SPEAKING SYSTEM FOR MUTE PEOPLE USING HAND GESTURES

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ABSTRACT

It's 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 8 stored messages, "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. Thus we have a fully functional smart speaking system to help mute people communicate with regular people using a simple wearable system.

We are proposing an simple device which can help deaf/mute peoples to use in their emergency or normal position .

CHAPTER – 1

INTRODUCTION

1.1 Background

It is very difficult for mute people to talk to the other people as they only rely on the sign language which cannot be understand by the regular people as they are not trained for this kind of language. Because of this the communication becomes very difficult and in emergency or other times when a mute person is travelling with regular people it becomes very hard to understand or talk to mute people.

There are some products like an translator which can help mute people to visually see the translation of speaking of other people , but as they are very complex and also very costly to purchase them.

1.2 Motivation

Being an engineer we have been not only to design or develop any machine or software ,but also to discover an efficient way to use them . by sticking to this motto we have decided to develop a device using an raspberry pie device .

This can help some of the people to communicate with the world in different manner which can be very helpful to the majority of mute people who cannot afford to use costly devices .

1.3 Problem definition

Muteness or mutism (from Latin mutus 'silent') is defined as an absence of speech while conserving or maintaining the ability to hear the speech of others. Mutism is typically understood as an inability to speak on the part of a child or an adult due to an observed lack of speech from the point of view of others who know them. Such observers commonly include a mute person's family members, caregivers, teachers, and health professionals like doctors or speech and language pathologists.

One of the major shortcomings of society is thesocial barrier that is created between disabled or handicappedpersons and persons who are blessed with all their human

faculties in order. Communication, which is the basis of humanprogress, often tends to be an obstacle for those unfortunatepeople who are unable to articulate their thoughts. In this constantly changing world their problems remain unchanged and this can be countered using some simple engineering ideas .

1.4 Objective

we propose a smart speaking system that helps mute people in delivering their messege to regular people using hand motion reading system

To use the mute people will just simply have to use their hand gestures but will be monitored by Gloves we put on their hand.

Our main objective is to help mute people with being armed with a system that can be used in any emergency or any other situation that can be cheap as compared to any translating devices.

1.5 solution

We propose to make an device using the raspberry pie as a central computing device.

Device contains various sensors working together. main part of this is gloves that should be worn during the use and it contains some sensors which identify the hand gestures and gives the crucial data to the raspberry pie.

giving an output of some prefitted message on screen or giving output in form of sound that can also be connected to the device .

1.6 Summary

Chapter one (1) is totally based on the introduction of the topic of the minor project

“ SPEAKING SYSTEM FOR MUTE PEOPLE USING HAND GESTURES”

Also why it is needed to duild a device its uses , motivation , and efficiency.

CHAPTER – 2

PROJECT MANAGEMENT

2.1 FEASIBILITY STUDY

Feasibility analysis evaluates the project's potential for success; therefore, perceived objectivity is an essential factor in the credibility of the study for potential investors andlending institutions. There are five types of feasibility study—separate areas that feasibility study examines, described below

2.1.1 Technical Feasibility

This project is technical feasible as all the resources are available.it helps that resources is capable of converting the ideas into working systems. Technical feasibility also involves evaluation of the hardware, software, and other technical requirements of the proposed system.

2.1.2 Economic Feasibility

Economic analysis is the most frequently used technique for evaluating the effectiveness of a proposed system. This project involves a cost/ benefits analysis, helping organizations determine the viability, cost, and benefits associated with a project before financial resources are allocated. It also serves as an independent project assessment and enhances project credibility—helping decision-makers determine the positive economic benefits to the organization that the proposed project will provide.

2.1.3 Legal Feasibility

This project doesn't conflict with legal requirements like, data protection acts or social media laws.

2.1.4 Operational Feasibility

Project plan satisfies the requirements identified in the requirements analysis phase of system development.

2.1.5 Scheduling Feasibility

This project is scheduling feasible as we are having enough time.

2.2 Risk Analysis

All the projects have some risk they can be solved asap. Risk analysis is the process of analyzing the risks associated with your Testing Project.

For the success of your project, Risk should be identified and corresponding solutions should be determined before the start of the project. For risk analysis we have followed the steps to analyze the product risks. We investigate the specification documents, discussed with the members about the project, and applied the real world problems. This is important because sometimes software might fail to satisfy the expectation of the user. With the given requirements we ensure this app cannot cause any performance issues, security issues, crash issues. We also focus on the testing the main features of the app.

