SIGN LANGUAGE INTERPRETER WITH ANDROID

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Abstract

This paper presents the complete design of Sign Language Interpreter with lost cost with usage of android phone and wireless communication. Today, we are living in the 21st century where technology is increasing and advancing every second we breathe and in which human life plays a vital role. We are in the era where everyone wants to make their life more easy and reliable on technology. Sign language interpreter is a boon for people who can't speak. Communication is nothing but exchanging of information by speaking, writing, or using some other medium. Normal people generally use speaking to share their thoughts or to share the information. But some people can't speak, so it produces barrier in communication. And because of that they can't share their thoughts effectively .The objective of this project is to reduce the barrier in communication. Andto reduce the communication gap.

Keywords---- AVR atmega 328, Flexsensor, Accelerometer, Bluetooth v2.1,Battery, Smart phone, Speech recognition

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1.INTRODUCTION

Communication is the only medium by which we can share our thoughts. Generally dumb people use sign language for communication but they find difficulty in communicating with others who don't understand sign language.The main aim of this project is to give voice to voiceless person with the help of android phone. Android is playing important role in this project as it has inbuilt word predictor and text to speech convertor.In this project, flex sensors and accelerometer is mounted on gloves to capture the hand gestures of a user. The accelerometer is placed on the palm. The output of flex sensor and accelerometer is a stream of data that varies with degree of bend or rotation of hand. The analog output from the sensors are then fed to digital signal conversion, also the gesture is recognized and the corresponding text information is identified. The resulting digital signal is encoded into characters or alphabets or words and transmitted through Bluetooth transmitter.The Smartphone receives the signal by means of Bluetooth receiver. After getting characters, word prediction is done by the phone. Text to speech conversion takes place in the TTS section of Smartphone and the resulting word or letter is out through the speaker.

2. BLOCK DAIGRAM

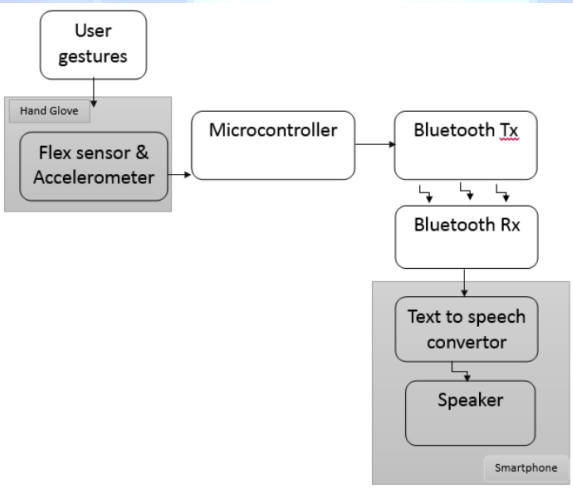

Fig.2.1

A block diagram of this project represents the principal parts or functions by blocks connected by lines that show the relationships of the blocks.

This block diagram gives higher level, less detailed descriptions which are intended to give overall concepts without concern for the details of implementations. Also it shows the implementation details of electrical components and physical construction.

The block diagram of Talking Glove for Deaf and Dumb is divided into three main sections:

- Hand Glove
- Main Circuit
- Smartphone

3. HARDWARE DESIGN

A. Hand Glove

Flex sensors and accelerometer is mounted on hand glove in such a way that for a bending of each finger and rotation of wrist, sensors produce analogues values. By comparing that values we assign particular alphabet.

B. Flex Sensors

Here flex sensor plays the major role, flex sensors are sensors that change in resistance depending on the amount of bend on the sensor. Hence the output of the flex sensor is in the form of the variable resistance. The output of flex sensor is a stream of data that varies with degree of bend. As the person wearing the glove begin to communicate using sign language gestures the flex sensor bends producing analog output. The analog outputs from the sensors are then fed to the microcontroller.

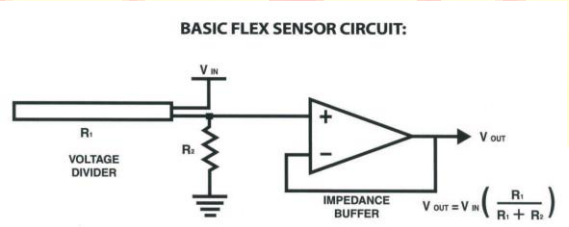

Fig.3.1

C. Accelerometer

In this system a 3 axis accelerometer is used. Accelerometer works on the principle of the gravitational Force. Accelerometer output changes accordingly to the inclination in response to the movement of the mass inside. Accelerometer provides temperature compensation and g-select options which allow selection among 4 different types of sensitivity. It can be directly interfaced to the ADC.

The ADXL335 is a small, thin. Low power, complete 3-axis accelerometer with signal conditional voltage outputs.

As some signs requires rotation of wrist, it is possible to detect rotation with the help of accelerometer.

Fig. 3.2

D. Arduino Nano (Atmega 328)

In this project we have used Arduino nano board.it is a microcontroller development board with microcontroller Atmega328.

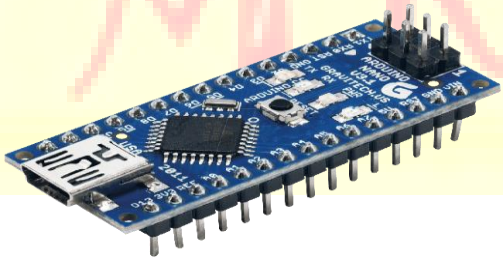

Fig. 3.3

It has 14 digital input/output pins .Out of which 6 can be used for PWM signals, 8 analog inputs, and a 16 MHz crystal oscillator, a USB connection, a power jack, an UART and a reset button.

