International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 04 | Apr 2021 www.irjet.net p-ISSN: 2395-0072

Voice, Hand Gesture and Indoor Navigation Guidance For Physically Challenged People

Arul Kumar D[1], Gurupandi D[2], Swetha M[3], Monica N[4], Uma R[5]

[1]*Associate Professor, Dept. of ECE, Panimalar Institute of Technology, Chennai, India*
[2]*Assistant Professor, Dept. of ECE, Panimalar Institute of Technology, Chennai, India*
[3, 4, 5] *Student, Dept. of ECE, Panimalar Institute of Technology, Chennai, India*

Abstract - *Every human will be busy in their schedule so they are not able to take care of physically challenged people. The main aim of our project is to help the people who are not able to do their daily routine. The physically challenged person having trouble in controlling home appliances without others help. To help physically challenged people we proposed this system. It will help physically challenged people to control electronic devices. The electronic devices are controlled by using hand gesture and voice command. 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. And we proposed indoor navigation system using an IR sensor. It will not only help physically challenged people and aged people but also to control our home appliances. This project proposes a simple and easy method of controlling the home appliances*

Key Words: **MEMS accelerometer, Arduino, Hand Gesture, voice command, indoor navigation, ZigBee.**

1.INTRODUCTION

In today's world, physically disabled and elder peoples are depending on others peoples, because they are not capable of body movements as compared to normal persons. So in such situations, we propose a system that helps them to control home appliances using hand gesture and voice command. The simple motion is based on the hand gesture recognition technique.[12] The gesture recognition technology is an advanced technology, by using this technology the physically disabled person can control the devices by sitting in one place and the main functionality of the gesture recognition technology is to boost the confidence for physically challenged people as it will help them to be self-confident.[15] The gesture recognition is a process, by which the gesture made by user are used to control the devices such as to turn on and off the fan, light etc. With the assistance of Arduino voice control application on android phone someone can control home appliances through voice commands.[17] The design of this method is based on Arduino board, Bluetooth module, sensors and smart phone application. Bluetooth module HC-05 is interfaced with Arduino board and electronic devices are connected with Arduino board via relay. The Arduino blue control application is used for serial communication between smart phone and Bluetooth module which is further connected with Arduino board.[18]

2. EXISTING SYSTEM

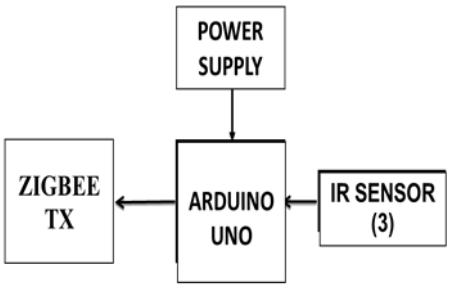
In the existing system they used PIC microcontroller because of the PIC microcontroller the program will be long and the program memory is not accessible and the only one accumulator is present. Matlab software is used, it is an interpreted language and the process of executing will be very slow. There is more wastage of power in the system.

3. PROPOSED SYSTEM

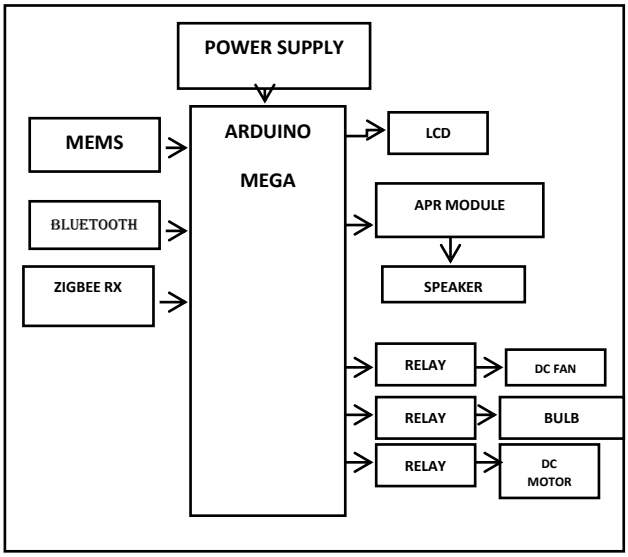
In the proposed system all devices are controlled by using Arduino microcontroller, so the program will be short and it will execute faster. Here for wireless communication, we are using wireless ZigBee and LDR module is also used to prevent wastage of power.

