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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 damage to the upper limbs and spine. The best way to overcome the imperfection in mechanical working is to find an alternative using electricity with mobility impartments. 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 travelling distance using a solar assist system while introducing a smartphone-based controlling mechanism with the modified version of the joystick application. A research gap has been identified regarding portability while powering them two modes. The difficulties in handling the joystick are also clearly addressed using Bluetooth data transmission. The project aims at achieving a maximum velocity of 12 km/h with solar assist and smartphone control. In construction, a manual wheelchair with an adjustable backrest has been chosen, and a solar panel has been mounted as a roof while incorporating a 24 V motor. The mathematical calculations revealed that the system requires 355 W of motor power and 25 Nm torque while producing 133 rpm. The developed unit has been tested for power usage: battery power alone and dual-powered mechanisms. The maximum speed achievable at the given condition was reported as 8 km/h. The system could cover 24 km using the battery power source and 27 km using both the battery and solar assist. The unit achieved an improved range with the dual-source power supply, thus covering nearly 3 km of additional range compared to a system powered by battery only. This confirms that the power from solar increased the travelling distance while making portable and easily dismantlable solar panel frames. The major limitation noted is the time of charging. It is suggested to investigate 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 the 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, Smartphone control