

SECURED WEB SERVICE FOR SMART HOME LED AND PROXIMITY CONTROL IN IoT

¹Mohammed Azam.A.A, ²Mounika.K, ³Prabu.M.M⁴Seenivasan.D

¹UG Student, ²UG Student, ³UG Student, ⁴Assistant Professor

Department of Computer Science and Engineering

K.S.Rangasamy College of Technology Tiruchengode, Namakkal – 637216

²mounikavanitha22@gmail.com

ABSTRACT: The Internet of Things(IoT), is the internetworking of physical devices, vehicles, buildings and other items-embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. Home automation refers to the control of home appliances and domestic features by local networking or by remote control. Artificial Intelligence provides the framework to go real-time decision and automation for Internet of Things (IoT).The Smart Home known as Home Automation, with the use of new technology, to make the domestic activities more comfortable.

The proposed system is associated with the design and implementation of interoperability for sub-systems in smart home environment regardless of their level. A proximity sensor is able to detect the presence of nearby objects without any physical contact. A photoelectric sensor is an equipment used to discover the distance, absence, or presence of an object by using a light transmitter. The transmitter emits infrared rays which, when bounces off after hitting some object, are captured by the receiver. On the basis of the time taken by the rays to come back to sensor, one can determine how far or close is the object from the sensor. These sensors are mostly used in applications where short range detection.

INDEX TERMS: PIR, RASPBERRY PI.

INTRODUCTION: The Internet of Things (IoT) is the internetworking of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity that enable these objects to collect and exchange data. The Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as “the infrastructure of the information society”. The IoT allows objects to be sensed and/or controlled remotely across the existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. IoT is a new revolution of the Internet. IoT is can be said the expansion of Internet Services. It provides the platform for communication between the objects where objects can organize and manage themselves.

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. A thing, in the Internet of Things, can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low or any other natural or man-made object that can be

assigned an IP address and provided with the ability to transfer data over a network.

IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS), microservices and the internet. The convergence has helped tear down the silo walls between operational technologies (OT) and

information technology (IT), allowing unstructured machine-generated data to be analysed for insights that will drive improvements. The fundamental components that make internet of things a infrastructure which consists of protocols and technologies which enable two physical objects to exchange data.

SCOPE OF IoT: Internet of Things can connect devices embedded in various systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. Internet of Things can connect devices embedded in

various systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. The connectivity then help us capture more data from more places, ensuring more ways of including more efficiency and improving safety and IoT security.

IoT is transformational forces that can help companies improve performance through IoT analytics and IoT Security to deliver better results. Business in the utilities, oil & gas, insurance, manufacturing, transformation, infrastructure and retail sectors can reap the benefits of IoT by making more informed decisions, aided by the torrent of interactional and transactional data at their disposal.

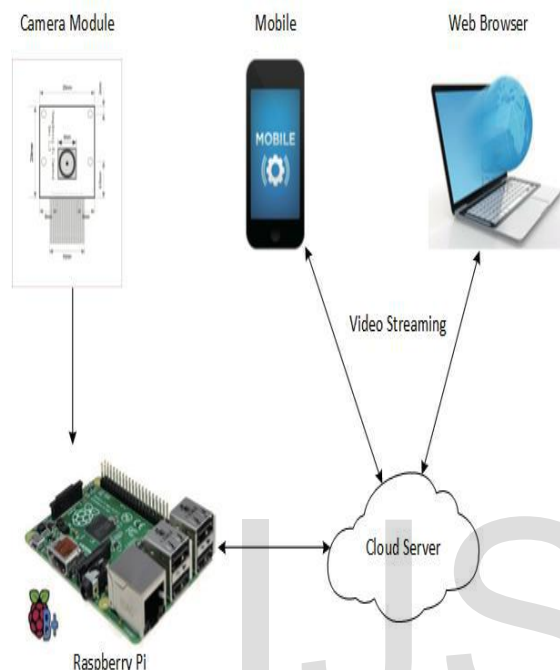
LITERATURE REVIEW:

EXISTING SYSTEM: In recent years Internet of Things technologies has been widely applied to safe home applications in security, lights and,

gas etc. The performance of safe home can be improved which needs more economical design of secured home security. With the use of secured safe home enhancement techniques helps to obtain economic design of secured home security and thereby reduction of the security costs which generally leads to cost savings. In the group of secured web services security techniques, Raspberry Pi is one of the economic techniques which significantly give good results in the past studies. In this context, the present chapter reviews the various studies carried out related to the secured home web service for smart home using Raspberry Pi fitted in a smart home technology in the recent past.

