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Sign Out Loud

Sudha.K, Abhishek Matotia, Ritika Jaiswal, Shakshi Bhardwaj, Ajay Kumar
Asst.Prof,Eee Bvcoe Delhi
Eee Bvcoe Delhi
Corresponding Author: Sudha.K

ABSTRACT- Generally dumb people use sign language for communication, but they find difficulty in communicating with others who don't understand sign language. This project aims to lower this barrier in communication. It is based on the need of developing an electronic device that can translate sign language into speech in order to make the communication take place between the mute communities with the general public possible. A Wireless data gloves is used which is normal cloth driving gloves fitted with flex sensors along the length of each finger and the thumb. Mute people can use the gloves to perform hand gesture and it will be converted into speech so that normal people can understand their expression.
Sign language is the language used by mute people and it is a communication skill that uses gestures instead of sound to convey meaning simultaneously combining hand shapes, orientations and movement of the hands, arms or body and facial expressions to express fluidly a speaker's thoughts. Signs are used to communicate words and sentences to the audience. A gesture in a sign language is a particular movement of the hands with a specific shape made out of them. A sign language usually provides sign for whole words. It can also provide signs for letters to perform words that don't have a corresponding sign in that sign language. In this project plate based glove. This glove can be made using Flex Sensor which plays the major role, Flex sensors are sensors that change in resistance depending on the amount of bend on the sensor.
The final implemented design is using copper small metal strips that are fixed on the five fingers of the glove. It is better to use a ground plate instead of individual metal strips is because the contact area for ground will be more facilitating easy identification of finger position. We are in the process of developing a prototype using this process to reduce the communication gap between differently able and normal people.
Keywords— engine, safety, helmet, alcohol sensor.

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I. INTRODUCTION

Communication means exchange of information, it becomes effective if all are using same media/language for conveying information. Generally mute people use sign language for communication in which gestures are used to convey meaning instead of sound. It is a non verbal form of language uses gestures to convey thoughts gesture is a particular movement of the hands with a specific shape made out of them. Generally dumb people use sign language for communication, but they find difficulty in communicating with others who don't understand sign language.

This project aims to lower this barrier in communication. It is based on the need of developing an electronic device that can translate sign language into speech in order to make the communication take place between the mute communities with the general public possible. A Wireless data gloves is used which is normal cloth driving gloves fitted with flex sensors along the length of each finger and the thumb. Mute people can use the gloves to perform hand gesture and it will be converted into speech so that normal people can understand their expression. Signs are used to communicate words and sentences to the audience. In this system flex sensor plays the major role, flex sensors are sensors in which resistance changes according to degree of bending. This microcontroller and sensor based data glove helps to lower the communication gap between deaf, dumb and normal person.

The development of the most popular devices for hand movement acquisition, glove-based systems, started about 30 years ago and continues to engage a growing number of researchers. This paper contains the map to develop a gesture vocalize. It gives the related works, explains the system architecture, characteristics and operation of each component in the system architecture. It provides the discussion, advantages, applications and future works, of this device. Gesture recognition has been a research area which received much attention from many research communities such as human computer interaction and image processing. The increase in human-machine

interactions in our daily lives has made user interface technology progressively more important. Physical gestures as intuitive expressions will greatly ease the interaction process and enable humans to more naturally command computers or machines.

Objective

- To design a low cost sign to speech converter for mute people.
- To design a model which helps mute people to communicate easily.
- To design a compact language translator also.

II. SYSTEM DEVELOPMENT

1. Block diagram

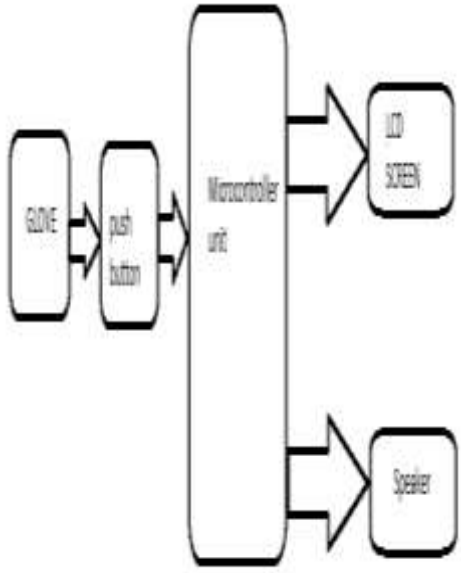

Fig01:block digram

The data glove is fitted with push button along the length of each finger and the thumb push button output a stream of data that varies with degree of bend.

