

Managing Power Energy Consumption in IOT Environment by using PIR Motion Sensor

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Abstract - In this paper we mainly concentrate on the energy conservation by using the PIR motion sensor for the IOT environment. Now a days there is a huge loss of energy in the homes because of the people forgotten to switch off the devices that were on and running continuously irrespective of user's presence. To overcome this problem we are using the motion sensor (PIR sensor) that is connected to the Raspberry Pi and the electronic devices that are connected to Raspberry Pi can be controlled with the Android application. The electronic device such as electric bulb, fans, etc. Identify motion detection using detector (sensor) and intimate user about energy loss, when no user exists.

Key Words: PIR sensor, Raspberry Pi, Android application.

1. INTRODUCTION

Now a days we are wasting enormous amount of electric energy at some places like homes, work stations by without turning off the electronic device. It will leads to wastage of electric power. So to overcome this type of problem, we will use the PIR sensor that will detect the motion of the people in the home, if there is one in the home then it will send a notification to the user, who is using the android application that will be provided by the administrator in the cloud.

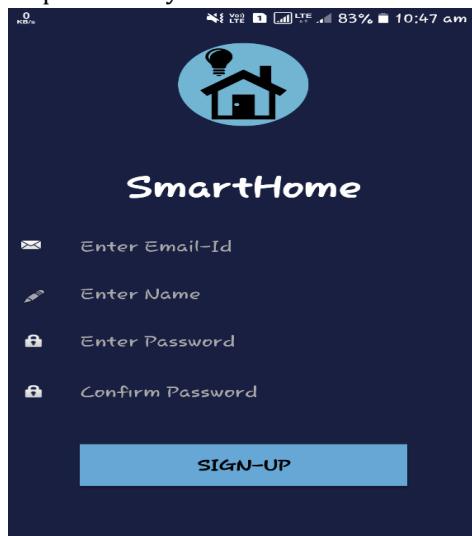


Fig 1: Registration Page

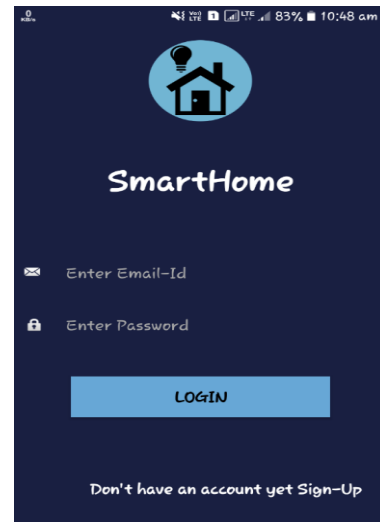


Fig 2: Login Page

The above Fig 1 shows the registration page of the user. Once the user install the android application he needs to register first. Then the admin accept the registration through the cloud and provides services to the registered user. The fig 2 shows the login page. To control the electronic device that are connected to the Raspberry Pi, where the certificate is sent to the user and to the raspberry Pi by the admin from the cloud infrastructure. Then the certificate is verified by the Raspberry Pi which was sent by the user. If both the certificates are same then the secured connection is established between the user and Raspberry Pi. Than the user can control the electrical device through the android app.

2. SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

Although many protocols for the Internet have been put forward, it is still not enough to meet the increasingly complex requirements from applications. Many of them are not efficient enough to adapt the device diversity and timely communication environment. Nowadays, network connects

people, data, processes and things, standardized ultra-low power devices with wireless technologies, including Wi-Fi, RFID (Radio Frequency Identification). As time passes, powerful embedded devices such as smart phones and tablets will occupy the great part of the IOT. The different devices not only bring kinds of applications, but also many problems, especially in terms of privacy and security issues.

DISADVANTAGE OF EXISTING SYSTEM :

- It is easy to discover that how easy it is to physically attack these embedded devices, as most of the time these components are unattended.
- The second problem is that many devices use wireless communication, which makes it easier to eavesdrop the messages.
- Another issue that should be pointed out is their limited hardware resources and energy.
- There would be a loss of energy, if the user is not there in the home.

2.2 PROPOSED SYSTEM

It mainly concentrates on the design of a security protocol for the IOT and the energy conservation, and the implementation of this corresponding security protocol on the Sensible Things platform. This protocol will not only cover the integrity of messages, but also the authentication of each user by providing an efficient authentication mechanism. It is a common platform for communication between sensors and actuators on a global scale, and enables a widespread proliferation of IOT services. This secure communication provides a more efficient information transmission mechanism between user and device.

The above Fig 3 shows the architecture diagram of the process. Here we are using the PIR sensor that will detect the movement of user in the home. A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors[1]. First user needs to register and login through an android application. Once the user registers the request is sent to admin to accept or reject the request. The registration process collects data such as users email ID, password and the IMEI number of the phone from which the user is registering. After the approval of request from the admin, the user can login and request for using the services. Once the user request for a service the request is forwarded to admin in the cloud, it then generates a certificate and sends it to both user and IOT server. The permission to use the service is granted in the form of certificate; on receiving the certificate the user can choose the time slot to control the device and also the list of services available. The request from user is forwarded to IOT server along with certificate. The IOT server evaluates the certificate received from the user app and the authority node if it matches then it allows to control the device else the user need to repeat the entire procedure. If the user is away from the home and forgot to switch off the device that is on. Then the motion sensor (PIR sensor) will check for the moment of the people in the home for a certain period of time , then it will send a notification to the user about the energy loss in the home. So that user can control the device form anywhere with the help of android application[2].So that energy will be conserved.

PIR Sensor



Fig 4: PIR sensor

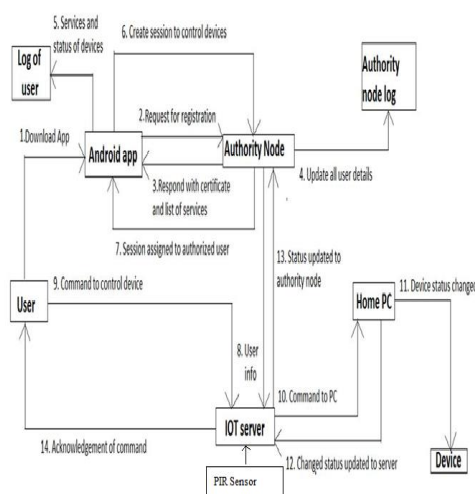


Fig 3 : Architecture Diagram

The above fig 4 is the motion detection sensor(PIR sensor)[3]. That will detect the movement of the user. If no one is present in that particular area then it wait for certain amount of time and then sends a notification to the user to take a respective action. PIR sensors are often used in construction of human motion detectors[4].

ADVANTAGES OF PROPOSED SYSTEM:

- Energy is conserved with the help of motion sensor.
- Authenticates the user to provide security.
- Allows the user to control switches efficiently.
- Provides an android application through which the user can control the switches.
- No other person other than the registered user can control the switches.

3.REQUIREMENT ANALYSIS

- Software Requirements:
 - Operating Systems : Linux
 - Programming Language : Java
 - Drivers : Serial Drivers.
- Hardware Requirements:
 - Processor : 1.8GHz
 - Memory : 4GB, Internet
 - Device : PIR sensor

4. Conclusion

In this paper the energy management is presented based on a PIR sensor to minimize the energy consumption. The main purpose of the device is to provide simple configuration them to use it at most anytime anywhere. Since the device is useful for conservation of energy, it will be very much beneficial for the society and for the organization who use it.

References

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