

Prosthetic Bionic Arm

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Abstract

Prosthesis is an artificial substitute or replacement of a missing body part. Protheses are typically used to replace and to provide supplement to missing or defective body parts. Missing body parts can be of due to any reason like lost trauma, surgically removed, congenital etc. In addition to the standard artificial limb for every-day use, many disabilities have special limbs and devices to aid in the participation of sports and recreational activities. The main requirement of prosthesis is that it should function as natural as real arm. In this study, hardware of voice controlled prosthetic arm is designed and implemented. For main machine interface through speech a voice recognition module is used, which is initially trained for five voice commands, to control the movements of the elbow and palm. This prosthetic hand with two degrees of freedom in elbow and palm is designed with the help of gear DC motor, which has the ability of simply picking up and placing the objects.

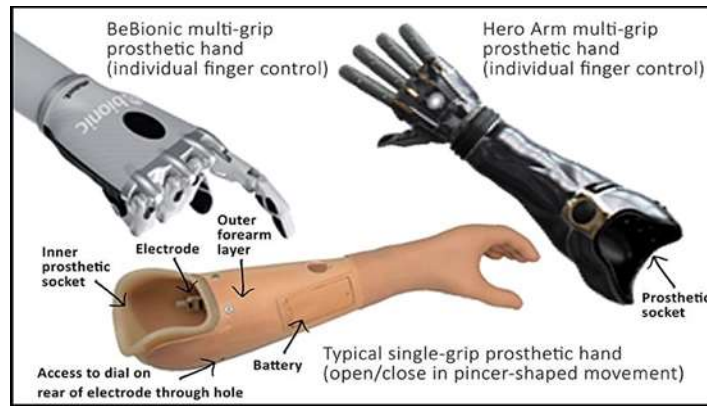
Key words: Bionic hand, Prosthesis, Amputees

I. INTRODUCTION

In the present world, the number of amputee cases is rising every year, which needs to be resolved. Currently many different types of prosthetic arm, which are medically certified, are around the market. These are either too expensive or don't satisfy the needs of the patients to the fullest. In this paper, we provide a technological advancement for the arm by enabling voice control and even manage to cut down the cost of the electronic and mechanical equipment required in building a working prototype of the prosthetic arm. Our prototype resembles the functional structure of the biological human arm. Most of the complex movements of the arm and hand is made possible by achieving near perfect replication of the movements of the biological human arm. The joints of the fingers on the prosthetic arm have been modelled based on the biological human fingers to replicate all the actions typically obtainable by any human finger. The prototype of the prosthetic arm presented here doesn't rely on the biological signals from the nerve endings of the residual arm in the human body, hence it can easily replace the prosthetic arm which rely on phantom limb, as the human brain loses the phantom limb sensation after a period of about six to eight months. In this paper, we have specifically tackled this above problem and even provided an advancement in the form of voice control commands to the robotic prosthetic arm which we modelled using economical devices and equipment to cut down the heavy cost of affording a prosthetic arm.

The objective of this research work was to design and construct a prosthesis that will be strong and reliable, while still offering control on the force exerted. The design had to account for mechanical and electrical design reliability and size. This paper describes the design features of artificial limbs that are lightweight, compact and dexterous, that mimics human anatomy and maintain a high lifting capability these signals can be designated to control a particular degree of freedom in the prosthesis. Many researchers are working in the development of prosthetic devices to aid the physically challenged people in their routine activities Active prosthetics devices provide functionality in addition to structural support in place of missing limbs.

A disabled person is struggling for our daily life like eating, dressing, walking and that person is dependent on another person. The main goal is to help the people with disabilities by assisting them in their daily activities with help of prosthetic arm.



Proposed Model of “PROSTHETIC BIONIC ARM

II. METHODOLOGY

This chapter describes the overall in-depth information about the project. This chapter also involves aspect of the project, such as design, implementation and modelling. This gives the complete details about the hardware components and software programs used in our project. This chapter also involves the basic theoretical information about each and every component as well as we have explained about the software used for the purpose of designing.

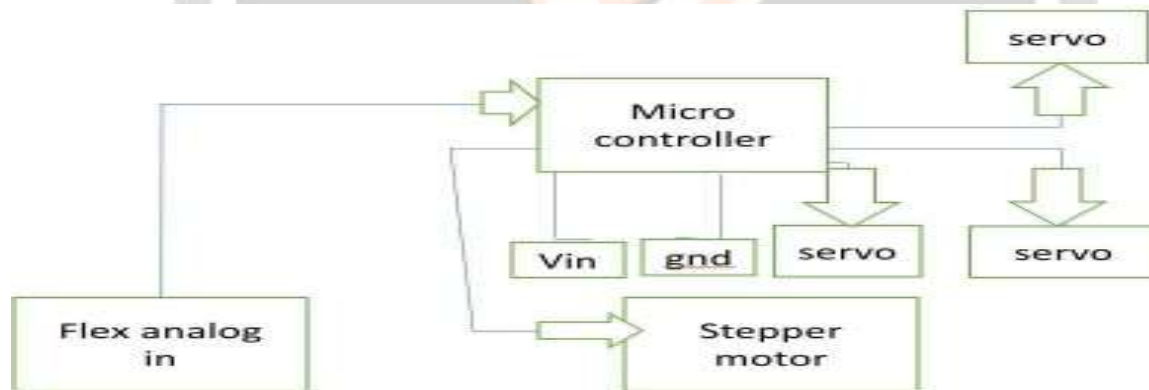


Fig: Block diagram of Prosthetic bionic ARM

The block diagram in figure shows all the major components that is required for a voice controlled robotic arm using amicrocontroller. The voice inputs are given through a microphone to the voice recognition module. The digital output corresponding to the voice command is provided to the microcontroller (its requires an external power supply of 5V). Microcontroller will generate the control signals to operate the four motors of the robotic arm. These signals are given to the motor drivers (to meet the additional power requirements of the motors). Motor drivers control the direction of rotation of the four motors. Initially the output from the voice recognition module is of the state 00 the BCD of this state is given to the Arduino board When a command is given to the voice module the corresponding number in which that particular word is stored is displayed on the 7-segment display. The BCD corresponding to it is given to the microcontroller. The nine conditions are then checked. If a particular condition is satisfied, appropriate signals are taken from the Arduino to the motor driver which drives the required motor.

III. RESULT & CONCLUSION

The hardware and software of the prosthetic bionic arm were setup and tested for all activities and tasks under different operating conditions. The prosthetic arm was used to pick up a light weight object and was place it in its desired position. All the movements of the prosthetic arm was working using the gesture based movement of the hand.

Conclusion:

The present research work demonstrates the movement of elbow and simple pickup and drop movement with the help of gesture, Software analysis, design, implementation and testing are described. In this paper we've conferred the prosthetic hand or arm almost like human hand by victimization voice management which means physical by this can be each mechanical and physical 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 commands. so handicap area unit used the project to meet their Daly wants.

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