SIGN LANGUAGE TRANSLATOR FOR DEAF AND DUMP PEOPLE

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Abstract

This paper establishes about deaf and dumb people others are only using the motion of their hands and expressions. We proposed a new technique called artificial speaking mouth for dumb people. It will be very helpful to them for conveying their thoughts to others. Some peoples are easily able to get the information from their motions. The remaining is to understand their way of conveying the message. In order to overcome the complexity, the artificial mouth is introduced for the dumb peoples. This system is based on the flex sensor. The flex sensor gives input to the Arduino with the bending of the fingers of the person hence changing the resistance will trigger the Arduino to give the relevant output as per the code. The speaker which is connected to the SD card Module will give the speech signal as output. In the last several years there has increased interest among the researchers in the field of sign language introduce means of interaction from human to human-computer interaction.

KEYWORDS: Atmega 328P, SD card module, Gesture, Flex Sensors, Speaker

1. INTRODUCTION

The communication between a dumb and hearing person poses to be an important disadvantage compared to communication between blind and ancient visual people. This creates an extremely little house for them with communication being associate degree elementary aspect of human life. A gesture in associate degree extremely language is also a certain movement of the hands with a particular kind created out of them. Facial expressions collectively count toward the gesture, at constant time. A posture, on the other hand, is also a static variety of the hand to purpose an emblem. Gesture recognition is classed into a pair of main categories: a vision-based mostly and detector based [7] [4]. The disadvantage of vision based totally techniques includes advanced algorithms for the process.

A training mode is gettable on the device, therefore, it fits every user and accuracy is inflated. The device will even be able to translate larger gestures that require single hand movement. Gesture recognition implies a method by that knowledge is collected from parts of the physical body (usually the hand) and processed to work out attributes like hand form, direction, and speed of gesture being performed. There are presently 2 sorts of the answer. Device-based most-ly techniques involve some variety of guides like a glove or glove-like framework fitted with position trackers and flex sensors to live the condition and position of the hand. Visual-based mostly techniques use camera chase technologies, whereby usually the user wears a glove with specific colors or markers indicating individual parts of the hands, especially the fingers. The cameras record the ever-changing image and position of the hand because the user signs and also the pictures are then processed to retrieve the hand form, position, and orientation.

1.1 COMPONENTS USED

- Flex sensor
- Arduino ATMEGA328P
- SD module
- Speaker

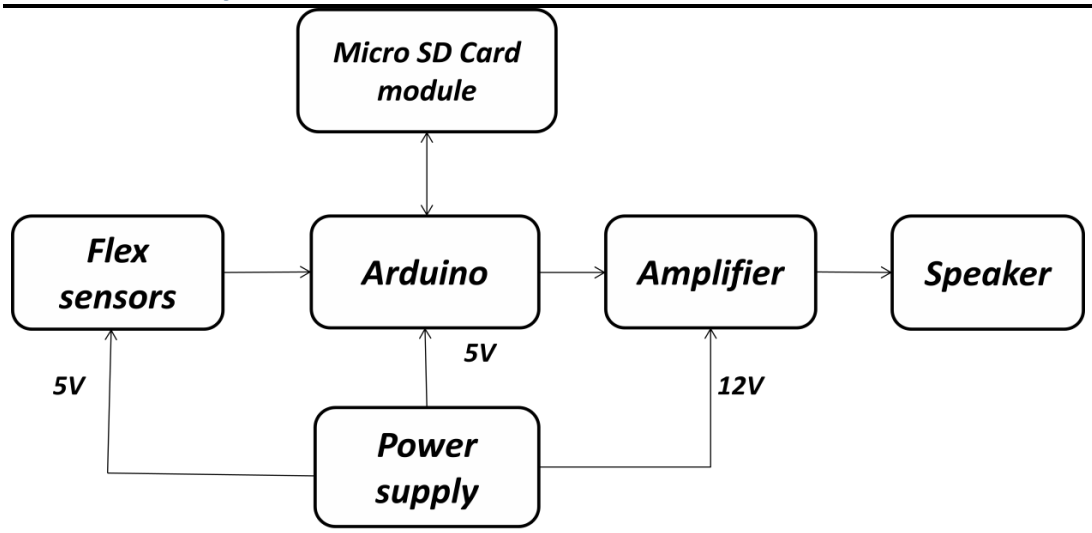

Fig.1 Block Diagram

1.2 FLEX SENSOR

A flex sensor is one of a kind of a variable resistor. It measures the amount of deflection or bend. It"s a sensor whose output changes when it is bent i.e. as the sensor is flexed, the resistance across the sensor increases and when it comes back to the normal position i.e it is straight, it has lesser resistance as compared to the resistance value when it was bent[1]. This change in resistance is one of the key features being used in our project. The flex sensor has two output wires and the resistance between these two wires varies when the sensor is bent.

