

Smart Speaking Glove for Deaf and Dumb

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Abstract:- Smart hand gloves help physically disabled people to communicate with normal people. As Dump person cannot speak then this smart gloves helps him to convert this hand gesture into text or pre-recorded voice. This also help normal person to understand when he is trying to say and do accordingly this smart gloves has facility of home appliance control from which a physically impaired person become independent to live the main objective or the implemented paper is to develop a reliable easy to use light weight. Smart hand gloves system which can minimize the obstacles for disabled people.

1. INTRODUCTION

Sign language is the language used by deaf and 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 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 sign for letters to perform words that don't have corresponding sign in that sign language [1]. In this paper Flex Sensor Plays the major role, Flex sensors are sensors that change in resistance depending on the amount of bend on the sensor.

In this paper we propose a Sign Language Glove which will assist those people who are suffering for any kind of speech defect to communicate through gestures i.e. with the help of single handed sign language the user will make gestures of alphabets. The glove will record all the gestures made by the user and then it will translate these gestures into visual form as well as in audio form [2].

This paper uses ATmega328 microcontroller to control all the processes and flex sensors along with accelerometer sensors will track the movement of fingers as well as entire palm.

2. EXISTING SYSTEM

In existing system, there is no circuit is used to announce their thoughts of physically challenged peoples. And gesture based papers or circuits are not available in markets. In existing method is sign language, it couldn't understand all people for communication. There after a circuit is used to design predetermined postures are captured and matching the captured image with deaf & dump peoples sign language.

3. PROPOSED SYSTEM

In proposed system we have using flex sensor to converts sign language to voice as well as displays text in LCD display of controller [3]. A gesture based circuit is

designed to express the need of speechless patient & physically challenged people. The pre-determined gesture is stored in microcontroller to process what types of gesture is generating and expressed thought is announce as voice.

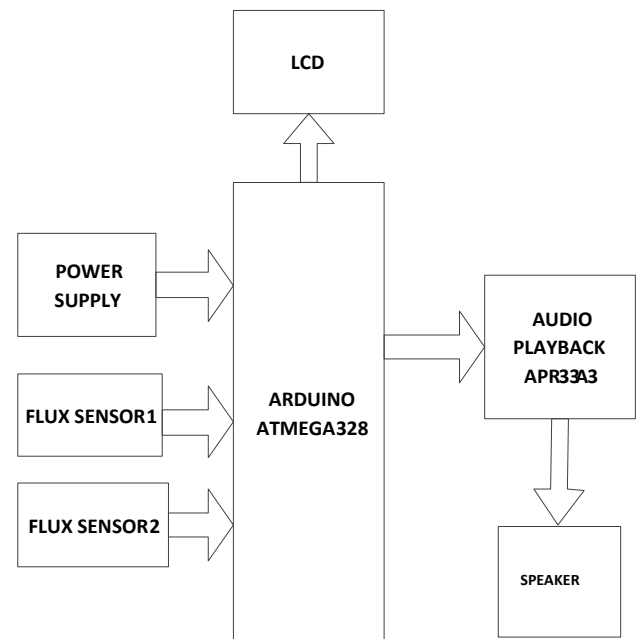


Fig.1 Block Diagram

4. BLOCK DIAGRAM DESCRIPTION

Arduino is an open-source computer hardware and software company. A microcontroller board contains on-board power supply, USB port to communicate with PC, and an Atmel328 microcontroller chip. A glove is used to fix the flex sensor to detect the sign language input to the microcontroller to process the gesture output as voice as well as displays in LCD [4]. The power supply section is in-built in the Arduino board in different power source input. First one is power adaptor input and second is 6 UNNI USB input and it will acts as a serial communication with computer system and program dumping port [5].

A 16x2 LCD display is used to displays the gesture patterns. The displaying message is also announced as a voice using APR33A3 voice board. The voice is pre-recorded in this voice board and playback when the particular gesture is detected corresponding voice is announced in speaker [6]. The normal electromagnet speaker is used to detect the voice from the input of voice board.

5. WORKING PRINCIPLE

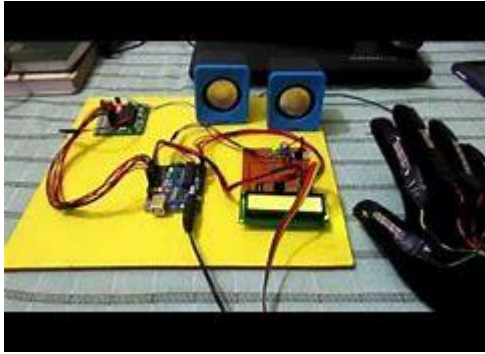


Fig.2 Experimental Setup

The work of this paper start from movement of hand gloves where the flex sensors are attached, and the value of sensor changes when its experiences the bending. The flex sensor is another type of potentiometer are attach to the fingers when we bend the figure the value of the sensor get changes. The changing value of the sensor is depend upon the resistance and applied angle of the bending when we bend the sensor at some particular angle we can see the value of the resistance is increase and accordingly the output get reduced [7]. On the other way we can say that it's like a inversely proportional when the resistance of the sensor is increase at that instant the value of output decrease and accordingly we can make paper by getting the advantage of this process.



