



Wheelchair Mounted Robotic Arm

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Abstract: Wheelchair mounted robotic arm(WMRA) is mainly aimed to meet the needs of mobility impaired persons with limitations of upper extremities and to exceed capabilities of current devices of this type. The entire system consists of two sections, an electric powered wheelchair and a robotic arm mounted on it. The movement of wheelchair and robotic arm is controlled by the user itself with a suitable user interface. Touch screen is used as the user interface. Touch screen has 2 parts one for the wheelchair and other for the robotic arm. The screen will be placed at the handle of the wheelchair. WMRA have the capabilities like grasping an object, opening a door, turning on switch and other activities of daily living.

I. INTRODUCTION

Wheelchair mounted robotic arm(WMRA) can enhance the capabilities of disabled person. It is difficult to accomplish many of the Activities of Daily Living(ADL) tasks with the WMRA currently on the market. This project attempts to overcome these difficulties and make a WMRA which helps in daily life activities.

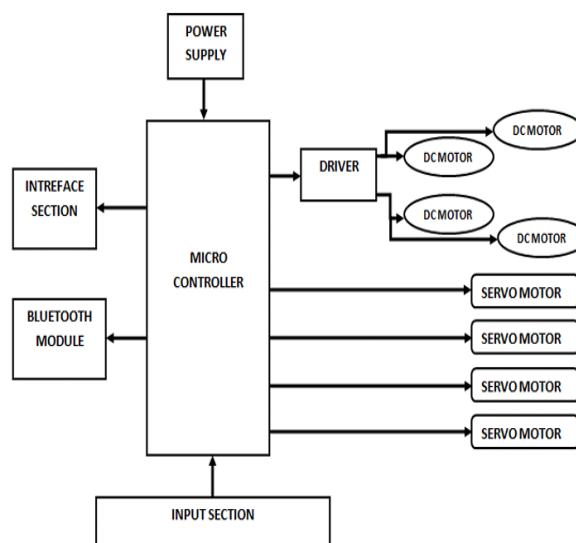
This work focuses on people who have limited or no upper extremity mobility due to spinal cord injury or genetic problems. Persons that can benefit from these devices are those with severe physical disabilities, which limit their ability to manipulate objects. These devices increase self sufficiency, and reduce dependence.

Since many persons with these disabilities require mobility assist devices, such as a power wheel chair, it is a natural platform for adding further mobility assistance. There have been several attempts in the past to create commercially viable wheelchair mounted robotic arms. The power wheelchair provides an excellent structure with which to mount the device. The system consists of two parts one is an electric powered wheelchair and other is robotic arm with four degree of freedom. The controlling of the system is done by an Android application. When the connection is established then data will be sent through the Android App. There will be control for both wheelchair and robotic arm.

II. BLOCK DIAGRAM

The proposed system is a combination of a wheelchair and a robotic arm mounted on it. The movement of wheelchair and arm movements are controlled by the user itself. The wheelchair is possible to move in four directions and arm has four DOF.

The controlling of the system is done through Android application. Initially a connection is established through bluetooth module to the system by the mobile android application.



III. CONCLUSION

A wheelchair-mounted robotic arm (WMRA) was proposed to meet the needs of mobility impaired persons, and to exceed the capabilities of current devices of this type.

The mechanical design incorporates DC servo controller with motors at each joint. The arm has sufficient degrees of freedom to meet the daily living activities of the disabled person.

Future scope will focus on overcoming the challenges to reduce the manufacturing cost. Future work also aims many factors like the weight of user, age of batteries, automatic control system, etc. Hence future work prioritizes on improving functionalities which allows to move the wheelchair mounted robotic arm without much interaction from user.



ACKNOWLEDGMENT

We are extremely thankful to our Principal **Dr.A.K Vasudevan** for giving us his consent for this Literature Survey. We are thankful to **Prof.Sushma M**, Head of the Department of Electronics & communication engineering, for her valuable suggestions and support. We are indebted to our Project Coordinator **Mr.Sugesh M S** and our guide **Ms.Sreeja P**, Asst. Professors, Dept. of Electronics And Communication Engineering for their constant help and support throughout the presentation of the survey by providing timely advices and guidance. We thank God almighty for all the blessing received during this endeavor. Last , but not least we thank all our friends for the support and encouragement they have given us during the course of our work.

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