

## Speaking Microcontroller for Deaf and Dumb People

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### **Abstract**

*India is an agricultural country where farmer faces a lot of problems. Farmer suffers major losses every year due to crop infestation with pests and this in turn affects his lifestyle. Soil Nutrient uptake is also an important aspect in the calculation of soil quality, as it indicates how much it can sustain plant life. Soil nutrient uptake is determined by the quantity of water ph of macro and micro nutrients, etc. The oldest method of inspection the soil parameters was time intensive in which the farmers used to verify and calculate the results manually. In order to resolve the above issue, it is important to establish a system that monitors the farm continuously and detects the disease as quickly as possible. And also this system allows the user to detect soil parameters which will predict crop suitable for that soil. In this paper we gave brief idea by continuously monitoring crops using Image Processing to solve this problem. This system is used to detect diseases and spray disease pesticides in adequate quantities when appropriate, and also detect soil fertility.*

**Keywords**— *Image processing, Pesticide, Raspberry Pi, Disease Prediction, SIFT, Soil Detection.*

### **1. Introduction**

It is estimated that millions of people in our country is suffering from some type of disability. A person who is not able to speak or they lost their ability in some accident, this people face the problem like they are not able to speak properly and explore their thoughts, ideas, views, knowledge or feelings in front of society. To find solution for these issues, a system is implemented called "SPEAKING MICROCONTROLLER FOR DEAF AND DUMB PEOPLE". The system is microcontroller primarily based speaking system for deaf and dumb is meant to offer the signs, that square measure preloaded within the device. It is a small controller primarily based device, which provides the sounds simply by pressing the management buttons, that square measure given some audio messages like soliciting for water, lavatory etc., here the person will simply press the management button and speak message that indicates the sign of water(example) then the device convert it into the text and send to users to assist them. It stores the information of the requirements of the person. So, it will create use of the information keep whenever the person uses the device. This device facilitates the deaf and dumb those who get announce their needs and send help to it persons. By this the one who is read the appliance which will browse their need and facilitate them. This protects the time to grasp one another and ease in communication using this device. It is designed to supply with a larger advantage by obtaining voice primarily based announcement from the user and output as a text. Sign language is a language which, instead of acoustically conveyed sound patterns, uses manual communication and body language to convey meaning. Sign language is difficult to understand to the normal people.

### **2. Literature survey**

### **A. Speaking Microcontroller For Deaf And Dumb People**

**Author: Ankit Singh, Rohit Tripathi**

Description: Microcontroller based mostly speaking system for deaf and dumb is mean to provide the signs, that are preloaded within the device. It is a small controller based device, which supplies the alert sound simply by pressing the management buttons, that are given some redefined messages like requesting water, medicine, etc. Small controller is that the main part of the device. It stores the information of the requirement of the person. This device helps the people to speak their needs. According to this the one person close to will perceive there would like and facilitate them. This device protects the time to perceive one another and ease in communication.

### **B. Multiple Sign Language Translation into Voice Message**

**Author: Carlos Pesqueira Fiel, Cesar Cota Castro, Victor Velarde Arvizu**

Description: The paper presents the answer for deaf and dumb individuals usually dumb individuals use language for communication, however they realize issue in communication with others UN agency don't perceive language. This project aims to lower this barrier in communication. It's supported the requirement of developing associate in nursing device that may translate language into speech so as to create the communication come about between the mute communities and therefore the general public as potential. A Wireless information glove that may be a traditional textile driving glove fitted with flex sensors is employed on the length of every finger and therefore the thumb. Mute individuals will use the gloves to perform hand gesture and it'll be regenerate into speech so traditional individuals will perceive their expression. A signal language typically provides sign for whole words. It may offer sign for letters to perform words that don't have a corresponding register that language. During this project, flex device plays the foremost role, flex devices are the sensors whose resistance changes reckoning on the number of flexions practiced by the sensor. Here the device acknowledges the language alphabets and numbers. It is within the method of developing a model to scale back the communication gap between differentiable and traditional individuals. The program is in embedded C secret writing. Arduino package is employed to visualize the operating of the program within the hardware electronic equipment that is meant exploitation microcontroller and sensors.

### **C. Design of Translator Glove for Deaf-Mute Alphabet**

**Author: Carlos Pesqueira Fiel, Cesar Cota Castro, Victor Velarde Arvizu**

Description: This glove helps to deaf and dumb people for communication. This glove works as a converter for communication between deaf and dumb people. This helps according to distinctive the position of the fingers of a hand to translate the letters into words and audio signals. Additionally, it helps to enhance communication by adding a transportable voice synthesizer and a microcontroller rather than a laptop or microphone.

