

Artificial Prosthetic Hand-An Aid for Differently Abled Persons

R. Gopi*, U. Harihararoban*, J. JustinRuban*, G. Kathiravan *, K. Arun Ganesh#

* UG Students # Assistant Professor

Department of Electrical & Electronics Engineering

PeriyarManiammai Institute of Science & Technology, Thanjavur, Tamil Nadu, India

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ABSTRACT:

We use our hands without even considering how important they are in our daily lives. Hands play an important role in our lives, and losing a hand means losing a significant portion of our lives. It's heartbreaking to witness one of our loved ones lose a hand and suffer as a result. The researchers' major goal is to make something useful and cheap for persons who have lost their hands or were born without them. Prosthetic devices have sparked interest in a variety of disciplines, including medical and industrial fields, thanks to their rapid development and technological innovation in mechatronics. A prosthetic device is a machine that is worn on the outside of the body and covers all or part of it. Electric motors produce it. It is suitable for use on the elbow, wrist, and fingers. It can also be utilised for a variety of applications, including physically disabled people, rehabilitation, power support, diagnostics, monitoring, ergonomics, and so on. The majority of current wearable gadgets have size, cost, and weight issues; they are large, expensive, and heavy. The goal of this project is to create a portable, light-weight, and low-cost prosthetic hand for those who are physically disabled. The hand, wrist, and finger are monitored and controlled via a Bluetooth app in this project. A user can do particular movements with the wearable device.

KeyWords: Prosthetic Hand, Bluetooth module, Brushless DC Motor, Low-cost.

I. INTRODUCTION:

We use our hands without even considering how important they are in our daily lives. Hands play an important role in our lives, and losing a hand means losing a significant portion of our lives. It's heartbreaking to witness one of our loved ones lose a hand and suffer as a

result. Modern artificial hands, which are advanced and very intelligent, play a vital part in this. The expense of it rises in tandem with its improvements. Bionic and mionic hands, on the other hand, involve muscular motion, which is difficult for individuals to use. This prompted us to consider an alternative approach to the complications that exist in the existing environment. The researchers' major goal is to be useful and cheap to persons who have lost their hand or were born without a hand. The product's effectiveness will allow it to be employed in industries that handle explosive items. The bending variations will be done by voice recognition employed in the hand prototype. Using a microcontroller, the voice commands to a brushless dc motor. It is generated by electric motors. It can be put on either the upper or lower limb.

Most existing wearable devices have various issues in terms of size, cost, and weight; they are large, costly, and heavy. As a result, the purpose of this research is to create a human-sized, lightweight, and low-cost artificial hand. Men are far more likely than women to lose their hands, with men accounting for 67 percent of upperlimb amputees. Upper limb amputations are most common during productive working years, with 60% occurring between the ages of 16 and 54. This patient population has significant functional needs, and their expectations of a prosthetic limb reflect this. In recent years, wearable robotics research has aided in the creation of novel active mechatronic lower-limb prosthesis with the objective of reducing the cognitive and physical effort required by lower-limb amputees in everyday living tasks. These devices also allow for the performance of tasks that require active power supply at the knee joint. Lower extremity amputees have movement constraints, which negatively impact their quality

of life. We are utilising a Bluetooth app in this project to monitor and control the hand, wrist, and finger. The wearable gadget enables the user to do particular movements. The robot reacts to forward, backward, left, and right movement orders. This initiative is low-cost and open source, however the majority of people are impoverished and lack access to these technologies. As a result, having a low-cost and user-friendly prosthetic hand might be a huge advantage for many individuals.

OBJECTIVE:

- To create a low-cost prosthetic hand, regardless of geographical or budgetary constraints.
- The researchers' major goal is to be helpful and inexpensive to persons who have lost a hand or were born without one.
- The product's effectiveness will allow it to be employed in industries that handle volatile items.

EXISTING SYSTEM:

The current method, that is, the hands, is highly expensive and out of reach for the majority of people. These systems also anticipate either high-power batteries that might injure the subject or the subject's physical effort, which will be exhausting. Along with this, the negative effects of

suffocating sockets are obvious. As a result, it is evident that the current system is costly, difficult, and has adverse consequences.

EXPERIMENTAL PROCEDURES:

Our prototype takes use of simple low-power batteries as well as finger, elbow, and wrist movement. Prosthetic devices have gained popularity in a variety of disciplines, including medical and industrial fields, as a result of their rapid growth and technical innovation in mechatronics.

Apart from other technologies like sensors and switches, in our research we use voice commands to operate the hand via bluetooth.

Voice command is given to operate the robot hand through an application 'Arduino Voice Controller'. This command is received by 'Bluetooth Module' and it is sent to 'Arduino Module'. It will take the corresponding action as per the program. As a result the driver circuit will be activated, which inturn will activate the motor. As per the command the motor will rotate.

In this project, Voice recognition through bluetooth will be used to make the bending modifications. We will be able to use this prosthetic hand to employ the active human hand's motion.

