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GESTURE BASED CONTROL OF HOME APPLIANCES FOR ILLITERATE AND DISABILITY PEOPLE

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Abstract –*The physically challenged people have many difficulties in their day to day life. Mostly to control the home appliances is very difficult task for them and some of the people are still illiterate. In order to aid them, gesture based control of home appliances without the sign language is proposed in this report. The various components used are Flex sensor, XBee Transceiver and DC motor.The flex sensor is calibrated initially for every position using microcontroller. The data from flex sensor are transferred to wireless transmitter through microcontroller. It is received by wireless receiver and send to microcontroller which controls home appliances. The gesture made by the physically challenged people is also displayed in LCD.*

***Key Words*: Flex sensor, XBee Transceiver, Arduino UNO**

1. INTRODUCTION

The Flex sensor is used by the physically challenged people for gesture purpose. The Flex sensor is similar to variable resistor but it is flexible sensor. As we bend the Flex sensor, the resistance value changes. It is the resistive sensor and in order to obtain output voltage, the voltage divider circuit is used. The wireless transmitter and receiver used is XBee transceiver. The XBee provides wireless communication at the speed of up to 250 kbps. The main purpose of this work is to help the illiterate and physically challenged people.

2. LITERATURE REVIEW

Aaisha et al have designed a narrative hand gesture recognition technique which consists of microcontroller and accelerometer sensors.The acceleration values of a hand motion are transmitted to microcontroller and to identify all gestures in a sequence an algorithm is developed.Most of the exciting method by gesture based control uses five flex sensors to control the home appliances and sign language has to be known by the people. But this proposed method is easier way and it uses less number of Flex sensors. This method is very useful for illiterate people.The objectives of this project areto detect the changes in the flex sensor output for various signs, to interface the flex sensor with XBee transmitter andto transmit the flex sensor output to control the appliances wirelessly through XBee transceiver.

3. SYSTEM DESIGN AND ARCHITECTURE

3.1 Block diagrams

The proposed method has two modules-Transmission module and reception module respectively. The transmission module consists of flex sensor, microcontroller, wireless transmitter and liquid crystal display. The microcontrollers used are Arduino Uno. The receiver pin in microcontroller receives data from the flex sensor and that information is sent to a wireless transmitter. The data are transmitted to wireless receiver through antenna.

Fig-1: Block diagram- Transmission module

Fig-2: Block diagram- Reception module

The reception module consists of wireless receiver, microcontroller and the home appliances. The receiver pin in microcontroller receives data from wireless receiver. According to the gesture of the flex sensor, the microcontroller is programmed to control the home appliances. The home appliances which are controlled are shown on a LCD.

3.2 Flex sensor

Flex sensors are analog sensors which changes the resistance when subjected to bend. The change in bend of the sensor is converted to resistance. When the bend of Flex sensor is more, the resistive materials inside the sensor are pulled apart. So the electrical resistance increases accordingly. The sensor can be either unidirectional or bidirectional. The maximum resistance value is 200 kohm.

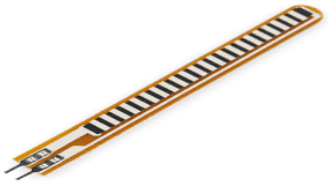

Fig -3: SEN-10264 Flex Sensor

3.3 XBee transceiver

The XBee transceiver is used for the serial wireless communication. The XBee transceiver is very useful for long distance communications and it is the low cost module. It operates within 2.4 GHz frequency. The XCTU software is used to make the two XBee transceiver modules.

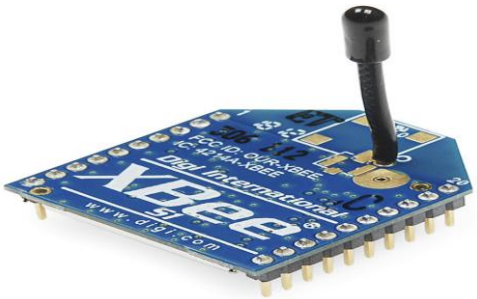

Fig-4: XBee transceiver

3.4 Interfacing of Flex sensor with Arduino UNO

ATMEGA328 is the heart of this circuit. VCC and GND of Microcontroller is connected to +5V and GND of the sensor respectively. The output pin of Flex sensor is connected to any one of the analog pins in Arduino UNO which is to be configured as an input pin. The same connection is done for another flex sensor also.