### **D. Deaf-Mute Communication Interpreter**

**Author: Anbarasi Rajamohan, Hemavathy R., Dhanlakshmi**

Description: It is difficult for a deaf and dumb user to communication with a normal person. Normal people don't understand the language of the deaf and dumb users. Hence, to make the communication easier we have to use a glove based communication interpreter system. This glove has five flex sensors, a tactile sensor, and a measuring device. This system works as a, it produces a

promotional modification in resistance according to every specific gesture and measuring device measures the orientation of the hand. The working of these hand gestures is in Arduino. This glove worked in a two-way operation mode: 1. Coaching mode, 2. Operational mode. The translating process of letter to make words is additionally wiped out Arduino. Additionally, it includes the text to speech conversion module that interprets the matched gestures that is text to voice output.

### E. Speech to Text Conversion for Multilingual Languages

**Author: Yogita H. Ghadage, Sushama D. Shelke**

Description: The current system work on multilingual speech to text conversion system. This conversion is based on data in a speech signal. This speech is a natural type and useful type of communication for the soul. Speech to text technique takes a speech vocalization as input and needs a string of words as output. This technique aims to extract, tokenize and acknowledge the data related to speech. The planned system implemented mistreatment Mel-frequency cepstral constant (MFCC) feature extraction technique and support vector machine, minimum distance classifier techniques for speech classification. Speech audio square measure pre-loaded and put it in a piece of exceeding information. Information divided into two components testing and coaching. Samples from coaching information capable coaching section and options square measure extracted. Similarly, the feature vector is computed between these options and references and words have the most similar square measure given as output

### 3. Methodology for Implementation of Proposed System

Sign language is a language which, instead of acoustically conveyed sound patterns, uses manual communication and body language to convey meaning. This can involve simultaneously combining hand shapes, orientation and movements of hand, arm or body, and facial expressions to fluidly express a speaker's thoughts. Wherever communities of deaf people exist, sign language will be useful. Sign language is also used by persons who can hear, but cannot physically speak. Sign language translating equipment helps in conveying their message to common people. It translates their message in sign form to the normal understandable text or voice form. In this project one such effort in developing a glove which senses the hand movements of sign language through sensors and translates it into text and voice output. In order to overcome communication barrier, this device which translates their sign language into voice form. This conversion is done using microcontroller which takes the input from sensors which senses the hand movements of signing.

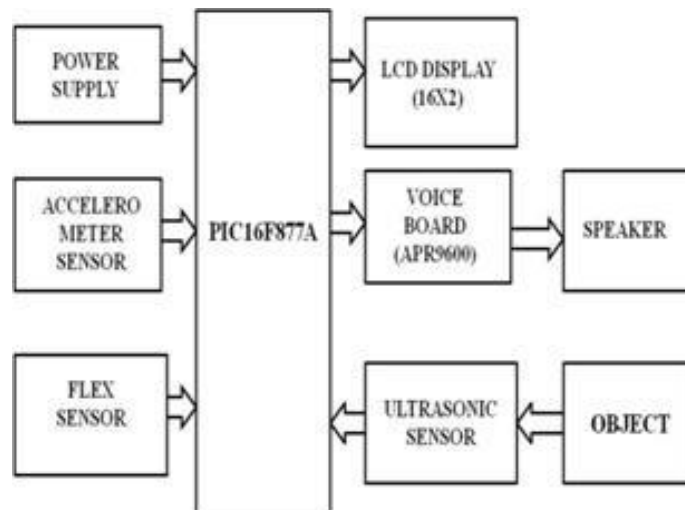


Figure1. System architecture

### 4. Proposed System Design for the System

All the systems proposed earlier provide one way communication only that is, they facilitate communication either of a normal person to physically challenged people or physically challenged people to a normal person but two communication is not possible. We have proposed a system in which two-way communication is possible that is deaf and dumb people communicate with a normal person through the device. In this paper we introduce a novel that get users provides inputs by two ways. First is voice through the software that get users voice as an input and convert into text using Mel Frequency Cepstral Coefficient that pre-process speech, segment into words, apply MFCC feature, extract feature and SVM classify it into text. Second is

key using keypad to the Arduino UNO Microcontroller. The Arduino UNO recognize the key enter by user and giving output to the speaker which is connected to ISD 1760 module which is output device. ISD 1760 module use speech for processing and storing the recording. LCD is used to show the users can help them. If something not available that person wants then the user sends it to the higher authority and then higher authority help that person if requirement is under limitation. It stores the information of the requirement of the person. This device protects the time to perceive one another and ease in communication.

