

## Voice Control Prosthetic Arm

<sup>1</sup>S. Mohamed Sulaiman, <sup>1</sup>M. Anto Bennet,  
<sup>2</sup>P.L. Annamalai, <sup>2</sup>E. Ramki and <sup>2</sup>M. Mohamed tazudeen

<sup>1</sup>Professor, Department of Electronics and Communication Engineering,  
VELTECH, Chennai-600062, India

<sup>2</sup>UG Student, Department of Electronics and Communication Engineering,  
VELTECH, Chennai-600062, India

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**Abstract:** The paper which deals with the design and implementation of the 3 fingered robotic hand using the voice control comments. It has special commands which may be managed the usage of voice. The robot hand can be moved in exceptional directions. The hand may be moves in a single freedom axis and the palm may be moved to close and open action. The mechanical hardware layout of the robotic hand is completed with double revolute joint mechanism. it may be used to choose the items via using the commands. The work executed by means of the robotic arm is quite precise and related the usage of Dc aspect shaft motor. As an instance a few work needs to be carried out very precisely however the conditions do now not in shape humans. In such conditions, this robot arm can be used remotely and the venture may be executed. The programming is done on Microcontroller the usage of Arduino programming.

**Key words:** dc motor • Regulator • Voice sensor

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### INTRODUCTION

A robot is a mechanical or virtual artificial agent, usually an electro-mechanical system this is guided with the aid of a computer application or digital circuitry. robot can be autonomous or semi-independent. Robots are widely used for form of duties such as service stations, cleansing drains and in obligations that are considered too dangerous to be accomplished through humans. A robot arm is a robot manipulator, usually programmable, with not unusual functions to a human arm This robotic arm is programmable in nature and it is able to be manipulated. The robot arm is also every now and then called anthropomorphic as it is very just like that of a human hand. A robotic arm can be used for numerous responsibilities which include welding, drilling, spraying and plenty of extra. A self enough robotic arm is fabricated by way of using additives like micro-controllers and motors. This will increase their pace of operation and reduces the complexity. It additionally brings about an boom in productivity which makes it clean to shift to risky materials. within the implementation system, the necessary components of structure ICs, blocks and power supply are all assembled on the PCB.

**Mechanical Hardware Design:** The mechanical hardware style that consists of 1.palm, 2. wrist, 3. elbow and also the 3 finger and also the gliding joint consists of one dc facet shaft motor wherever it's shafted to the fingers in palm and another dc motor is constructed within the elbow wherever it's shafted to the gear. The management hardware is employed for the index, the center finger, the thumb and also the gliding joint dominant the movement of the palm. The Robotic Arm is meant victimization the Micro-controller victimization Arduino programming. This method works on the principle of interfacing motors. The specification of the dc motor is 12v, 100 rpm, 2 kg-torque. the dc motors can respond per the commands given by the wireless feedback of voice. It consists of a motor that is coupled to a arduino board, used for position feedback, through a discount gear case. It conjointly accompanies a comparatively controller, typically an obsessive module designed specifically to be used with dc motors. The cup formed plastic material that is employed to hide the motors and therefore the cell that's wont to connect the palm, wrist and elbow. after the association the Si gloves that is comparable to the human skin wont to cowl all the materials used. after the covering it will be mounted to the disabled persons. the fixing will

be finished the slot given within the elbow and a fabric that's mounted to the handless person. by giving totally different commands through the voice management the hand [1] will be touched and wont to decide and place the objects.

**Task Specification:** Prosthetic need to resemble human hand in size and form.

Prosthetic must carry out like human hand. ought to suit vehicles within the hand or Fore arm, no longer outside of hand or arm. design need to make use of popular components where available. layout should comprise the least amount of a motors viable. Step one we took when designing the prosthetic hand [2] became to determine at the fine control mechanism for finger motion. The goal for our design changed into to minimize the variety of actuators essential to govern the motion of the finger and simplify the equations had to describe the motion of the finger. There are very many ways to do this and we explored as many options as viable. There had been numerous preliminary designs we handled earlier than deciding on what we determined was the nice method. those designs ranged from a anxiety controlled tool, to pulley structures with distinct tiers of complexity, to a four-bar linkage design