Farag Sallabi and Khaled Shuaib developed the notion of a smart home with integrated sensors, actuators, wireless network and a graphical user interface is very enticing. This paper presents the design and implementation of reliable, flexible, secure and economical sensor network for transforming traditional home into a smart home. In a home automation system, the monitoring subsystem requires input readings acquired from several sensors like light, temperature, pressure, humidity, motion, fire alarm, dust air sensors, etc. An approach for developing a campus wide sensor network using commodity single board computers. Our key premise is that super sensors—sensors with significant compute capability—enable more flexible data collection, processing and reaction. In this paper, we describe the initial prototype deployment of our super sensor system in a single department. Our key idea is to embed physical sensors directly into the fabric of the campus. These might include footfall-sensors on walkways, temperature sensors in rooms, and sound sensors in public spaces. The Closed-Circuit Television (CCTV) surveillance system is being utilized in order to keep peace and provide security to people. The algorithm for motion detection is being implemented on Raspberry Pi, which enables live

streaming camera along with detection of motion. The live video camera can be viewed from any web browser, even from mobile in real-time. Closed-circuit television monitoring system has now become an indispensable device in today's society.



MONITORING SYSTEM ARCHITECTURE

Sohum Misra proposed that the work of computer science engineers, computers can now outperform humans in many face recognition tasks, particularly those in which large databases of faces must be searched. A system with the ability to detect and recognize faces has many potential applications including crowd and airport surveillance. An automatic face recognition system is perfectly suited to fix security issues and offer flexibility to smart house control. This project aims to replace costly image processing boards using Raspberry pi board. Internet of things is the communication of anything with any other thing, the communication mainly transferring of useable data, for example a sensor in a room to monitor and control the temperature. This paper aims to describe a security alarm system using low processing power chips using Internet of things which helps to monitor and get

alarms when motion is detected. Privacy would also be a great challenge as after the recent hacks people are all becoming more concerned about their privacy. Hence these challenges need to be taken in careful consideration before planning any project related to the Iot. A Raspberry pi micro-controller board obtains user input from a website that is accessed through a user name and password. The customized user friendly website has several buttons to control the appliances. A Raspberry pi will be located in a room and will be connected to all electronic appliances in the home with the help of electromagnetic relays. The Raspberry pi can be controlled from any distant place with the help of weaved cloud service.

DRAWBACKS OF EXISTING SYSTEM:

- Existing system locally accessible, it can't access through internet. This system does not speak about the scalability and security.
- It only controls the LED. There is no security assurance given to the individuals and also no proximity controls are provided.

PROPOSED SYSTEM: This system mainly focus on the secured home automation using One Time Password with Proximity sensors. Using Raspberry pi 3 Model B which controls LED and PIR (Passive Infrared Sensors). Internal LED is controlled either by LDR(Light Dependent Resistor) which senses the light and enable LED or it can be controlled by switching on or off by clicking the button in the web page. Proximity sensor used for detecting the person whenever someone gets nearer to the proximity sensor and if (PIR)proximity sensor detects any person near it then it enables the buzzer(Alarm).This project's Web User Interface is secured using One

Time Password and if One Time Password is entered then it redirect to Web User Interface Content where the LED and Buzzer is controlled manually by Turn on or off the light and Turn off the Alarm manually and enable the (PIR)proximity sensor in the page. Raspberry pi connected to the Local Network is Port forwarded and which we can access the Raspberry Pi globally and domain name is given to the Raspberry Pi's Internet Protocol(IP).

ADVANTAGES OF PROPOSED SYSTEM:

- The Web User Interface is globally accessible User can control it from anywhere in the world.
- LED is controlled manually through Web User Interface or
- and alarm can be turned off by using Web User Interface.
- Web user Interface is Secured using One Time Password.

