

## IoT Based Secured Smart Home Using Raspberry pi

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### ABSTRACT

This paper deals with the design and implementation of Raspberry pi based IOT concept it means internet of things. In this present generation everything is going on internet itself. Internet of things is a technology of the future that has already started to touch our homes. This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. Besides, the same can also be utilized for home automation by making use of the same set of sensors. When it comes to our house, this concept can be aptly incorporated to make it smarter, safer and automated. This paper relates smart home or home automation which induce technology for home atmosphere which is usage to provide ease and protection to its occupants.

**Keywords:** *IOT, Wi-Fi, automation, sensors, camera, cloud, android, Raspberry pi.*

### INTRODUCTION

The Internet of Things (IoT) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves. Building IoT has advanced significantly in the last couple of years since it has added a new dimension to the world of information and communication technologies. The Internet has come a long way over the last 30 years. Old-fashioned IPv4 is giving way to IPv6 so that every device on the Internet can have its own IP address. Machine-to-machine (M2M) communication is on the rise, enabling devices to exchange and act upon information without a person ever being involved.

The scope and scale of the Internet have changed as well: industry leaders predict that the number of connected devices will surpass 15 billion nodes by 2015 and reach over 50 billion by 2020. The challenge for the embedded industry is to unlock the value of this growing interconnected web of devices, often referred to as the Internet of Things (IoT), describing it as the ultimate tool in our future surveillance. This network has the power to reshape our home and cities.

## II.SMART HOME AUTOMATION

Home Automation (or) Smart Homes can be described as introduction of technology within the home environment to provide convenience, comfort, security and energy efficiency to its occupants. Adding intelligence to home environment can provide increased quality of life. With the introduction of the Internet of Things (IoT), the research and implementation of home automation are getting more popular.

The introduction of home automation in the 1970s failed to improve the lifestyles of users for several reasons. Firstly, determining economic benefits of home automation technologies is difficult. Secondly, the costs of implementing smart home technology must be justified by the effects brought about by their installation. There is a need for home automation technologies to be cost effective, easy to install and flexible with many network infrastructures and appliances. In 2003, Housing Learning & Improvement network published a smart home definition offered by Interacted which states that a smart home is “a dwelling incorporating a communications network that connects the key electrical appliances and services, and allows them to be remotely controlled, monitored or accessed”. The purpose of these experiments was to provide health monitoring for elderly and disabled person at home by using fully automated measurements to support daily health care and improve quality of life.



Fig: 1 Home Appliances Connected in Network

In my focus of this paper helping users to operate home appliances with their own smartphones and to help elderly or handeled physically challenged people live a more independent life as long as possible. The objective of our system is to take care of several domestic systems that may normally be difficult for those who are physically challenged or elderly to take care of. The proposed idea will allow a user with any android enabled device to run a piece of downloadable software on any mobile device such as a smartphones. This application will allow the user to control a device that is connected to any home appliance that is Pi enabled. The focus of

this application will be to direct a security system with webcam surveillance, door sensor notification and a light control system. Sensors will be connected to the home appliances with Pi so that they can be monitored and controlled.

Suppose an employee who has gone to work and during this period a thief sneaks up into the house breaking through a window. The proposed system would enable the client to monitor his home when a door or a window sensor triggers the alarm. Client monitors his home with webcam and could immediately inform local authority or a policeman.

The Client could also check the status of the outside light and turn on and off the light without the need to get out of bed. These devices would also benefit users with limited mobility that may have a difficult time getting to or even reaching their light switch. These objectives require a large amount of technology. The user interface must be as simple and powerful as possible and operate in a self organized way.

### III.RASPBERRY Pi BOARD

**Raspberry Pi:** A microprocessor will interface with the android module to perform the automation. A simple microprocessor will receive signals from the smartphone and it will be processed.

**Develop Software Interface Mobile Device:** An android application to be developed using the ADT (Android Developer Tools) java platform for programs running on mobile devices that communicates between pi and home devices easily.

**Integrate the Sensors to a Device:** The Raspberry Pi needs to be integrated with the lighting, door sensors and webcam control systems at a low cost with easy installation. After extensive research into the products and solutions currently available, the following were chosen to meet our application specific requirements.

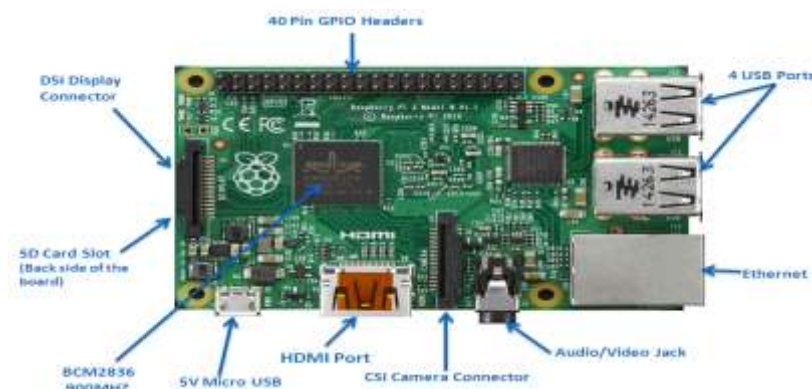


Fig: 2 Raspberry Pi 2 Model B

The Raspberry Pi is a credit card sized single board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The Raspberry Pi is manufactured in two board configurations.

The system uses original Raspberry Pi 2 Model B having 40 pins. It has 26 GPIO pins, 4 USB 2.0 ports. It has a better hot-plug as well as over-current behaviour. It also has easy-to-use micro SD version with push-push facility. It is power-efficient by replacing linear regulators. Raspberry pi module acts as server; it receives radiations from PIR sensors as input. It then activates the relay module.