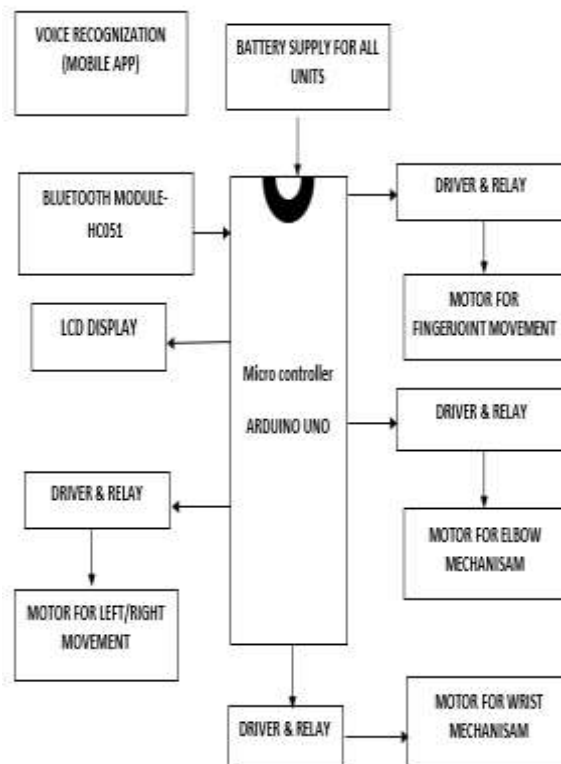


Figure No:1 Block Diagram

HARDWARE SETUP:

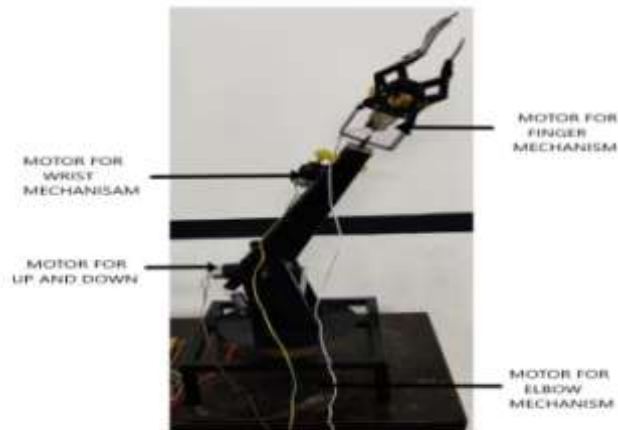
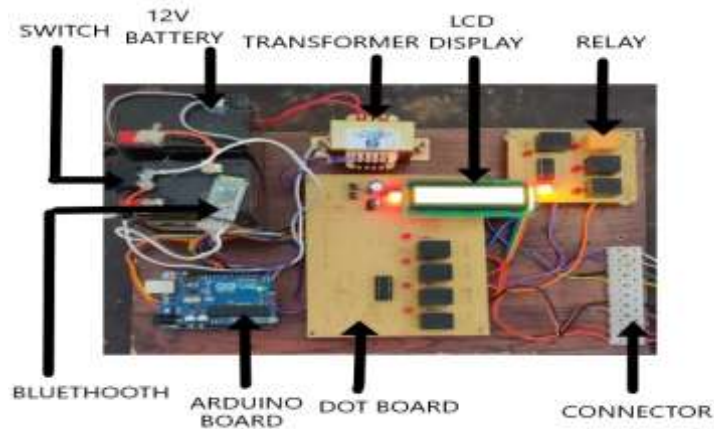


Figure No:2 Hard Ware Set Up

II. RESULT AND DISCUSSION:

Through the application 'Arduino Voice Controller,' voice commands are supplied to operate the robot hand. The 'Bluetooth Module' receives this command and sends it to the 'Arduino Module.' As per the programmed, it will take the appropriate action. The driving circuit will be triggered as a consequence, and the motor will be activated as well. The motor will revolve as per the command.



Figure No:3 Hand in up position



Figure No:4 Hand in down position



Figure No:5 Hand in left position



Figure No:6 Hand in right position



Figure No:7 Hand in open position



Figure No:8 Hand in close position

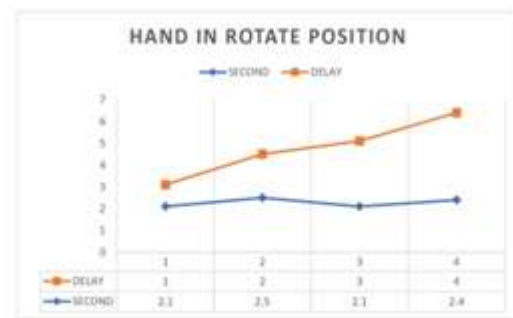


Figure No:9 Hand in rotate position

III. CONCLUSION:

The human hand is one of the most intricate and beautiful examples of natural engineering. It offers us a strong grasp while also allowing us to manage little items with pinpoint accuracy. The importance of hand function in the workplace cannot be overstated. The higher the impairment in abilities that allow for independence and engagement in academic and social activities, the greater the impairment in hand function. When a person's hand is missing, they feel bereft and despondent. Here comes the role of the artificial prosthetic hands. In this paper an affordable low-cost artificial prosthetic hand is being developed. It can aid the people who are born without hands and the people who have lost their hands in accidents. The artificial prosthetic hands developed by this project uses voice recognition for commands. Thus helps the users to access it a comfortable way.

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