BASIC TASK: A basic task in this home security system is to provide the secured home automation based on One Time Password and using Proximity sensors. Using Raspberry pi 3 Model B which controls LED and PIR(Passive Infrared Sensors). Internal LED is controlled either by LDR(Light Dependent Resistor) which senses the light and enable LED or it can be controlled by switching on or off by clicking the button in the web page. Proximity sensor used for detecting the person whenever someone gets nearer to the proximity sensor and if (PIR)proximity sensor detects any person near it then it enables the buzzer(Alarm).This project's Web User Interface is secured using One Time Password and if One Time Password is entered then it redirect to Web User Interface Content where the LED and Buzzer is controlled manually by Turn on or off the light and Turn off the Alarm manually and enable the (PIR)proximity sensor in the page. Raspberry pi connected to the Local Network is Port forwarded and which we can access the Raspberry Pi globally and domain name is

given to the Raspberry Pi's Internet Protocol(IP).

The Web User Interface is Globally accessible User can control it from any where in the world. LED is manually controlled through Web User Interface and alarm can be controlled by PIR Sensor. This Web UI is safe by providing One Time Password.

MATERIALS AND METHODS:

RASPBERRY PI: It is a microcomputer that suddenly the authors came pretty much popularity. Available in several versions, the price is about \$ 40. Despite the relatively small size, this is a microcomputer, which is installed and operating systems that works. In addition to the standard as a computer interface, Raspberry Pi has "pin" for connecting external devices, it broadens the scope of the Raspberry Pi in automation systems and the construction of other interesting things from the wise and house robotic systems. The Raspberry PI makes a wonderful device for security: you can place it anywhere in your home and it's easy to keep out of sight. User could also use the LCD screen to display alerts if a zone has been breached. or you may want to trigger another GPIO on the Raspberry PI to do something when a zone is breached. The fact that the Raspberry Pi is running Linux gives you so many opportunities for this project compared to Arduino or a similar microcontroller. It's quite simple to add an internet connection to the Raspberry Pi so it can keep you up to date about the sensors or you may want to log how many people walk past your house every day.

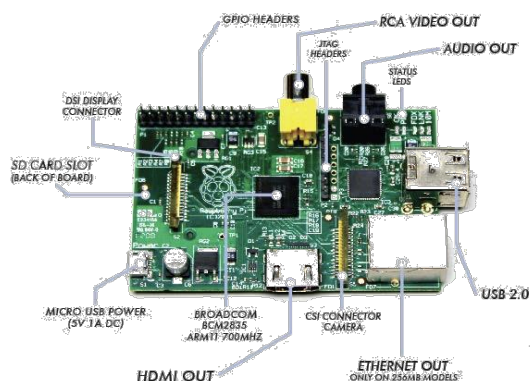
- automatically through LDR sensors.

Alarm is controlled normally through the PIR (Passive Infrared Sensor)

ARCHITECTURE OF RASPBERRY PI

SENSORS : Sensor simply means a

device which detects or measures a physical property



ARCHITECTURE OF RASPBERRY PI

SENSORS : Sensor simply means a device which detects or measures a physical property and records, indicates, or otherwise responds to it. Sensors like temperature is used. For example, Temperature sensor is used to measure the body temperature of the patients.

LED SENSOR: A little used technique is to use an LED as both a light emitter and a light detector. Just like a dog walking on its hind legs one marvels, not that it is done well, but that it is done at all. The LED would change between bright or dim depending if it was covered or not. Not it is not just a matter of setting it bright if covered, you have to hold that state until it is covered again before turning it on to dim.



LED SENSOR

PIR SENSOR: A PIR-based motion detector is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically-activated lighting systems. They are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector".

APPLICATIONS OF PROXIMITY SENSOR:

- Ground Proximity warning system for aviation safety.
- Vibration measurements of rotating shafts in machinery.
- Sheet break sensing paper machine.



PIR SENSOR

BUZZER : A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Types of Buzzer:

- Electromechanical
- Mechanical

- Piezoelectric

The system is done by connecting Raspberry Pi with sensors, led and buzzer.