- Push button when closed connects resistance to the circuit and gives low voltage value thus, output corresponds to 0
- On the other hand, if push button is open it disconnects the resistance and thus, thus output value corresponds to 1.
- A group of signs that represent words are collected as the data set for this system.
- The output data stream from the flex sensor is fed to arduino Microcontroller where it is processed and converted into digital form.
- The microcontroller will compare these readings to the look up table stored in internal program memory, whichever reading is closest to the look up table microcontroller will select that word.
- After this microcontroller will search the SD card for .wav file with a similar name.
- That text will be displayed on LCD and played out via speaker.

2. Hardware requirement

A. Push Button

A Pushbutton (also spelled push button) or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Different people use different terms for the "pushing" of the button, such as press, depress, mash, hit, and punch. The"push-button"hasbeenutilized in calculators, push-buttontelephones, kitchen appliances, and various other mechanical and electronic devices, home and commercial. In industrial and commercial applications, push buttons can be connected together by a mechanical linkage so that the act of pushing one button causes the other button to be released. In this way, a stop button can "force" a start button to be released. This method of linkage is used in simple manual operations in which the machine or process has no electrical circuits for control. To avoid the operator from pushing the wrong button in error, pushbuttons are often color-coded to associate them with their function. Commonly used colors are red for stopping the machine or process and green for starting the machine or process.

Fig02:push button

B. Microcontroller:

The MSP-EXP432P401R is the first 32-bit Launchpad from the legendary MSP430 family. It features an ARM Cortex-M4F core perfect for projects that require low power + performance such as battery operated applications. The MSP432P401R microcontroller supports low power applications that require increased CPU speed, memory, analog, and

32-bit performance. It includes on-board debug probe for programming, debugging, and energy measurements.

Energia MT is supported for MSP432. All pins of the MSP-EXP432P401R device are fanned out for easy access. These pins make it easy to plug in 20-pin and 40-pin Booster Packs that add additional functionality like wireless, capacitive touch and more.

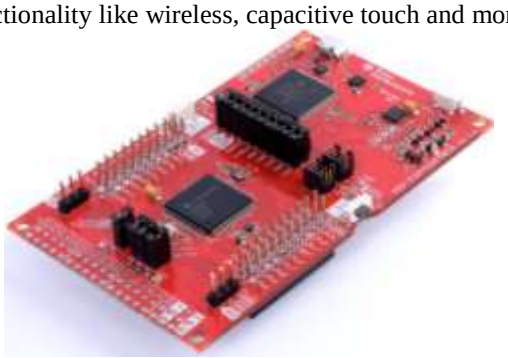

Fig03: msp-exp432p401r

C. LCD (liquid crystal display)

It is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. An LCD is made with either a passive matrix or an active matrix display display grid. The active matrix LCD is also known as a thin film transistor (TFT) display. The passive matrix LCD has a grid of conductors with pixels located at each intersection in the grid. A current is sent across two conductors on the grid to control the light for any pixel. An active matrix has a transistor located at each pixel intersection, requiring less current to control the luminance of a pixel. For this reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time. Some passive matrix LCD's have dual scanning, meaning that they scan the grid twice with current in the same time that it took for one scan in the original technology. However, active matrix is still a superior technology.

Fig 04: LCD Screen

D. Speaker

Speakers are one of the most common output device used by computer systems. Some speakers are designed to work specifically with computers, while others can be hooked up to any type of sound system. Regardless of their design, the purpose of the speakers is to produce audio output that can be heard by the listener. Speakers are transducers that convert electromagnetic waves into sound waves. The speakers receive audio input from a device such as a computer or an audio receiver. This input may be either in analog or digital form. Analog speakers simply amplify the analog electromagnetic waves into sound waves. Since sound waves are produced in analog form, digital speakers must first convert the digital input to an analog signal, then generate the sound waves. The sound produced by the speakers is defined by frequency and amplitude. The frequency determines how high or low the pitch of the sound is. For example, a soprano singer's voice produces high frequency sound waves, while a bass guitar or kick drum generate sounds in the low frequency range.

