

Voice Controlled Home Automation with Flame and Gas Sensors

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Abstract— The home automation arduino based system is an integrated system that provides elderly and disabled people with a simple to use home automation system that can be fully controlled using an Android application through voice. The system is compact and designed to be simple to set up, configure, run, and maintain. A traditional wireless smart home automation system helps you to power your household appliances wirelessly controlled with your voices. The control unit is wireless and can be centralized. This project shows how a device can be combined into a single portable unit and used to power lamps, fans, air conditioners, televisions, surveillance cameras, electronic doors, computer systems, audio/visual equipment, and other appliances wirelessly. An android program is used to monitor the whole device.

Keywords: Internet of Things, Home automation, voice controlled home automation, arduino, Bluetooth based home automation

I. INTRODUCTION

Smart home automatic control system is a new wireless platform with a lot of potential for future secure and smart home applications. Many new technologies with many revolutionary innovations have been developed on top of this technology. Our tv sets and other computer devices now have remote controls, which have made our lives even easier. Have you ever considered home automation, which allows you to use a remote control to control tube lights, fans, and other electrical equipment in your home? Yes, beyond a doubt! But, are the solutions available cost-effective? If the answer is no, we've come up with a plan. We've built a new Arduino-based home automation system that uses Bluetooth. This technology is extremely cost-effective, allowing users to monitor any electronic device without the need for a remote control. This project allows the user to use his or her smartphone to monitor all of his or her mobile devices. Time is very useful. All needs to save as much time as possible. New tools are being developed to help us save time. We are launching a Home Automation system that uses Bluetooth to save people's time. This device allows you to monitor your home appliances from your smartphone. Inside Bluetooth's spectrum, you can toggle on and off your home appliances. The system is also having a buzzer buzzing facility to detect the flame or gas leakage.

II. PROJECT AIM

The aim of the project is to develop and build a home automation device that can turn on or off any connected household appliances using a ARDUINO, voice dialing on a tablet, or a Bluetooth-based android program.

III. PROJECT OBJECTIVE

The aim of this project is to create a low-cost, dependable, and modular home automation device that can be used to turn on or off any household appliance remotely using a ARDUINO UNO, a low-cost short messaging service for input, and voice dialing from any phone to toggle the switch state.

IV. PROJECT SCOPE

This project completes itself by manually and automatically turning on or off an electrical device, not limited to household appliances, through voice based device controlling android application for switching on and off the devices for smart home. It also uses sensors like flame sensor and gas sensor for automatically detection of gas leakage or fire and buzzer the buzzer for emergency.

V. DESCRIPTION OF PROJECT

One of the most critical Arduino projects is this. The Arduino-based home automation with Bluetooth project allows users to monitor any electrical gadget from their Android smartphone using the Device Control software. The Android app sends commands to the Arduino controller via Bluetooth wireless communication. As seen in the block diagram below, the Arduino is attached to the main PCB, which has four relays. Different electronic devices may be wired to these relays. Device 1- Bedroom light, Device 2- Hall light, Device 3- Bedroom Fan, Device 4- Hall fan respectively according to the block diagram. The Buzzer is turned on when flame or gas sensors detect the fire or gas leakage in home and buzzes loudly for emergency situation.

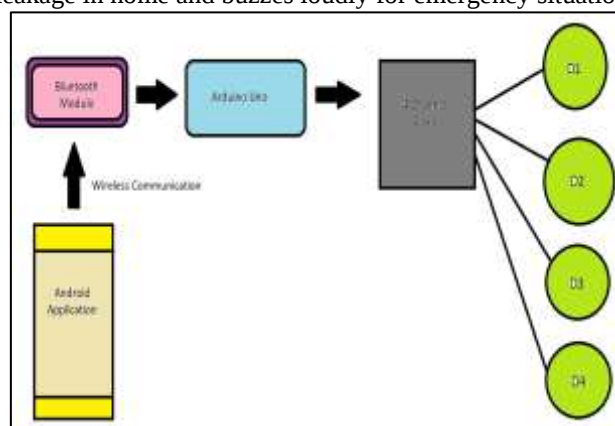


Fig. 1: Proposed System

Firstly, we have to connect the bluetooth module with the android application. As soon as the bluetooth is connected, the system is ready to operate. As the android application uses the voice recognition module, so basically by this, when the user speaks "TURN ON BEDROOM LIGHT" the bedroom will turn on, when user speaks "TURN ON

HALL LIGHT” the hall light is turned on, same goes with the bedroom fan and hall fan. So basically the voice is recognized by the system as input and the devices get turned on or off as output.