MODULE DESCRIPTION:

WORKING WITH PIR SENSOR

Setup Raspberry pi with Raspbian jessie operating system and Passive Infrared Sensor (PIR) is a sensor which is used to detect the presence of any object within the radius of PIR sensor. The buzzer automatically enabled when PIR sensor is Turned on PIR sensor is fixed on the edge of the doors and window pane. When any person breaks through the window the alarm rings and alerts the surrounding.

In our setup breadboard contain PIR sensor is fixed in the bread board and connected to the buzzer both the PIR sensor and Buzzer is connected to the raspberry pi's GPIO pin and when Python code which is in Raspberry pi is executed the PIR sensor get enabled.

WORKING WITH LDR

The function of LDR(Light Dependent Resistor) is to detect the light emission level in its surrounding and gets invoked if the light level goes below the proposed level and it activates the Light Emitting Diode(LED). A separate connection is given between the LDR and LED.

In our setup the Light Emitting Diode(LED) and Light Dependent Resistor(LDR) both are encapsulated in breadboard and the breadboard is connected with Raspberry pi3 modal B device. In the similar way if the python code is executed, the function of LDR starts working.

MAKING WEB USING PHP

The concept of third module is to design a UI (User Interface) page using php

page as front end.

This page has two options fro the user to work with Sensors(LDR and PIR). One is by automatic and another by manual. in automatic method all the sensors are activated and enables automatically according to surroundings. In manual method the user's work is to turn on or turn off the LED and turn off the alarm.

PORT FORWARD THE IP

A port forward is a way of making a computer on your home or business network accessible to computers on the internet, even though they are behind a router. Port forwarding or port mapping is an application of Network Address Translation (NAT) that redirects a communication request from one address and port number combination to another while the packets are traversing a network gateway, such as a router or firewall.

Here Raspberry pi is connected to a wireless LAN, and the Internet Protocol(IP) is PORT forwarded to Internet. So even if the user is beyond the range of the WLAN, since the port is forwarded so this can be accessed globally.

SECURED WEBSITE

OTP(One Time Password) is a powerful means to make a secured Website. A One-Time Password (OTP) is a password that is valid for only one login session or transaction, on a computer system or other digital device. OTPs avoid a number of shortcomings that are associated with traditional (static) password-based authentication; a number of implementations also incorporate two factor authentication by ensuring that the One-Time Password requires access to something a person has (such

as a small keying fob device with the OTP calculator built into it, or a smartcard or specific cellphone) as well as something a person knows (such as a PIN). Here we need to register our mobile number or email to raspberry pi. The change of number or email can only be done by the admin. Every time when we need to access the Web User Interface user need to generate the One Time Password.

CONCLUSION: Priority for the automation is automatic or remote control of appliances and equipment in the house. But the high price of these systems, forcing seek alternative cheaper solutions that could afford each user. One of these decisions can be based on a system mini-computer Raspberry Pi. The constant evolution of Internet and IoT, enable us to create new solutions to common problems that people has. The access to Internet and computer technologies, has become in a real alternative and, if at first it was practically impossible to access them, today the access to these technologies is massive.

The proposed idea is to utilize nodes as an alternative to regular Switch boards in traditional home, thereby effectively converting it into Smart Home with secured Web User Interface and PIR sensor is used to secure home cheaper if any person try to spying our home. With this setup we can control not only LED with the Relay we can control all the Home appliance. This project achieve the Security that is not available in the existing system.

The work focuses on the security aspect of the existing home automation system and points out its flaws. It shows how the concept of the security and meaning of the word "intruder" has changed in modern homes. This paper points out all the shortcomings of the existing home automation systems in identifying and preventing sophisticated intruders in a home environment.

The future work in the field of home automation security, encourage the researchers to consider a home automation system as a

whole and develop the behaviour prediction and advanced sensing parameters that can help to identify and prevent skilled and sophisticated intruders. Security is vital for the proper way of implementation and development of the home automation systems. Moreover, it provides a sense of security to a home's inhabitants and puts their minds at ease.

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