

# Speaking System for Mute People using Hand Gestures

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**Abstract** – Mute people can't speak and normal people don't know the sign language which is used for intercommunication between mute people. This system will be useful to solve this problem. Gestures are in line with people's habits of communication, so many researchers have done a lot of work in gesture recognition based on vision based approach, hand gestures also known as sign language will be converted into voice for mute people. Gyroscope is used for hand gesture recognition in this system. Using gyroscope to get the hand moment, and then process those gestures using a ARDUINO MEGA 2560, then displaying that gesture on LCD and At last, the template matching is used to realize the hand gesture recognition. The recognized gesture is processed by the hardware and converted to voice.

**Keywords** – Internet of Things; Device Management; Platforms; Sensors.

## I. INTRODUCTION

In real life we come across people who are dumb and when they try to communicate we are unable to understand their Language.

We thought of something that would bridge the gap. Here in this project we have prototype model using hand gestures as input gives voice as output.

## II. PROBLEM STATEMENT

It is very difficult for mute people to convey their message to regular people. Since regular people are not trained on hand sign language, the communication becomes very difficult. In emergency or other times when a mute person travelling or among new people communication with nearby people or conveying a message becomes very difficult. Here we propose a smart speaking system that helps mute people in conveying their message to regular people using hand motions and gestures.

The system makes use of a hand motion reading system equipped with motion and flex sensors along with a speaker unit. This system is powered by a battery powered circuitry to run it. A raspberry pi is used for processing the data and operating the system.

The system consists of around 10 stored messages like "need help", "where is the toilet/washroom" and so on that help mute people convey basic messages. The system reads persons hand motions for different variations of hand movement.

It also consists of a trigger sensor in order to in date that the person wishes to activate the system and speak

something. This ensures the system does not speak when the person is just involuntarily making hand motions. The raspberry pi processor constantly receives input sensor values and then processes it. Now it searches for matching messages for the set of sensor values.

Once it is found in memory these messages is retrieved and is spoken out using text to speech processing through the interfaced speaker. Thus we have a fully functional smart speaking system to help mute people communicate with regular people using a simple wearable system.

## III. PROPOSED SYSTEM

For implementation of this system we require different hand gestures and web camera is required for capturing the gestures. The person would be placing different gestures in front of the camera. When the user makes the gesture of a symbol while implementing system there are different modules involve in the system.

## IV. SOLUTION DESCRIPTION

Using hand gesture angle is measured and then through arduino the action is displayed as well as through speaker voice is delivered for matching messages for the set of sensor values.

## V. GYROSCOPE:

Gyroscope sensor is a device that can measure and maintain the orientation and angular velocity of an object. These are more advanced than accelerometers. These can measure the tilt and lateral orientation of the object whereas accelerometer can only measure the linear motion.



Fig .1 .Gyroscope.

### 1. Speaker:



Fig. 2 .Speaker.

### 2. LCD:

A 16\*2 LCD is used to display data



Fig. 3. LCD.

### 3. Raspberry-pi:

The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting an updated 64-bit quad core processor running at 1.4GHz with built-in metal heat sink, dual-band 2.4GHz and 5GHz wireless LAN, faster (300 mbps) Ethernet, and PoE capability via a separate PoE HAT.



Fig .4.Raspberry –pi.

### 4. Crystal Oscillator:

The Raspberry Pi 3 Model B+ maintains the same mechanical footprint as both the Raspberry Pi 2 Model B and the Raspberry Pi 3 Model B. Adafruit made/brand cases will still fit but some other cases may not, especially ones that depend on component location or have a built in a heatsink.

A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency.



Fig .5.Crystal oscillator.

### 5. Breadboard:



Fig .6 .Breadboard.

### Need and Scope

Need:

The main objective of this project is that Mute people can easily communicate with normal people simply by showing hand gestures.

It is a social cause project

We develop this project to understand the language mute people can use because regular people are not trained about hand sign language.

Scope:

Research is completed when all the research activities have been carried out and the objectives met. As a final product of our research, the fully working system after meeting the objectives and also met the stakeholders' expectations submitted. The

A breadboard is a rectangular plastic board with several tiny holes in it. These holes let us easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting

diode).Proposed system will be beneficial to voice impaired people as a reason to bridge the communication gap with their fellows who are normal, since communication is very important. Therefore, inability for the dumb and deaf people to deliver their message or effective communication, will be simplified to minimum.