VI. HARDWARE REQUIREMENTS

A. Arduino UNO:

The Arduino Uno is an open-source microcontroller board designed by Arduino and built on the Microchip ATmega328P microcontroller. The board has a number of digital and analog input/output pins that can be used to connect to expansion boards and other circuits. The board has 14 optical I/O pins and 6 analog I/O pins, and it can be programmed using the Arduino IDE and a USB type B cable.



Fig. 2: Arduino Uno board

B. Bluetooth HC-05:

The HC-05 is a fascinating module that allows you to incorporate two-way (full-duplex) wireless functionality to your ventures. You may use this module to connect with two microcontrollers, such as an Arduino, or with any Bluetooth-enabled computer, such as a phone or laptop.

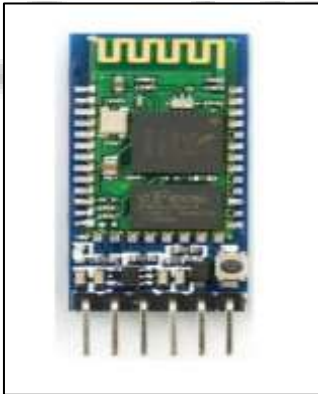


Fig. 3: Bluetooth Module

C. Channel Relay:

It is a 4 channel isolated 5V 10A relay module that can be controlled by a variety of microcontrollers including Arduino, AVR, PIC, ARM, and others. It can also power a wide range of appliances and other high-current devices.

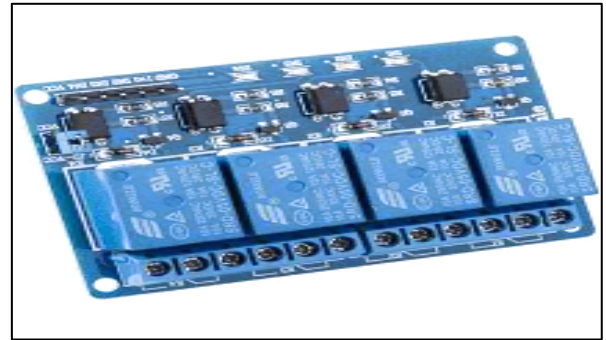


Fig. 4: 4 Channel Relay

D. Gas Sensor:

Gas sensors are instruments that sense the inimitable breakdown voltage (ionization potential), which is a special feature of gases that varies depending on the gas.



Fig. 5: Gas sensor

E. Flame Sensor:

A flame-sensor is a kind of detector that is primarily used to detect and respond to the presence of a fire or flame.



Fig. 6: Flame sensor

F. Other hardware requirements:

- 1) 1k ohm Resistor x 4
- 2) 1N4007 DIODE x 4
- 3) 2N2222 TRANSISTOR x4
- 4) ALTERNATER
- 5) MOTOR DRIVER

VII. SOFTWARE DESCRIPTION

A. Proteus 8 Professional:

The Proteus Design Suite is a proprietary software tool suite that is mainly used to automate electronic design. Electronic design engineers and technicians use the program to produce schematics and electronic prints for printed circuit board production.

The Proteus Design Suite is a Windows program that allows you to grab schematics, simulate them, and design PCB layouts. It comes in a variety of variations, based on the scale of the prototypes being developed and the microcontroller simulation specifications. An autorouter and simple mixed mode SPICE simulation capabilities are included with all PCB Design products.

The Proteus Design Suite's schematic capture feature is used for both design modeling and the design process of a PCB layout project. As a result, it is a critical feature that comes standard in all product setups.

VIII. DESIGN AND IMPLEMENTATION

In our architecture, we present a low-cost, high-efficiency smart home solution. This device is based on Proteus 8 Specialist, an IoT simulator. The Arduino Uno microcontroller, which also serves as a micro web server and interface for all of the hardware components, is at the core of this device. The Arduino Uno is responsible for all contact and control in this device.

The first Image shows the simulation of home automation based on proteus and the second image shows the simulation of flame and gas sensor detetion module.

