

REVIEW ON BUILDING SMART HOME USING IOT

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Abstract: An emerging important feature of a smart home is conservation of the earth's limited resources. Smart home is a residence equipped with a number of devices that automate tasks normally handled by human beings. This paper mainly deals with the concepts of smart home system and building smart home system using Internet of Things (IoT). The internet of things refers to the ever growing network of physical objects that feature on IP address for internet connectivity. FLIP architecture is the one of the platforms for building smart home and this also discussed in paper.

Keywords: IoT, smart home

I. INTRODUCTION

A smart home is also known as e-home, where basically the main focus is done on the internet. Every device in the house is connected to the internet and the user can operate those devices from the remote area. A smart home system is called as a Intelligent system as the entire system is monitored by a computer or some different electronic devices.

A smart home consist of new technology which is connected to home network which helps improving the quality of living. A smart home can be used to monitor or control the temperature, lighting, other home appliances and multimedia devices. Through IoT almost every object in day to day life can be controlled or monitored regardless of place and time.

II.MOTIVATION

As per the new program set by the government of India all the cities in India should be developed to smart cities. So that every person life becomes easy through IOT. As monitoring and controlling the devices will be easy through IOT. Through latest technology IOT can help the country in the technical development field.

A smart city is nothing but a place where infrastructure and the surrounding highly depends on Internet for various different services. In this paper there is a brief information about smart home and smart devices which are used through IOT. The main motive of this paper is to build a smart city in India through IOT.

III.VARIOUS FUNCTIONS OF SMART HOME

Through IoT smart home systems are built. The smart home system can have the following functions

A. Alerting the User:

A smart home device can sense its environment and after analyzing the environment it sends the required information to the user or on to the device which is registered. This information can be anything like if the Air-conditioner is left ON, the user will be sent a message that the Air conditioner is ON, these are sent through emails, or through mobile apps.

B. Monitoring:

Monitoring is the most important feature of a smart home system where a smart home monitors its surrounding & analysis it as per the requirement. Through various different sensors and actuators one can monitor the system. It is an important limitation as it keeps a track and record of the device. Due to the monitoring function various major decision can be taken for example monitoring the room temperature using temperature sensors. When the temperature increases or decreases it will send the user a message whether to change the temperature or not.

C. Controlling the devices:

This function of a smart home system helps the user to control different devices. Controlling various devices includes switching ON/OFF of lights, controlling the temperature of the air-conditioner, controlling the kitchen appliances, controlling the locks of doors and windows, controlling the garden area. The user can control the device from one place or from any different places. These devices are connected through the internet due to which the user can control those devices.

IV.SMART HOME APPLICATIONS

Applications area of smart home is only depended on human imagination. This give some brief application of the smart home systems.

A. Lighting:

Smart lighting and home appliances are used saving energy. These can be achieved by adjusting the lighting to ambient condition. Due to these smart lighting reduces the unnecessary use of energy. By saving energy one can save money. There are some smart LED which helps in reducing the use of energy. The smart lighting works on sensing upon the luminous of the environment due to which light condition is being adopted. These smart lights are being coded in such a way that according to the timing of the day the light condition will be adopted.

B. Home appliances:

Smart home appliances gather the information of different devices. These information are served through the sensors and are being analyzed. For example if any one of the device isn't working it will send the user a message through email or apps.

C. Intervention detection:

The user will be alerted through message or email. These applications can also send the report with images or audio/video formats. This is used prevent any intervention activity and to alert the user.

D. Smoke or Gas detection:

The main purpose of this application is for the security purpose of the smart home .These may be a chances where a user may left the gas system open or due to some reason there may be a leak in the gas cylinder .The smoke or gas detector sensor will sense the change and soon the user will be notified about it, through a text message or email .Or in some cases if there is any critical conditions the message will also be sent to the nearest fire station in case of fire. Smoke can be detected by the physical ionization process.MQ2 Flammable gas and smoke sensor module can be used in this application.

