

IOT BASED PORTABLE HAND GESTURE RECOGNITION SYSTEM

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Abstract – In our country around 5% of peoples has difficulty in speaking or cannot speak. They communicate with others only using the motion of their hands and expressions. Some peoples are easily able to get the information from their motions. The remaining is not able to understand their way of conveying the message. To overcome this problem, The proposed system introduces a device called as artificial speaking mouth for dumb people. It will be very helpful to them for conveying their thoughts to others. This system is based on the motion sensor. According to dumb people, for every motion they have a meaning. That message is kept in a database. Likewise all templates are kept in the database. In the real time the template database is fed into a microcontroller and the motion sensor is fixed in their hand. For every action the motion sensors get accelerated and give the signal to the microcontroller. The microcontroller matches the motion with the database and produces the speech signal. The output of the system is using the speaker. By properly updating the database the dumb will speak like a normal person using the artificial mouth.

Key Words: Gesture, Flex sensor, Arduino, Bluetooth model, Speaker/mobile phone

1. INTRODUCTION

Deaf and dumb people communicates using visual gestures and signs, this system is known as sign language. There are different categories in the sign language such as Indian Sign Language, American Sign Language, British Sign Language and etc... But none of the sign languages are universal or international. A person should know the sign language to understand the language; this becomes complicated when a person who has inability to speak or hear wants to convey something to a person, since most of them are not familiar with the sign language. A Dumb communication translator is also a tool that interprets the hand gestures to sensibility speech. A gestures include movement of hands, face or other parts of body. Gesture recognition is classified into two main categories: vision based and detector based. The disadvantage of vision based techniques includes advanced algorithms for process. Another challenge in image and video method includes varied lighting conditions, backgrounds and other natural conditions. The detector based technique provides larger quality. The aim of this project is to introduce efficiently translate language gestures to every text and sensibility voice. The interpreter makes use of a glove. This glove consists of 2 detectors; flex sensors and measuring device sensor. The output of the measuring device sensors and overall gesture is detected by the

detection module(Arduino), the Arduino decodes the detected gesture and compares it with the database. The decoded instruction is transmitted to the smartphone via Bluetooth module. The smartphone uses a app which converts text message to a voice output.

2. METHODOLOGY

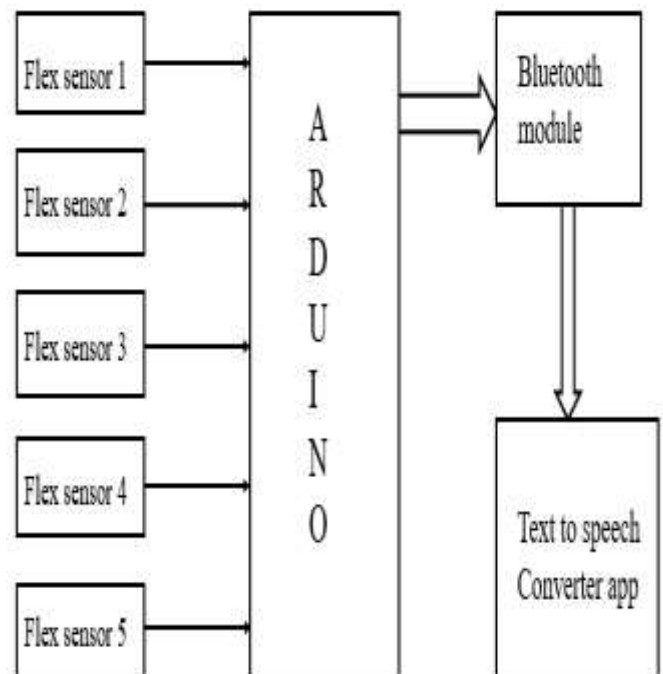


Fig 1: Block diagram

2.1 Components used

Flex sensors: Flex means 'bend' or 'curve'. Sensor refers to a transducer which converts physical energy into electrical energy. Flex sensor is a resistive sensor which changes its resistance as per the change in bend or curvature of it into analog voltage. By increasing the curvature from 0° to 90°, resistance varies accordingly. The sensors are usually connected to the microcontroller via three pin connectors namely ground, live, and output. The device can turn on the sensor from off mode, enabling it to power down when not in use and greatly decreasing power consumption.

