



# IOT HAND GLOVE SIGN GESTURE USING FLEX SENSORS

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## ABSTRACT:

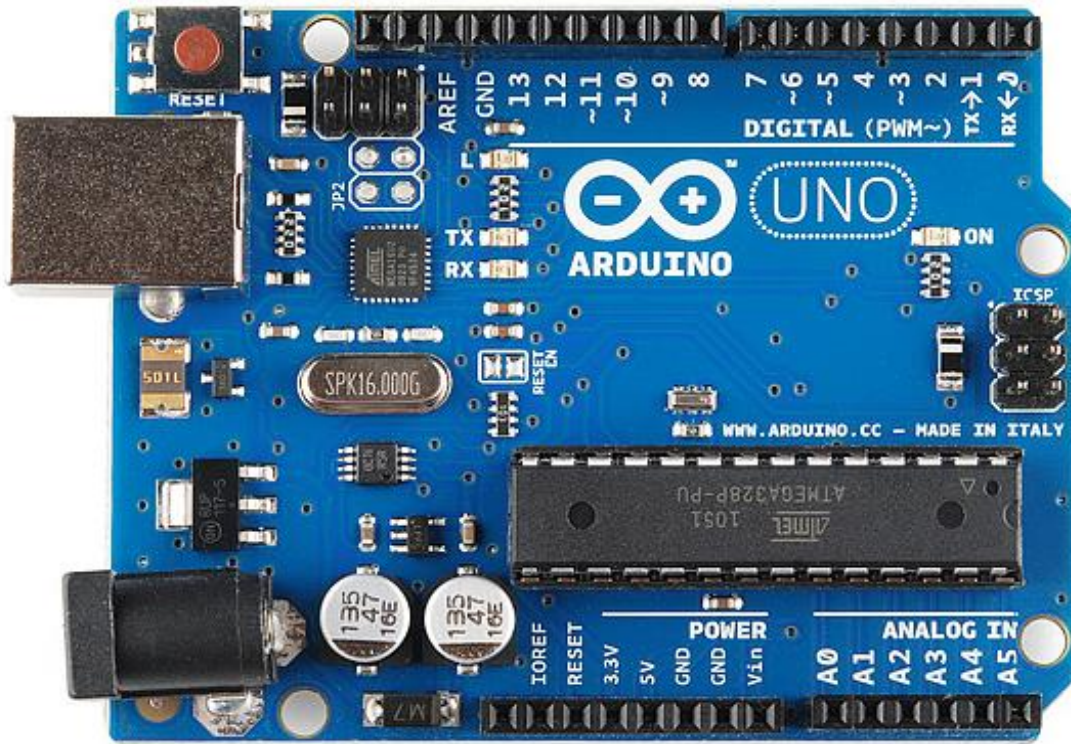
In this paper we represent smart glove for deaf and dumb patient. About nine billion people in the world are deaf and dumb. The communication between a deaf normal visual people. This creates a very little room for them with communication being a fundamental aspect of human life. The blind people can talk freely by means of normal language whereas the deaf-dumb have their own manual-visual language known as sign language. Sign language is a non-verbal form of intercourse which is found amongst deaf communities in world. The languages do not have a common origin and hence difficult to interpret. The project aims to facilitate people by means of a glove based communication interpreter system. The glove is internally equipped with five flex sensors. For each specific gesture, the flex sensor produces a proportional change in version of the microcontroller and the Thinkspeak software. It compares the input signal with predefined results stored in memory. According to that required sound is produced which is stored in memory with the help of speaker. In such a way it is easy for deaf and dumb to communicate with normal people.

## INTRODUCTION:

General, deaf people have difficulty in communicating with others who don't understand sign language. Even those who do speak aloud typically have a "deaf voice" of which they are self-conscious and that can make them reticent. The Hand Talk glove is a normal, cloth driving glove fitted with flex sensors along the length of each finger and the thumb. The sensors output a stream of data that varies with degree of bend. The output from the sensor is analog values it is converted to digital and processed by using microcontroller and then it will be transmitted through wireless communication then it will be received in the receiver section and processed using responds in the voice using speaker. 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. They convert the change in bend to electrical resistance - the more the bend, the more the resistance value. They are usually in the form of a thin strip from 1"-5" long that vary in resistance from approximately 10 to 50 kilo ohms. They are often used in gloves to sense finger movement. When the substrate is bent the sensor produces a resistance output relative to the bend radius

## What is Arduino

Arduino is an open source electronics platform based on easy to use hardware and software. Arduino boards are used to read inputs-lights on the sensor, a figure on a button or a message and turns it into a output like activating a motor, turning on an LED. We can command the board by sending a set of instructions to the microcontroller on the board. We use arduino programming language, and arduino software based processing.



