Intelligent Energy Saving and Voice Control System

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Abstract - *The world faced the biggest problem is power. To overcome the problem of power distribution this paper provides an overview of the home automating based on the person and temperature it will operating the devices. In addition, we control the door locking system by our voice with the help of Bluetooth module and smartphone. The motto of this project is to reduce the power wastage by automation and also securing our home with the electric locking system controlled by our voice recognition.*

Keywords: *Arduino UNO, Ultrasonic sensor, Temperature sensor, Relay, Human Presence, Bluetooth module, LCD display*

1. INTRODUCTION

Generally, the basic needs of the people are three things. But now energy has become the fourth one. Nowadays the source of energy is getting decreased. So, it is mandatory to save power. People don't always remember to switch off the home appliances whenever they are not required. This is one of the reasons for wastage of power. For example, a man entering a room and he turn on the light, fan etc. When he leaves the room, he is accountable to turn off the appliances. But due to his carelessness he forgot to turn off the fan, light. This results in wastage of power. To overcome from this, it is advised to enter into the automation world. This project helps the people for saving the energy power. This project contributes that the ultrasonic sensor senses the human detection and interface with the microcontroller for automatic purpose. In this paper, door locking can be operated by our voice recognition with the help of Bluetooth module. By using our smartphones with the Bluetooth module, we can open or close the door lock. It can be used for more securer purpose. The relay is used for tripping purpose and also used to interface the Arduino Uno board for automation. If the project available at the market at ease, it will make the future in more advanced manner and also it can extend the life of energy power. This project is used for efficient purpose to save the electricity bill. The voice control door lock system helps people for the protection purpose and also leads to the automation world. The aim of the project is to reduce power consumption with help of microcontroller and also secure homes by using voice recognition door lock system. This project helps the people for rectifying their careless mistakes and also used to reduce the wastage of power. The home appliances like fan, light, television, air conditioner is running in unnecessary situations and it can be controlled by using microcontroller (Arduino Uno).

2. BLOCK DIAGRAM OF PROPOSED SYSTEM

The figure 3 illustrates the block diagram of proposed method. The framework of the proposed project is the Arduino Uno board. Arduino Uno is a microcontroller interfacing with ultrasonic sensor, temperature sensor, Bluetooth module and relay. A 230V supply is given to the relay circuit. Using Arduino voice control app, we can open or close the door lock by our voice recognition. The home appliances like fan, light and television are controlled by using relays. The temperature sensor is used for measuring the temperature of an object or room and it can be used to interface with microcontroller for energy saving system
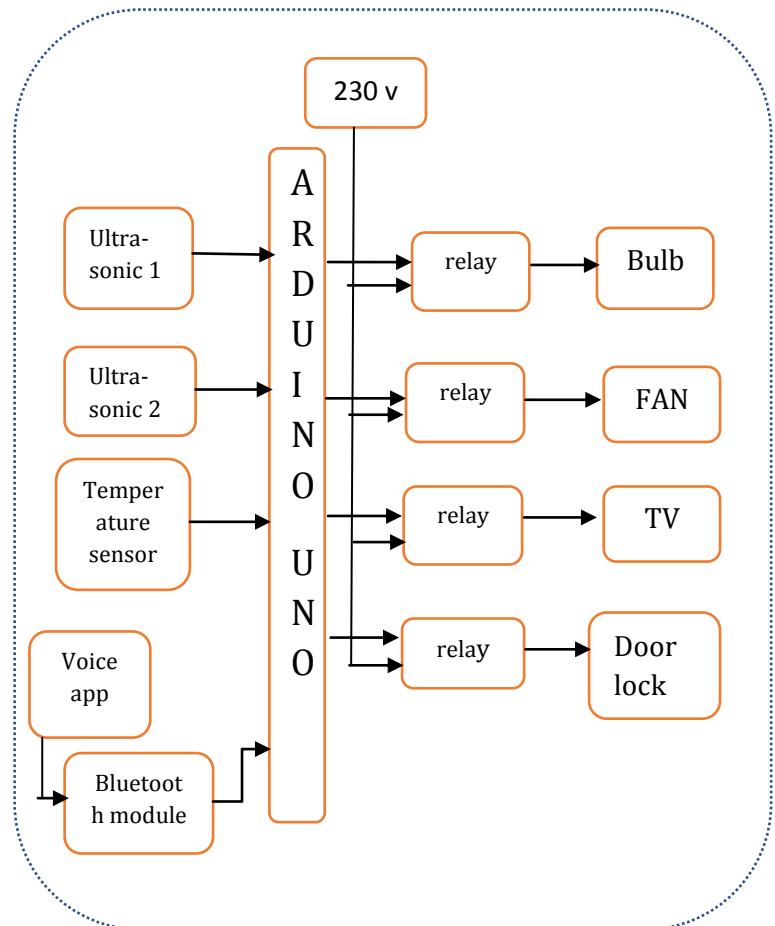
3.EQUATION