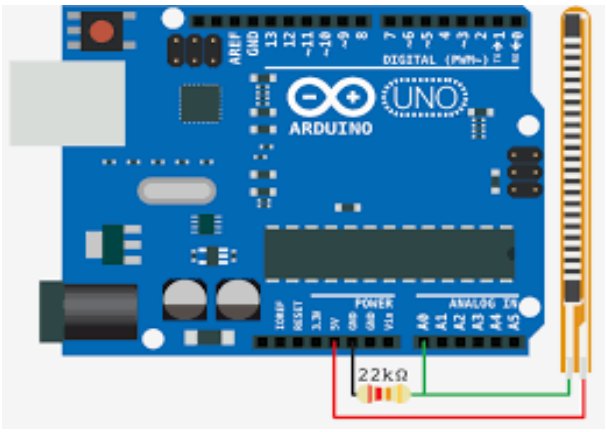

Fig-5: Interfacing flex sensor with arduino

3.5Interfacing of XBee transceiver with Arduino UNO

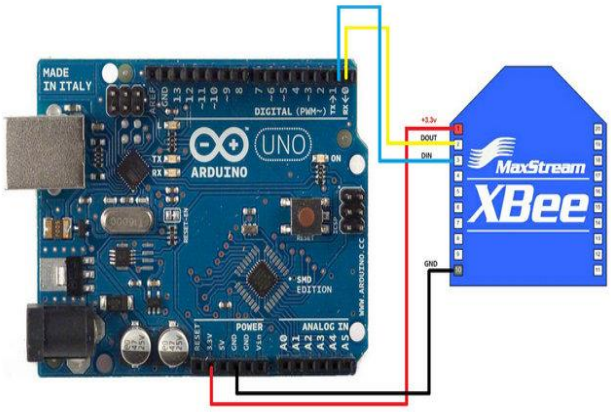

Fig-6: Interfacing of XBee transceiver with Arduino

The VCC and GND of microcontroller are connected to VCC and GND of the XBee transceiver respectively to give power supply. Then, in the transmitter side the TX pin of the microcontroller is connected to the DIN pin of the XBee transceiver. For the receiver side, the RX pin of the microcontroller is connected to the DOUT of the XBee transceiver.

3.6Control of Home appliances

In this proposed methodology, the two flex sensors are used which can control three DC motors i.e. If 'n' flex sensors are used, 2^n-1 DC motors can be controlled. The flat position of the Flex sensor is considered as '0' and the flex sensor when bend to 90^o angle is considered as '1'.

Fig-7: Resistance variation with the bend

The above figure shows that when the flex sensor is bend to 45^0, the resistance is increased. Similarly when the flex sensor is bend to 90^0, the resistance is increased further.This work is done with two flex sensors and three DC motors are controlled.

The programming is done in such a way that for all the conditions when made for the first time, the corresponding DC motor will be switched ON and when the same condition is made for the second time, the corresponding DC motor will be switched OFF.

Table -1: Various conditions of the Flex sensor

Condition	Flex sensor-1	Flex sensor-2	Output
1	Flat position	Bend 90^0	Fanis controlled
2	Bend 90^0	Flat position	Light is controlled
3	Bend 90^0	Bend 90^0	Air conditioner is controlled

The main advantage of this work is that when any one of the condition is done and both flex sensor is changed to flat position the output remains the same i.e. if the condition-1 is done for the first time the fan will be Switched ON and even when both the Flex sensor are changed to flat position, the fan will be in ON state itself.

4. REAL TIME IMPLEMENTATION

Initially, the sensor value is read using Arduino IDE. The sensor analog values are displayed in the serial monitor.

