Special Issue - 2015

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
NCICCT-2015 Conference Proceedings

Prototypic Hand Talk Assistive Technology For Perceptual Disabilities

Shalini Priya.K
U.G. Student

Shyamala Devi.R
U.G. Student

Steffi Lincy.J
U.G. Student

Ayesha Rumana.T
Assistant Professor

Centre for System Design and Information Processing
Department of Biomedical Engineering
PSNA College of Engineering and Technology, Dindigul, India

Abstract:- **Deaf and dumb people use hand gestures to communicate with the people. Normal people cannot understand mute people's hand signs. To make this communication possible glove-based technology is designed. The technology helps the mute people to translate their hand gesture into voice. The response is from the normal people as the speech signal. Mimix software is used to convert it into sign language. Hand gestures are converted into voice by using flex sensors, microcontroller and sound recorder/replay IC (APR 9600) the output is received via speaker. Mimix will give the sign language through an animation character.**

Keywords:- Mute people; Two way communication; Smart glove; Flex sensor; MIMIX software.

I.INTRODUCTION

Sign language is a unique language that can be used for the communication between the normal and the mute people. In existing method, the vision based method can be utilized by the computer readable program. The coding for those programs could be very difficult and cost also high. In our project, hand glove can be used for the conversion of sign language to speech wisely.

Hand glove can be converted to smart glove with the attachment of flex sensor on it& the microcontroller is used to code for the conversion of the analog to digital value from the sensor input and the voice IC(APR 9600).The microcontroller output is amplified in the voice IC and the speaker will produce the speech signal which is predefined. MIMIX software will be

used in two way communication. It is very reliable.
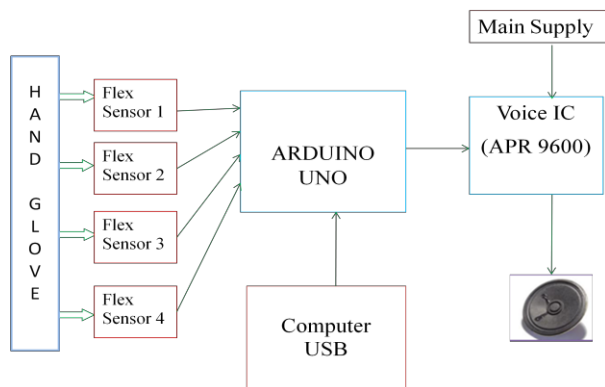
II.DESCRIPTION OF THE SYSTEM

Figure 1: Hardware block of the hand talk assistive technology

Figure 2: **Software block of hand talk assistive technology**

This technology involves four sensor which act as a input sign sequence. This sensing analog(resistance) value converted into digital value using A-D converter. This value can be given to the microcontroller of the arduino which is coded with a threshold& predefined word.This word can heard with the help of IC(APR9600) and the loudspeaker. The response from the normal people can be converted as a sign language by the mimix(designed)software.

III. HARDWARE & SOFTWARE:

3.1. HARDWARE:

3.1.1. ARDUINO MICROCONTROLLER:

The Arduino board can only control and respond to electricity, so specific components are attached to interact with the real world. These components can be sensors, which convert some aspect of the physical world to electricity so that the board can sense it, or actuators, which get electricity from the board and convert it into something that changes the world.The most popular boards contain a USB connector that is used to provide power and connectivity for uploading your software onto the board.

The Ardunio is a microcontroller board based on the ATmega328. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with battery to get started.   It has 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, and a reset button. Recommended input voltage to this is 7-12V.

3.1.2. VOICE RECORDER AND PLAYBACK DEVICE:

APR9600 is a low-cost high performance sound record/relay IC incorporating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module. The replayed sound exhibits

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high quality with a low noise level. Sampling rate for a 60 second recording period is 4.2kHz that gives a sound record/replay bandwidth of 20Hz to 2.1kHz. The APR9600 has a 28 pin DIP package. During recording and replaying, current consumption is 25mA. The current drops is 1µA.

The APR9600 device supports both random and sequential access of multiple messages. Integrated output amplifier, microphone amplifier, and AGC circuits greatly simplify system design. The device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications. The APR9600 experimental board is an assembled PCB board consisting of an ARP9600 IC, a microphone, support components and necessary switches to allow users to explore all functions of the APR9600 chip. The oscillation resistor is chosen so that the total recording period is 60 seconds with a sampling rate of 4.2 kHz.

3.1.3. FLEX SENSORS:

The Flex Sensor patented technology is based on resistive carbon elements Flex sensors are normally attached to the glove using needle and thread. They require a 5-volt input and output between 0 and 5 V, the resistivity varying with the sensor's degree of bend and the voltage output changing accordingly. It will only change resistance in one direction. As the flex sensor is bent, the resistance increases to 30- 40 kilo ohms at 90 degrees.

3.2. SOFTWARE

3.2.1.MIMIX SOFTWARE:

Mimix for android is a mobile application that can understand spoken and written words then it pass it to a 3D avatar which translate them to sign language in real time. Mimix availability has faster recovery, stronger data production and smarter way to manage high availability for IBM.The main features of this software is real time translation&more than 2500 animated signed words.

IV.FUTURE SCOPES:

(1) The completion of this prototype suggests that sensor gloves can be used for partial sign language recognition. More sensors can be employed to recognize full sign language.**(2)**With a little modification hand signs can be used for operating vehicles. The various operations like taking turns, starting or stopping vehicles can be implemented efficiently**.(3)** A handy and portable hardware device with built in translating system,speakers and group of body sensors with the pair of data gloves can be manufactured so that a deaf and dumb people can communicate to the normal person anywhere. To **increase the number of sensor**

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and the **coding to the microcontroller device**, real time implementation of hand sign technology can be **versatilized.**

V.CONCLUSION:

"PROTOTYPIC HAND TALK ASSISTIVE TECHNOLOGY FOR PERCEPTUAL DISABILITIES" is mainly used for the communication between the normal and mute people effectively. The advantage of this project is to the two way communication between the people.

Some advantages of this people are:-

➢ To reduce the size of unit we can use SMD.
➢ High quality sensor can be used.
➢ The range can be increased.

VI.LITERATURE REVIEW:

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