Abstract

This thesis focuses the development of a semi-autonomous wheelchair for mobility restricted individuals. The main objective was to develop an autonomous wheelchair to aid and improve the quality of life of mobility restricted individuals at an affordable price compared to the autonomous wheelchairs available in the market today. The low cost objective was achieved when developing the wheelchair but at the expense of exclusion of motorized mobility.

Autonomous wheelchairs have improved the functionality of the standard wheelchair by introducing multiple features in order to ease the operation of the standard wheelchair. Depending on the features introduced the autonomous wheelchairs can be categorized into power wheelchairs and smart wheelchairs. Power wheelchairs are only capable of motorized mobility whereas the smart wheelchairs are more user oriented and addresses specific needs of the patient while providing motorized mobility.

Even though the autonomous wheelchairs are capable of improving the quality of life of disabled individuals, it comes at a greater cost. The starting price of a semi-autonomous wheelchair is approximately USD 1500 (LKR 217000), whereas the price of a standard manual wheelchair is around USD 65 (LKR 9000). The large increase in price makes it unable for every disable person to enjoy the benefits of the autonomous wheelchairs as the monthly income of a disabled person in Sri Lanka is approximately USD 1 (LKR 145).

The developed semi-autonomous wheelchair was designed based on the standard manual wheelchair and features 3 main functions; wheelchair user monitoring, communication and control and power assist systems. These system work in tandem to carry out the functionality of the semi-autonomous wheelchair as expected.