

# Voice Controlled Robotic Hand

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**Abstract-** The Voice Controlled Robotic Hand for Disabled People presents a system in which the hand can be controlled by the human voice. Our goal is to help the people with disabilities by assisting them in their daily activities with the help of a robotic hand. The people with motor impairments such as those with paraplegia, spinal cord injuries, war-time injuries rely on others to assist them in their daily activities. The proposed system can be used for paralyzed people to use this hand for holding and any other activities whatever they are doing daily.

**Index terms-** Disabled people, Hand project, Robots, Voice control

## I.INTRODUCTION

When we say about voice control, the first thing come into our mind is Speech recognition which makes system to understand the human voice/commands[1]. Now, depending upon this voice commands our robotic hand is going to be controlled. First thing has to be cleared is model of the voice recognition module. There are two types of voice recognition modules namely V2 and V3. To build up the strong robotic hand for lifting high weights high torque motors should be used where DOF's are preferred. As of the small robotic hand servo motors are preferred. The controlling of the robotic hand is controlled with micro controller namely Arduino UNO. When we give a voice command it is driven to controller to perform the operation of the robotichand[2].

## II. PROPOSED WORK OF ROBOTIC HAND

This project presents the working of a robotic hand using voice control. The main aim of this project is paralyzed people able to be like normal human. The primary concern is considered the voice control and to make the pc to understand user voice. The motive is to make the pc should understand the user voice. This project mainly depends on the voice module.

The data collected from the voice module will be given to the Arduino[3]. Once the recognized voice is processed then the corresponding servo motor will be going to work and the speed also determined by the signal generated from the Arduino. Initially the system will be in off state it activates when the signal received from the controller/processor. one can operate this robotic arm similar to the real hand such as holding and releasing the objects, moving fingers freely. All these operations canbedone by recognizing the corresponding voice commands which is very realistic

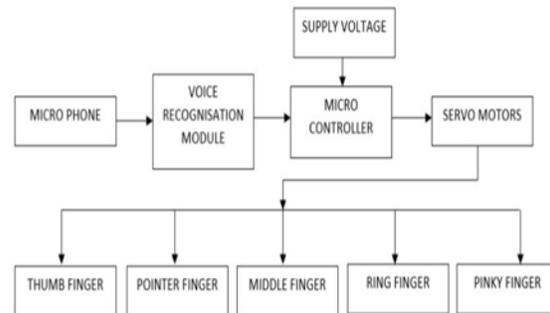


Fig:1 Block diagram of robotic hand

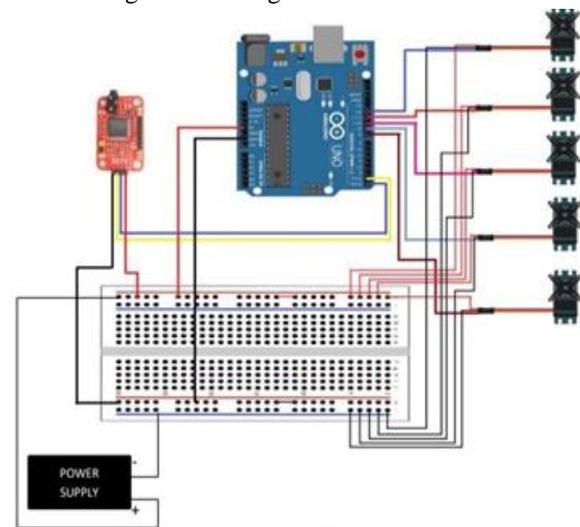


Fig:2 connections of proposed system

## III. ARDUINO

It is a development board whose working is based on ATmega series of microcontroller. This board has a set of digital, analog, power and PWM pins. It also has pins for serial communication and for interfacing of SPI devices. All these are programme using embedded programming language. The pins can be used to interface various types of sensors and actuators which will help it interact with the environment [4].

#### IV. SERVO MOTOR

This is a Dc motor which is used to measure the angular position. This is mainly worked by the gears. This motor revolution ranging from 90 degrees to 180 degrees. Some servo motors will have 360 degrees and more. This movement is not constant. This motor angle is restricted and can have many fruitful advantages from this motor.

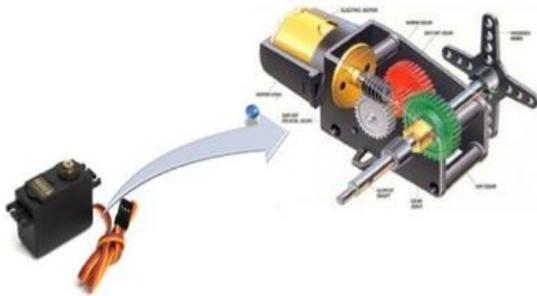


Fig:3 Internal diagram of servo motor

#### V. VOICE RECOGNITION MODULE

This module is an speaking identification board. This board is restricted to certain commands or limited words. In this board we can record the commands and can store in the sd card module and can be used as an input for our project. All recorded voice commands will be sent to a library for further use case.

