

# Hand Gesture Recognition and Voice Conversion System for Dumb People

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**Abstract**— In our country there are 2.78% people are speech disable[dumb]. Speech is a necessary element for every human being people suffering from speech disability are apprehensive while communicate with normal people. This project proposes development of vocalize to communicate speech disable person to normal person. Technologies that employ recognition of gesture are broadly classified into two types: vision based and sensor based, the drawbacks of vision based solution level is the level of complexity of algorithm implemented in capturing a movement. MEMS (Micro-Electro mechanical system) Sensor is a sensing Technologies consisting of electronic parts of size of order of microns which are capable of movement of with or without external force .MEMS sensor can easily place on human body parts like hands .bending of fingers possess significant role in performing gestures by hands flex sensor is used in this project as an example of bend sensor. Three-dimensional accelerometer sensor has been created for measuring involuntary human hand motion[2].

**Key words:** Raspberry Pie, Flex Sensor, Accelerometer Sensor, LCD Display, Speaker

## I. INTRODUCTION

The need of gesture technology is most for speech disabled people .According to 2011 Indian census 26,814,994 people disabled amongst which 1,998,692 are speech disabled. The main aim of proposed project is to develop cost effective system which can give voice to dumb people. The main aim of this project to provide the smooth communication between dumb people and the normal preson using vocalizer. Gesture recognition is classed into a pair of main categories: vision based mostly} and detector based[5].

This project algorithm is very easy to understand when dumb people communicate with normal people. Our project purpose is to providing good communication to the dumb people.

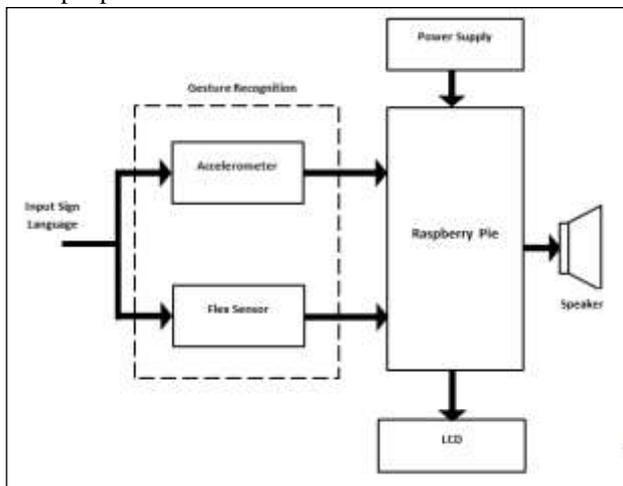


Fig. 1: Block diagram of Proposed System

In this project, we are giving input as a own sign language which is given to raspberry pi through accelerometer and flex sensor. Accelerometer works on the basis of movement of gloves and flex sensor works on movement of fingers. Raspberry pie converts signal to desired output. The output is given to the speaker, as well as lcd.

## II. RASPBERRY PIE

The microcontroller is used for processing and instructing .In this system we use Raspberry Pi microcontroller. It is a very popular microcontroller chip produced by Atmel. It is an 64-bit microcontroller that has 4 USB ports, 1 GB RAM, Full HDMI Port, Ethernet Port, Combined 3.5mm audio jack and composite video, Camera interface(CSI), Display interface(DSI) and Micro SD card slot. The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside of its target market for uses such as robotics.

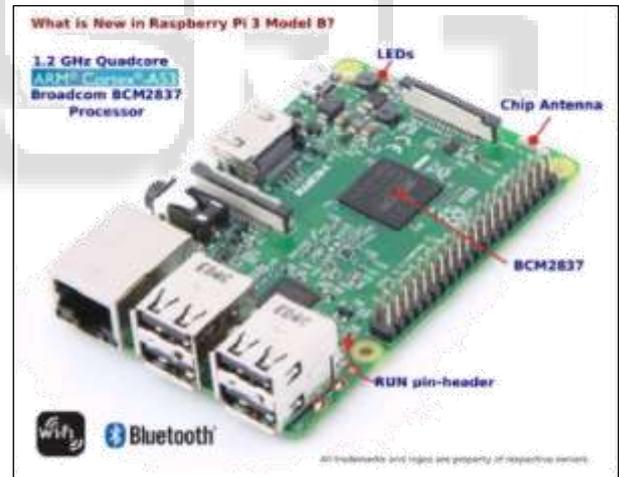


Fig. 2: Raspberry pie

## III. FLEX SENSOR

Flex sensors are passive resistive devices that can be used to detect bending or flexing. The Flex Sensor patented technology is based on resistive carbon elements. As a variable printed resistor, the Flex Sensor achieves great form-factor on a thin flexible substrate. When the substrate is bent, the sensor produces a resistance output correlated to the bend radius the smaller the radius, the higher the resistance value. The flex sensor will be flat postion vaule of the resistance is .nominal resistance. They can be made unidirectional or bidirectional.in this project we can use unidirectional sensor. The vaule of flex sensor can be increase by bending sensor at 45degree.the flex sensor will be bend 90degree resistance vaule will be increase further.

#### IV. ACCELEROMETER

An accelerometer is an electromechanical device that will measure acceleration forces[5]. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic caused by moving or vibrating the accelerometer. Accelerometers have multiple applications in industry and science. Highly sensitive accelerometers are components of inertial navigation systems for aircraft and missiles. Accelerometers are used to detect and monitor vibration in rotating machinery. It uses Newtons second law of motion,  $F=Ma$ , by measuring the force from acceleration on an object whose mass is known. To measure force, method used in accelerometer sensor is measuring the displacement of mass when it is suspended by springs. Forces acting on the proof mass include the force from external acceleration, the force from damping (proportional to velocity), and the restorative force of the spring (proportional to position).

#### V. LCD DISPLAY

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

This LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command

Instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The d a 16x2 LCD means it can display 16 characters per line

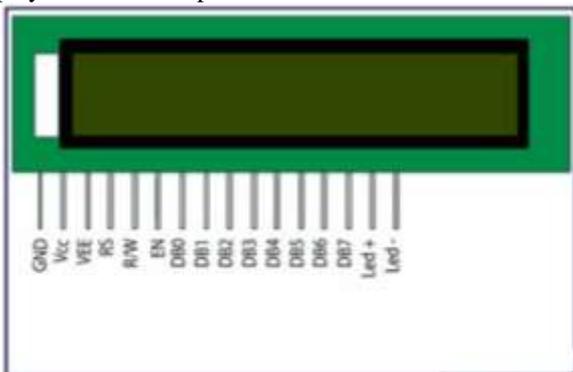


Fig. 3: LCD display

#### VI. SOUND

Grimm Audio's LS1 is an unusual loudspeaker. Its wide but shallow cabinet is the direct opposite of nearly all contemporary loudspeakers and the DSP filter is mainly IIR based in spite of the availability of cheap DSP. Why? This white paper argues that all choices derive from basic acoustics, signal theory and psychoacoustics



Fig. 4: Sound

#### VII. RESULT



Fig. 5: RESULT

#### VIII. CONCLUSION

Sign language is a useful tool to ease the communication between the deaf person and normal person. The system aims to lower the communication gap between deaf people and normal world, since it facilitates two way communications. The projected methodology interprets language into speech. The system overcomes the necessary time difficulties of dumb people and improves their manner. This system converts the language in associate passing voice that's well explicable by deaf people. With this project the deaf mute people can use the gloves to perform sign language and it will be converted into speech; and the speech of normal person is converted into text and corresponding hand gesture, so the communication between them can take place easily. Testing a sensor capable of measuring the three-dimensional acceleration of involuntary human hand motion[2].

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