

Gesture Controlled Home Automation System for Differently Challenged People

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ABSTRACT: Gesture based home automation is gaining more importance nowadays. Control of huge electrical equipments by a simple hand gesture is the advancement of modern technology. A processing device will focus on the hand gesture recognition algorithm and the corresponding user interface. The hand gestures can be captured through a flex sensor and are transmitted wirelessly to a target device. Bluetooth technology, which aims to exchange data wirelessly in a short distance using short-wavelength radio transmissions. For differently abled people this technology will provide a necessary platform for their better living in the smart world

KEYWORDS: Flux sensor, Differently abled people

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 idea 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 where the finger bending data is captured and analysed. Also there is a receiving section where the control of home appliance, speech system, alarm etc are attached. Flex sensor is used to capture the finger bending data by producing change in resistance value depends on the amount of bending. Finger bending data is transmitted via Bluetooth and given to the driver circuit to control the home appliances. Lighting control and speed control of fan are done in this project as home automation. And a speaker is provided for dumb to express their feelings through gestures Also an alarm is specially provided for the paralysed people which helps to pay others attention on them.

II. BLOCK DIAGRAM AND DISCRPTION

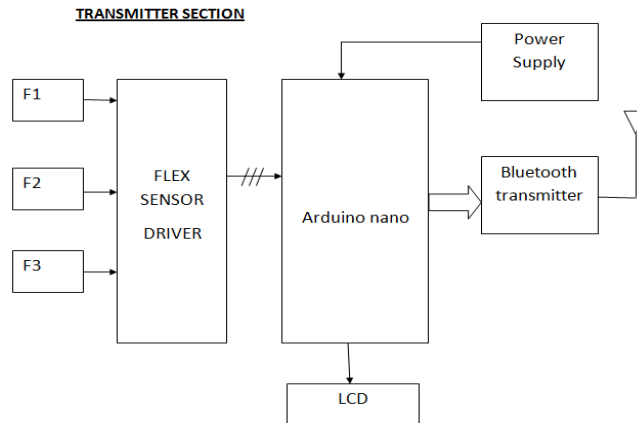


Fig 1. Transmitting section

The transmitting section involves the input module in which the flex sensor attached to the glove .Output from the flex sensor is given to the microcontroller. The micro controller determines the corresponding input signal and gives necessary signal to the transmitting device. The transmitting device is a Bluetooth module which transmit data. And this will be received further in receiving section. Three flex sensors in the input can give combinations of three binary signals.

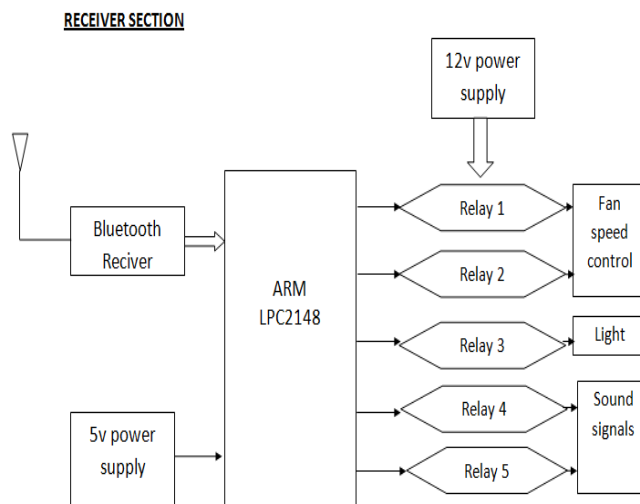


Fig .2 Receiving section

In the receiving section the Bluetooth module receives the transmitted data. The microcontroller placed in the receiving section will recognize the proper signal and enables the corresponding relay. Relays are connected to the microcontroller and its output will control the different home appliances.

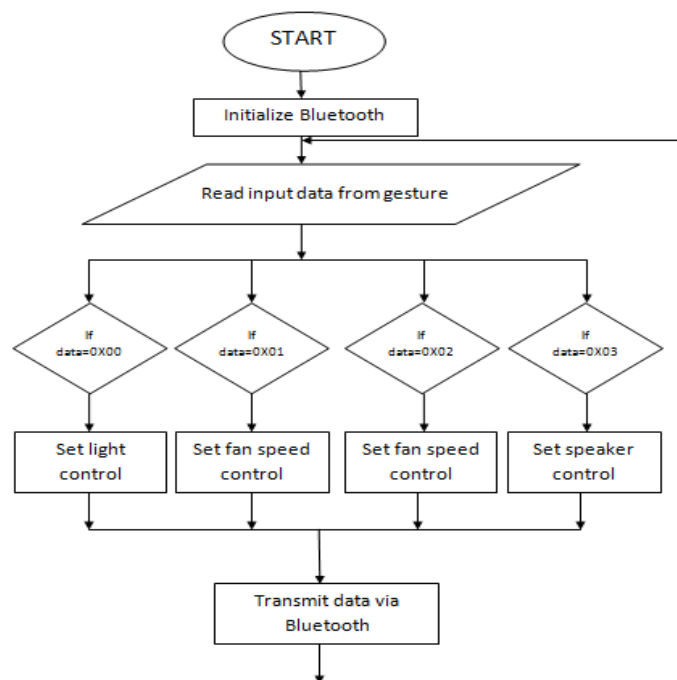
III. ALGORITHM&FLOWCHART

Algorithm for transmitting section

- Step 1: start
- Step 2: Initialise Bluetooth

- Step 3: read data from gesture
- Step 4: check data=00 then go to step 5 otherwise check data =01 then go to step 6
- Otherwise check data= 02 then go to step 7 otherwise check data=03 then go to step 8
- Step 5: set light control then go to step 9
- Step 6: set fan speed control then go to step 9
- Step 7: set fan speed control then go to step 9
- Step 8: set speaker control then go to step 9
- Step 9: Transmit data then go to step 3
- Step 10: stop

