

DEVELOPMENT OF AN ELECTRIC VEHICLE FOR THE DIFFERENTLY ABLED WITH SOLAR ASSIST

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A wheelchair is a necessary assistive device for differently abled people to improve their independence, mobility, and quality of life. Manual wheelchairs suffer a huge mechanical efficiency loss with the risk of discomfort and damages to the upper limbs and spine. The best way to overcome the imperfection in the mechanical working is to finding an alternative using electricity with mobility impairments. A survey-based study suggests that the differently abled suffer in handling the joysticks thus, reluctance towards such power sources. Indeed, this work is concerned with improving the traveling distance using a solar assist system while introducing a smart-phone based controlling mechanism which with the modified version of joystick application. A research gap has been identified in terms of portability while powering them two modes. The difficulties in handling the joystick are also clearly addressed using a Bluetooth data transmission. The project aims at achieving the maximum velocity of 12 kmph with the solar assist and smart phone control. In construction, a manual wheel chair with adjustable back rest has been chosen and a solar panel has been mounted as a roof while incorporating a 24V motor. The mathematical calculations revealed that the system requires 355W of motor power along with 25Nm torque while producing 133 rpm. The developed unit has been tested for power usages namely, battery power alone and dual powered mechanisms. The maximum speed achievable at the given condition was reported as 8km/h. The system was capable to cover 24km using the battery power source, in the meantime, 27km using both the battery and solar assist. The unit achieved an improved range with the dual source power supply thus, covering nearly 3.5 km of additional range compared to a system powered by battery only. This confirms that the power from solar increased the traveling distance while making portable and easily dismantlable solar panel frames. The major limitation noted is with the time of charging. It is suggested to investigate on improving the charging potentials. Overall, the present study provides an effective method of expanding motorized wheelchair travelling distance. The research suggests the importance of maintenance due to chain transmission system. Moreover, it opens the area for more investigation in terms of minimizing the weight of the system.

Keywords: Battery powered, Electric powered wheelchair, Handicapped assist, Smart phone control.