GESTURE CONTROL OF HOME APPLIANCES USING FLEX SENSORS

[1]B.SURESH RAM, [2]K.SATHISH,[3]B.ARCHANA, [4]UDAY,[5]SHRIYA

[1] Assoc. Prof, Dept. of ECE, CMR COLLEGE OF ENGINEERING & TECHNOLOGY

[2,] Asst. Prof,Dept. of MECH, CMR COLLEGE OF ENGINEERING & TECHNOLOGY

[3,] Asst. Prof,Dept. of CSE, CMR COLLEGE OF ENGINEERING & TECHNOLOGY

[4-5]B-TECH,Dept.of AIML, CMR COLLEGE OF ENGINEERING & TECHNOLOGY

Abstract

This paper titled "Gesture control of home appliances using flex sensor" to control the home appliances is the easiest way. The main idea of this project is to help the bilateral amputee in other words people who lost their legs and also physically challenged people to control the home appliances by their hand and to reduce some problems that they are facing in day-to-day life. So, we have decided to help of physically challenged people to control their home appliances with gesture to detect their gesture with the help of flex sensor and to make the way easier to them for controlling the home appliance. Wireless communication and Sensors play a vital role in our project and for the wireless communication we used Bluetooth Module and Blend Sensor which is also known as flex sensor. Let's make it simple the sensor will give us resistance value based on the value we can predict the amount of deflection is made by person accurately and dynamically, Arduino Nano is the microcontroller is used for processing the input from the user through sensor and Arduino UNO will get the data through the Bluetooth and process the data and find which appliances should be controlled. Based on the input from the user the Arduino which is preprogrammed will decide which appliances that the user want to Turn ON or OFF through wirelessly.

Keywords: ArduinoUNO,Bluetooth module, ATmega168V, Flex Sensor, Home Automation.

1. INTRODUCTION

The Flex sensor is used by the physically challenged people for gesture purpose. The Sensor is related to variable resistor but it is flexible sensor. As the Flex sensor bends, there is a change in resistance. The Voltage divider circuit is used to obtain output voltage and it is a resistive type sensor. A Flex sensor is a kind of sensor which is used to measure the amount of defection otherwise bending. The Flex sensor works on the principle of a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. While the flex sensor operates on the principle of a variable printed

resistor, then it achieves the ideal shape-factor in a thin flexible substrate. When the substrate is bent, the resistance output is produced in relative to the curvature radius. If the radius is smaller, the resistance value is high. The design of this sensor can be made using materials such as plastic and carbon. As the resistor bends in the compression direction across the sensor, the flexion sensor increases in curvature across the tensile direction across the sensor increases [1]. This sensor is used in places where you need to measure curved, flex, otherwise any tool with no change of angle to any device. The internal resistance of this sensor linearly changes and approximately with its angle. Thus, by when connecting the sensor to the device, it may have a flex angle within the resistances of the power parameter. Thus, it is also named as a curve sensor. Its differential resistance can be directly proportional to the magnitude of the turn, so it can also be used as a goniometer. A curved sensor, also known as a flex sensor, is used to measure the amount of deflection caused by sensor bending. The optical flexibility sensor consists of a flexible conductor ink deposit on which a detached conductor is placed on top to create a flexible potentiometer, in which the resistive transitions on the deflection flexor sensor consist of two layers of conductive materials separated between

them and reduced in resistance with respect to deflection between them.

2. RELATED WORK

Many handicapped people face inconveniences in identification and reorganization of various home appliance switches in house. The proposed system would enable the person to control by turning on and off the home appliances by their commands through app. All of these can be done using their Android smartphones and an Arduino module with Bluetooth.

Design a controller for old people which is user friendly and able to operate without moving their position. It should be operable by Wi-Fi/Bluetooth/voice assistant. The controller range should be minimum 0f 5 meters and its cost should not be more than RS 1000,

The main aim of our system is to build a perfect companion for someone to be at old age home. Generally, home automation research targeted many needs like applications that provide the luxury and smart requirements while some threw light on the special needs for elderly and disabled etc. our system is aarduino based system that can accept to direct commands and process them. The system provides us switching any device ON/OFF.

