International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

Speaking Glove By Using Mobile App and Aurdino For Speachless Person

[1]Mitali Srivastava, [2]Sanjana Srivastava,[3]Vinita,
[4]Pratibha mall,[5]Amit Kumar

Dept. of Electronics and Communication Engineering,Gorakhpur, (India)

ABSTRACT

A Speaking Glove with mobile app design by using aurdino is purposed in this paper. It is design to provide abets to dumb person through simple android mobile application. Generally, a dumb person face problem in communication for simple task such as need water, food, want to washroom, communication with doctor and not feeling well. Therefore, we design a gadget in shape of glove which converts movement of finger in voice output. This electronic glove is equipped with flex sensor which is based on resistive carbon elements and it work as a variable printed resistor. This flex sensor produces proportional voltage as function of bending of flex. All processing in done on aurdino Uno and process data is send to mobile app using bluetooth module and respective sound and image display on mobile. Sound output is simple to change into desire output by simple programming in android mobile application.

Keywords— Speaking Glove;Flex Sensor;Speachless Person; Aurdino;

I.INTRODUCTION

How frequently do we meet a speechless patient in normal life? How visible are they in offices or behind shop counters? The truth is that there is often little room for these people in the workplaces.

In recent years, researchers have been focusing on hand gestures detections and been popular for developing applications in the field of robotics and extended in the area of artificial or prosthetic hands that can mimic the behavior of a natural human hand. This project although utilizes a similar approach for the detection of the movement of fingers, however we have tried to extrapolate the idea in a slightly different perspective and have come up with a small yet significant application in the field of bioengineering. This project is useful for the deaf and dumb, it can also be used for the (speechless) patients with half of their bodies
paralyzed and who are not able to speak but are able to move
their fingers.

The aims and objectives of this research work include [1]:

- Basic object of this project is to design a portable embedded system
- Developing an economical and simple solution for the detection of finger gestures
- Cost effective, reliable data acquiring method and signal conditioning

Project key features are [1]:

- Fully embedded

- Portable
- Less weight
- Single Li-ion battery for longer operation
- Low power consumption
- Less hardware
- Robust

Many researchers have found out a number of possible solutions. Bhatti et al [2] developed a hand glove with the support of text on LCD display via computer interface with PIC 18F8680 micro controller having DC power supply instead of battery. Edin et al [3] developed a robotic hand for grasping and lifting different object. Wald [4] developed software for editing automatic speech recognition in real time for deaf and hard-hearing people. Simone et al [5] developed a low-cost method to measure hand and finger range of motion. Zhao et al [6] developed a five-fingered prosthetic hand system.

II.PROPOSED SPEAKING DESIGN

Proposed speaking glove contain five flex sensor,voltage divider circuit,Bluetooth module, aurdino and mobile application, shown in Fig.1.

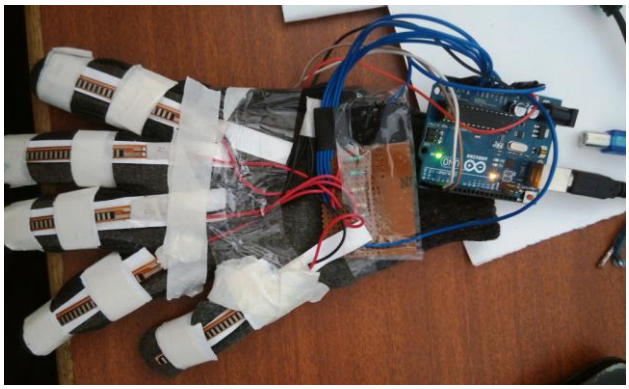


Fig1. Proposed Speaking Glove

Hardware Description:

Hardware used in designing speaking glove is explain below,

a. **Flex sensor:** The Flex Sensor patented technology is based on resistive carbon elements shown in Fig.2(a)[9]. As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate.

When the substrate is bent, the sensor produces a resistance output correlated to the bend radius the smaller the radius, the higher the resistance value. As shown in fig2. (b)

We use this property of variable resistor of flex sensor and create voltage divider circuit As flex sensor has a range from about ~10K to ~35K, that means it won't give us a full 0-5 volt range (or 0-1023 analog value). Try

to use the serial monitor below to find out what analog value you will take while you bending the sensor. It supposed to be between 700 to 900.

