different IDS techniques i.e. Anomaly based and Signature analysis using different sensors and wireless camera for detection of intruder.

3)If any intruder is detected then detected intruder image is examined with previously stored database and send notification to the owner. If the person is legitimate then provide access to home.

4)Enables the owner to monitor his/her home with live feedback through an application and provide home automation through application.

METHODOLOGY

The research methodology used in this is mainly based on experimental research though analytical research is also adopted in the beginning of the this work. Experimental research that often starts with a concrete problem is used to evaluate the impact of one peculiar variable of a phenomenon by keeping the other variables controlled so that we can arrive a concrete solution. .

- Analytical research methodology will be applied to perform a threat analysis of the IoT network. Analysis start with known security threats in the IoT medium and examine how to provide security mechanisms in IoT to guard against these threats.
- To provide IOT applications it can be integrated on Linux platform and QT creator IDE
- To provide secured communication, The **light weight cryptographic algorithms** such as AES,DES will be implemented.
- To prevent attacks in IoT and sensor devices using **light weight intrusion detection system**

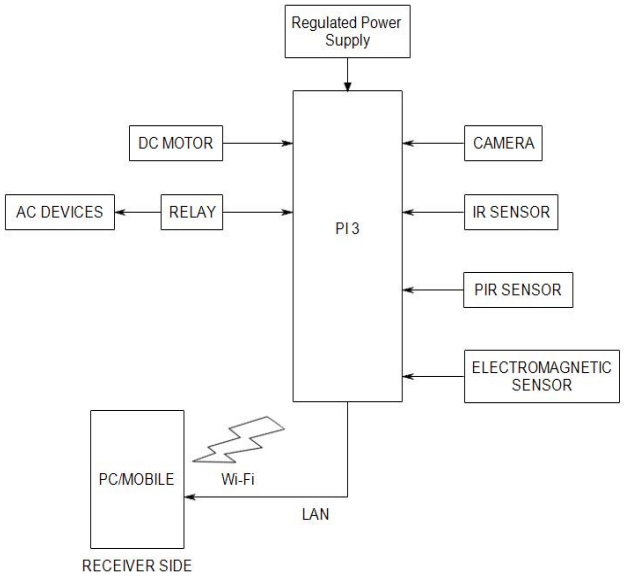

Fig2. Data Flow Diagram

IMPLEMENTATION

- **Anomaly Detection Technique :**

  No deviation ()

  deviation ()

  Normal_behaviour ()

  Abnormal_behaviour ()

  Camera Module ()

- **Signature Analysis Technique**

  Captured Image ()

  Predefined_ Image ()

  haar cascade alog ()

  Intruder Detection ()

- **Administrator**

  Automation ()

  Live feed ()

Results

The proposed system implements detecting intruder with wireless sensors and provides automated environment over IOT.

Home Security

The system also capable of differentiating between known person and intruder and sending alerts to the owner.Upon intruder detection alert he can alert the police or neighbour through call or take actions preferably.

Home Automation

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Conclusions

The system incorporates security along with automation using IOT. The security module successfully sends alerts upon detecting intruder using wireless sensors and biometric techniques where owner further can take necessary actions also owner can successfully automate environment through app thus enabling owner to simplify complex tasks, enhance convenience and comfort, save energy efficiently, access and use home systems anywhere and enjoy completely security.

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