Each risk should be classified on the basis of following two parameters: The probability of occurrence & the impact on the project.

It's a 3-Step process

1. Identify the Risks.
2. Analyze Impact of each Identified Risk.
3. Take counter measures for the identified & analyzed risk,

2.3 Project Scheduling

The objective of Software Planning is to provide a framework that enables the manager to make reasonable estimates of resources, cost, and schedule. These estimates are made within a limited time frame at the beginning of a software project and should be updated regularly as the project progresses. In addition,

estimates should attempt to define best case and worst case scenario so that project outcomes can be bounded.

Gantt chart

A Gantt chart is popular type of chart that illustrates a project schedule. Gantt chart illustrates the start and finish dates of the terminal elements and summary elements of a project. Terminal element and summary comprise the work breakdown structure of the project.

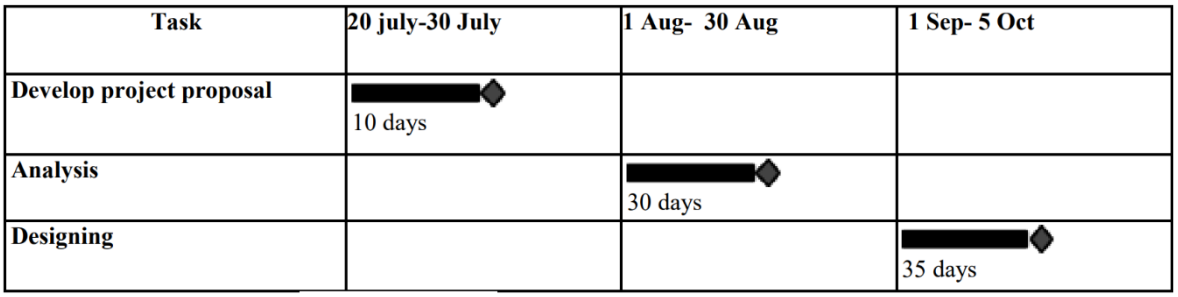


Figure: Gantt chart

2.4 Effort Allocation

As the name suggests, "effort" is defined as the amount of work, or the number of work units used to complete an activity. In simple terms, the effort is the number of hours' workers spend, focused on a particular task, to get a certain job done. If you want to determine the other two, you must first determine the effort in a project. Effort is most often expressed in staff hours, days, or weeks.

Stakeholders often want to know how much a project will cost. This chiefly depends on the measure of time members of the project spend on the project. A simple example to explain this concept follows. Let's say you begin to paint your house. You work for 6 hours a day for 9 days. Your effort would then be the amount of time you take in a day multiplied by the number of days you work, which would be 54 hours. The effort you put in is 54 hours

2.5 Cost Estimation

Estimating is determining in advance the expected costs of labor, material, construction equipment and tools which are needed to complete a project. Our total estimation would approximately 20,000 Rs. We have used Cocomo model for finding cost estimation of

our project. The first thing to do in order to create an estimate is to create an estimating plan, which should include:

1. Scope definition of the project, defining the boundaries.
2. Time plan

2.6 Summary

This chapter is all about the project planning and management in which we have covered all the aspects just like the technical feasibility, economical feasibility, types of risks: project risk, product risk, project Scheduling: Gantt chart, effort allocation, cost estimation.

Till this we have covered the all basic requirement of the software all the aspects.

CHAPTER – 3
COMPONENTS USED

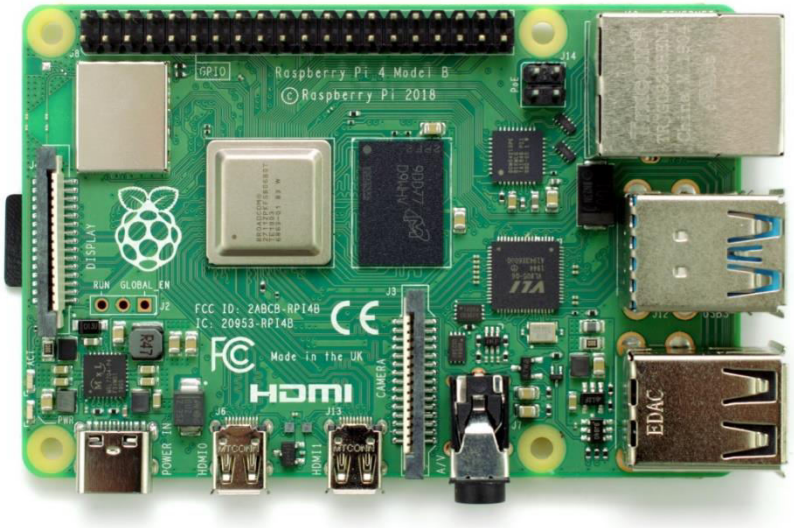
3.1 Raspberry pie

Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. Early on, the Raspberry Pi project leaned towards the promotion of teaching basic computer science in schools and in developing countries. Later, the original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It is now widely used in many areas, such as for weather monitoring,because of its low cost, modularity, and open design.