The corresponding values of graph which is output of Fig.2(b)

Calculations of fig.2(c) on various bend of flex sensor are as following:

Formula for voltage divider circuit:

$$V_0 = V_{cc}\left(\frac{R_2}{R_1 + R_2}\right)$$

Consider R1= 10kΩ and R2= resistor of flex sensor on different bending as below

For Vo minimum when sensor deflection is 0^o

R1= 10kΩ ,R2=10kΩ and

$$V_0 = 5\left(\frac{10}{10 + 10}\right) = 2.5V$$

For Vo middle when sensor deflection is 45^o

R1= 10kΩ ,R2=20kΩ and

$$V_0 = 5\left(\frac{20}{10 + 20}\right) = 3.3V$$

For Vo middle when sensor deflection is 90^o

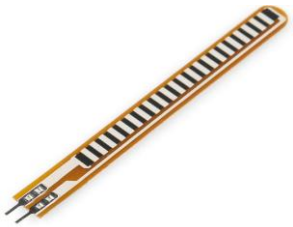
R1= 10kΩ ,R2=30kΩ and

$$V_0 = 5\left(\frac{30}{10 + 30}\right) = 3.75V$$

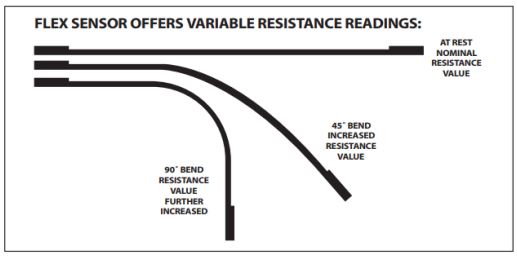
As flex sensor output resistance output is ranging from 2.5v to 3.75v in straight and bending respectively. Which produce after analog to digital convertor of 10bit in aurdino from 700 to 950.

We use it as digital output, below 700 as logic 0 and above 850 logic 1. This is process by aurdino and makes decision on basic of program.

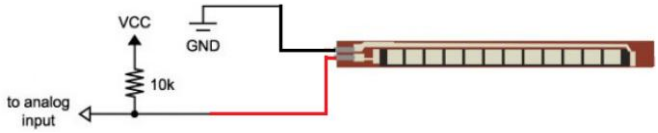
.



(a)



(b)



(c)

Fig.2(a) Flex sensor (b) Flex sensor as a variable resistor (c) Flex sensor as voltage variable

b. Aurdino: Arduino is an open-source electronics platform based on easy-to-use hardware and software shown in Fig.3. It consist two GND, 3.3v and 5v power supply, A0 to A5 (6)Analog Input pins, 0 through 13 on the UNO total 14 digital pin, PWM pin AREF pin and pin 0 & 1 use for Tx and Rx. This board is brain of our project.

Fig.3. Aurdino UNO board

c. Bluetooth Module: we use Bluetooth moduleHC-05 shown in Fig.4 for sending and receiving process by aurdino to mobile application.

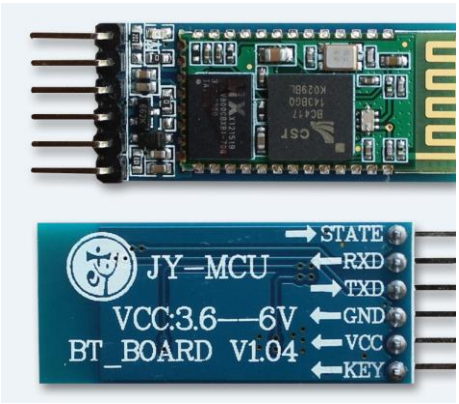


Fig.4 Bluetooth module HC-05

Over all hardware structure shown in Fig5.

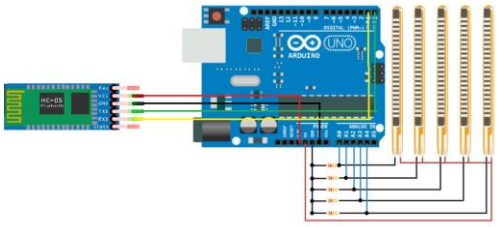


Fig.5 Hardware structure of speaking gloves

International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

Software section:

Hardware programming is done of aurdino open software as shown in Fig.6(a) [10]

Fig.6.(a) Program of speaking glove

Design of mobile application is done App Inventor for Android is an open-source web application originally provided by Google, and now maintained by the Massachusetts Institute of Technology [10] as shown in Fig.6(b).

Fig.6 (b) Design of mobile app in App inventor.

Block Diagram:

Working of speaking glove is explain on the block diagram as shown in Fig7.