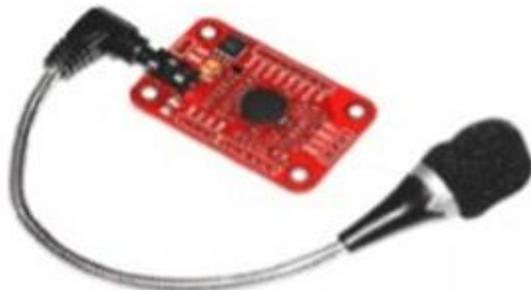


Fig:4 voice recognition module

#### V. RESULTS

##### A. Training status of voice module

There are 5 servo motors connected to each finger of the robotic hand which are controlled by PWM pins of micro controller. So, according to the input received by now appropriate signals will be sent to rotate the required motor in required direction. For example, if an user say “HOLD”, the analog signal is converted to digital which are used as an input to the controller. Now depending on the code the controller of arduino sends PWM signal to the servomotors. Once the signal received by the servo all the servo motors connected to the fingers of robotic hand rotates by 180 degrees. Record indication: D1 (RED) flashes 5 times within the 800ms, then off for 600ms, and then flashes quickly for 6 times within 500ms. Now the recording indication is over. Begin to speak: D1 (RED) is off for 500ms, and then is on. Recording a voice instruction successfully for the first time: D1(RED)off, D2 (ORANGE) on for 300ms. Recording a voice instruction successfully for the first time: D1(RED)off, D2(ORANGE) on for 700ms. Recording failure: D2 (ORANGE) flashes 6 times within the 800ms. In cases that voice instructions detected thrice not matched, or the sound is too large, or there is no sound, recording will fail. You need to begin the recording process for that instruction.



Fig: 5 Training of voice module

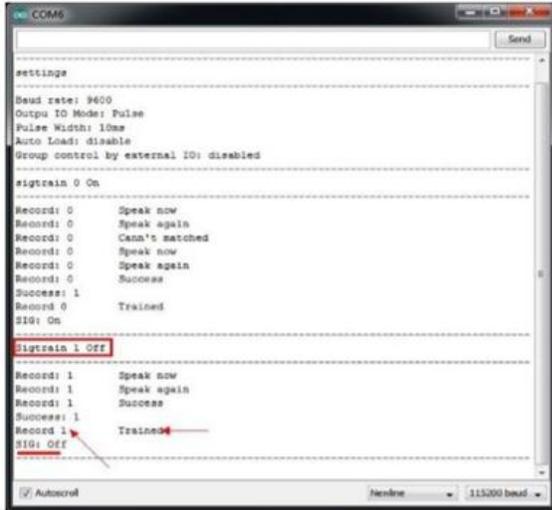


Fig: 6 Training status of voice module

### B. Training of Voice Module

1. Connect Arduino to voice module with PC.
2. First turn on the serial monitor after dumping the code into Arduino.
3. Now training the module with user voice.
4. HOLD – when yellow Led on for 2sec
5. Once the command is identified by the module, it will show a message named “success”.
6. When we want to dump any command “sigtrain 0” command” is the format.
7. 0 indicates the number of code. Similarly all the commands will be dumped into the module.

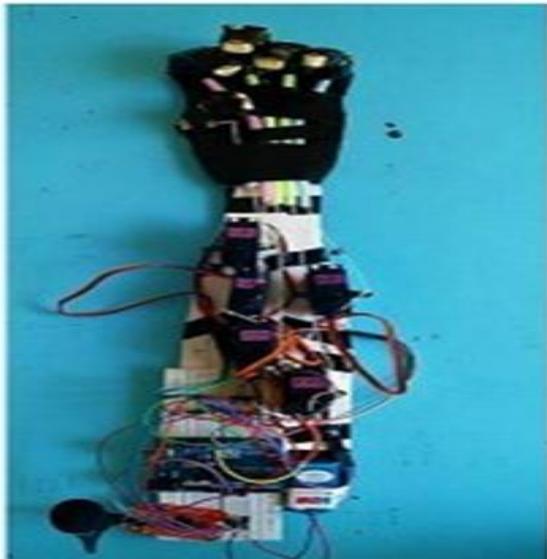


Fig: 7 Robotic Hand

### VI. CONCLUSION

The design will help the paralyzed people or people with impairments. It can be performed as a realistic hand which perform the task easily. The design is low cost and works with good accuracy.

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