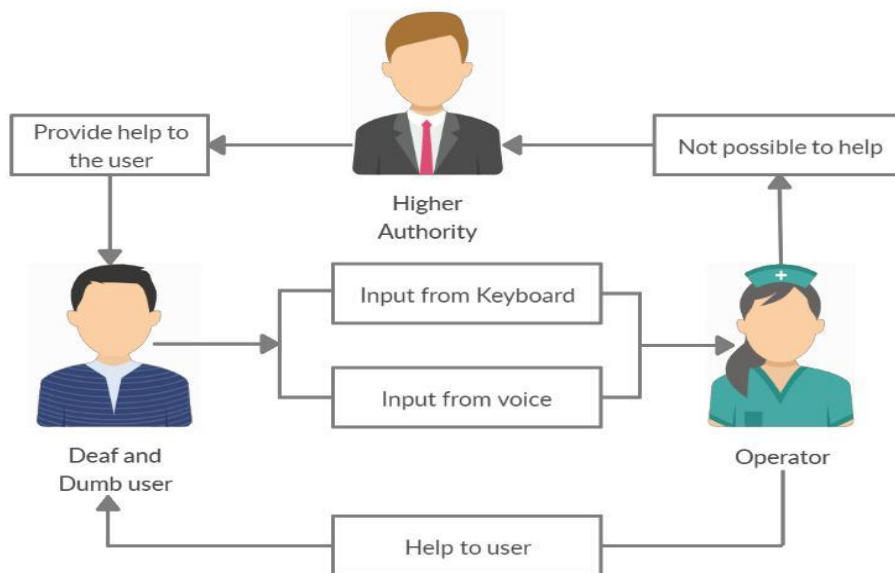


Figure 2. Working Model of system

In this paper system architecture broadly explain the flow and the methodology of the project. Deaf and Dumb people as a user can give the inputs in two ways, one is from keypad and another is from voice. After getting these inputs it will displayed on the LCD and operator will provide the help to that particular user. In case if operator is unable to help to the user, he will send that request to the higher authority. Then higher authority will take decision about that request. After getting input from voice, system will first remove the stop words from the request then it will tokenize and then a perfect request of user is identified.

## 5. Result Discussion

In this paper we have introduce ATMEGA328p microcontroller which will speak out requirement of deaf and dumb people through a sound attach to it. Our proposed system implemented

using Arduino board and computer is configured with Intel I3 processor with 4GB RAM. Arduino IDE1.8 platform used for Arduino programming and Embedded C for Microcontroller. Recorder is used to receive the audio requirements which will speak out through speaker. Keypad is used as an input device and LCD, speaker as output device. Inputs are taken through keypad and will displayed on LCD. Another way of taking input is through speech and it will be sent to the operator who provides the help to the people. This application is implemented in Eclipse IDE in java language.