4. SYSTEM DESIGN:

4.1 BLOCK DIAGRAM FOR TRANSMITTER SECTION:



4.2 BLOCK DIAGRAM FOR RECEIVER SECTION:



5. HARDWARE ARCHITECTURE

5.1 ARDUINO UNO

Microcontroller that we used is Arduino UNO. It consists of 14 digital input /output pins,6 analog inputs, a USB connection, a power jack, an ICSP header and a reset button. It is one of the embedded system devices. It is also called as embedded development board. It is an open-source electronic device. It is based on microchip Atmega328p.Its operating voltage is 5V and input voltage is 7 to 20 volts. It provides serial communication. [1]

5.2 ARDUINO MEGA

Arduino mega contain more memory. It contains a flash memory and it gives 8x more memory. It has 54 digital input output pins. Its operating voltage is 5Vand input voltage recommended is 7-12v but the limit is up to 20V.It contains 256 kb flash memory. Its clock speed is 16MHZ.

5.3 MEMS Accelerometer Module

The module which we have used is ADXL337 accelerometer module. MEMS accelerometers are micro-electromechanical systems which are basically used to measure the forces of acceleration. In the proposed system ADXL337 accelerometer sensor are used for interaction with household appliances using recognized hand gestures. It is used in motion and tilt sensing applications.

5.4 BLUETOOTH MODULE

Bluetooth module HC05 is meant for a wireless serial connection. Its communication is established through serial communication which helps in making a easy method for interfacing with controller. This module is employed to communicate with devices which supports the Bluetooth functionality which may be a Phone or Laptop[19]. There are many android applications that are already available which makes this process easier.[2]

5.5 SOFTWARE AND ANDROID APPLICATION FOR HC05

The android application Arduino Voice Control is employed to communicate with the HC05 module. This application works by pressing the mic button, then the it will stay up for you to mention a command. This app then displays the word that you simply have pronounced.

5.6 REGULATED POWER SUPPLY

It is a power source to the entire system. RPS is required to produce the specified power supply. This whole RPS system comprises of Step-down Transformer, rectifier, voltage regulator, and filter circuit in series for generation of 5V DC power.

5.7 LCD DISPLAY

A 16*2 LCD display can be a small, flat display which uses light modulating properties of liquid crystals. Its operating voltage is 4.7V to 5.3V. It is an alphanumeric display module. It consists of two rows and each row can display 16 characters. In this proposed system, it is employed to display whether the devices are turned on/off.

5.8 IR SENSOR

An infrared sensor is a device, that emits infrared radiation so as to sense objects present in the environment.

5.9 ZIGBEE

ZigBee is a low-cost true single chip 2.4 GHz transceiver designed for very low power consumption for wireless applications.

6.SOFTWARE ARCHITECTURE

In this project we have used two software Arduino Integrated Development Environment (IDE) and Bluetooth application are used.

6.1 ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application that is written in C and C++ language. The Arduino IDE supplies a software library function, which provides many common input and output procedures.

7.WORKING PRINCIPLE

7.1 CONTROL ELECTRONIC DEVICES USING MEMS ACCELEROMETER

The MEMS accelerometer identifies four different types of hand gestures such as up, down, left, and right direction using the reading of the accelerometer sensor values the devices are controlled and the status is displayed in LCD. The accelerometer identifies the hand gestures and the signals are sent to the Arduino MEGA at the receiver section. The various hand gestures can be used in controlling the different Electronic Devices. When the MEMS values range from 300 to 350 is meant to turn ON the light, and values range from 370 to 400 are meant to turn ON the fan, and the rest of the values are meant to turn off both the light and fan. The various hand gestures can be used in controlling the different electronic devices.

