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Gesture and Voice controlled Home Automation Differently Challenged People

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Abstract—A processing device will focus on the hand gesture and voice recognition algorithm and the user interface. The hand gesture can be captured through an accelerometer sensor and transmitted the data to the Arduino UNO. In the voice control, the Google application has been used as voice recognition and automatically process the voice input by our android application and transmitted the data wirelessly to the Arduino UNO through Bluetooth technology. Our voice control user interface working as with a voice commands instead of the hand operating. Our proposed system working as a hybrid module

Keywords— Arduino UNO, Accelerometer sensor, Bluetooth module, Android application.

I. INTRODUCTION

Gestures play a major role in daily activities of human life and gesture recognition refers to recognizing meaningful expressions of motion by human involving hands, arms etc. The proper decoding of the gestures will help the differently challenged people to communicate effectively with the external world. Evolution of a proper automation system and implementation of various ideas are widely practicing nowadays. The glove based system can be use more comfortably and effectively for the simple recognition and processing of gestures. The glove based system consists of the glove circuit which is designed with sensors attached to the controlling unit and also there is a receiving section. Bluetooth technology has ability to transmit data serially up to 3 Mbps within a physical range of 10m to 100m depending on the type of Blue tooth device. The design of proposed method is based on Arduino board, Bluetooth module, sensors and smart phone application. Bluetooth module HC-05 is interfaced with Arduino board and home appliances are connected with Arduino board via relay . Smart phone application is used for serial communication between smart phone and Bluetooth module which is further connected with Arduino board.

II. SYSTEM DESCRIPTION

The proposed system has two main parts hardware and software. The hardware part consists of four main hardware components smart phone, Arduino board and accelerometer sensor Bluetooth module. Software part consists of Arduino integrated development environment (IDE). hand gesture has been improved in moving of hand up and down concept using to the reading the accelerometer sensor to monitor output source which is used for hand gesture and Bluetooth terminal smart phone

application which is used for wireless communication between smart phone and Arduino board. In our smart phone application process the voice input and transmitted the voice data to the Arduino UNO board through the Bluetooth module.

III. HARDWARE ARCHITECTURE

The project is built on Arduino UNO and has LCD module for the user interface, ADXL- 335 gesture sensor for user input and a relay circuit to drive appliances ON or OFF, interfaced to it. An open-source library for interfacing ADXL- 335 gesture sensor with the Arduino is utilized in the project. The Arduino code is written on the Arduino IDE. The relay circuit controlling the appliances is hard wired with the Arduino based remote control. In this research work Bluetooth module HC 05 and Arduino Uno are used for hardware implementation.

3.1. Arduino UNO

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino projects can be stand-alone, or they can communicate with software running on your computer (e.g. Flash, Processing.)

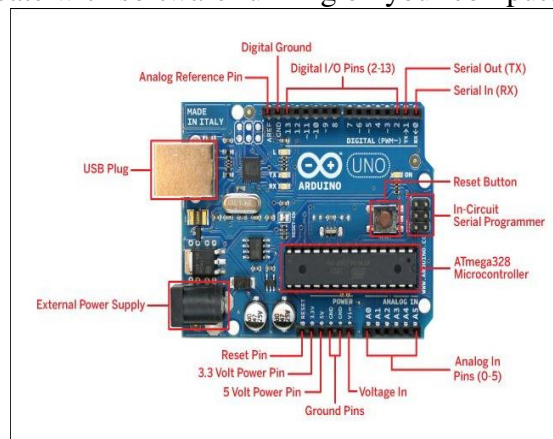


Fig 1. Arduino Uno

The boards can be assembled by hand or purchased preassembled; the open source IDE can be downloaded for free. The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

3.2. Bluetooth Module

Bluetooth module HC-05 is used for wireless communication between Arduino Uno and smart phone. HC-05 is a slave device and it can operate at power 3.6 to 6 volts. It has 6 pins: State, RXD, TXD, GND, VCC and EN. For serial communication connect TXD pin of Bluetooth module HC-05 with RX (pin 0) of Arduino Uno and RXD pin with TX (pin 1) of Arduino Uno. Connection diagram of Arduino and Bluetooth (BT) module is illustrated.

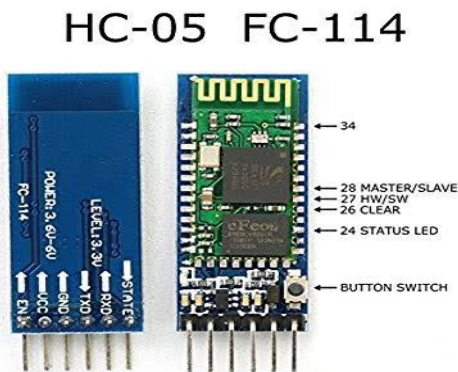


Fig 2. Bluetooth Module HC-05

3.3. Accelerometer Sensor

Accelerometer can be used for tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration. The ADXL335 gives complete 3-axis acceleration measurement. It contains a poly silicon surface-micro machined sensor and signal conditioning circuitry. By measuring the amount of acceleration due to gravity, an accelerometer can figure out the angle it is tilted at with respect to the earth. ADXL335 is three axis accelerometer with on board voltage regulator IC and signal conditioned Analog voltage output. The module is made up of ADXL335 from Analog Devices.