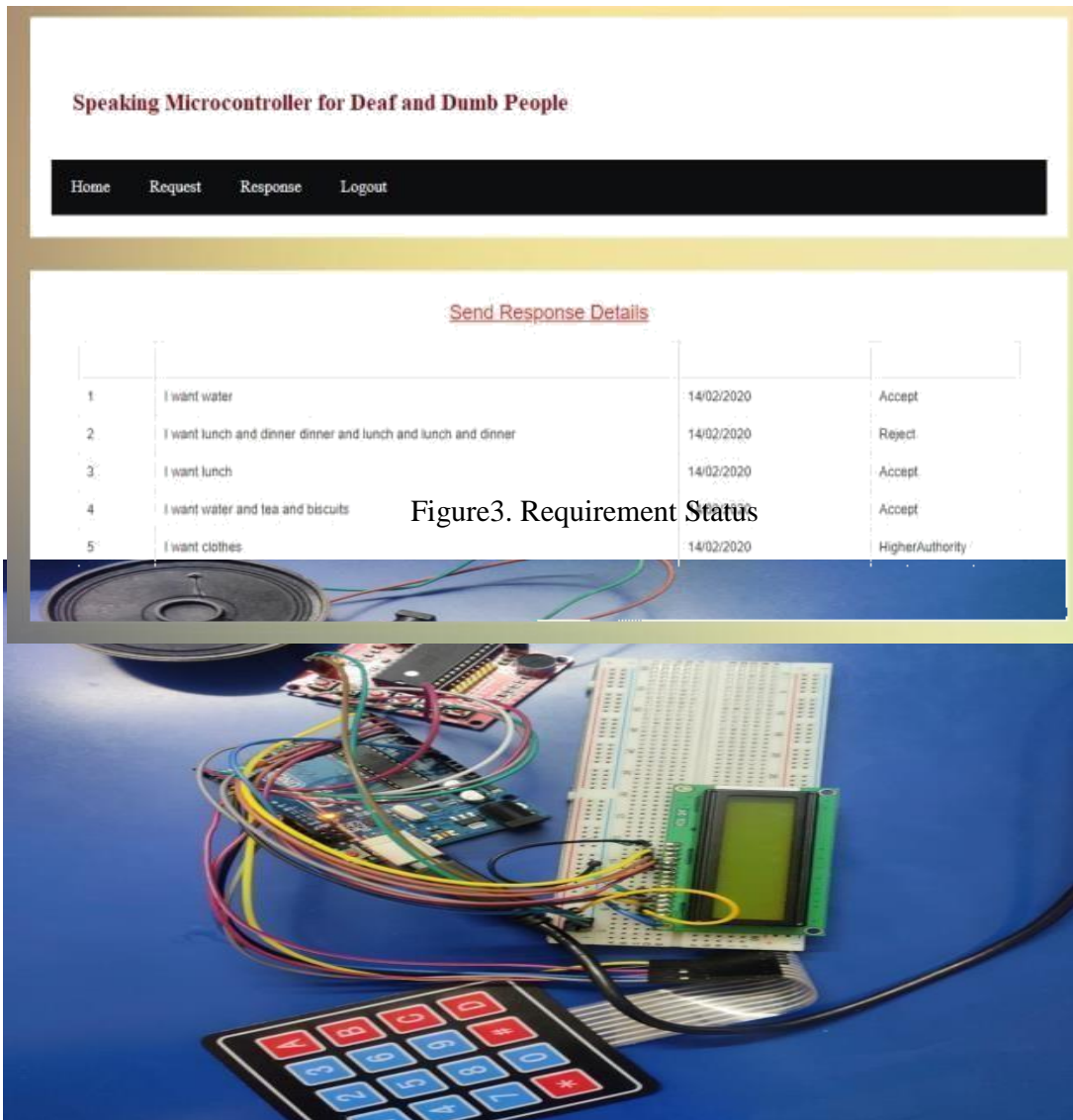


Figure3. Requirement Status

Figure4. Proposed System

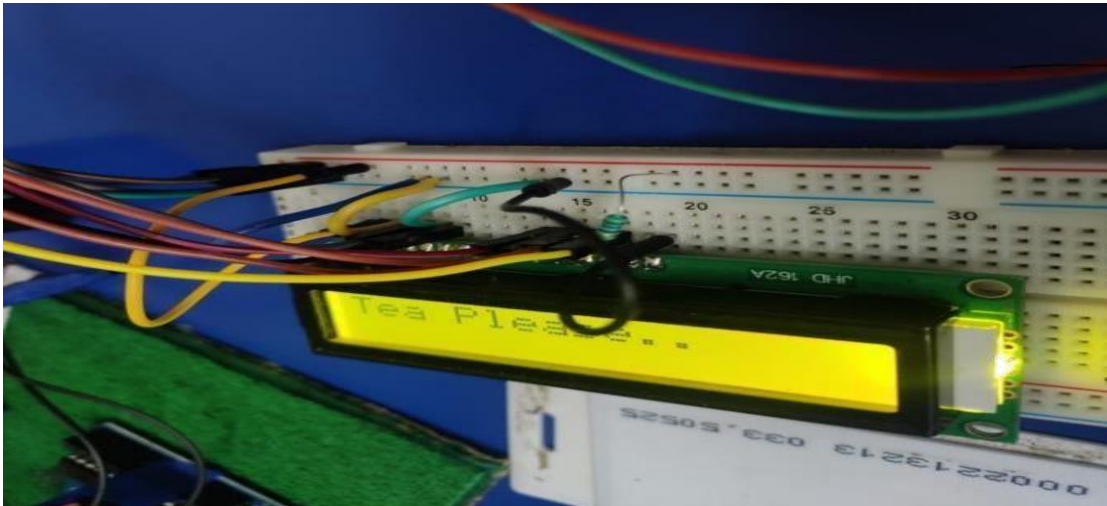


Figure5. LCD showing Requirement

## 6. Conclusion

In such a way this project has two ways to take inputs one is through speech and another is from keypad. The requirements which has been taken from this input types will speak out from the speaker and at the same time sent to the operator so that they will provide the help to the deaf and dumb people. In the case operator is unable to help they will be sent it to the higher authority and then higher authority will decide what to do with such a requirement of deaf and dumb people.

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