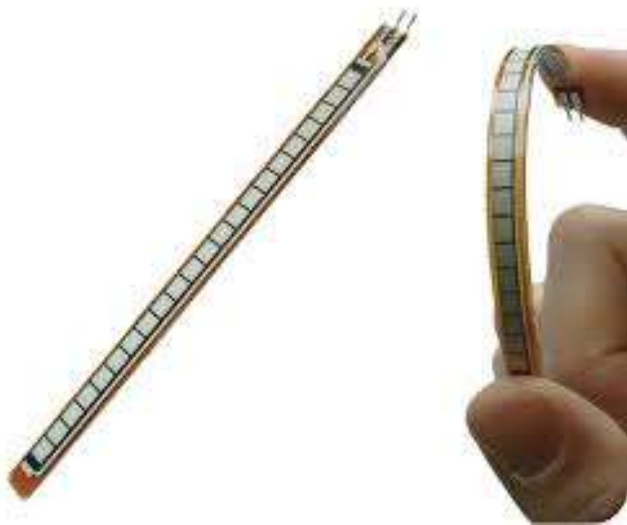


Fig2: Flex Sensor

When bending angle of flex sensor increases, resistance also increases. And when resistance increases, the output voltage from flex sensor will decrease.

Bluetooth module: A Bluetooth technology is a high speed low powered wireless technology link that is designed to connect phones or other portable equipment together. It is a specification (IEEE 802.15.1) for the use of low power radio communications to link phones, computers and other network devices over short distance without wires. Wireless signals transmitted with Bluetooth cover short distances, typically up to 30 feet (10 meters).

Bluetooth Network consists of a Personal Area Network or a piconet which contains a minimum of 2 to maximum of 8 bluetooth peer devices-Usually a single master and upto 7 slaves.

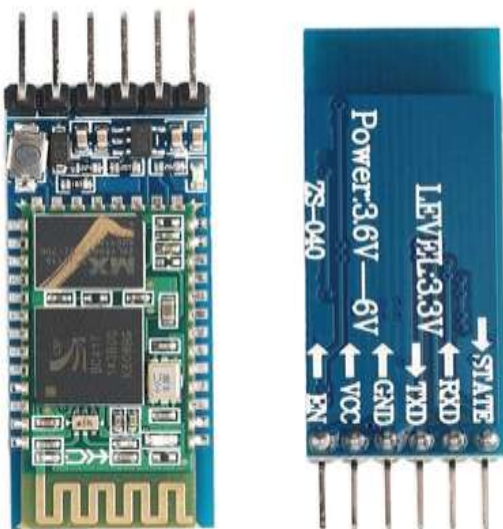


Fig3: Bluetooth Module

A master is the device which initiates communication with other devices. The master device governs the communications link and traffic between itself and the slave devices associated with it. A slave device is the device that responds to the master device. Slave devices are required to synchronize their transmit/receive timing with that of the masters.

Arduino: Arduino boards designs use a variety of microprocessors and controllers The boards are equipped with sets of digital and analog Input / Output (I/O) pins that may be interface to various expansion boards or breadboards (shield) and other circuits. ARDUINO is an open source computer hardware and software company , project and user community that designs and manufactures singleboard microcontrollers and microcontroller kits for building a digital devices and interactive objects that can sense and control objects in the physical and digital world. Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by



Fig4: Arduino board

Hand, and even the pre-assembled Arduino modules cost less than \$50. The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.

