

# IoT based Smart Home Automation By Sensor Node

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**Abstract**— Now a days increasing demand of digitalization the new technology taking place like Internet of Things (IoT). IoT technology used in various sources and applications. Now a days Home Automation is one of the important application. In Home Automation the home appliances are connected in network together and able to operate in absence of human. Home Automation increase the standard ness of living. In Smart Home Automation the home appliances like fan, light, energy consumption and level of the gas cylinder using the sensors like LM35,IR,LDR module, Node MCU ESP8266 and Arduino UNO. The sensor can detect the senses in presence or absence of human in home accordingly. Our solution will give the solution of how much energy will consumed by the home owner regularly in form of message. Our solution also give the solution that the if cylinder value is less than the threshold value then it will directly book the gas and sent message to the owner including booking number. Finally, in this paper, the working model of our proposed solution is developed as a prototype and explained as a working model.

**Keywords :** Smart Home; IoT; Sensors;

## I. INTRODUCTION

The trending technology IoT [1] is nothing but the various home appliances are connected together in the network through internet .They communicate with each other via internet. IoT is enhancing the standard ness of end user and quality of life. The analyst said that the over 2020 there will be 20billion devices connected to the network using IoT technology. Nearly \$6 Trillion will be spent on IoT solutions by 2025.

Now we are in the world that which is increasing demand of Smart Home using IoT. Automation is nothing but the appliances which are connected to each other in network they can sense the data .Anywhere like in industry various offices the use the automation to reduce the human work as well as time. It involves the heating, ventilation, lighting , climate like this the various system are connected in the network. By using the smartphone and tablets and development of various communication technologies like Wi-Fi, Bluetooth and ZigBee.

The efficient home automation system proposed in this paper. Some contribution f this paper as follows.

- 1). First of all we will automate the functioning of some essential home appliances like fans, lights, air-conditioners and water heaters by the readings received by various sensor installed at different parts of house.
- 2).The sensors which we are using in this system all these sensors should be connect to the Node MCU ESP8266 or Arduino UNO which will process the readings received by sensors and control the relays.
- 3). The CT sensor which is used for measure the energy which is consumed by the appliances regularly and stored in database. By using that database calculate the per 15 days bill and give notification to the user .
- 4). The load sensor is used to measure the weight of gas cylinder. If the weight will go below the threshold value then it will book the gas and gives notification to the user.

This paper henceforth is organized as follows. The existing home automation explained further.

## II. LITURATURE SURVEY

Home Automation is increasing in current days. In this section we will discuss the various existing solution proposed by

different research papers. In[5] paper the author uses the 433MHz radio frequency control module to control the home appliances directly. Gadgets like smartphones and tables can be directly connected to the central controller using Wi-Fi interface. The only problem with radio signals is that they can be easily intercepted and are prone to distortions due to interference.

In[6] author uses Bluetooth 4.0 Protocol to establish connection between smart home appliances and the user. The user can use the cell phones and tablets to control these appliances remotely. The only disadvantage using Bluetooth technology is that the devices can be only controlled from short range. As an example in[7] the author is proposed Bluetooth based home automation system. In this system the home appliances are controlled based on android smartphones without the internet controllability.

IoT based Home Automation using android phones[8] is proposed. In this the author used two types of automation Bluetooth and Ethernet based. Android applications also used to control the appliances like fan ,AC etc.

### III. MOTIVATION

Home Automation is increasing in the past few years. With ever-evolving technology, there have been smarter and more advanced solutions in the domain of home automation. To enhance the standard of living, the appliances need to be wholly automated without any user intervention in any form whatsoever. This enables the end user hassle-free interaction with the appliances as the appliances learn and react as per the user's requirements without him physically pressing a button. Wired sensor systems are more difficult to handle and also require much amount of wiring the sensors at different locations. Thus, the importance of wireless sensor node has been on the rise and is a critical factor for efficient implementation of home automation. Energy saving is one of the significant advantages of automating home appliances. So the user has to be kept aware of the energy consumption of the automated appliances.

### IV. PROPOSED SYSTEM

#### A. System Design

##### Sensor data:

In this layer the devices which we are used are connected in network by using Wi-Fi Node MCU ESP8266. In this layer data will be collected from various appliances and give to Arduino then Arduino will trigger the relay and take

action to on/off the device. Arduino UNO and MCU Node ESP8266 are plays important role.

