



BIONIC HAND ARM

Shivendra Kumar¹, Rituraj Vishwakarma², Suraj Kumar³, Shashi
Bhushan⁴, Mr.Sachchidanand Jaisawal⁵

1, 2, 3,4(E&C Deptt., BIT, GIDA, Gorakhpur, India)

5(Asst. Prof., E&C Deptt., BIT, GIDA, Gorakhpur, India)

ABSTRACT

The ambition of bionic hand are provide the artificial body part, which person disable in hand after going through accident or sustain neurological damage. A bionic prosthesis is a device which is used to replace a missing body part. The bionic hand performs the several function such as the replacement or enhancement of the body part through the Biomechatronic description. The basic human body involved the excessively more complicated anatomy biological system with bones and muscles, probably most complex of all the joints in the body. This paper present a criticism of traditional method uses to control prosthetic hand by means of Biomechatronics. This paper describes a novel approach to the control of the multifunctional prosthetic based on the classification of electromyographic pattern. The model is should be fabricated with servo motors, arduino and flex sensor for movement of the finger. The entire setup is mounted on to the shoulder of the amputated person. This paper focus on the innovative approach for the design and development of the bionic hand based on the mechanism of biomechatronics.

Keywords- *Artfciali, Prosthetic, Neurological, Anatomy, biomechatronic, Electromyographic, Amputated.*

I. INTRODUCTION

Bionic Arms is the optical revolution idea for amplitude across the world. The bionic arms works under the influence of electrography signal Bionic human referred to human being with bodily functions added or controlled by technology devices. In United States, approximately 171 per 100,000 people experience stroke each year. In the majority of these cases, people experience to partial absence of motion hand ability. An intelligent prosthetic hand mimics the natural movement of the human hand. The word "Bionics" is the combination of two words – "Bi" means 'life' and 'once' means 'electronics'. The bionic hand arm is the cure for handicapped person and it is also the boon for handicapped person. The bionic hand is an artificial device that replaces a missing body part, which may be lost through the trauma, disease, or congenital conditions. The prosthetics is intended to restore the normal functions of the missing body part.

II.LITERATURE REVIEW REPORT

A. *Modeling of Bionic Arms*

Method: The study report is made on the bionic arm modeling which work on the myoelectric signals which are converted in the mechanical energy used to move prosthetic arm.

The signal are converted from the brain by using microcontrollers and sensors. The modern equipment used are sensors. The combines' signal from the random signals goes to the brain.

Result: As the brain observes various signals to perform a wide range of functions pertaining to different system of human body any unknown system would require the training of brain. We have to program the controller so that it can identify which signals are extensively for the movement of the limb.

Conclusion: The ambition of the paper is to give a theoretical investigation of a concept which can be important lamented in practice. This would also help to glance about the boundary of prosthetic limbs which can only perform a limited action making user all the more conscious of their development deficiencies.

B. *Designed of Prodthetic Hand*

Method: The study report is made on the natural human hand which works on the myoelectric signals & mechanical equipment which make a prosthetic hand.

The signal is received by the organic sensors. Which are amplified by the microcontrollers and give signals to the mechanical parts concert to make a human hand. The movements of a fingers arm are controlled by the pressure sensors or flex sensor and gear motors and a sensory feedback system.

Fig1 shows the Anatomy of hand.

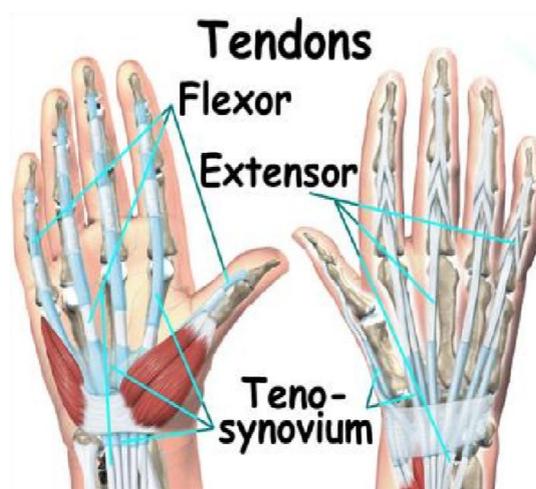


Figure1: Anatomy of hand

Result: -The prosthetic arm model uses the pressure sensors and a sensor feedback system hence the human hand works more like the natural arm but the signals vary from one person to another person and the sensor and system have to be designed as per the individual.

III. ROBOTIC ARMS

Methods: The report review gives the overview on the different prosthetic models that are generated by the different scientists and manufactures. In Fig2 we design the modern prosthetic hand demonstrating the modular assembly and aesthetic appearance of currently available prostheses in our project.