7.2 CONTROL ELECTRONIC DEVICE USING VOICE COMMAND

The electronic devices are controlled by using voice command using Bluetooth module. The Bluetooth is connected between our smartphone and the Arduino microcontroller for wireless communication. In our smartphone application, the voice input is transmitted to the voice data to the Arduino MEGA board through the Bluetooth module. The android application Arduino blue Control is used to communicate with the HC05 module. This application works by pressing the mic button, then it will stay up for you to mention a command. This app then displays the word that you simply have pronounced. In the Arduino blue control application, we will set data to send command as “A" and vocal command as "light on”, when we speak light on means automatically light will on and command “B” for “light off” and so on. The status is displayed on LCD.

7.3 INDOOR NAVIGATION SYSTEM

The Arduino UNO is connected between the ZigBee transmitter and the IR sensor on the transmitter side. An IR sensor can measure the heat of an object as well as detect the motion. If any object is detected the data is sent to the ZigBee receiver on the receiver side. On the receiver side, Arduino Mega is used. It is connected with the ZigBee receiver and APR module. In the APR module already the voice is recorded. When any object is detected by the IR sensor it sends the data to the ZigBee Receiver, the electronic devices are turned on and the audio message is played in speaker. The usage of light during day time leads to wastage of power. So, we are using LDR. The LDR is mainly used to sense the absence and presence of light. when there are any external sources of light the light is off otherwise the light is ON.

8.RESULT, CONCLUSION AND FUTURE WORK:

This paper has discussed a system which will help physically challenged people to manage house appliances using hand gestures. We have used Bluetooth module which helps to enable device switching through voice commands by an android application (Arduino blue control), and indoor navigation system. In upcoming years more home appliances are controlled by using microphone instead of using android application and mat lab can be used for detecting objects.

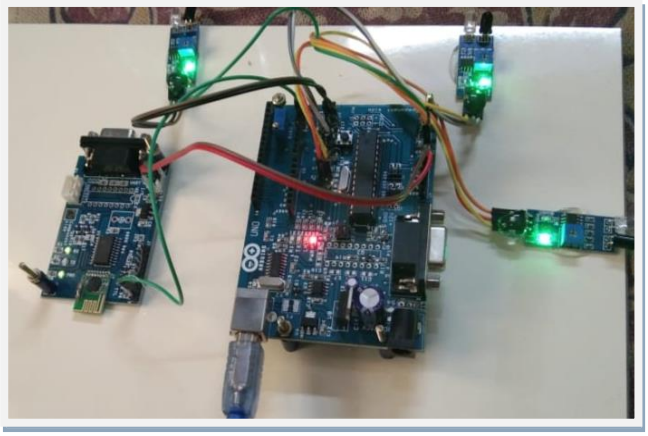


Fig -1: Transmitter Section

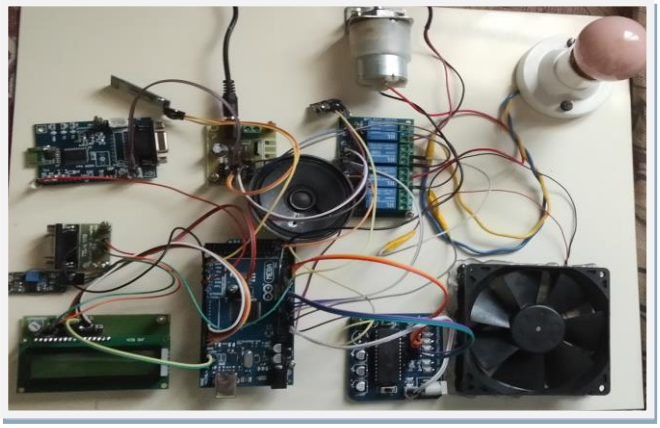


Fig -2: Receiver Section

Fig -3: Working Of The Proposed System

9.REFERENCES.