After the release of the second board type, the Raspberry Pi Foundation set up a new entity, named Raspberry Pi Trading, and installed Eben Upton as CEO, with the responsibility of developing technology. The Foundation was rededicated as an educational charity for promoting the teaching of basic computer science in schools and developing countries.

The Raspberry Pi is one of the best-selling British computers. As of December 2019, more than thirty million boards have been sold. Most Pi are made in a Sony factory in Pencoed, Wales, while others are made in China and Japan.

Diagram 1. Raspberry pie

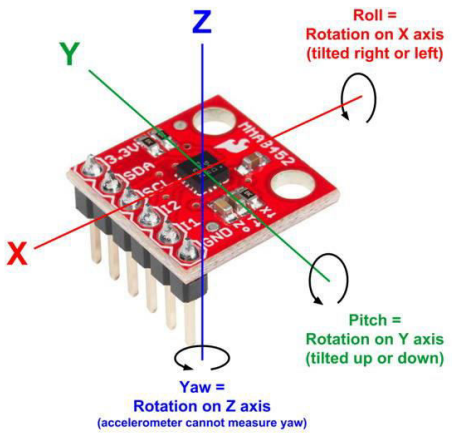


3.1 ACCELEROMETER

An accelerometer is a tool that measures proper acceleration.[1] Proper acceleration is the acceleration (the rate of change of velocity) of a body in its own instantaneous rest frame;[2] this is different from coordinate acceleration, which is acceleration in a fixed coordinate system. For example, an accelerometer at rest on the surface of the Earth will measure an acceleration due to Earth's gravity, straight upwards[3] (by definition) of g ≈ 9.81 m/s2. By contrast, accelerometers in free fall (falling toward the center of the Earth at a rate of about 9.81 m/s2) will measure zero.

Accelerometers have many uses in industry and science. Highly sensitive accelerometers are used in inertial navigation systems for aircraft and missiles. Vibration in rotating machines is monitored by accelerometers. They are used in tablet computers and digital cameras so that images on screens are always displayed upright. In unmanned aerial vehicles, accelerometers help to stabilise flight.

When two or more accelerometers are coordinated with one another, they can measure differences in proper acceleration, particularly gravity, over their separation in space—that is, the gradient of the gravitational field. Gravity gradiometry is useful because absolute gravity is a weak effect and depends on the local density of the Earth, which is quite variable.



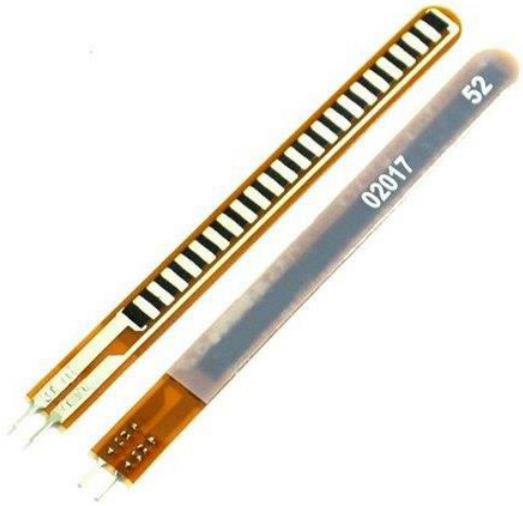
(Fig 2. Accelerator)

3.3 Flex sensor

A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and resistance of sensor element is varied by bending the surface. Since the resistance is directly proportional to the amount of bend it is used as goniometer, and often called flexible potentiometer.

Flex sensor is used in wide areas of research from computer interfaces, rehabilitation, security systems and even music interfaces.

(Fig 3 illustrative images of flex sensors)



3.4 Output Devices

3.4.1 LCD screen

Liquid Crystal Display short formed as LCD is a modern screen type which will be used as a output in our projet.