E. Bluetooth

Bluetooth module used here is HC 05 which based on Bluetooth version 2.0. Bluetooth serial module is used for converting serial port to Bluetooth.Bluetooth is a wireless technology used for transfer or receive data over short distances from fixed and mobile devices, and building personal area networks (PANs).

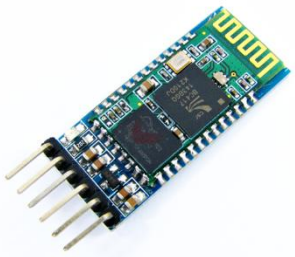

Fig.3.4

F. Smartphone

The signals transmitted by controller needs to be converted to speech. For these the smartphones is used. The three blocks of smartphone get used for this purpose: Bluetooth, text to speech convertor and speaker. By means of an android application the signals from the controller are received. This application receives the signals that is letters or words. Later these words are converted into speech using the text to speech convertor block of smartphone.

These words are then spoken by the smartphone using speaker. All these work is done by the android application.

G. Text To Speech Converter

Text to speech (TTS) is a type of speech synthesis application that is used to create a spoken sound version of the text in a smartphone document or application.

TTS can enable the reading of smartphone display information for the visually challenged person.

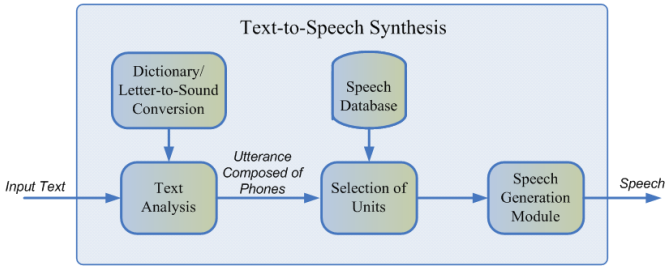

Fig.3.5

H. Schimatic

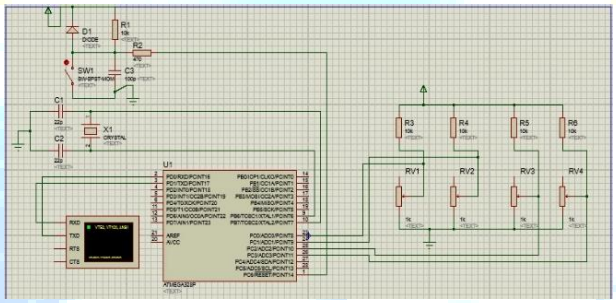

Fig.3.6

4. SOFTWARE DESIGN

Software design is divided into two sections.

1 Main function of the system designed in atmega328 microcontroller.

2 Android Application Development

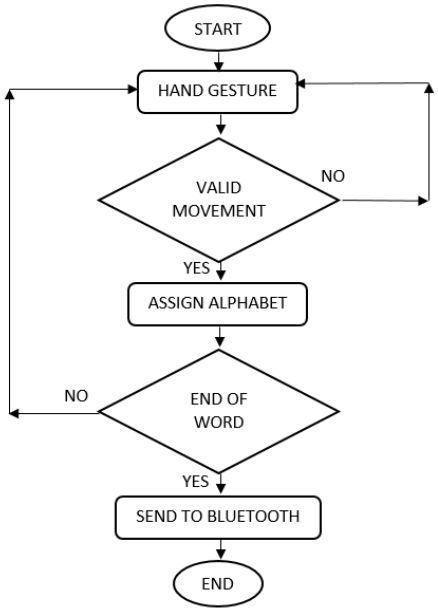

Fig 4.1

Above fig. shows the flow of this project. Basically in this project hand and finger movements are converted into electrical signal. For each valid movement particular alphabet or a complete word is assigned. After each alphabet, end of word is sensed. If there is an end of word then that word is send to Bluetooth.

5. ANDROID APPLICATION DEVELOPMENT

Android Application is interface between human and appliances. The Android application is designed using MIT AppInventor2.

App Inventor for Android is web application provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). It allows newbie to computer programming to create software applications for the Android operating system (OS).

6. RESULT

We made the prototype and conclude that it gives output with respect to hand gesture .Sign viz. All the best, YO, Awesome are successfully

Interpreted by the prototype

Fig. 6.1

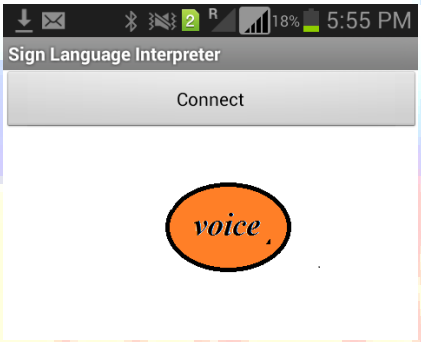

Fig. 6.2

7. APPLICATIONS AND ADVANTAGES

1. Device is portable.
2. Support letter to letter interpretation.
3. Data access directly from the machines in real time.
4. Use of android phone.

8. FUTURE WORK

As we are using hand gesture signs so response time required for converting signs into speech should be low. So in future faster speech recognition may be possible.

9. REFERENCES

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