2.2 System Functionality

When power is ON, the position and orientation of hand is obtained from the data glove that consists of five Flex sensors on fingers (Thumb, index, middle, ring, and pinky), bluetooth module and arduino. Flex sensors can measure the bend of the five fingers when making a sign. When the user performs a gesture, signals coming from the sensors are captured by the Arduino. It decodes the detected gesture and compares it with the database. The decoded instruction is transmitted to the smartphone via Bluetooth module. The smartphone uses a app which converts text message to a voice output.

2.3 System flow

This proposed system is represented by following flowchart. This flowchart explains the working of entire system in pictorial way. Initially when system starts, The sensor senses the hand gestures and sends sensor data to Arduino. If the Arduino successfully recognize the sign with the help of program then at the receiving side will get voice output. If arduino fails to recognize the sign then it wait until delay and after delay buzzer turns on and system again starts from initial stage.

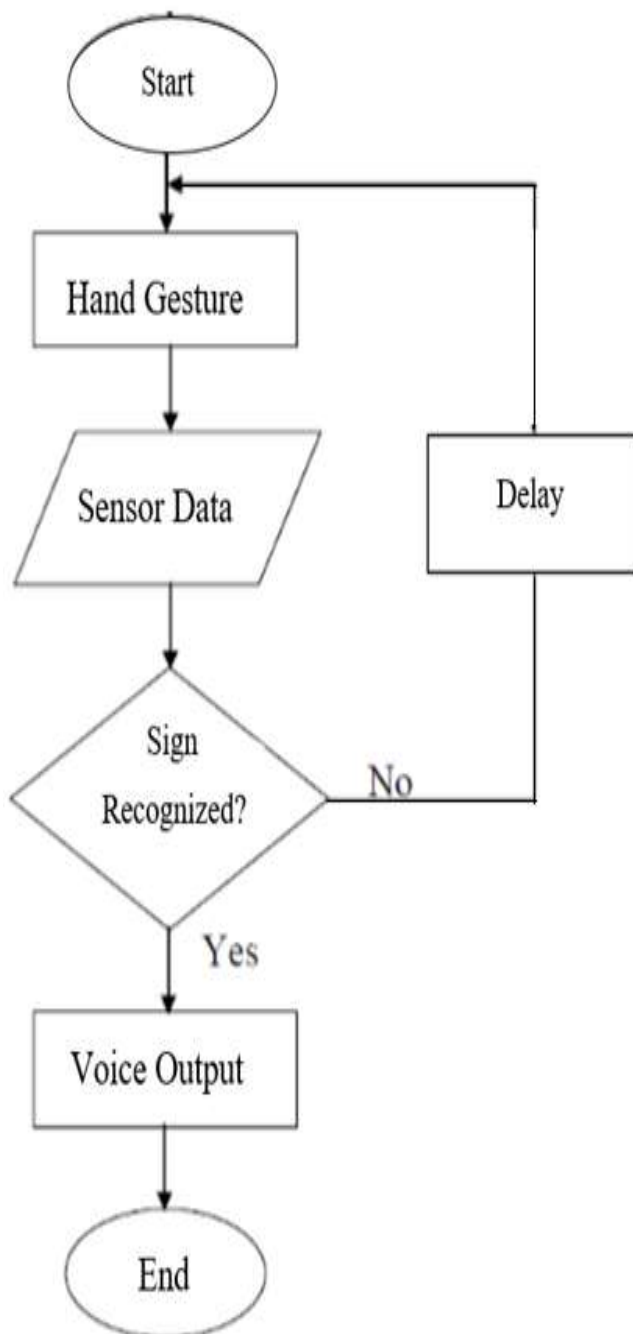


Fig5: Flowchart

3. CONCLUSION

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. Compared with existing system the projected arrangement is compact and is possible to carry to any places i.e. portable. This system converts the language in associate voice that's well understand by blind and ancient people. In world applications, this system is helpful for deaf and dumb of us those cannot communicate with ancient person. It's in addition useful for speech impaired and paralysed patient means those do not speak properly and in addition used for Intelligent Home Applications and industrial applications.

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