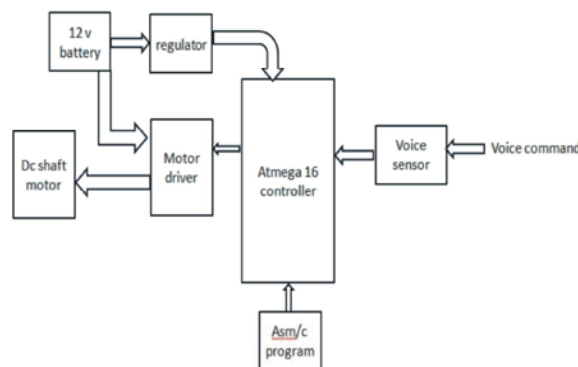
**Existing System:** The existing system of the hand in which the elbow is not motorized in this they have used the spring system and working is in manual condition. (ref7) in this they have made to work only the palm of the children and has two fingers only. and to the have reduced the speed of the palm (ref6). the palm that can be controlled with the help of sensors. the palm that is used to pick up the objects and place it under the surveillance of the sensor. the palm that can be attached to the disabled persons by the metallic cup and can be shafted.

**Proposed System:** To avoid the difficulties in the existing system we have propped a system. The Robotic hand has three fingers which is similar to the human arm. The fingers has two joint where it can able to move in a flexible direction. It can be worked without any connection to the nerve in the arm or In brain. The robotic hand consists of a 16-bit controller where the voice recognition is inbuilt. It has different commands such as open, close, move (right, left, up, down). The robotic hand can be able to pick up the objects and work as similar to the human hand.

**Architecture of Proposed System:**

- DC side shaft motor
- Motor driver
- Power supply
- regulator
- Atmega 16 microcontroller
- Speech recognition circuit

**Block Diagram of the Proposed System:** The actuation of the prosthetic hand [3] is accomplished by voice instructions. The voice instructions, which include “choose up” and “launch,” are processed by way of a unique voice command recognition circuit (to be described next) and appropriate drive signals are despatched to the DC motors. The controller electronics, similarly to sending these drive alerts, additionally choices up force sensor alerts and cuts the motor force indicators whilst the level of desired (preprogrammed) grip pressure is reached. The prosthetic hand [4, 5] manipulate block diagram is proven in parent 1 on this prosthetic hand this includes two dc element shaft motor. 1dc motor fixed in palm and alternative dc motor is fixed in elbow. in palm segment the dc motor is turned with the aid of single shaft rotation it's open and shut. for selecting and setting of the objects. these operations vicinity unit done by using many methods. these area unit wireless voice control remarks shift system. from these ways voice control not pricey method and conjointly it is extraordinarily truthful for unmarried hand men and women conjointly. by means of those palm consists of 5 hands for the duration of this 2 fingers place unit dummy ultimate fingers place unit motorized. so it is type of a traditional human palm. on this total palm phase covered with the aid of element gloves.



From elbow section it's conjointly consists of same dc factor shaft motor the mechanism of the elbow is based on the back and front shaft rotation for to induce closer to the item.so this motorized phase is consists of 1 elbow clamp with housing place and motor therefore it's sincerely allotted sure operations that the user wants.completely the every aggregate of elbow and palm seems like much like human hand the region between the elbow and palm created from the mechanical substance mobile lined with a material while a glove is closed the hand. therefore it's just like the mechanical structure of the hand.

There area unit 2 prospects of strength provide. one is constitutional battery and therefore the alternative desire is external electricity provide because of this given outside supply to the hand. but constitutional battery has does not stand up to a whole lot of time and its lifespan conjointly minimal that the external energy offer is straightforward and powerful thats why we tend to locomote with external power offer.

The dc aspect shaft motor that converts the electrical energy into mechanical energy.they are often done by the electrical generator the electrical motors are often operated through the interaction of the electrical and magnetic field. in which it are often trimotored to produce the electric energy. it can be used as the plumps, motors. these are the electrostatic devicesit can be driven at the load of 3 kg and to sustain the weight.

They are used to produce the linear or rotatory force and should be distinguishedsuch as solenoidsand used to convert the electric energy to mechanical energy but they are not used to generate themecahnicable state of usable power. they are of higher power and some motors are used for the propulsion with the rating of 100 megawatts.