V.RELATED WORK**FLIP Architecture:**

Flip is an IoT device architecture which is developed by Frugal labs Bangalore. Flip is a platform for IoT where anyone can practice or do projects on IoT. Flip architecture is represented in Fig.1

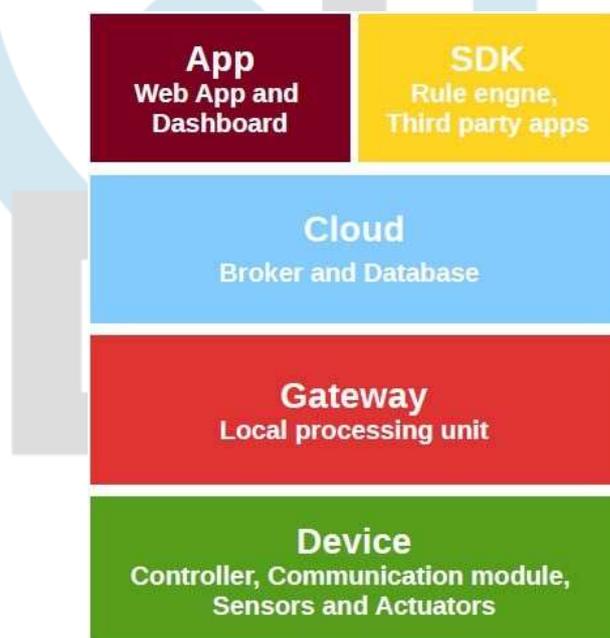


Fig. 1. FLIP Architecture.

There are four layers in Flip Architecture. They are device layer, gateway, cloud and application layer.

A. Device Layer:

Device layer mainly consist of controller, sensor and actuator. Flip is used as controller in this architecture. Flip is mainly based on Arduino board and raspberry Pi. Device layer act as a shield in this architecture.

B. Gateway Layer:

Gateway layer consist of a processing unit which works on operating system that is Linux operating system. It uses Raspberry Pi3 as a gateway layer in the system. The gateway layer is being connected to the internet which is again connected to other devices.

C. Cloud Layer:

Cloud layer consist of the database, where all the records related to smart home system is stored. The cloud layer has three main structure named mosquito, Node.js and Mango database.

D. Application Layer:

The top layer of the flip architecture is the application layer and SDK layer. These layers are mainly based on the wet based application. Using application layer one can monitor the device. The python SDK work as a logical decision maker. Like if for certain room temperature the air conditioner will be automatically switched ON. It can be connected to various different social media sites.

The following below code segment helps in switching the different colours of LED light. Each button is assigned to different colour. According to the buttons which we press the colour LED light will glow.

```
#define CUSTOM_SETTINGS
#define INCLUDE_KEYBOARD_SHIELD

/* Include 1Sheeld library. */
#include <OneSheeld.h>
/* LEDs on pin 11,12,13 */
int ledRed = 13;//for Red LED
int ledYellow = 12;//for yellow LED
int ledGreen = 11;//for green LED
void setup()
{
  /* Start communication. */
  OneSheeld.begin();
  /* Set the LED as output. */
  pinMode(ledRed, OUTPUT);
  pinMode(ledYellow, OUTPUT);
  pinMode(ledGreen, OUTPUT);
  /* Keyboard callBack function. */
  AsciiKeyboard.setOnButtonChange(&keyboardFunction);
} //end of void setup
void loop()
{}
/* Function to be invoked once a new character is pressed. */
Void keyboardFunction(char data)
{
  /* Check on the incoming character. */
  if(data == 'R')
  {
    /* Turn on the LED. */
    digitalWrite(ledRed, HIGH);
  } //end of if
  else if(data == 'Y')
  {
    /* Turn off the LED.*/
    digitalWrite(ledYellow, HIGH);
  } //end of else if
  else if(data == 'G')
  {
    digitalWrite(ledGreen, HIGH);
  } //end of else if
  else if(data == 'c')
  {
    digitalWrite(ledRed, LOW);
    digitalWrite(ledYellow, LOW);
    digitalWrite(ledGreen, LOW);
  } //end of else if
  else
  {
    digitalWrite(ledRed, LOW);
    digitalWrite(ledYellow, LOW);
  }
}
```

```
digitalWrite(ledGreen, LOW);  
  } //end of else  
} //end of keyboard function
```

CONCLUSION

The development of Internet and communication technology have made the advancement in smart home. An IoT based smart home is emerging as an important part of the smart home to improve the standard of living and making the work easy. The aim of this paper is to propose smart home systems using IoT. These smart homes also can made secure by installing security modules within it.

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