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Data Glove For Speech Impaired Using XBEE AND GSM

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Abstract-Communication is key element connecting people. Communication helps human being to exchange feeling, thoughts, ideas, emotions etc. Speech impaired people find it difficult to interact with normal people. Speech impaired uses sign language to communicate with normal people, but not all people know sign language and find it difficult to interact. There is the need of developing an electronic device that can translate sign language into speech and text, in order to make the communication take place between the mute with the general public. The paper describes a way to reduce this communication barrier by developing Data Glove Based System For Speech impaired using XBee & GSM. The Data Glove is a complete portable communication aid. It converts sign language into speech & text, it sends the text message through GSM module & controlling the home appliances through hand gesture. The glove is equipped with flex sensor. For each hand gesture the flex sensor bends its resistance varies , this resistance is analog in nature, it is converted into digital value using ADC of LPC2148. The value of flex sensor & MEMS are transmitted by means of XBee to another LPC2148 at receiver side. The output of system will be presented with the help of speaker. As we go on updating the database the dumb will speak like a normal person. We can train the glove as per our need.

Keywords: Speech impaired; Communication aid; Flex Sensor; LPC2148; GSM; MEMS; XBee.

I. INTRODUCTION

Communication is the most important in the wildlife. Better communicate we must required a voice and some should for better understanding. If we consider the peoples those are deaf cannot speak and hence they may get misunderstand by other person due to improper communication. So, sign language is commonly developed for deaf communities. Sign language is communication skill that uses gestures instead of sound to convey meaning. This project "***Data Glove Based System For Speech impaired using XBee & GSM***" aims to resolve the above mentioned issue.

In this project , we make a glove that contains flex sensor which detects the bending movements of the fingers. The signal is given to microcontroller. Microcontroller will send this data wirelessly to a sound generating IC. In which, already contains some sound or words that will be played through speakers according to the data. He/she whatever the deaf user wants to speak he/she just needs to give sign input through his finger's and arm then the word he want to speak is played through the speaker. And hence the person in front to him will get what exactly deaf person wants to speak.

Figure 1. Glove With Flex Sensor

II. SYSTEM DESCRIPTION

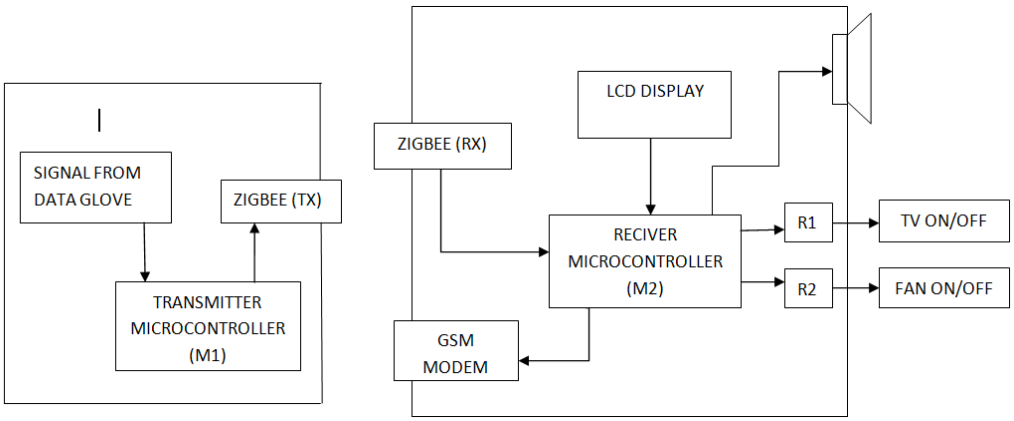


Figure 2. Block Diagram

Flex sensor:

The flex sensor patented technology is based on resistive carbon elements. 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. Bi-directional flex bend sensor is a unique component that changes resistance when bend. An Un-flexed sensor has a nominal resistance of 10 (K ohm). Sensor is also pressure sensitive, and may be used as a force or pressure sensor. The flex Sensor operating temperature range is -45F to 125F. Images new experimental bi-directional Bi-Flex Sensor (Patent Pending) is a unique component that changes resistance when bent or flexed in either direction. Anun - flexed sensor has a nominal resistance of 20-50K.

