

Design and Implementation of Human Prosthetic Hand through Voice Recognition

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Abstract: Prosthesis is an artificial approach which is used to replace a disabled body part. Prosthesis is typically used to replace and provides implement disabled/defective body parts. Disabled body parts can be of any reason like lost accidentally, birth physical disability etc. In addition to the standard artificial hand for every-day use, many disable have special hand devices to aid in the participation of sports and recreational activities. The main requirement's function should be as natural as real arm. There are various designs of artificial arm that are available in the market categorized as electrical, mechanical, and Myo-electric arm. Mechanical prosthesis uses some motion of the body to provide the power necessary to control the prosthetic component. Electrical arms activate the hand by a motor which is driven by microswitches and relays. With an aging population and war veterans, the disabilities of a human being are increasing day by day. In prosthesis is finding their way into the lives of many individuals. The aim of the paper is to find cheaper solution for robotic prosthetic hand than the product found in market. Human innovations for any problems or disability should serve both poor and rich person of the world. Lack of money should not restrict the people to use advance technology. In this paper, a detailed design of voice and muscle controlled prosthetic hand is proposed. This paper will mostly on the development and manufacturing of the prototype of the prosthetic hand.

Keywords: Voice recognition, Bluetooth module.

I. INTRODUCTION

The history of prosthetics started with Egyptians who sees the exciting future of the technology. German mercenary Gotzvon Berlichingen got iron hand with advance technological benefit after losing his hand in the battle in 1508. Some of the historians also found the proof of prosthetic hands that are capable of generating feelings, but they were never confirmed. Earlier researches of Prosthetic hand go back to 1960's during the time people with amputation used some sort of plastic or wooden arms. There was no automation or movement at all. From then to now the basic operation of an ideal prosthetic hand remained the same. Although with the advancement of technology it became more reliable and more advance. There had been some researches around the robotic arms that can be operated from distance that was near to the real prosthetics. A prosthetic hand is an artificial device or a replacement of missing body part. A prosthetic arm is a fake arm for those who amputated their arm. Earlier arm reissued prosthesis mainly in battle to hold sword and shield. Modern prosthetic principles evolved after II world war. In 1949 first myoelectric switch was developed. Earlier body powered prosthesis components have not much changed because most of the research has focused one externally powered prosthesis and high cost of manufacturing also a prime issue.

The first microprocessor-controlled prosthetic knees became available in the early 1990s. The Intelligent Prosthesis was first commercially available microprocessor controlled prosthetic knee. Batch ford & Sons, Ltd., of Great Britain, in 1993 made walking with the prosthesis feel and looks more. natural. An improved version was released in 1995 by the name Intelligent Prosthesis Plus. Batch for released prosthesis, the Adaptive Prosthesis, in 1998[1]. The Adaptive Prosthesis utilized hydraulic controls, pneumatic controls, and a microprocessor to provide control action.

II. LITERATURE SURVEY

In this paper we have completely focused on prosthesis is an artificial approach which is used to replace a disabled body part. Prosthesis is typically used to replace and provides implement disabled/defective body parts. Disabled body parts can be of any reason like lost accidentally, birth physical disability *etc.* In addition to the standard artificial hand for every-day use, many disable have special hand devices to aid in the participation of sports and recreational activities. The main requirement's function should be as natural as real arm. There are various designs of artificial arm that are available in the market categorized as electrical, mechanical, and Myo-electric arm. In this system we mainly deals with the human prosthetic hand by wireless Bluetooth module which they can use by giving the voice of the user and connecting to Bluetooth by using this shows movement of the prosthetic arm.

III. METHODOLOGY

An artificial arm is a man-made device that is integrated into a human to replace a natural organ, for the purpose of duplicating a specific function so that the patient may return to normal life as soon as possible. New plastics and other materials, such as carbon fiber have allowed artificial arm to become stronger and lighter, limiting the amount of extra energy necessary to operate the arm. This technology has been used in both animals and humans. This artificial arm having servo motors each individually connected to the five fingers. These servo motors will help in controlling function such as extension and flexion. These movements will be controlled by the command signal generated from Arduino Uno according to the voice input received. Hence, the arm is controlled by using the command signal on a real time basis. The project proposes a Voice controller, to control the movements in the prosthetic arm. The prototype consists of two main parts the voice recognition and the prosthetic arm.

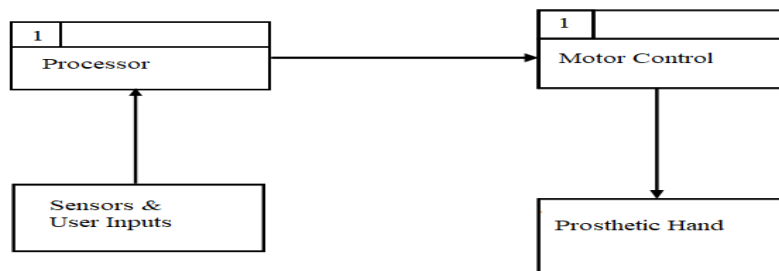
3.1 Advantages of Proposed system

- The voice-controlled arm is easy to handle
- Cost effective easy to use device

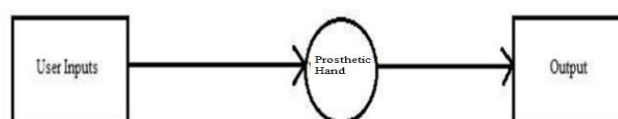
3.2 Objectives

- To receive the voice input
- To make device Economical.
- Self-controlled and operating facility.
- Controlling the Prosthetic Arm.
- Controlling the Home Automation