The aim of the project " Wireless Home Appliances Controlling System" is to furnish a system that can control the ON/OFF status of electrical devices, such as lamps, fans, television etc., in the home. The system should be reasonably cheap, easy to configure and easy to use. The user should be able to control all the appliances from any point in their home, so a wireless controller should be provided. This project demonstrates a system that can be integrated as a single portable unit and allows one to wirelessly control lights, fans,air conditioners, television, etc., and turn on or off any appliance that is plugged into a wall outlet. This integrated platform for home security, monitoring and automation by using microcontroller. A Bluetooth model is interfaced with the control unit for sensing the signals transmitted by android application. The commands given through App are conveyed to the control unit with switches on loads ON/OFF as desired. The microcontroller unit takes decision and perform the required decision.

This portable method is able to assist the disabled people who have problem with locomotion difficulty. This method provides facility to the user to control the home appliances without walk to the switches on the wall.

3. IMPLEMENTATION

HARDWARE DESCRIPTION

- Arduino UNO
- Android phone
- Laptop/pc
- Bead board
- Flex Sensor
- LCD Display
- Power supply board
- Ac 220v/120v loads/home appliances
- 5v 4 channel relay module
- 5v adapter
- Accelerometer (ADXL338)
- Bluetooth module (HC 05)
- Jumper Wire's
- Bread board

Methodology

The Design includes a flexible sensor, relay, Arduino (NANO/UNO) and

Bluetooth module (transmitter and receiver). The Flex sensors are will be connected to the Arduino NANO and then it connected to the Bluetooth which will be configured as master. Then Another Bluetooth will be configured as slave it is connected to the Arduino UNO which is linked to the relay which is connected to the appliance. Whenever the user wants to interact with the home appliances to switching ON/OFF all just need to use their hands to control it and When the flex sensor is blend and resistance value changed, then the Arduino converts the change in the current into digital signals and transmits to Bluetooth module master transmits to the other end slave receives the data and sends it to the Arduino through the TX pin of the Bluetooth module. The code uploaded on the Arduino checks and compares the received data. Based on the results that logical data is sent to the relay, a relay can be controlled by an Arduino or microcontroller which is an electrical switch, it can be programmed. It is used to program devices that use high voltage and/or high current on/off programmatically. If the data obtained is 1, the bulb will run. The bulb turns off when the received data is 0 by this way we can control all the appliances in home.

Block Diagram

The overall functioning of the System is explained through the block diagram shown in figure. It represents the general order and hierarchy of various working blocks of the project. The person wears the glove which has flex sensors, contact sensors and accelerometer stitched to it and makes the gesture. Arduino UNO is used to gather signals from the flex sensors and accelerometer placed on the glove. Then the processed output is send over the LCD to display the text output and also via a Bluetooth link to an Android Smartphone or a Personal Computer consisting of test to speech software (application) and speech output is obtained
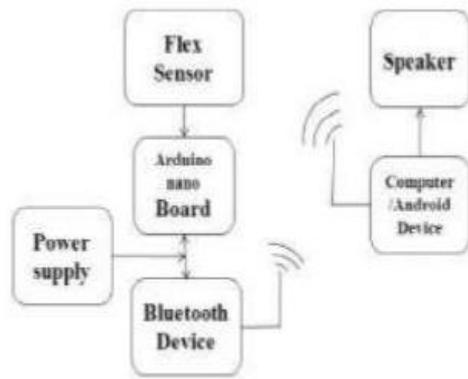
Figure 2:- Block Diagram