[1] Ahmad Akl. Chen Feng and ShahrokhValaee."A Novel Accelerometer-Based Gesture Recognition System ". IEEE Transactions on Signal Processing, vol.59, No.12, December 2011.

[2] Alice Linsie A, Mangaiyarkarasi J, Hand Ahmad Akl,Chen Feng and ShahrokhValaee, " A Novel Accelerometer- Based Gesture Recognition System ",IEEE Transactions On Signal Processing, vol.59,No.12,December 2011 Gesture Recognition using MEMS For Specially Challenged People,international Journal of VLSI and Embedded Systems-IJVES ,Vol 04,issue 02;March -April 2013,pp.238-241.

[3] N.bt Aripin and M.B.Othman," Voice control of home appliances using android",2014 Electrical Power,Electronics, Communications, Control and Informatics Seminar.

[4] S. Kumar and S.S.Solanki, "Voice and touch Control home automation," 2016 3rd International Conference on Recent Advances in Information Technology (RAIT),Dhanbad,2016,pp.495-498.

[5] Kumar V,sundara.(2015).MEMS based Hand Gesture Wheel Chair Movement Control for Disable persons.

[6] Hand Gesture controlled message Conveyer and controlling devices for physically disabled, Mahavir penna, shivashankar, vyshak gouda N V, uday Kumar R, such y, Praveen B R.,2018.

[7] R. Pirate, M.Tazil,"Bluetooth based home automation system using cell phone",2011 IEEE 15 th International Symposium on consumer Electronics.

[8] Hand Gesture recognition system for physically challenged people using IOT, Rajit Nair,dileep Kumar Singh,ashu, Shivam Yadav, sourabh bakshi-2020.

[9] Ramya V and Palaniappan B Article:Embedded Home Automation for visually impaired,International Journal of Computer Applications 41(18):32-39,March 2012.

[10] Electronic device control using hand gesture recognition system for differently abled., Sanmukh Kaur,Anuranjana Nivedita Nair ,2018.

[11] J.Sathyan and A.R. Ramakrishnan,"A Unique SelfContained UniversalRemote Control ",IEEE 2004

[12] Shashank H,Pradyath Hehde,"MEMS based device for physically challenged " , Proceedings of 10 th IRF International Conference,October 2014.

[13] HiguoLian,Wei Hu,Kai Wang," Automatic User State Recognition for Hand Gesture Based Low-cost Television Control system",IEEE, 2014.

[14] N.Sriskanthan, F.Tan, A.Karande," Bluetooth Based Home AutomationSystem", Elsewhere Science B.V.Microprocessors and Microsystem, 10 May 2002

[15] N.bt Aripin and M.B.Othman," Voice control of home appliances using android",2014 Electrical Power,Electronics, Communications, Control and Informatics Seminar.

[16] Rajit Nair,dileep Kumar Singh,ashu, Shivam Yadav, sourabh bakshi, "Hand Gesture recognition system for physically challenged people using IOT", -2020.

[17] T. Rajendiran, R. Vijayakumar, "PLC Based Sensor Operated Obstacle Detection Mobile Robots", Australian Journal of Basic and Applied Sciences, 10(1), January 2016.

[18] Kalaichelvan.M, Sathiyapriya.S, Ch. Sai Ravi Teja, Jinka Sumanth, "Gesture based car control with gyroscope sensor and IoT based controlling", International Journal of Advance Research, Ideas and Innovations in Technology, Vo. 5 (2), pp. 502-504, 2019.

[19] R Prathipa, M Arun, C Sownndarya, V Nivetha,"ultrasonic waist-belt for visually impaired person", International Journal of Emerging Technology in Computer Science & Electronics,Volume 26,Issue 4,Pages 23-25,2018