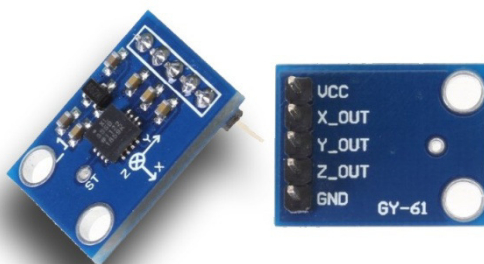


Fig 3. Accelerometer sensor MemS ADXL335

3.3.4 Channel Relay Board

4 Channel Relay Board is a simple and convenient way to interface 4 relays for switching application in your project. Very compact design can fit in small area, mainly this board is made for low voltage application.

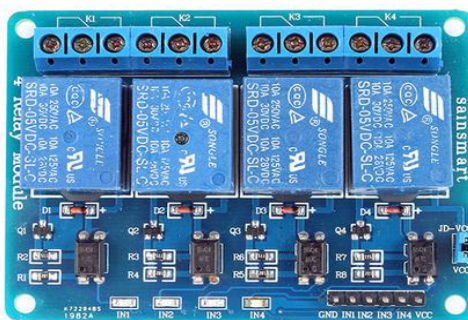


Fig 4. 4 Channel Relay Board

Features:

- 4-Channel Relay interface board, and each one needs 15-20mA Driver Current

- Both controlled by 12V and 5V input Voltage
- Equipped with high-current relay, AC250V 10A ; DC30V 10A
- Standard interface that can be controlled directly by microcontroller (Arduino , 8051, AVR, PIC, DSP, ARM, ARM, MSP430, TTL logic active low)
- Opto-isolated inputs.
- Indication LED's for Relay output status.

IV. SOFTWARE ARCHITECTURE

In this research work two software Arduino Integrated Development Environment (IDE) and Bluetooth terminal application are used.

4.1. Arduino IDE

IDE stands for Integrated Development Environment, entire programming for proposed system is done in Arduino IDE tool. Baud rate is set to 9600 bits per second for serial communication between Arduino board and smart phone. Arduino IDE command "Serial. A available 0" is used to receive data serially from smart phone and "Serial.println" command is used to transmit data serially from Arduino board to smart phone. The code to receive data serial from smart phone. State variable is used to store the value of received byte and then it is compared with different condition and performs the specific operation.

V. ADVANTAGES

- All the control would be in your voice commands by using this home automation system.
- This project can provide the facility of monitoring all the appliances with in the communication range through Bluetooth.
- It is robust and easy to use system.
- It is a hybrid system

VI. OUTPUT

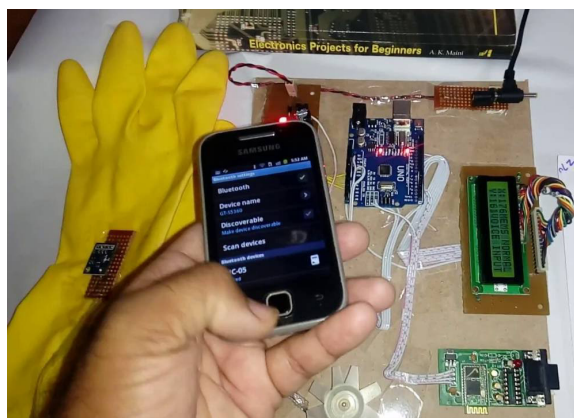


Fig 5. output

VII. CONCLUSION

In this paper we have introduced design and implementation of a low cost, flexible and wireless solution to the home automation. The system is secured for access from any user or intruder. The users are expected to acquire pairing password for the Arduino BT and the cell phone to access the home appliances. This adds a protection from unauthorized users. This system can be used as a test bed for any appliances that requires on-off switching applications without any internet connection

VIII. REFERENCE

- [1] Khusvinder Gill, ShuangHua Yang, Fang Yao, and Xin Lu “A Zigbee based home automation system” IEEE Transactions on Consumer Electronics, Vol. 55, No. 2, MAY 2009.
- [2] Pomboza- Junez Gonzalo Holgado-Terriza Juan A “Control of home devices based on hand gestures” IEEE 5th International Conference on Consumer Electronics Berlin (ICCE-Berlin),2005.
- [3] Aditya Arun Ramamurthy et al., "Recognition of dynamic hand gestures", International Journal of Recent Technology and Engineering (IJRTE), vol. 11, no. 10, pp. 14-34, 2014.
- [4] Deval G. Patel, "Point Pattern Matching Algorithm for Recognition of Gestures", International Journal of Recent Technology and Engineering (IJRTE), vol. 31, no. 2, pp. 20-33, 2015.