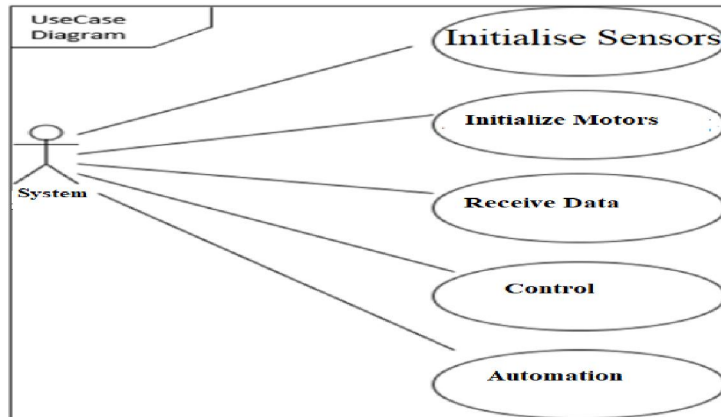
IV. DATAFLOW DIAGRAM



DATAFLOW DIAGRAM 1

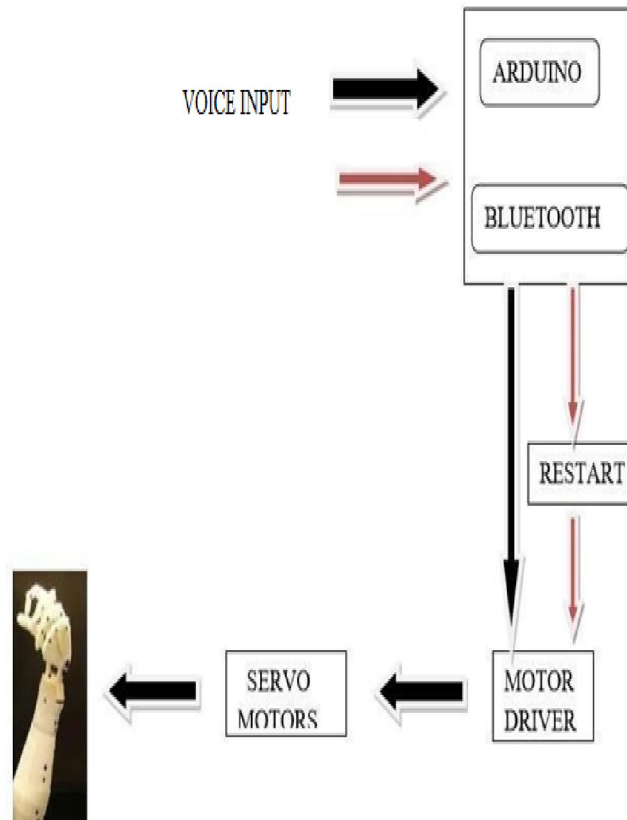


DATAFLOW DIAGRAM 2

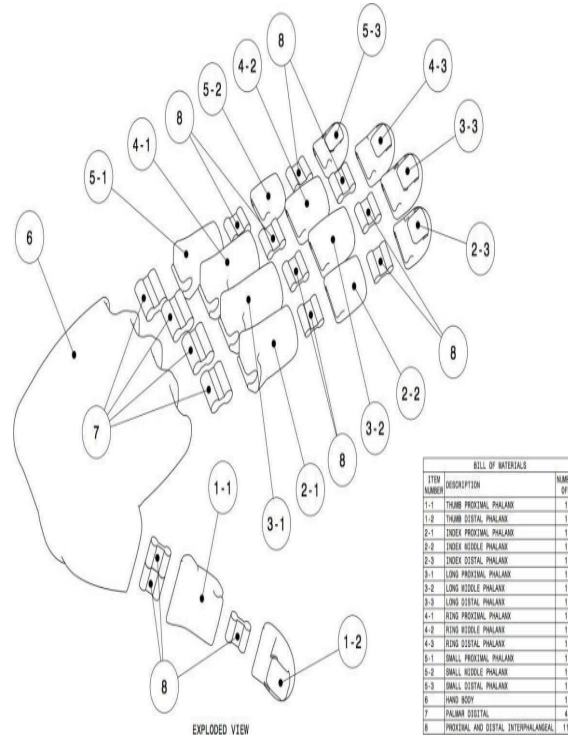


DATAFLOW DIAGRAM 3

V. SYSTEM ARCHITECTURE



VI. SYSTEM DESIGN



VII. CONCLUSION

The project proposes a mechanical completely active and multifunctional 3-D printed prosthetic arm imitating a normal human hand structurally and functionally. The aim of being able to perform general actions and activities as the normal human hand was met. A functional glove controller with prosthetic arm was successfully built. The glove controller was able to control the actions of the prosthetic arm in most appropriate way, not only the flexing action but the wrist motion was an added advantage for the gripping action of the object. The prototype built is a cost-effective model which can aid prosthesis is most efficient way. Thus, an anthropomorphic 3-D printed prosthetic arm was designed and developed meeting the aim of the project.

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