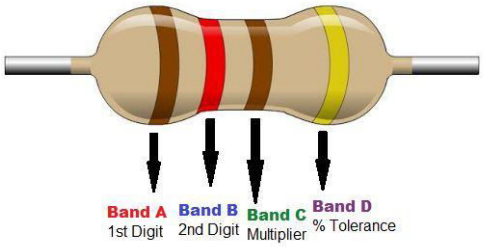
3.4.2 Speaker

speaker can also be used as a output device which can open up more possibility to interact with illiterate people.

3.5 Sensors

3.5.1 Resistors

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.



3.5.2 Capacitors

A capacitor is a device that stores electrical energy in an electric field. It is a passive electronic component with two terminals. The effect of a capacitor is known as capacitance.

3.5.3 Crystal oscillator

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 constant frequency.

3.5.4 Transistors

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. Transistors are one of the basic building blocks of modern electronics. It is composed of semiconductor material usually with at least three terminals for connection to an external circuit.

3.6 PCB

A printed circuit board (PCB) mechanically supports and electrically connects electrical or electronic components using conductive tracks, pads and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate. Components are generally soldered onto the PCB to both electrically connect and mechanically fasten them to it.Printed circuit boards are used in all but the simplest electronic products. They are also used in some electrical products, such as passive switch boxes.

(fig 5 PCB)

3.7 Other Components

Gloves , wires , mounting devices are also used as per required by user.

CHAPTER – 4

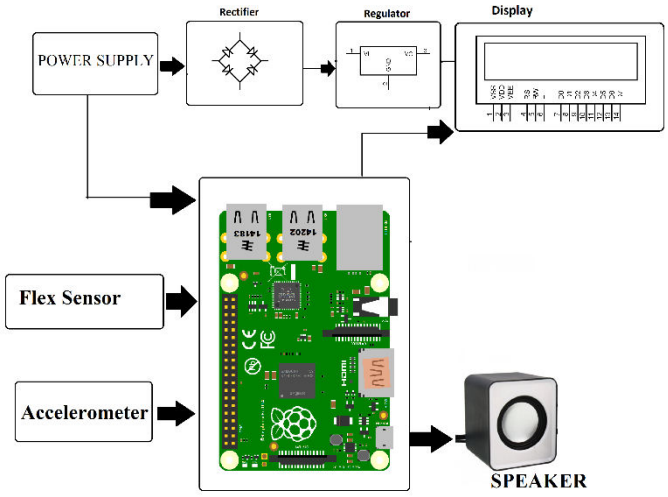
BUILD AND WORKING

4.1 Assembling Components.

Putting raspberry pi as the centre of the project , firstly we have to connect the PCB to the raspberry pi . Flex sensors are attached to the gloves properly aligned to the fingers.

The flex sensors are also connected to the PCB which is connected to the gloves , then the sesors such as oscillator , transistor , capacitor are also to be attached properly to the PCBs'.

At last the output devices such as speaker and LCD are to be connected.



(Fig 6 Block diagram of assembled system)

4.2 Commands

There are various command that has to be given to the raspberry pie in order to the received inputs,

Commands has to be flashed / stored in Raspberry pie using programming language java with accordance to the data received through the sensors.

The main commands stored will be “NEED HELP” , “ WHERE IS TOILET” , “ SORRY” , “SHOW DIRECTIONS”.

4.3 Actual working

When the all components are properly assembled together and the commands stored after a trial run for the data to be received ; our system will be in working position .

When Hand gesture is used the flex sensor caches the exact amount of deflection or the amount of bend form the each finger and will sent it to the PCB connected to it , then further it will be processed and will sent it to the raspberry pie where it will measure all the inputs and compare it with the all stored data where all the prefitted deflections and other data will be compared with the raw data received and thus raspberry pi will match the most matching data flows and will give an suitable output via fitted sound or visual instruction .

(Fig 7.ex.of type of sign input to be given)

CHAPTER - 5

CONCLUSION

The key endeavor of this project is to reduce thecommunication hurdle between deaf and dumbcommunity and normal people using our systemi.e. give the voice output from gesture or signinput. Talking hand speaking system for mutepeople using Arduino and flex sensors issuccessfully executed withhighperformance skill.

Due to the performance, the deaf and dumbpeople can easily communicate with others andthey can use this tool as a part of their dailyhabit.

This can also open an wide field of opportunity to other people as well to develop the use of gloves with flex sensor to use as entertainment devices also.

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