Fig.3 Prototype of Experiment Setup

6. CIRCUITDIAGRAM DESCRIPTION

The Atmega328 Microcontroller is used in the arduino board and it contains on board power supply and USB port to communicate with PC. In this circuit diagram the LCD is connected in digital IO ports of 13 to 8 for displays what action is going or expressing and the 2 flex sensors are connected to analog inputs A0, A1. The flex sensor is fixed with glows which are wearing to disabilities of partial disabilities. The actions are pre-defined and it is already fixed in microcontroller. When the action is implemented by the people the voice play back will activate and announce the pre-recorded action sequence. We can change the action voice through voice recorder using microphone in the voice playback board. The sign language action determines the need of disabilities to express what they though and what they need or what necessary things they need. The action expression will change through microcontroller coding and we can add more expression action by increasing more flex sensors.

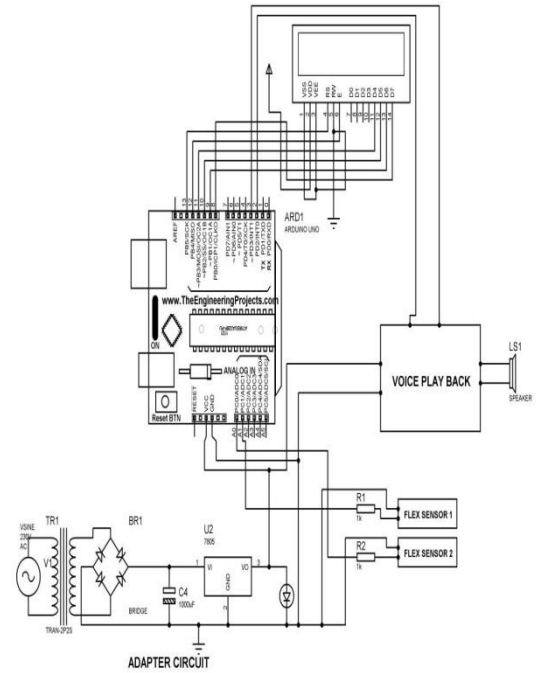


Fig.4 Circuit Diagram of Experiment

7. ARDUINO UNO

“Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists and anyone interested in creating interactive objects or environments”.

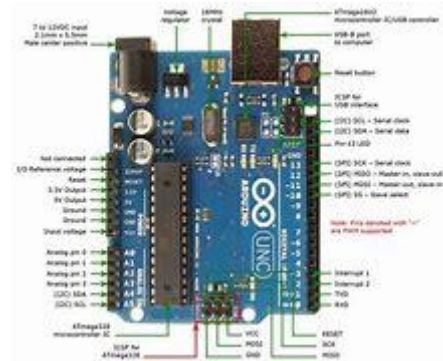


Fig.5 ARDUINO Board

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

7.1 FLEX SENSOR

A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and resistance of sensor element is

varied by bending the surface. Since the resistance is directly proportional to the amount of bend it is used as goniometer, and often called flexible potentiometer.

This flex sensor is a variable resistor like no other. The resistance of the flex sensor increases as the body of the component bends. Sensors like these were used in the Nintendo Power Glove. They can also be used as door sensors, robot whisker sensors, or a primary component in creating sentient stuffed animals.



Fig.6 Flex Sensor

7.2 ADVANTAGES

- A gesture based circuit is used for speechless patient & physically challenged people.
- Pre-determined gesture is used to express their thoughts and announced as voice.
- A flex sensor is used to detect the expression and processed by microcontroller.
- It requires fewer components so its cost is low
- Small in size; due to small size we can place its hardware on our hand easily
- Light weight
- Flexible to users
- Easy to operate; anyone can operate it easily
- Real time translation

7.3 DISADVANTAGES

- Accuracy and processing of system may be slow
- We may have some difficulty in operating the glove
- These gloves cannot capture the facial expression
- Many deaf people may not want to carry around the glove or may find that the computer processing is too slow or unnatural

7.4 APPLICATIONS

- ❖ Useful for Physically challenged peoples
- ❖ Conveying information related operations
- ❖ Provides easy communication between the speech impaired people and the natural people

- ❖ Used for disabilities
- ❖ Handicaps
- ❖ Panic switch helps in tracking the location of the user in emergency

8. CONCLUSION:

This system will be useful for physically challenged people and will tackle the gap between them and normal people. Since it is two way portable communication systems, it can be used at any time.

9. REFERENCES

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