### DOOR SENSORS

This Door Sensor is essentially a reed switch, encased in an ABS plastic shell. Normally the reed is 'open' (no connection between the two wires). The other half is a magnet. When the magnet is less than 13mm (0.5") away, the reed switch closes. They are often used to detect when a door is open or close.



Fig: 3 Door Sensor Sensing Human

### WEBCAMERA SURVEILLANCE

A webcam is a video camera that feeds or streams its image in real time to or through a computer to computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet, and email as an attachment.



Fig: 4 WebCamera Sensing Human Activities

### AUTOMATIC LIGHTS ON/OFF APPLICATION

Nowadays, human has become too busy, and is unable to seek out time even to change the lights were not necessary this system is like this provides the simplest answer for wastage. Conjointly the manual operation of the lighting system is totally eliminated. During this idea the sensing elements square measure used that square measure lightweight Dependent resistance LDR sensor to point a day/night time and also the small controller is employed which is able to generate standing of sunshine to the user by exploitation GSM module that acts as a group action half between backside and also the side half. Wherever the programming language used for developing the package to the micro controller is C language. Finally, the system has been with success designed and enforced as epitome system.



Fig: 5 Lights Power ON/OFF Using Mobile Phone

### SAFETY AND SECURITY SYSTEM

This method is to build a safety and security system that carries out various functions, like remotely controlling and checking the status of devices connected. Like fire alarm, Burglar Alarm etc.

A fire detector is a sensor designed to detect and respond to the presence of a flame or fire. A fire detector can often respond faster and more accurately than a smoke or heat detector due to the mechanisms it uses to detect the fire.



Fig: 6 Fire and Safety Alarm

## FUTURE WORK

Although the final products were very successful at accomplishing the objectives, it must be kept in mind that the products produced are simple prototypes and much more work would need to be done to create a marketable product. Several areas that need to be improved are the size of the devices, the cost of the devices, the power sources used and the range of communication. Currently, the Raspberry device is too large to fit easily into a pre-existing wall switch electrical box. There are several ways this could be improved in future work. The use of surface mount components would dramatically decrease the overall size of the components. Surface mount components are also often less expensive as they require less material to produce. This would help reduce the overall cost of the devices as well as the size. Another area to help improve the size is the circuit board that is used. Currently for the prototype, a generic breadboard style board was used. If this device were to be commercially produced, a more compact circuit board could be designed.



Fig:7 Future Scope

## IV.CONCLUSION

The devices produced enable the user to control the appliances using pre-existing devices such as their Smartphone or home computer. The interfaces are intuitive and easy to use and provide the user with a more accessible interface than those found in the home. The devices are also very easy to integrate into existing applications and require only a small amount of expertise to install. Our research shows the many types of applications for implementing home automation and the applications are not limited to those discussed in this paper. The technology used could be implemented in a wide variety of applications that require the use of sensors and appliances. This project successfully designed a system that communicates with a mobile device such as a Smartphone or laptop via Raspberry Pi to control a door sensors and a light switches and a camera to stream live video, but has many possible applications that could benefit from this work.

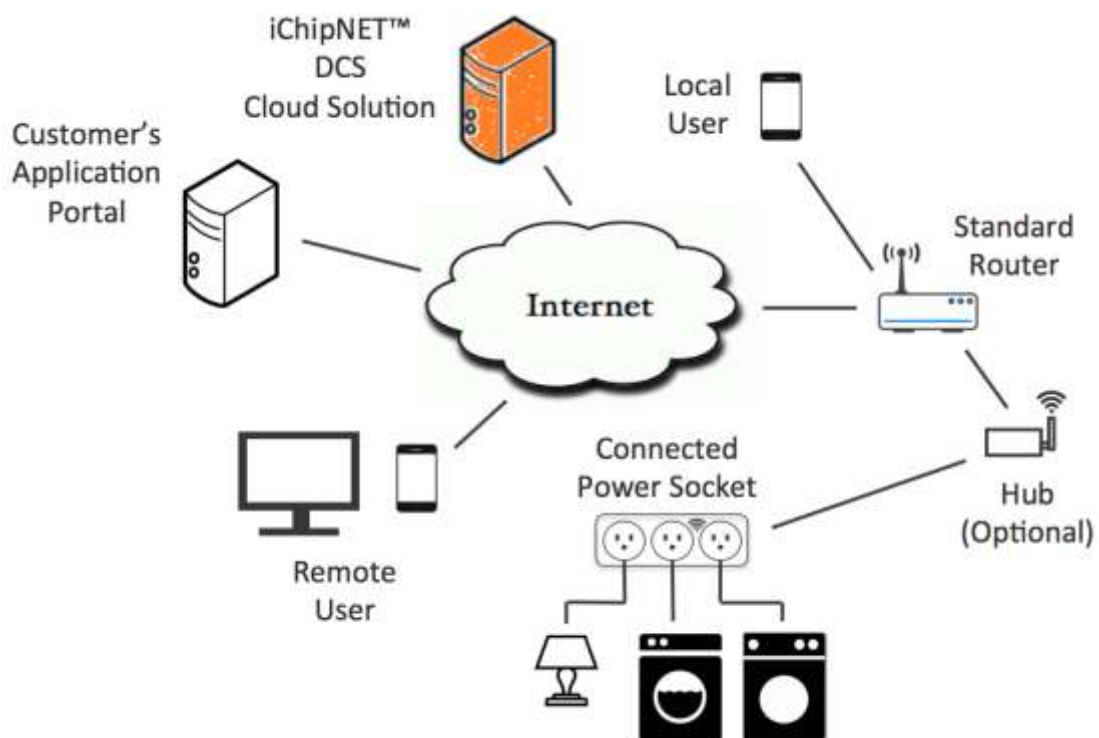


Fig:8 Overall IoT System Connection

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