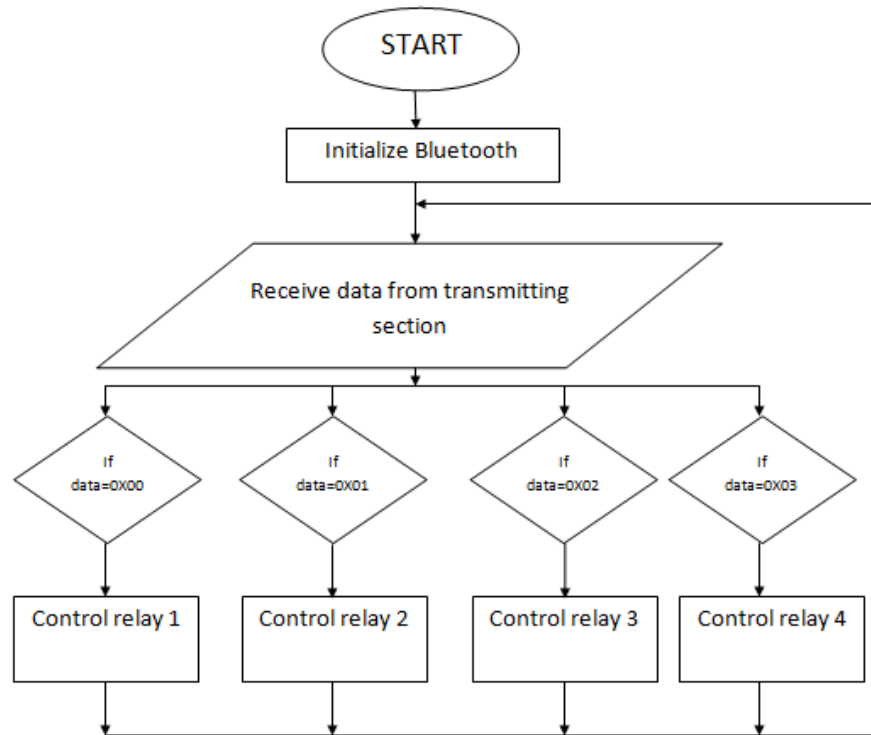
Flow chart for transmitting section



Algorithm for receiving section

- step 1: start
- step 2: initialize Bluetooth
- step 3: Receive data
- step 4: check data=00 then go to step 5 otherwise check data = 01 then go to step 6
- otherwise check data =02 then go to step 7 otherwise check data = 03 then go to step 8
- Step 5: control relay 1 then go to step 3
- Step 6 :control relay 2 then go to step 3
- Step 7: control relay 3 then go to step 3
- Step 8: control relay 4 then go to step 3
- Step 9: stop

Flow chart for receiving section



IV.COMPONENTS USED

1. Flex sensor

Flex sensors are the sensors that change resistance depending upon the amount of bend on the sensor. They convert the change in bend to electrical resistance – the more the bend, the more the resistance value. They are usually in the form of a thin strip that vary in resistance. And the flex sensors work on the principal of voltage divider form.

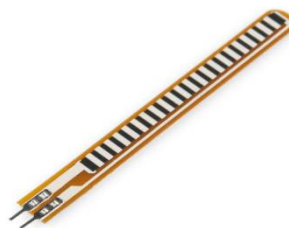


Fig.3 Flex sensor

2.Arduino Nano

Arduino Nano is a small, complete and breadboard- friendly board based on the ATmega328 or ATmega168. It has a 32 KB flash memory or 16 KB flash memory respectively.Arduino Nano has a number of facilities for communicating with a computer.

3. ATmega 16:

It is an 8 bit high performance microcontroller of AVR family. Most of the instructions will execute in one machine cycle. It can work on a maximum frequency of 16MHz. And It has 16KB programmable flash memory, 1KB static RAM and EEPROM of 512 bytes.

4. Voice Recorder Breakout:

This is a multiple message record/playback device. The chip can record up to 64 seconds of voice messages and can handle microphone inputs and speaker outputs. An external resistance is necessary to select the record duration and sampling frequency. A switch is connected to allow the selection of various operating modes.



5. Relay

A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. Heart of the relay is an electromagnet, which is a coil of wire wrapped around a soft iron core. The energising and de-energising of the coil will make or break the circuit respectively.

V. CONCLUSION

The objective of this project is to develop such a system which will help physically impaired to control home appliances by mere hand gestures. This provides comfort and convenience for common users as well. For capturing gesture we connect flex sensors with the gloves. In the transmitter and receiver sections we use suitable microcontroller units for processing the data. For automation here we use Bluetooth as communication system. Suitable relay systems with relay drives are used for connecting home appliances with the controller unit.

REFERENCES

1. 'Control of home devices based on hand gestures'. Pomboza- Junez Gonzalo Holgado-Terriza Juan A. 2015 IEEE 5th International Conference on Consumer Electronics Berlin (ICCE-Berlin).
2. 'A novel authentication method for security systems using multidimensional characteristics of cost-effective flex sensors.' Gururaj Mulay and Akshay Yembarwar Maharashtra Institute of Technology, Pune.
3. 'A Zigbee based home automation system' Khusvinder Gill, ShuangHua Yang, Fang Yao, and Xin Lu. IEEE Transactions on Consumer Electronics, Vol. 55, No. 2, MAY 2009.
4. 'Gesture recognition { A survey' Sushmita Mitra and Tinku Acharya IEEE Systems, Man and Cybernetics Society. April 2007.