4. RESULTS AND DISCUSSIONS

After the implementation of flex sensor with the glove and the system was tested. It worked properly for every command. It is tested at different distance and transmission between the master and slave Bluetooth was smooth. The Master bluetooth is the transmitter, which is connected to flex sensor with arduino. The Slave bluetooth is the receiver, which is connected to the appliance with arduino and relay. And both are powered using the arduino. When the bend was not to the required limit, the command will be failed to turn on/off the appliance, because the resistance value is not equal be equal to the condition given in the arduino. The Arduino correctly recognizes the flex to turn on/ off the right appliance. It correctly recognizes the appliance is turned on/off and turns on if the appliance is off or turns off if the appliance is on. The Proposed project gave the expected result. Thus, the result was obtained for the proposed project.
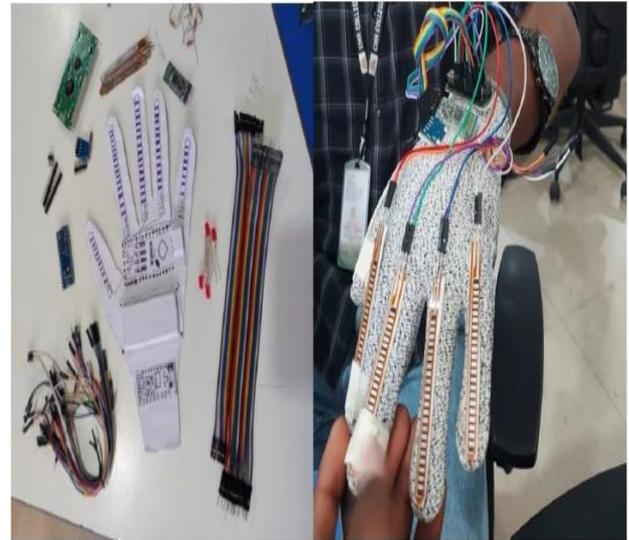
5. CONCLUSIONS

The prime objective of the project is to assist handicapped/old aged people. The project gives basic idea of controlling various home devices using Android phone. This project is based on Android platform which is Free Open Source Software. The total implementation cost of the project is very cheap and it is affordable by a common person. The consumer can interact with the application interface of the android phone and send control signal to the Arduino which in turn will control the other embedded devices. We have introduced the design and implementation of a low cost Smartphone based home automation system. This home based automation system can be easily manufactured on a large scale for mass production because of its simplicity and

ease of design. Another advantage is that application software is based on Android, which has the largest Smartphone base. With improvements in technology of Android software which is open source, cheap Smart phones can be used as the controller in our project, making the total system cost affordable for mass production.

The Proposed system is basically for the physically challenged people who are unable to move from the respective position. It proposes a viable solution for them. It is very difficult task for them to turn on/off the appliances from their respective position. It helps them to get their home under their control without help of others and manually switch on or off the appliance. From this proposed system. Slave Bluetooth is connected to another Arduino with a relay to the required appliance. The advantage of implementing our proposed system will be cost efficient,less complex and user friendly. The user need not have to immense knowledge over anything. Just by bending the finger the corresponding sensor and value given to that specific appliance to switch on or off will allow the user to have complete control over any appliance with less effort.

6. REFERENCES

1. http://lemelson.mit.edu/winners/thomas-pryor-and-navid-azodihttps://www.sparkfun.com/datasheets/Sensors/Flex/flex22__.pdf. Sign Language to Speech Translation System Using PIC Microcontroller: Gunasekaran. K1, Manikandan. R2 :May 2013.

2. https://www.arduino.cc/en/uploads/Main/ArduinoNanoMa nual23.pdf

3. https://www.sparkfun.com/datasheets/Sensors/Flex/flex22 .pdf

4. http://www.in.techradar.com/news/wearables/These-gloves-literally-turn-sign-language-into-speech/articleshow/51810332.cms

5. http://www.ijste.org/articles/IJSTE V2I9089.pdf

6. Solanki Krunal M, "Indian Sign Languages using Flex Senser Glove," International Journal of Engineering Trends and Technology (IJETT) - Volume4 Issue6- June 2013 ISSN: 2231

7. http://www.statesymbolsusa.org/symbol-official-item/maine/state-language-poetry/american-sign-language