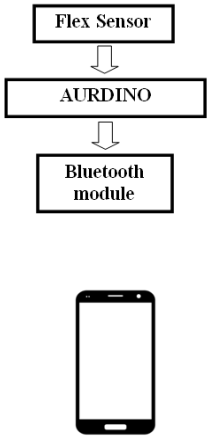
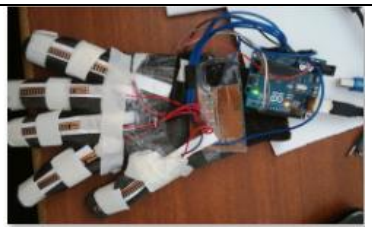
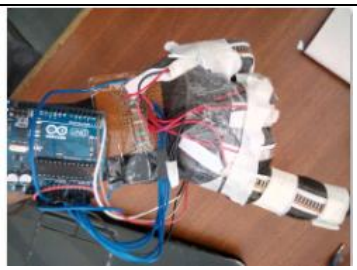
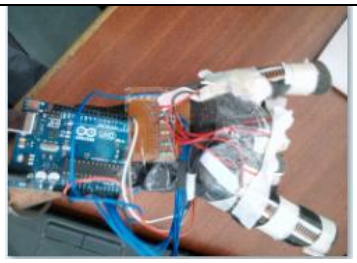


Fig7. Block diagram of working of speaking Gloves.

As discuss above all hardware and software section. Different gesture is produces respective binary data and respective data is send to mobile app. In mobile app receive data is compare in programming , is any data is match then it display image and produce voice output. Table of different output at different gesture is shown in table.1

Table1.Speaking glove gesture and message output

S. No.	Bin	Gestures	Message
1	00000		No message
2.	11100		Need water

3.	01111		I want to go washroom
4.	11001		Feeling Well
5	01110		Call Doctor

III.CONCLUSION

This project is a useful tool for speech impaired and partially paralyzed patients which fill the communication gap between patients, doctors and relatives, This project will give dumb a voice to speak for their needs and to express their gestures, As it is portable, requires low power operating on a single lithium-ion rechargeable battery and having less weight and robust gives patient liberty to carry it anywhere at their will.

IV.FUTURE ENHANCEMENT

Nothing is perfect in this world, always there is a room for improvement. This project can be enhanced further by using memory which would have real voice recorded by humans to generate a huge speaking dictionary and more natural voice could be heard with ease, To make it 100% waterproof, some protected layers may be fashioned in order to secure the circuit, battery and speaker.

REFERENCES

[1]. B. Ali, S. Munawwar, B. Nadeem, "Electronic Speaking Glove for Speechless Patients", August 2010, Bachelor of Electronic Engineering FYP Report, FEST, H11T, Hamdard University, Karachi, Pakistan

[2]. N. P. Bhatti, A. Baqai, B. S. Chowdhry, M. A. Unar, "Electronic Hand Glove for Speech Impaired and Paralyzed Patients", EIR Magazine, May 2009, pp. 59-63, Karachi, Pakistan

[3]. B. B. Edin, L. Ascari, L. Beccai, S. Roccella, J. J. Cabibihan, M. C. Carrozza, "Bio-Inspired Sensorization of a Biomechatronic Robot Hand for the Grasp-and-Lift Task", Brain Research Bulletin, Volume 75, Issue 6, 15 April 2008, pp. 785-795

[4]. M. Wald, "Captioning for Deaf and Hard of Hearing People by Editing Automatic Speech Recognition in Real Time", Proceedings of 10th International Conference on Computers Helping People with Special Needs ICCHP 2006, LNCS 4061, pp. 683-690

[5]. L. K. Simone, E. Elovic, U. Kalambur, D. Kamper, "A Low Cost Method to Measure Finger Flexion in Individuals with Reduced Hand and Finger Range of Motion", 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2004 (IEMBS '04), Volume 2, 2004, pp. 4791-4794

[6]. Jingdong Zhao, Li Jiang, Shicai Shi, Hegao Cai, Hong Liu, G. Hirzinger, "A Five-fingered Underactuated Prosthetic Hand System", Proceedings of the 2006 IEEE International Conference on Mechatronics and Automation, June 2006, pp. 1453-1458

[7]. Flex Point Inc. USA, .. http://www.flexpoint.com . Last Accessed on September 06, 2010

[8]. Magnevation SpeakJet Inc. USA,http://www.speakjet.com .Last Accessed on September 06, 2010

[9]. https://www.sparkfun.com/datasheets/Sensors/Flex/FlexSensor.pdf

[10]. https://www.arduino.cc

[11]. http://appinventor.mit.edu