Electrical Specifications:

- Flat Resistance: 25K Ohms
- Resistance Tolerance: +-30%
- Bend Resistance Range: 45K - 125K Ohms (Depending upon bend radius)
- Power Rating: Continuously 0.50 Watts and 1Watts

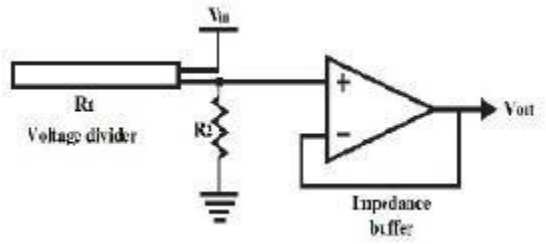

Fig. 2. Flex Sensor Internal Circuit

1.3 Equivalent circuit for flex sensor

Data glove consists of 2 detectors; flex sensors and measuring device sensor. The output of the measuring device sensors is detected by the lean detection module, whereas the output of the flex sensors and therefore the overall gesture of the hand square measure detected by the gesture detection module [12]. The gesture detection module provides associate degree 8-bit address for speech synthesis module; the 8-bit address is completely different for every gesture. Speech Synthesis module speaks the message severally to deal with received by it.

Flex sensors are resistive carbon parts. When bent, the device develops a resistance output correlative to the bend radius. The variation in resistance is [15] just about 10kΩ to 30kΩ. A global organization flexed device o has 10kΩ resistance and once bent the resistance will increase to 30kΩ at 90.The device incorporates within the device employing a potential divider network. The potential divider is employed to line the output voltage across 2 resistors connected non-parallel as shown in Figure 2. The electrical

device and flex form a potential divider that divides the input voltage by a quantitative relation determined by the variable and glued.

Bluetooth Module HC -05 – It is a master-slave module. In our glove, Bluetooth module is taking input from Arduino, then it is acting as a SLAVE unit and when Bluetooth module is giving input into the speaker or mobile phone, then it is acting as a MASTER unit.

1.4 ARDUINO UNO

We are using Arduino UNO for designing our glove which is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. On the idea of this comparison, the microcontroller involves acknowledging that that gesture will the hand build. Quickly the microcontroller is aware of that that knowledge is distributed by the bend detection module, and what [4] that means of this knowledge is. That means implies that the microcontroller is aware of if the hand is creating some outlined gesture and what ought to the system specification. The last step of the system is to convey voice to the every outlined gesture. For this purpose, a speech synthesizer is employed. Every word consists of some explicit phonemes and just in case of Speech synthesizer every allophone has some explicit addresses as shown in Figure 4. This address is to be sent to the Speech synthesizer at its address lines, to form the speaker, speak that individual.

A training mode is gettable on the device, therefore, it fits every user and accuracy is inflated. The device will even be able to translate larger gestures that require single hand movement. The edge images are further taken through the scan process and detection phase. The procedure of scan process includes i)marking of feature points ii) determination of heights of fingers in „UP‟ position iii) determination of angle between the line joining the feature point of „UP‟ fingers with the reference point and the horizontal line passing through the reference point and iv) determination number of instances „d ‟which is used to limit the number of searches among the 32 signs is considered. In the testing phase, the details as computed above are then compared with an available static images data which were obtained through a training phase with a set of 320 images.

II. WORKING OF A DEVICE

The user wears a glove that has flex sensors on it. Now when the user wants to say something, he/she makes gestures by bending the fingers. So, different combinations are made with the bending of the flex sensors creating different resistance combinations for the output pin of the Arduino to exhibit different entity. Arduino is connected to Bluetooth module HC - 05; which is further connected to Bluetooth speaker/mobile phone. The flex sensor will give input to Arduino with the bending of the fingers of the person resulting in the change of the angles of the flex sensor hence changing the resistance will trigger the Arduino to give the relevant output as per the code we have written i.e. which combination of resistances will give which entity as my output. Further, when I will have the output, the speaker which is connected to the Bluetooth module will give the speech signal as my output.