**Software Engineering Paradigm**

The paradigm is known as software engineering paradigm where all the engineering concepts pertaining to the development of software are applied. It includes various researches and requirement. Every project has certain phases of development. A clear understanding of these phases allows managers and executives to maintain control of the project more efficiently. By definition, a project has a beginning and an end and passes through several phases of development known as life cycle phases. These phases are varied depending upon the industry involved but all follow the same basic steps.

It is important to realize that the project life cycle for each project may differ, in

**VI. IMPLEMENTATION:-**

Our aim is to implement a hand gesture recognition system for mute people who can communicate using sign language. The hand gesture will be converted to voice as defined by the person.The system will act as a communicator for the mute person.

**VII. TESTING**

Before implementing the new system into operations, a test run of the system is done removing all the bugs, if any. It is an important phase of a successful system. After codifying the whole programs of the system, a test plan should be developed and run on a given set of test data.The output of the test run should match the expected results. Sometimes, system testing is considered as a part of implementation process.Using the test data following test run are carried out: Program test

System test

**VIII. PROGRAM TEST:**

When the programs have been coded and compiled and brought to working conditions, they must be individually tested with the prepared test data. All verification and validation be checked and any undesirable happening must be noted and debugged (error corrected).

**IX. SYSTEM TEST**

After carrying out the program test for each of the program s of the system and errors removed, then system test is done. At this stage the test is done on actual data.

The complete system is executed on the actual data. At each stage of the execution, the results or output of the system is analyzed. During the result analysis, it may be found that the outputs are not matching the expected output of the system.

**IX. BENEFITS OF IoT**

The internet of things offers several benefits to organizations, enabling them to:

- monitor their overall business processes
- improve the custom experience
- save time and money
- enhance employee productivity
- integrate and adapt business models
- make better business decisions
- Generate more revenue.

**1. Functional Requirements**

- The project shall be able to need &analyse hand gestures
- Identify the gestures.
- Print the gesture name.
- Speaker returns the value.

**2. Non-Functional Requirements**

A non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. They are contrasted with functional requirements that define specific behavior or functions. The plan for implementing functional requirements is detailed in the system design. The plan for implementing non-functional requirements is detailed in the system architecture, because they are usually architecturally significant requirements.

Broadly, functional requirements define what a system is supposed to do, and non-functional requirements define how a system is supposed to be.

	<b>No n-Functional Requirement</b>
R0	Wi-fi Internet connection
R1	Database implemented in ThingSpeak
R2	Open cv module
R3	Proper supply

Fig.7. Non functional requirements.

**3. Technical Feasibility**

Technical feasibility study is the complete study of the project in terms of input, processes, output, fields, programs and procedures. It is a very effective tool for long term planning and troubleshooting. The technical feasibility study should most essentially support the

financial information of an organization. Hence, in this project we have tried to maintain a proper ratio between the financial and technical feasibility.

#### 4. Financial Feasibility

It is a quite financial feasible hardware as it does need an input investment capital in high cost and can directly be used in the user.

#### 5. Operational Feasibility

- The operation performed by the device is to focus on hand gesture.
- To convert into voice.

## X. RESULT

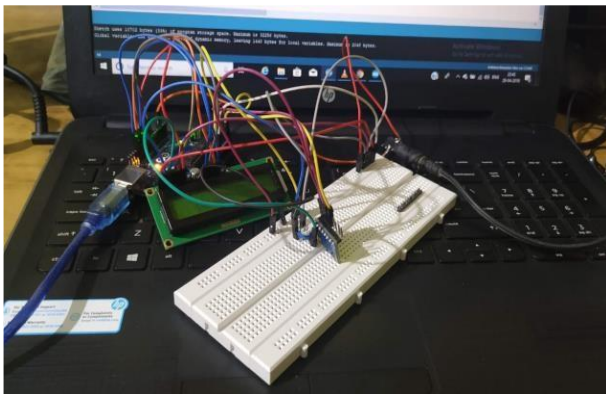


Fig. 8. Model.

## XI. CONCLUSION

This project aims to develop a useful tool that uses gesture recognition for reducing the communication barrier between the deaf and dumb community and the normal people. This project was meant to be a prototype for checking the feasibility of recognizing gestures. Using the designed project it is possible to convert hand gestures into speech which can be understood easily by normal people.

The idea of the proposed system has greater possibilities of future expansions. If more programming logic is introduced, more number of gestures could be incorporated. It could be developed into a multilingual speech enable system. Gesture control robot could be developed using the same thought. Gesture based smart devices such as HD TV and smart phone can also be developed. The same system can be modified for easier interaction of blind people with outside world .

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