1. The power can be measured by **P=VIcosØ (watt)**
2. Energy can be measured by **E=P*t (Wh)**
3. For average power tariff in India is **5 rupees per KWh**

4. FLOW CHART OF PROPOSED SYSTEM

Fig 4 shows the flowchart of proposed system. A flowchart is a type of diagram that represents an algorithm, workflow or process.The flowchart helps us to understand the concept of this project easily. The initialize of this project is to read the ultrasonic sensor 1, ultrasonic sensor 2, temperarture sensor, bluetooth module. The ultrasonic sensor are named as US1 and US2.US1 and US2 are placed in entrance and exit of the room respectively.The ultrasonic sensor senses the human detection and it automatically switch ON the fan, light and television with the help of relay. The bluetooth module is used for controlling the television and door lock which helps for automation purpose. If the count of the person more than 1, it will automatically switch ON otherwise it will be switch OFF. The count of the person should be increased more than 0 and it will automatically switch ON the home appliances and if the count of the persons should be decreased than 0 it will automatically switch off the fan, bulb and Television. This can improve the people for their rectification purpose.
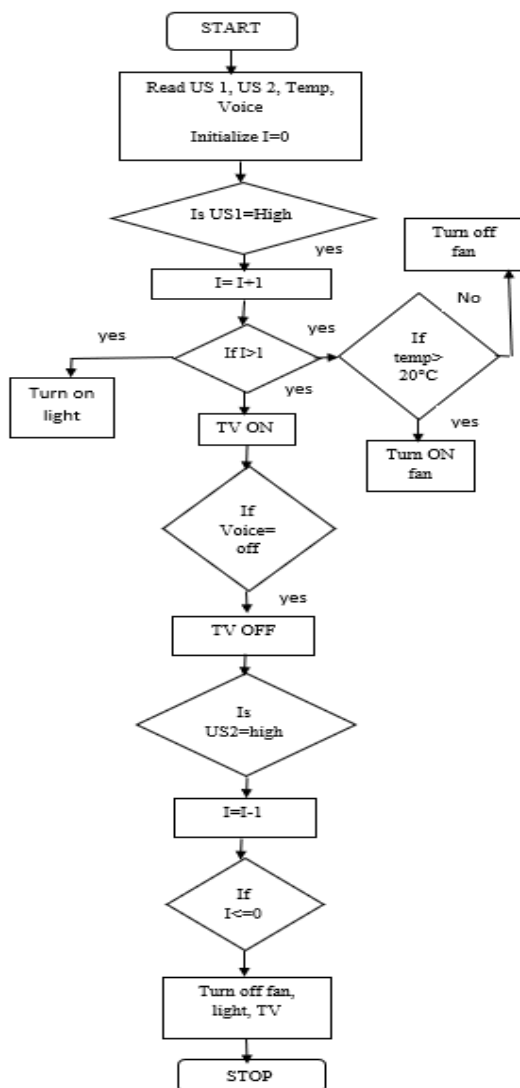

FIG 4 FLOWCHART OF PROPOSED SYSTEM

5. WORKING PLAN

Arduino Uno is used to control the light, fan by acting as an interface between the sensor and relays. Here we use two ultrasonic sensors named as US1 and US2.US1 and US2 are fitted at the entrance and exit of the room by crossing US1 it is programmed in the Arduino to increment the count by 1. Initially the count will be 0. If three man enters the room the count will be 3. It is programmed that if the count is greater than 0 the fan and light should be triggered ON, otherwise it should be off. The temperature sensor is continuously sensing the room temperature. If the temperature is less than (say <15ºC) then the fan should be triggered OFF. If they leave the room via the exit (crossing US2) then for every crossing the count will be decremented by 1. So, if number of men entered the room becomes equal to the exit number, then the count becomes zero and so the appliances turned OFF automatically. We also control television and door lock by our voice recognition with the help of smartphone. The Bluetooth module is also interfaced with the Arduino and programmed to turn ON and OFF the TV and to open or close the door lock. The power which can be measured by using energy meter. Using energy meter, we can show that the energy can be minimized and reduce the wastage of power. The Bluetooth module can interface with Arduino board for voice control automation method.