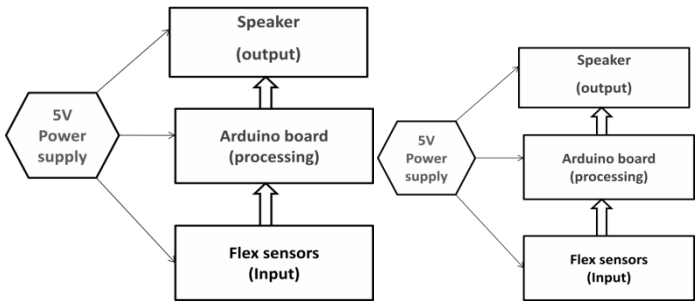

Fig. 4 Working Processing

2.1 FLOW CHART

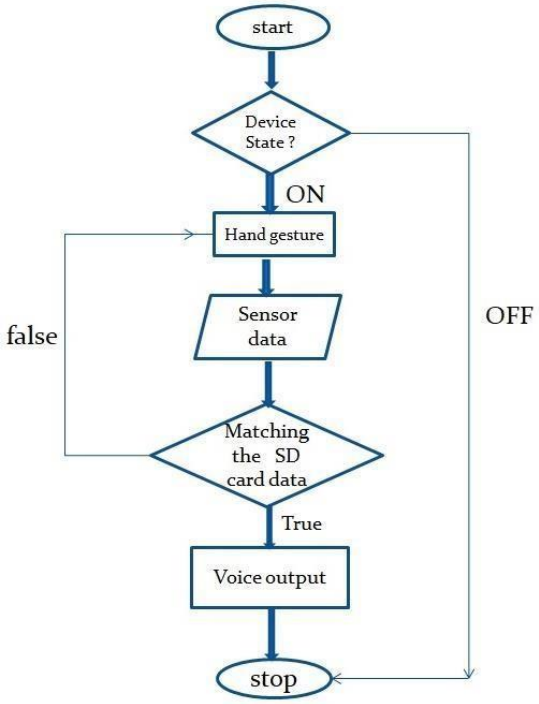

Fig 5 . Flowchart of the proposed system

3. ATMEGA 328P

Using this glove i.e. which can give a speech output from gestures input will help a lot of people communicating at public places which was a bit difficult earlier for differently abled people like if we say if they required to buy a coffee and for this they had to make the vendor understand via their gestures what they actually want; was a very difficult and time consuming task which will be easily sorted if that person is using this device while asking for a coffee now because, with the possession of this glove, his or her gestures will now. Arduino is connected to Bluetooth module HC - 05; which is further connected to Bluetooth speaker/mobile phone. The flex sensor will give input to Arduino with the bending of the fingers of the person resulting in the change of the angles of the flex sensor hence changing the resistance will trigger the Arduino to give the relevant output as per the code we have written i.e. which combination of resistances will give which entity as my output. Further, when I will have the output, the speaker which is connected to the Bluetooth module will give the speech signal as my output.

4. SYSTEM FUNCTIONALITY

When power is ON, the position and orientation of hand are obtained from the data glove that consists of five Flex sensors on fingers (Thumb, index, middle, ring, and pinky) and one accelerometer of PIC microcontroller LM386 Speaker Speak jet TTS256 Three outputs (X, Y, and Z positions). Tilting of the palm can be captured by the accelerometer where Flex sensors can measure the bend of the five fingers when making a sign.When the user performs a gesture/letter and press a button, signals coming from the sensors are amplified via a dedicated amplification circuit to each signal, and then captured by the microcontroller which converts the analog signals to digital values through its 8-channel ADC. These values are formatted into a simple state matrix: five values for the Flex sensors, one for each axis of the accelerometer. As a result, each letter in the ASL will have a specific digital level for the five fingers and the three axes of the accelerometer. Each level is represented by a value between 0 and 255; an interval of ± 3 levels should be taken into consideration in case the user could not keep his hand steady. This project aims to lower the communication gap between the mute community and additionally the standard world. The projected methodology interprets language into speech. The system overcomes the necessary time difficulties of dumb people and improves their manner. Compared with the existing system the projected arrangement is compact and is possible to carry to any places.

This system converts the language in an associate passing voice that's well explicable by blind and ancient people. The language interprets into some text kind displayed on the digital display screen, to facilitate the deaf people likewise. In world applications, this system is helpful for deaf and dumb of us those cannot communicate with the ancient person. The foremost characteristic of this project is that the gesture recognizer may be a standalone system, that's applied in common-place of living. It‟s in addition useful for speech impaired and paralyzed patient means those do not speak properly and in addition used for Intelligent Home Applications and industrial applications.

ADVANTAGES

- A compact device which is the easiest one to handle.
- So many languages are used including our mother tongue.
- Simplest programs we used in this project.

5. FUTURE SCOPE

In the future, this project gets a revolution among the deaf and dumb persons. They never feel about their disabilities what they are having. This project is convenient for those people, they also work as like a normal human they don‟t want to depend on others for help. In this WORK, we are storing the gestures as binary 0‟s and 1‟s in the database. By this, we can access it reliable and flexible to everyone.

6. CONCLUSION

Sign language may be a helpful gizmo to ease the communication between the deaf or mute community and additionally the standard people. This project aims to lower the communication gap between the mute community and additionally the standard world. The projected methodology interprets language into speech. The system overcomes the necessary time difficulties of dumb people and improves their manner. Compared with the existing system the projected arrangement is compact and is possible to carry to any places. This system converts the language in a voice that's well explicable by blind and ancient people. The language interprets into some text kind displayed on the digital display screen, to facilitate the deaf people likewise. In world applications, this system is helpful for deaf and dumb of us those cannot communicate with an ancient person. The foremost characteristic of this project is that the gesture recognizer may be a standalone system, that's applied in common-place of living. It‟s in addition useful for speech impaired and paralyzed patient means those do not speak properly and in addition used for Intelligent Home Applications and industrial applications.

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