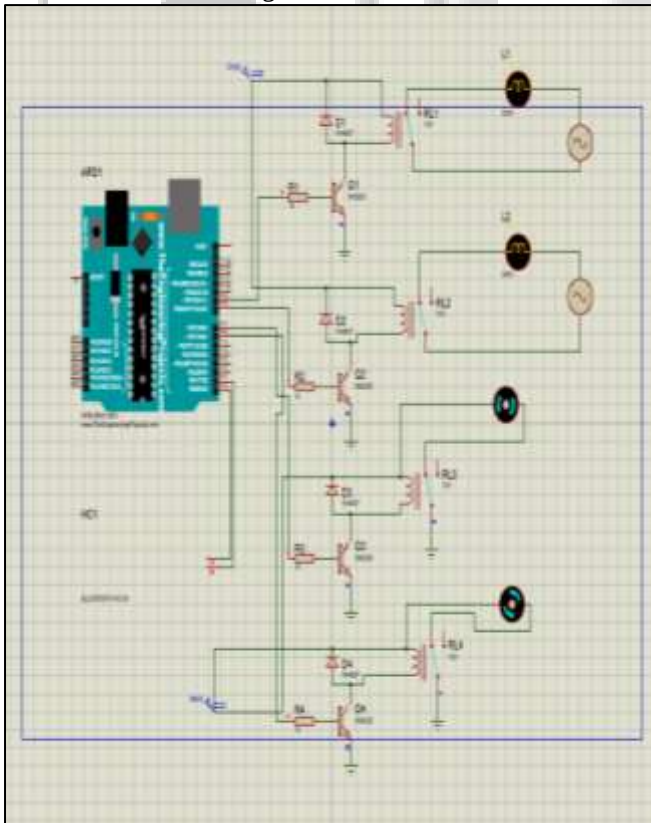


Fig. 7: Implementation Diagram of home automation

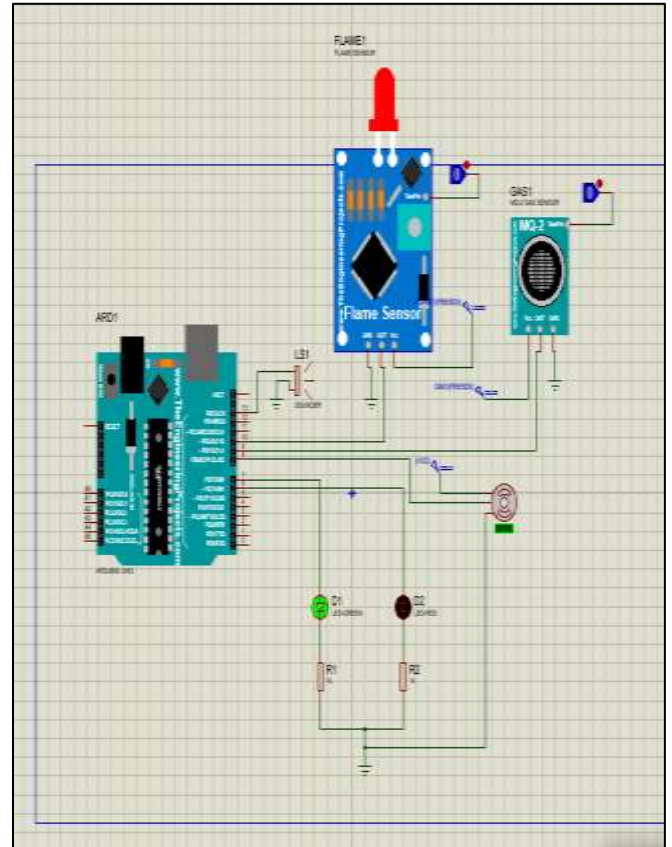


Fig. 8: Implementation Diagram of Flame and gas sensors

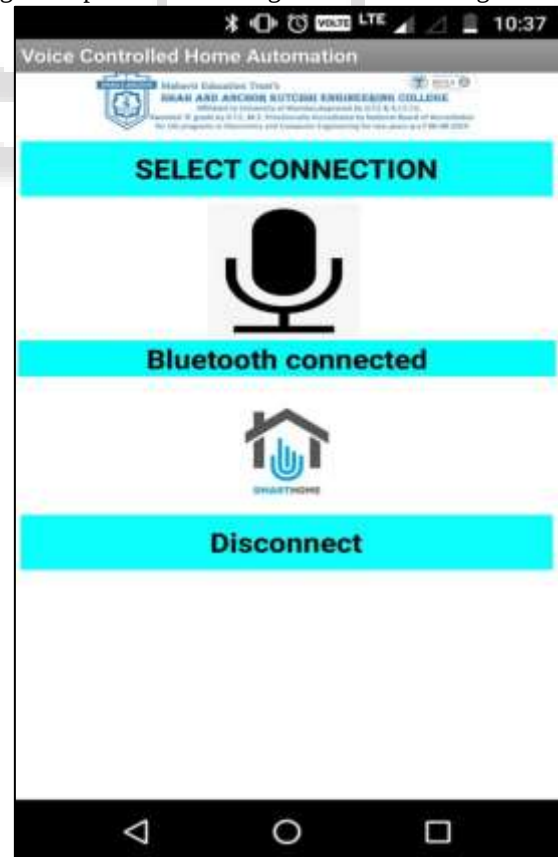


Fig. 9: Android App for controlling devices

IX. CONCLUSION

Through linking sample appliances to the home automation system and successfully controlling the appliances from a wireless mobile device, the system has been experimentally shown to operate satisfactorily. We learned a variety of skills, including soldering, circuit welding, and other techniques needed for this project, and we were able to work together as a team during the project.

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