Arduino has been used in thousands of projects and applications. The arduino software is easy to use and easy to understand and useful for the advanced users. It works on Mac, Windows and Linux. Arduino is one of the key tool to learn new things .There are many other microcontrollers available for physical computing it also simplifies the process of working with the microcontroller and it offers advantages for teachers, students, and other systems. Arduino is also used for building electronics projects and it consists of both physical programmable circuit board and software also. The arduino board is more advanced board compared to the other electronic boards. Arduino does not need a separate piece of hardware in order to load a new code onto the board we can simply use a USB cable. The arguing IDE uses a simplest version of c++ which makes the program easy to read and right.

### Introduction of ESP8266

- ESP8266 is a low cost Wi-Fi module that supports both TCP/IP and microcontrollers. It works with a 3V with maximum voltage range around 3.6V often than not it also comes with the name ESP8266 Wireless Transceiver.
- This is the most stabled module with a high processing speed and storage capacity. This module can be interfaced with the sensors and developed with to make it compatible with other devices.

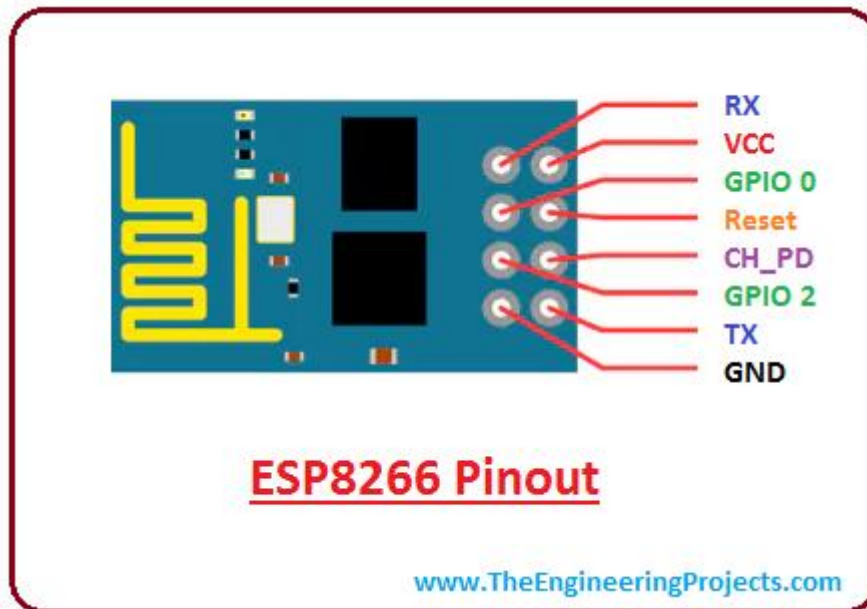
- This is a compact chip, it covers a ver4y small place and everything is laid out on PCB board and no external device is required to run this device. It is suitable to work under all different conditions.
- It doesn't support 5-3v logic shifting.
- It is also called as system on chip and comes with a 32 bit microcontroller, antenna switches ,RF balun, power amplification, power management module and filter capability.
- It incorporates 64 Ki boot ROM,80 Ki user data RAM and 32 Ki instruction RAM.
- It supports APSD which makes it a good choice for VoIP applications and Bluetooth interfacing.
- The power supply can be given to the device with the help of PC port using USB to serial adaptor.



### ESP8266 Pinot

ESP8266 comes with a eight pins named:

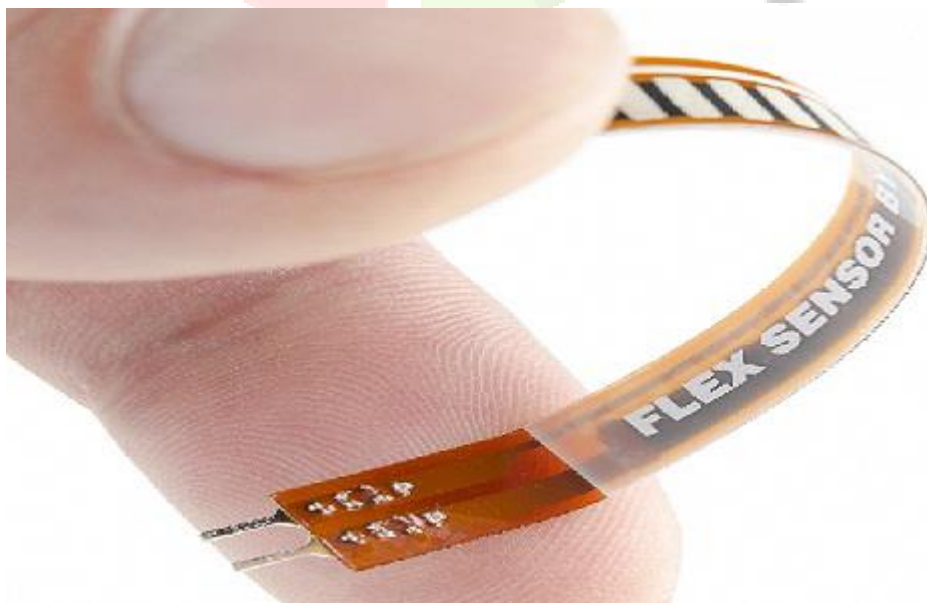
- RX
- VCC
- GPIO 0 General-purpose I/O No.0
- RST, Reset
- CH\_PD(Chip power-down)
- GPIO 2 General-purpose I/O No.2
- TX
- GND



