Department of Electrical and Computer Engineering
NORTH SOUTH UNIVERSITY

Senior Design Project
Summer 2022

[HAND GESTURE CONTROLLED WIRELESS – SMART WHEELCHAIR]

Supervisor

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Submitted By

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Agreement Form

We take great pleasure in submitting our senior design project report on "Hand Gesture Controlled Wireless-Smart Wheelchair'' This report is prepared as a requirement of the Senior Design Project CSE/EEE/ETE 499 which is a two-semester long design course. This course involves a group of students who build and test custom designed systems, components or engineering processes. We would like to request you to accept this report as a partial fulfillment of Bachelor of Science degree under Electrical and Computer Engineering Department of North South University.

Declared By:

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Contents

Abstract

Wheelchair has been an important assistive device and the demand are ever rising because of the increasing physically handicapped and old age populations. In recent time, overall all of people in the world, approximately 1.85% of them require a wheelchair especially from the group of elderly and disabled people for their mobility. Earlier the wheel chairs had to be moved and be externally supported by any person. The recent development in the robotics artificial intelligence extends vast scope for developing the more advanced and intelligent one to overcome limitations of the existing traditional wheelchairs. Here we have developed a “hand gesture-controlled wireless wheelchair” which can be moved with a slight tilt of the hand. This can be used in both hands and can be controlled by the user from a distance. Here we are offering an upgraded smart wheelchair that allows paraplegic people to navigate utilizing modern technologies with ease. The technology uses Arduino based devices such as Arduino UNO and Arduino NANO processors and programmed through Arduino IDE. The wheelchair control unit is be developed by integration of ATMEGA328 microcontroller with Arduino UNO and Arduino NANO. Here are using ADXL345 Triple Axis Accelerometer as motion and direction controller and for the wireless communication we are using NRF24L01 wireless transceiver module. We also added ultrasonic sensors which detect any harmful objects in the front and back side. This smart wheelchair has been developed to allow people to move safely and put reliability in accomplishment of all kinds of important tasks in daily life.

Keywords: Hand gesture control, NRF24L01 wireless transceiver module, Arduino uno, Arduino NANO, ATMEGA328 micro controller, ADXL345 Triple Axis Accelerometer, Ultrasonic sensor.

Introduction

According to the WHO, 16 million Bangladeshis are paralyzed. Approximately 10% of the country's overall population is represented here. The majority of the time, it is difficult for those with disabilities to go from one location to another without assistance. Therefore, it is essential to develop a system that would improve and increase the flexibility of their lives. Typically, paralyzed individuals use a "manual wheelchair," which requires the assistance of another person to propel the user. We have designed a wheelchair-capable machine that is significantly more practical and efficient than the conventional option. Any portion of the body can propel a wheelchair. Our objective is to reduce the amount of time and money needed on system maintenance while making it possible for individuals with disabilities to move about independently and safely.

Technical Details