6. HARDWARE IMPLEMENTATION

The hardware of the proposed work consists of Arduino Uno interfaced with the ultrasonic sensor. Bluetooth module is connected to the microcontroller for open or close the door lock by our voice recognition and this can applicable by using Arduino voice control app. A relay is used for tripping the circuit when the person enters or leaves the room
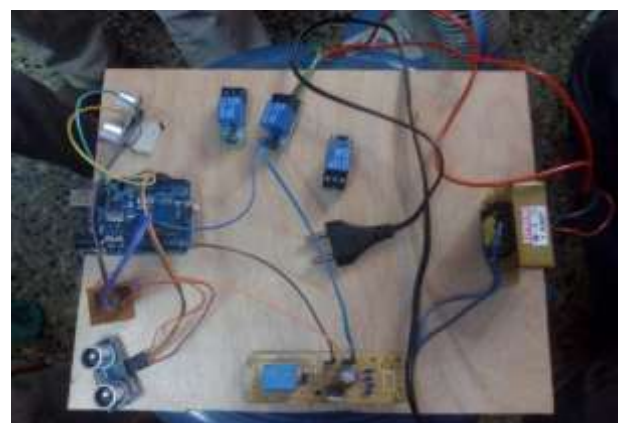

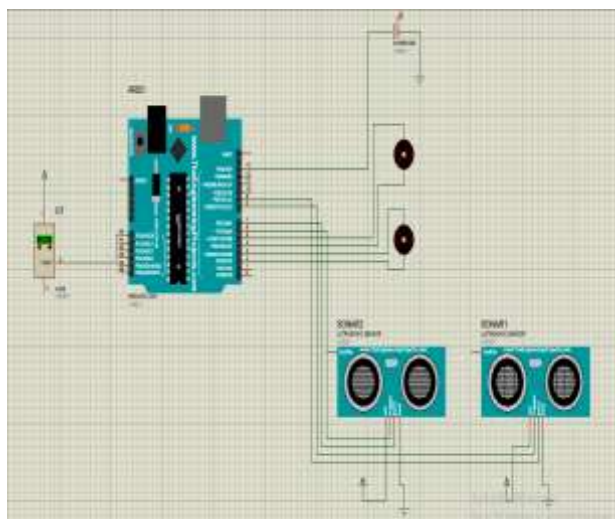**FIG 6 Hardware implementation**

7. SIMULATION

FIG 7 Simulation

The simulation which can be used for the purpose of checking the project in software design and it produces the correct outcome. In this project, the simulation result which shows the outcome of the project. The Arduino board interface with the sensor and motor for operation. The ultrasonic sensor senses the human presence and it passes to the motor for operation. Thus, the simulation is used for checking the software design of this project

8. EXPERIMENTAL OUTPUT

A 230 supply is given to the relay for tripping the circuit when no one is present in the room. The ultrasonic sensor senses the human detection in the room and it can be tripped to switch on the fan, light with the help of Arduino Uno. Then it can automatically switch off when no one is present in the room. With the help of Bluetooth module, we can also open or close the door by voice recognition by interfacing with the microcontroller. It can be used for our security purpose. This project can be used to reduce the wastage power by automation process
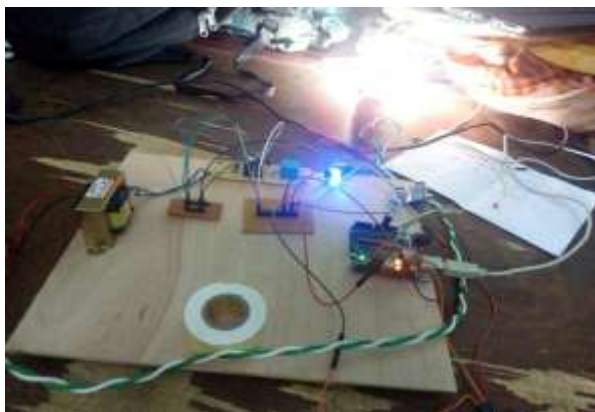

FIG 8 EXPERIMENTAL OUTPUT

Power rating of fan= 60W to 75W

Power rating of light=15W

Power rating of Television=60W

Table for 1(a) Energy and Cost using regular system

Energy in one day	Cost per day
= (75+15+60)	=3.6*5
=150*24	=18 Rs/day
=3600Wh	Cost per month
=3.6KWh	=18*30
	=540Rupees/month

Table for 1(b) Energy and Cost using Arduino system

Energy in one day	Cost per day
=150*6	=0.9*5
=900Wh	=4.5Rs/day
=0.9KWh	Cost per month
	=4.5*30
	=135Rupees/month

9. RESULT DISCUSSION

In the table1. (a) and (b), we discussed that the Arduino board can be used to reduce the electricity bill. In regular system, the wastage of power be high due to carelessness of people. The people forgot to switch off the home appliances during unnecessary situations. By using Arduino Uno board, we can control the power by automatically switch on and off if the human either enters or leaves the room. The energy and cost of the electricity can be low by using smart controlled system. In regular system, the energy and cost are 3.6KWh and 540 rupees/month respectively and it can be reduced to 0.9KWh and 135 rupees/month in Arduino system. It should be helpful for making smart control system and reduce the wastage of power and cost.

10. CONCLUSION

Thus, we implemented the intelligent energy saving system by using Arduino Uno for reduce and control the power and also in controlling the appliances by our voice can makes the automation world. This project is simple and essential to this world. Thus, our simulation clearly shows that the microcontroller controls the home appliances.

11. ACKNOWLEDGEMENT

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