Figure 2

**Specifications:**

- RPM: 30 at 12V
- Voltage: 4V to 12V
- Stall torque: 28 Kg-cm at stall current of 1.3 Amp.
- Shaft diameter: 6mm
- Shaft length: 22mm
- Gear assembly: Spur

- Brush type: Carbon
- Motor weight: 143gms
- Dimension: Refer to diagram above

The equipments and the materaials that are used are

- elbow prosthesis components
- terminal device
- wristunits
- forearmcell
- elbowjoints
- humurus sell
- shoulder harness and cosmetic glove

**Motor Driver:** The L293d is the motor driver integrated circuit in which the motor can be connected and driven. it can be driven in both directions.the two directions are clockwise and anticlockwise.the l293d in which it contains the 16 pins and the power supply of the l293d is 16 volts.the l293 requires the external power supply in which it can be get connected it can be able to be get connected in the 36volts and has the power usage of 600ma.



Figure 3

The principle concept of working the motor driver is the H-bridge. it consists of the high voltage and can be driven in both directions that is clockwise and anticlockwise.in the concept of motor driver it is used to rotate the motor idependently.the motor driver has the high voltage and a smaller size.the motor driver is commonly used in the robotics.

In the L293 driver circuit it has pin1 and pin 2. the pin1 which is known as the left h bridge and the pin9 which is known as the right h-bridge. if the pin1 goes high the motor rotates in clockwise direction. if the pin9 goes high the motor drives in anticlockwise direction

In the L293 there are four pins. the pins are pin2,pin7,pin15,pin10.the two pins pin2 and pin7 are present on the left side and pin 7 and pin 15 are present

on the right side. if it is connected towards the left then the motor drives in left side. if it is connected on the right then it rotates on the left side.

**Regulator:** In this the regulator used is L298. the L298 which consists of the two packages that is 15 lead multiwatt and powerSO20. the specification of the L298 is the high voltage and high current which can be designed according to the TTL logic levels. there are totally two pins. they can be enabled or disabled according to the program feed in the circuit. the emitter in the circuit can be get connected to each bridge in the transistor and also get connected to the sensor. the supply is given through the external circuit

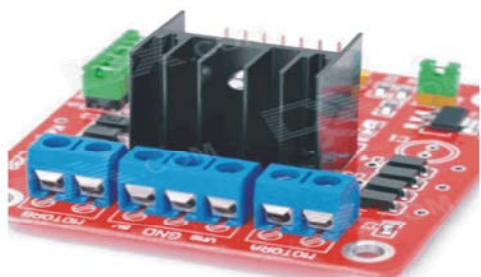


Figure 4

**Controller:** The AVR controller that comprises of the 32 pins which is the broadly useful registers. the 32 pins in which it can be straightforwardly associated with the number juggling rationale unit in which there are two independent registers. these two registers that can be straightforwardly accessible with the one single clock cycle the throughputs that can be achieved ten times speedier than the other 8-bit controller. the universally useful of the 16-bit microcontroller of Atmel gathering particularly Atmega 16 are 512 bytes EEPROM, 32 universally useful data yield lines, registers, fabricated utilizing Atmel's high thickness nonvolatile memory innovation. The On-chip ISP Flash permits the project memory to be reinvented in-framework through a SPI serial interface, by an ordinary nonvolatile memory developer, or by an On-chip Boot program running on the AVR center. The boot project can utilize any interface to download the application program in the Application Flash memory. Programming in the Boot Flash area will keep on running while the Application Flash segment is redesigned, giving genuine Read-While-Write operation. By consolidating a 8-bit RISC CPU with In-System Self-Programmable Flash on a solid chip, the Atmel Atmega 16 is a microcontroller that gives an exceedingly adaptable [6, 7] and practical answer for

some. Installed management applications. The Atmega16 AVR is bolstered with a full suite of project and framework improvement apparatuses including: C compilers.

The Atmega sixteen controller that has two eight-bit controller with the separate modes and prescalers and also the one-bit sixteen controller with the separate prescaler, compare mode and the capture mode and it's conjointly used for the 16-bit timer counter with separate generator and it conjointly consists of the eight-bit pulse breadth modulation (PWM) channels in two packages solely and the master-slave SPI interface and therefore the conjointly the on-chip comparator and it conjointly consists of external and internal interrupt sources and also has the inherent voices recognized and also the sensors may be activate high or low in line with the input mode given

## CONCLUSION

In this paper we've conferred the prosthetic arm or almost like human hand by victimisation voice management which means physics thus this {can be} each mechanical and physics by this hand patients can simply operate and conjointly works effectively. main aim of the project is motorizing the elbow unit, so the hand is correctly employed by patients command. so handicaps area unit used the project to meet their daily wants

Outcome



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