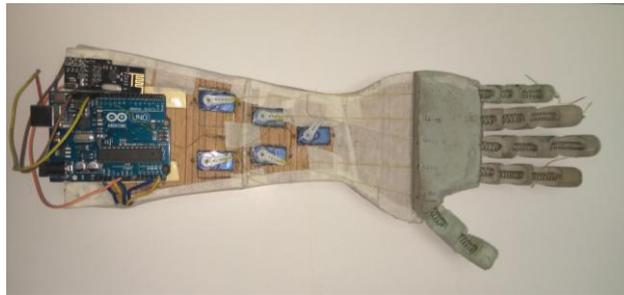


Fig2: The description of the limb hand as example of a modern prosthetic hand demonstrating the modular assembly and aesthetic appearance of currently available prostheses front size.



Fig3:The description of the limb hand as example of a modern prosthetic hand demonstrating the modular assembly and aesthetic appearance of currently available prostheses back side.

The report is done on various robot types: -

- a. Anthropomorphic Robots
- b. Articulated Robots
- c. Industrial Robots
- d. SCARA Robots



Applications:

- a. Deference
- b. Agriculture
- c. Medical
- d. Material Handling

Other Industrial Applications

Parts of Robotic Arms:

Actuators

Controllers

End effectors

Sensors

Driver

Future scope

Bionic arm is an artificial device that replaces a missing body part like eyes, nose, hands and legs, which may be lost through accident or trauma, disease or congenital conditions. The future development of prostheses will depend on the demand. Prosthetics are intentioned to restore normal functions of missing body part. First of all, naturel human fingers movements during grasping activities will be ahed calibrated in order to achiev a truly “human-like” behaviour of the artificial limb.Finally suitable control strategies will be calibrated and applied in order to developed a natural of the wearable hand.Future more varities and more flexible to or replace any part according to the prequirements can be make it more universal or flexibility.Specialist says that 50 percent of the human body is currently repla ceable with artificial emplacement and advanced prosthetics. Mechanical ingradient, inclusive the heart, lungs, pancreas, spleen, and kidneys, either currently are in advanced stages of development. There so many implants, like pacemakers and hearing aidsl, absolutely control, enhance normal body functions. The prosthticinnovations are often used thripty, primerily by amputees with private funding particulerly those who are competitive athletes.

IV. CONCLUSIONS

The Conclusion was made that mainly all the physical and physiological function are acquired by nervous system and virtually all neurons are similar component and principles to transmit information from sensor to effector.To make the review report on bionic arm as a prosthetic arm, various research papers and reports were studied. The result of the review report is basically that the researchers have made efforts to make this possible by developing more perfect and accurate prosthetic to match the need of the user which will help him to do daily works with the use of artificial limbs. In the feature bionic hand will preserve life of many human and given them new life with powerful organs which help them to get back to their ordinary life and also increase the prolongs life.

The side-by comparison showed that the customized body-powered arm provides reliable, comfortable, effective, powerful as well as subtle service with minimal maintenance; most notably, grip performance, center



of balance, component wear down, sweat/temperature independence and skin state are good whereas the limb system exhibited a number of relevant serious constraints.

REFERENCE

- [1] Richard F. ff. Weir, Ph.D., "Design of artificial arms and hands for prosthetic applications"
- [2] Chandra shekhar P. Shine, "Design of Myoelectric Prosthetic Arm", IJSET, ISSN 231 -5924 Volume 1, Issue 1, 2012, pp 21-25.
- [3] "DELSYS" "Fundamental concepts in EMG Signal Acquisition" by Gianluca De Luca Rev.2.1, March 2003.
- [4] B. Hudgins, P. A. Parker, and . N. Scott, "A new strategy for multifunction myoelectric control," IEEE Transl. J. Biomed. Eng., vol.40, no. 1, pp. 82–94, Jan. 93.
- [5] "Motion analysis of arm by use of myoelectric signal", Era, M.; Harada, H.; Ohbuchi, Y.; Yamaguchi, T. ICCAS-SICE, 2009, Publication Year: 2009, Page(s): 2023 – 2027.
- [6] J. G. Webster, "Medical Instrumentation: Application and Design", 3rd. New York: Wiley, 98, pp. 121–182.
- [7] Paul J. Biernmann."The Bionics: A Social and Functional Intereface". JOHNS HOPKINS APL TECHNICAL DIEGEST NUMBER3 (2011)
- [8] MichaelM. Bridges, Matthew P. Para, and Michael J. Mashner, "Control System Architecturefor the Modular Prosthetic Limb". JOHNS HOPKINS APL TECHNICAL DIEGEST NUMBER3 (2011)
- [9] James M. Burck, John D. Bigelow, and Stuart D. Harshbargere, "Revolutionizing Prosthetics: Systems Engineering Challenges and opportunities ","JOHNS HOPKINS APL TECHNICAL DIEGEST NUMBER3 (2011).
- [10] Matthew S. Johannes, John D Bigelow, James M Burck, Stuart D. Harshbarger, Matthew V. Kozlowski, and Thomas Van Doren, "An overview of the Developmental Process for the Modular Proshthetic limb". JOHNS HOPKINS APL TECHNICAL DIEGEST NUMBER3 (2011).