##### Database Layer:

The CT sensor will send its data to the Arduino coupled with ethernet shield. The data received process by Arduino and as a result the energy consumed price for the units consumed is send to database.

##### Notification Layer:

The above mentioned data is received by the database in respective tables. At the start of the month user is notified the weight of gas cylinder.

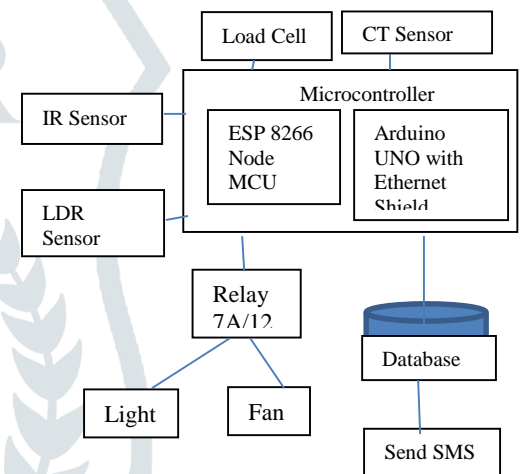


Fig1: Proposed System Configuration

#### B. Objectives

- 1) The sensor node senses the real-time changes in all the variables in the room using various sensors.
- 2) The microcontroller assimilates the sensors data and then triggers the relays connected to the appliances, thus automating them without any user intervention.
- 3) The energy of the automated appliances along with the units consumed, the total price and a reminder of booking a new gas cylinder beforehand is sent to the database.
- 4) The PHP program then notifies the user about the price incurred for every 15 days and a reminder for booking a new gas cylinder day before completion of the existing one.

## V. IMPLEMENTATION DETAILS

## 1) Data Flow Diagram (DFD):

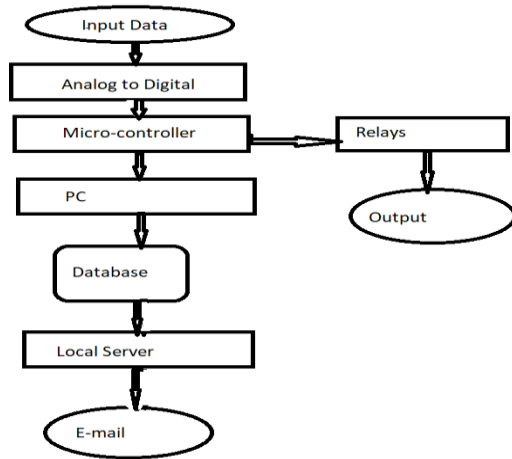


Fig2: DFD

## Algorithm:

## Algorithm 1: Node MCUESP8266

```

1: while(TRUE)do
2: read(LS)
3: if (var LS==1)&&(var IR==1) then
4: LIT=0;
5: FN=1;
6: else if (var LS==0)&&(var IR==1) then
7: LIT=1;
8: FN=1;
9: else If (var LS==1)&&(var IR==0) then
10: LIT=0;
11: FN=0;
12: else if (var LS==0)&&(var IR==0) then
13: LIT=1;
14: FN=0;
15: End if
16: End while
  
```

## Algorithm 2: Arduino programming

```

1: SET CNT=0;
2: SET UC=0;
3: COST=0;
4: while(TRUE) do
5: CNT=CNT+1
6: Read(CT);
  
```

```

7: Read(LC);
8: PWR=CT*230/1000;
9: UC=UC+(CT*230/180000);
10: COST=COST+(7*UC)
11: if(CNCT)then
12: GET_REQ(PWR,UC,COST,LC)t>Database;
13: else
14: Print("connection failed")
15: end if
16: end while
  
```

**Conclusion**

In this project, the home automation is improved by considering a Wireless sensor node. A smart home integrates various electrical appliances in the home and automates them with no or minimum user intervention. The smart home keeps track of different environment variables present and guides the appliances to work according to the needs of the user. Not only automating the home appliances of daily usage but also notifying the user about the price of his electric bill in regular interval and automatically booking the gas cylinder, if the level of the gas reaches lower than the threshold. By considering, the above features, we have developed the prototype and tested. We achieved the development of Smart Home by using the Internet of Things technologies. From the experiment, it was found that we can manage to make low cost, flexible and energy efficient smart home for the better and greener future.

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