- TX is used for data transmission and RX is used for receiving data.
- VCC and GND are the voltage source and ground
- RX and TX are used for communication

## FLEX SENSORS

Flex sensor is a type of sensor which is used to measure the amount of deflection or bending. This sensor is made up of material like plastic and carbon. The carbon is placed on the plastic strip as this strip is turned aside then the resistance of the sensor changes. This sensor is also called as bend sensor.

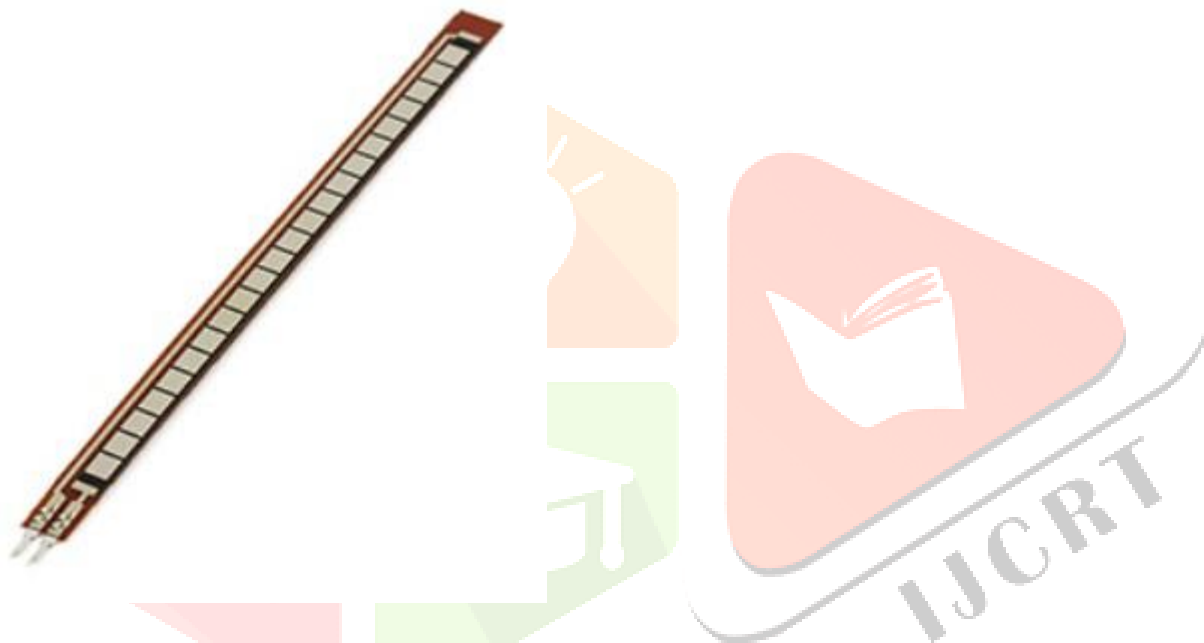


## TYPES OF FLEX SENSORS

Flex sensors are divided into two types based on its size namely 2.2-inch and 4.5-inch. Mostly 2.2-inch sensors are used in various applications like computer interface, servo motor, security system, music interface, intensity control.

## PIN CONFIGURATION

This is a two-terminal device and namely P1 and p2 are the terminals. It doesn't contain any diode or capacitor it means there is no positive and negative terminals in this sensor. It requires voltage range of 3.3V-5V DC which can be gained from any type of interfacing.



- Pin P1 is connected to the positive terminal of the power source.
- Pin P2 is connected to the GND pin of the power source.

## WORKING PRINCIPLE

This works on the bending strip principle it means whenever the strip is twisted then its resistance changes. It works similar to the variable resistance. When this sensor is twisted 45° then the resistance is dissimilar. When the sensor is twisted to 90° then the resistance is dissimilar. These are the flex sensors bending conditions. The resistance will be normal in the first case, the resistance will be double as compared to the first case, and the resistance will be four times when compared with first case so the resistance will be increased.