When the sensor is bent in the other direction its resistance will gradually decrease. Range of nominal resistances of the FLX-02 sensor may vary between 20-50 K. The flexible bend sensor operating temperature is -45F to 125F. Spectra symbol has used this technology in supplying the flex sensors for Nintendo power Glove, the p5 gaming glove. It can vary the actual nominal resistance of the flex sensors to meet the customer's needs. We can produce the flex sensors on a variety's of substrates.

Figure3. Flex sensor

Zigbee Module (TARANG):

Taranga modules are designed with low to medium transmit power and for high reliability wireless networks. The modules require minimal power and provide reliable delivery of data between devices. The interfaces provided with the module help to directly fit into many industrial applications. The modules operate within the ISM 2.4-2.4835 GHz frequency band with IEEE 802.15.4 baseband

FEATURES:

- Range - Outdoor line of sight: up to 50kms with directional antenna.
- Power supply :3.3to 3.6V
- Operating Frequency's band 2.4 GHZ
- RF Data Rate :250 kbps
- Transmit Power: up to 1 watt / 30 dBm nominal.
- Receiver Sensitivity: up to -107 dBm.
- AT Command Modes for configuring Module Parameters
- Direct sequence spread spectrum technology.
- Analog to digital conversion and digital I/O line support.
- Point to point, point to multi point and peer-to-peer topologies are possible. Mesh networking.

Figure4. XBee

APR9600 -VOICE RECORDING&PLAYBACKDEVICE
(60-SecondDuration)

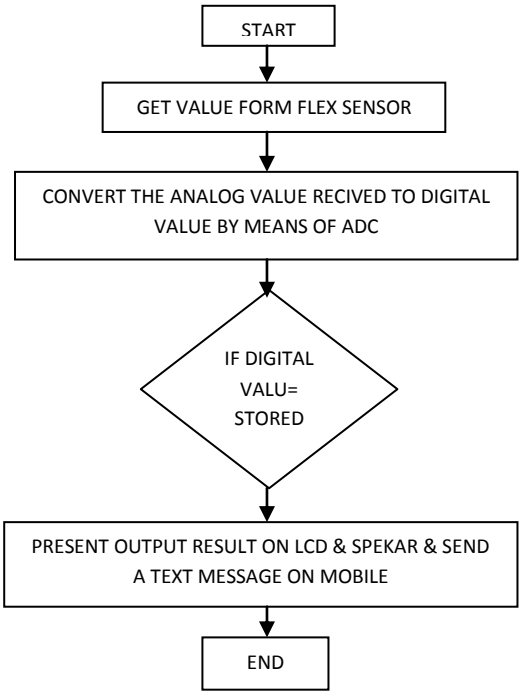
Figure5. ARP9600

APR9600 is a low-cost high performance sound record /replay IC in cooperating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module. There played sound exhibits 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. However, by changing an oscillation resistor, a sampling rate as high as 8.0kHz can be achieved. This shortens the total length of sound recording to 32 seconds. Total sound recording time can be varied from 32seconds to 60 seconds by changing the value of a single resistor.

The IC can operate in one of two modes: serial mode and parallel mode. In serial access mode, sound can be recorded in 256 sections . In parallel access mode , sound can be recorded in 2 , 4 or 8 sections . The IC can be controlled simply using push button keys . It is also possible to control the IC using external digital circuitry such as micro-controllers and computers. The APR9600 has a 28 pin DIP package. Supply voltage is between 4.5V to 6.5V. During recording and replaying, current consumption is 25mA.In idle mode ,the current drops to1 A.

The APR9600 experimental board is an assembled PCB board consisting of an APR9600 IC , microphone , support components and necessary switches to allow users to explore all functions of the APR9600chip . The oscillation resistor is chosen so that the total recording period is 60 seconds with a sampling rate of 4.2kHz.The board measures 80mm by 55 mm.

Flow chart:



Algorithm:

1. Initialize the ARM processor (M1 & M2),ADC,LCD, & other modules.
2. Get value from flex sensor.
3. Convert the analog value received from flex sensor to digital by means of ADC.
4. Match the output from ADC with database contents.
5. If data matches present output on LCD display & speaker.

CONCLUSION

Sign Language is a useful tool to ease the communication between the deaf, mute community and even the normal people who understand the language. Yet there is a communication barrier between these communities with the normal people. Therefore there is a need to develop an electronic device that can translate the sign language into speech (sound) in order to make the communication take place. With this project, the deaf or mute people can use the glove stopper form sign language and it will be converted into speech so that normal people can understand their expression.

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