

# [Abstract— from caregivers for their daily activities.](https://assignbuster.com/abstract-from-caregivers-for-their-daily-activities/)

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Abstract— Thisstudy has been conducted to reduce the physical and cognitive requirements ofpeople with wide ranging disabilities that limit their independent mobility.

Aprototype of the smart wheelchair system has been developed based on aconventional wheelchair that is commonly available in the market, with theaddition of related electrical and mechanical advancements. Voice and gesturecontrolling interfaces are deployed on this system in addition to theconventional joystick controlling interface to enhance its’ natural interactionwith the user. Moreover, an obstacle avoiding system is used to ensure thesafety of the user.

This paper describes our design and discusses the currentstatus of the developed system prototype. Keywords—Power wheelchair, Smartwheelchair, voice control, Gesture control, Obstacle avoiding system                                                                                                                                                               I.      Introduction The degradation of mobility is oneof the major issues that degrade the independent living ability ofelderly/disabled people. They need assistance from caregivers for their dailyactivities.

But today the gap between the supply and demand of caregivers iswidening and developing of devices that can support the elderly/disabled peoplein their day-to-day life has a great importance. According to several studiesthat have carried out previously, both children and adults get benefit from achievingaccess to a means of independent mobility 1, 2. Independent mobilityincreases vocational and educational opportunities for people while reducingdependence on caregivers and promotes feelings of self-reliance. For children, independent mobility acts as the foundation for their early learning. Non-ambulatory children lack access to the wealth of stimuli affordedself-ambulating children. This causes deprivation and reduced motivation thatmay lead to learned helplessness. For adults, independent mobility is animportant aspect of self-esteem. Due to these facts, mobilityassistive devices such as robotic wheelchairs are being developed recently 3, 4, 5, 6, 7.

Most of the commercially exiting robotic wheelchairs areequipped with controlling interfaces like joystick. However, human friendlyinteractive interfaces are preferred by elderly/disabled people instead of lowlevel controlling interfaces with limited abilities because of their ability tomaintain natural interaction with the users 8. Further, people withrestricted muscle movements may not be able to command the conventionaljoystick controlled wheelchairs. Due tothese reasons, smart wheelchairs with more interactive features and alternativecontrolling interfaces for conventional joystick, has been a topic for manyresearch projects in recent years. But few researches have been successfullytransformed into a commercial product. Furthermore, none hasintegrated more than one controlling interfaces on a single power wheelchair. Our aim is to develop a commerciallyviable smart wheelchair system with voice and gesture interface for controllingin addition to the conventional joystick.

This system will reduce the physical and cognitiverequirements of people with wide ranging disabilities that limit theirindependent mobility. This smart wheelchair is based on a most commoncommercially available conventional wheelchair transferred into a powerwheelchair system with the addition of three control modes and an interfacemodule interposed between the different control modes and power module of thewheelchair. Since this wheelchair will be used by elderly/disabledpeople, a safety concern is provided by deploying an obstacle avoiding systemusing a set of ultrasonic sensors attached to the wheelchair which will detectany obstacle and stop the wheelchair movements at a given distance despite ofany user command. So it can bebelieved that, this smart wheelchair will eventually enhance the rapportbetween the human users and the assistive robotic aid in order to uplift the lifequality of elderly/ disabled people.