## SPECIFICATIONS AND FEATURES

- Operating voltage of the sensors ranges from 0V to 5V
- It functions on low voltage.
- Power rating is 1 Watt
- Operating temperature ranges from -45c to +80c
- Flat resistance is 25K
- The tolerance of resistance will be 30%

## APPLICATIONS

- Medical Instruments
- Robotics
- Physical Therapy
- Virtual Motion (gaming)
- Musical Instruments

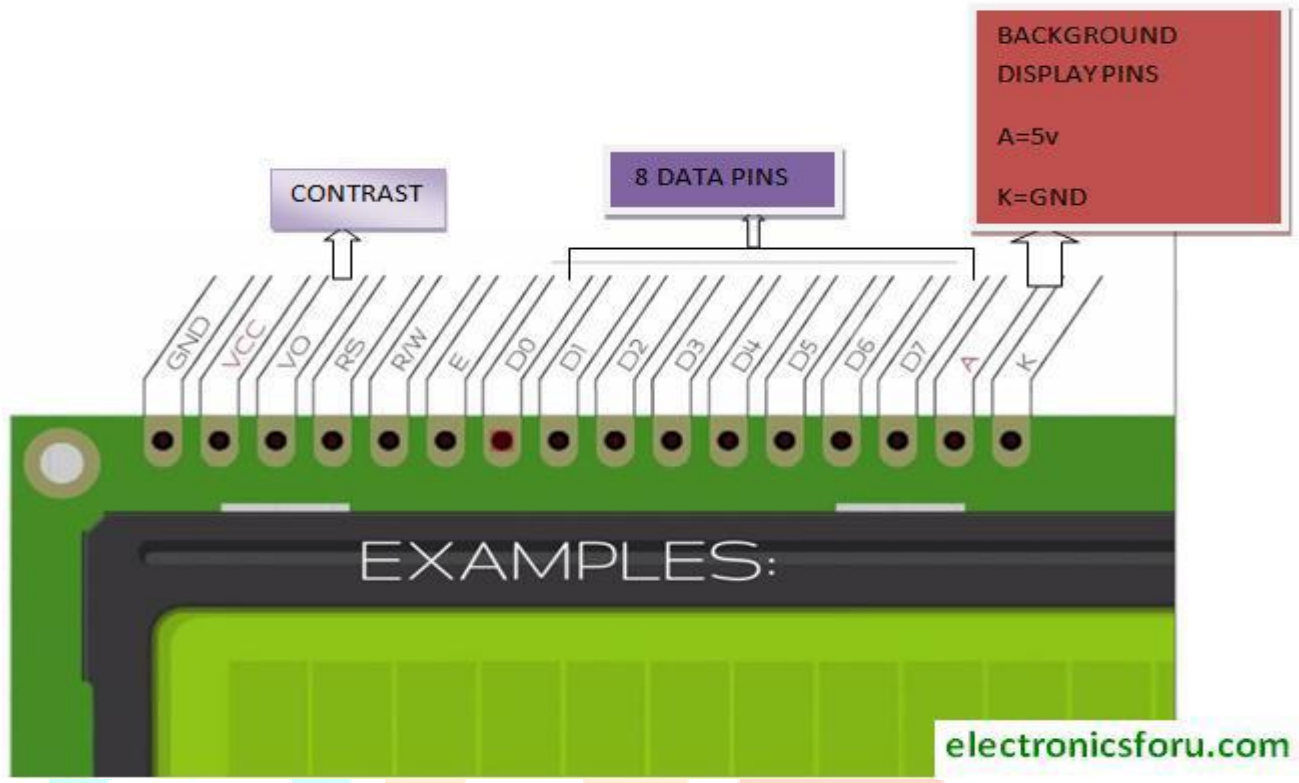
### 16\*2 LCD

LCD-Liquid crystal display

Computers, calculators, televisions, mobile phones, digital watches uses some kind of display to display things on screen. An LCD is an electronic module which uses liquid crystal to produce a visible images. The 16\*2 translates O a display 16 characters per line in 2 such lines.



### LCD pin description



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Pin No.	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V	Vcc
3	Contrast adjustment; The output of the potentiometer is connected to this pin. Rotate the potentiometer knob forward and backwards to adjust the LCD contrast.	Vo / VEE
4	Selects command register	RS (Register Select )
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight VCC (5V)	Led+
16	Backlight Ground (0V)	Led-

## RESULT ANALYSIS

This paper is a useful tool for speech impaired and partially paralyzed patients which fill the communication gap between patients, doctors and relatives.

1. As it is portable, cost effective.
2. This paper will give dumb a voice to speak for their needs and to express their gestures
3. Hence this paper is an attempt to make it easy to understand the actions of the dumb people by getting the output in the form of text and voice.
4. The text is also forwarded as SMS via Bluetooth or modem for better convenience and for security purposes.

## CONCLUSION

The main aim of this paper is to reduce the communication gap between deaf or mute community and normal people. This system is proposed to improve lifestyle of deaf and dumb people. This also favorable for degrading the communication difference between the blind person and the dumb person. All over the paper is effective and efficient because it is using IOT.

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