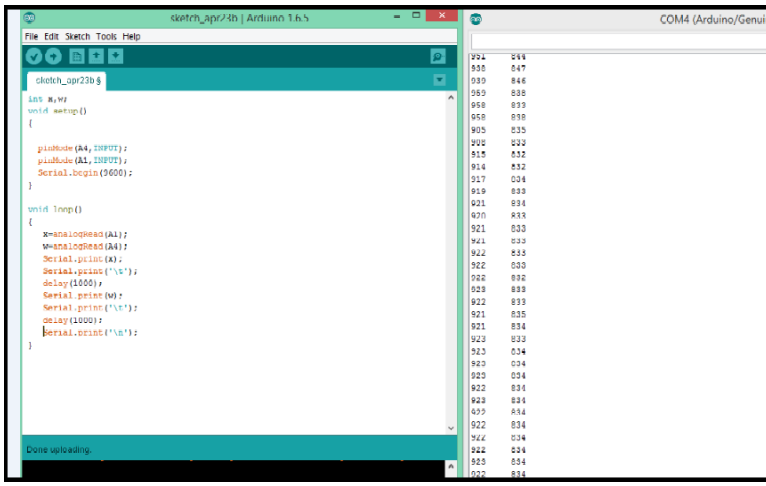

Fig-8: Serial monitor in Arduino

The figure below shows the transmitting module of the gesture based control. The two flex sensors are fixed in bread board.

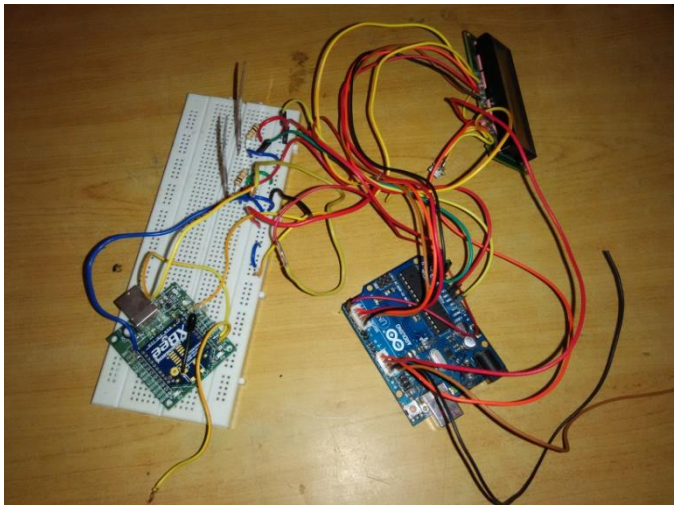

Fig 9: Gesture control module- Transmitting side

The figure below shows the receiving module of the gesture based control.

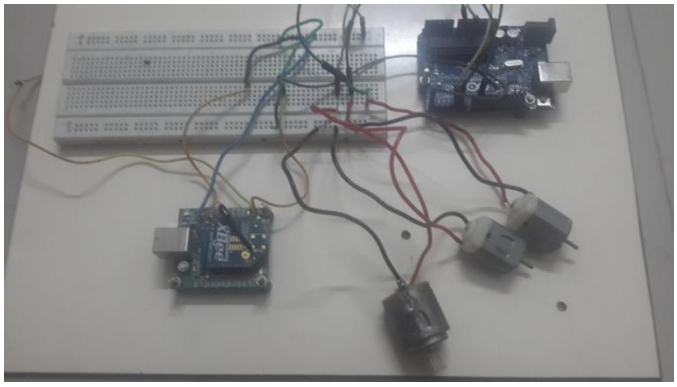

Fig 10: Gesture control module- Receiving side

5. CONCLUSIONS

Thus the setup that has been designed gives an easy approach of controlling home appliances for the physically challenged people without any assistance and to take care of their day to day activities themselves.

6. FUTURE SCOPE

Since the size of the Arduino and XBee setup is very large further optimization can be done on the design of the gesture based gloves. If required the gesture control can also be made to use more number of flex sensor to increase the appliance control respectively. Using more number of sensors, we can also increase the resolution correspondingly

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