Fig 05: Speaker

3. Software requirement

Embedded C: It is the language in which program is written in arduino nano.

This software is used by the programmer to program the arduino board and control the output of our system using inputs.

III. WORKING

The function of our system can be further simplified using a simple block diagram fig 06. First of all, when a gesture is made using the fingers, the glove is having push buttons which are used to take input to the system. The sign is converted into data form using microcontroller. The data converted is then compared and if the sign is recognized, then, output is shown otherwise not.

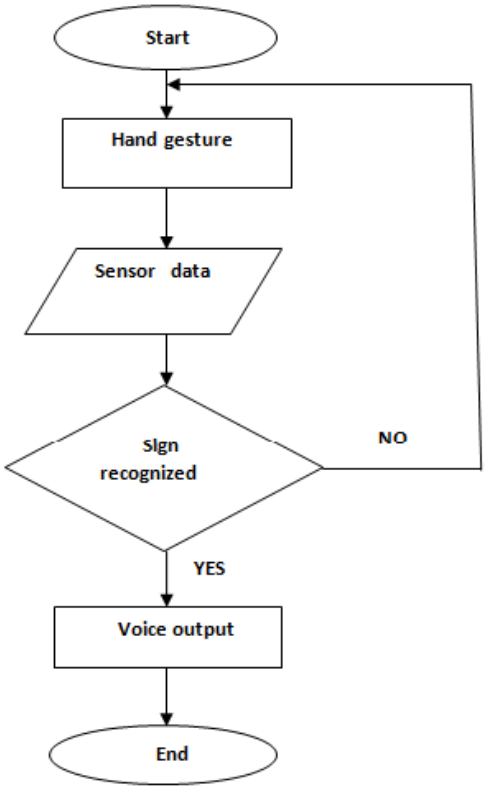

Fig 06: Simple Block Diagram

V. Frequency of sound

A. For different alphabets

- NOTE_A 100
- NOTE_B 200
- NOTE_C 300
- NOTE_D 400
- NOTE_E 500
- NOTE_F 600
- NOTE_G 700
- NOTE_H 800
- NOTE_I 900
- NOTE_J 1000
- NOTE_K 1200
- NOTE_L 1400
- NOTE_M 1600
- NOTE_N 1800
- NOTE_O 2000
- NOTE_P 2400
- NOTE_Q 2800
- NOTE_R 3000
- NOTE_S 3300
- NOTE_T 3500
- NOTE_U 3800
- NOTE_V 4000
- NOTE_W 4500
- NOTE_X 4800
- NOTE_Y 5000
- NOTE_Z 5500

B. For default words

- NOTE_None 600
- NOTE_Stop 1300
- NOTE_Hello 2200

IV. APPLICATIONS

- Gesture recognition and conversion.
- Translating device for mute people.
- It can be used for mobiles for SMS sending.
- Translation of sign language in many regional languages.

V. RESULT

A small, compact and low-cost sign to speech converter is designed without using any flex sensors. This model is small yet effective. The output is taken from speaker and from LCD also so, it can be used by deaf people as well. Since, push button is used in place of flex sensor so, cost is reduced many times and also, size is reduced. Input is taken from glove using push button and after processing of data output is taken from speaker and LCD screen as well. In this prototype system, the user forms a gesture and holds it for around 2 seconds to ensure proper recognition. Each gesture comprises of bending of all fingers in certain angles accordingly.

VI. CONCLUSION

The proposed method translates sign language to speech automatically and satisfies them by conveying thoughts on their own. The system overcomes the real time difficulties of mute people and improves their lifestyle. System efficiency is improved with the help of the ARDUINO UNO microcontroller. By implementing this system speaking dream of dumb people becomes true. Compared with existing system, it's possible to carry to any places. We have currently developed more reliable and flexible system. Which manufacture at low cost sign language translator for commercial purpose In future work of the proposed system supporting more no of sign and Different language mode.

Advantages

- Low cost sign to speech converter:
- Small and compact model:
- Easy to design and manufacture:
- It takes small power to operate

VII. FUTURE WORK

The device understands and identifies what a speech-impaired person is trying to say and then translates that into spoken language, converting it through robotic speech or text. For future work, this system can be expanded by using APR 9600 for better voice processing and amplification. Further, it can be integrated with the RF TF module for long distance communication. In case for voice translator, the

system can be fed with more than one language for translation to different languages.

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