

Home Automation System using Raspberry pi with Lock ON/OFF System on Particle Cloud

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Abstract— We are designing IoT based home automation system using raspberry it helps us to control home appliances automatically through internet from anywhere around the world by using computers or mobiles application. Also we can control solenoid lock for door ON/OFF controlling. This system are design on particle cloud for controlling all appliance from anywhere in the world through IoT.

Keywords: IoT (Internet of Things), Particle cloud, Relay, Solenoid Lock, DC Fan, AC Bulb

I. INTRODUCTION

The concept of home automation system can control appliance from anywhere in the world through mobile and web based application. This will make controlling home appliance easy and we can control home appliance smartly through IoT based mobile application.

This system have many advantages as this system use internet media to communicate and for sending command turn on and off devices so we can control devices from anywhere in the world this will helps to save electricity that makes our home automation system efficient also this system provide shock protection also because no need to touch electrical buttons physically.

The concept of smart homes has come a long way with the addition of various features and sellers and has become very widespread embraced to make it especially suitable for home appliances. Provides centralized control of devices with minimal damage resources. This program is a combination of various sub-components being it accessible by using an easy-to-use interface. Home automation system should also provide a user friendly interface on the host side, so that devices can be easily setup, monitored and controlled.[1]

II. LITERATURE SURVEY

Raspberry Pi is one of the most famous low cost computer and powerful tool for prototyping different types of IoT and embedded projects. With the popularity of Raspberry pi in the IoT domain, Particle cloud started support for this board on its platform. Particle Cloud is a very popular IoT platform which can help you to start with everything that you want to do in your IoT device. Particle is a reliable, scalable, and secure IoT device platform. There are many IoT enabled Particle devices like Xenon, Photon, Electron, etc. which have different functionalities according to our need.[3]

There are many IoT platforms like Blynk, Thing Speak etc. that you can use to connect Raspberry Pi to IoT clouds, but particle cloud platform has some awesome features which makes it different from others. Like you can run your Arduino code in your Raspberry Pi using the particle

cloud IDE and can program your Pi from anywhere in the world.

III. SYSTEM ARCHITECTURE

This Entire system based on IoT System we can control connected appliance through IoT application and IoT based application from anywhere in the world. In this system we used raspberry pi 3B+ controller it's an credit card size computer it additionally having GPIO pins that used for controlling and monitoring various operation also we used 4 channel board for controlling four different appliance. In this system we used particle cloud platform for IoT Application. [2]

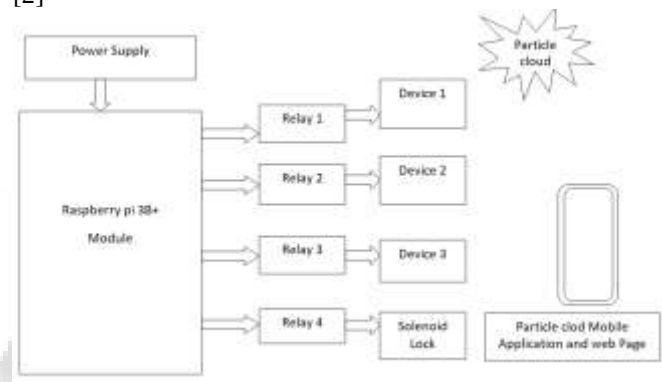


Fig.1: Block Diagram

A. Setup Particle Cloud account and Raspberry Pi:-

- 1) Go to Particle.io and click on Console in upper right corner. Now, click on Create Account. Fill all the information and click on Sign Up.[3]

- 2) Now, run the below command in the raspberry pi terminal to install the Particle agent.[3]

```
bash <( curl -sL https://particle.io/install-pi )
```

Enter your Particle cloud e-mail and password that you have created in first step.

3) Particle agent is successfully installed in the Pi and running in background. It is also listening to the Particle cloud. You can get more information agent using below commands.

B. Hardware

- Raspberry PI with Raspbian installed
- 4 - Channel Relay Module Board
- Jumper Wires
- Adaptor Power Supply
- Solenoid Lock
- DC Fan
- 220V Bulb

C. Flow Chart

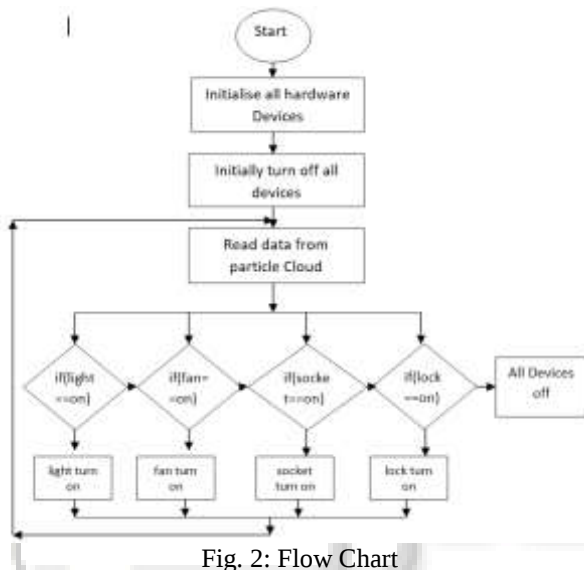


Fig. 2: Flow Chart

Firstly we can initialize all output components on GPIO pins of raspberry pi controller then we continuously read string data from particle cloud if get on string for any device we can turn on device by turning on relay of that device.

D. Raspberry Pi



Fig. 3: Raspberry Pi 3B+

RASPBERRY PI 3 is a development board in PI series. It can be considered as a single board computer that works on LINUX operating system. The board not only has tons of

features it also has terrific processing speed making it suitable for advanced applications. PI board is specifically designed for hobbyist and engineers who are interested in LINUX systems and IOT (Internet of Things).[4]

E. Solenoid Lock



Fig. 4: Solenoid Lock

The solenoid lock denotes a latch for electrical locking and unlocking. It is available in unlocking in the power-on mode type, and locking and keeping in the power-on mode type, which can be used selectively for situations. The power-on unlocking type enables unlocking only while the solenoid is powered on. A door with this type is locked and not opened in case of power failure or wire disconnection, ensuring excellent safety. This type is used mainly for places requiring crime prevention. The power-on locking type can lock a door while the solenoid is powered on. If the power is disconnected, the door is unlocked.

F. Relay

A relay allows circuits to be switched by electrical equipment: for example, a timer circuit with a relay could switch power at a preset time. For many years relays were the standard method of controlling industrial electronic systems.[4]



G. DC Fan



The direct current fans, or DC fans, are powered with a potential of fixed value such as the voltage of a battery. Typical voltage values for DC fans are 12V. In contrast, the alternating current fans, or AC fans, are powered with a changing voltage of positive and of equal negative value.

IV. RESULTS

We implement system that can control four different devices through IoT application that all control by Turn on and off Relay of that corresponding device.



Fig. 8: Output on IoT Application

Fig. 8 shows the user interface of IoT application on particle cloud we can easily control any device through mobile and web based application from anywhere in the world. We need to send on/off string on cloud to turn on and off any device. Even we can control solenoid lock also turn on and off door through particle cloud application.

V. CONCLUSION

The concept of home automation system can control appliance from anywhere in the world through mobile and web based application. This will make controlling home appliance easy and we can control home appliance smartly through IoT based mobile application. we can control devices from anywhere in the world this will helps to save electricity that makes our home automation system efficient also this system provide shock protection also because no need to touch electrical buttons physically.

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