

Solar based Electric Wheel Chair

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Abstract - This essay examines a wheelchair for handicapped individuals in rural South Africa that is inexpensive and powered by solar energy. On the market are manual wheelchairs that constantly need an able-bodied person to help the impaired person steer. When the battery in another type of wheelchair becomes low, power is used to recharge it. In rural places, electricity is costly and in short supply. The wheelchair frame, solar panel, DC motor, charging controller, switch, and wheels are the wheelchair's primary parts. People are converting to renewable energy sources for their needs, and since solar energy is abundant and cheap, automating a wheelchair with the aid of that electricity can help of power generated by solar energy. It can lower total fuel costs, change to be more environmentally friendly, and place a cap on automation. The suggested design is cheap for low-income earners in nations like South Africa and highly helpful for physically challenged persons living in rural regions. The wheelchair is affordable, easy to use, independent, and self-propelled. The solar-powered wheelchair will greatly improve daily mobility for those with physical disabilities in both urban and rural settings.

Keywords: Solar panel, Battery, PIC microcontroller, DC Motor

I. INTRODUCTION

Physical disability is increasing due to aging, mishaps and different sicknesses like loss of motion. Hence, the utilization of wheelchair is expanding. So, they need the assistance of others to move the wheelchair from one spot to the next. The android controlled wheelchair can beat these issues for the most part by carrying out the wheelchair utilizing android application; presently a day's android cell phones are regularly utilized. The wheelchair will be worked with the voice orders and signal as sources of info, which gives the headings as client coordinates. This wheelchair has acquired autonomous presence on the grounds that the Arduino serves to incognito the voice orders into yields and the wheelchair can move openly. Alongside this a ultrasonic sensor is utilized to distinguish the deterrents. By the proposed approach, the wheelchair will be dealing with the data sources, for example, voice, motion and contact by means of an android telephone that moves the wheelchair as indicated by the orders gave. It assists the genuinely crippled and matured individuals with moving the wheelchair freely with practically no outer help this undertaking is more important to the advanced society in setting of spying and reconnaissance. The undertaking points in planning a Wheel seat that can be worked utilizing Android cell phone. The controlling of the Wheel seat is done remotely through Android application utilizing the IOT include present in it. Here in the task the Android advanced mobile phone is utilized as a controller for working the Wheel seat. The control gadget of the entire framework is a Microcontroller.

IOT module, DC motor is connected to the Microcontroller. The information got by the IOT module from Android cell is taken care of as contribution to the regulator. The regulator acts likewise on the DC motor of the Wheel seat. In accomplishing the errand, the regulator is stacked with a program composed utilizing Embedded 'C' language. Related reference articles carrying out remote control of wheel seats have been concentrated as referenced. Still there exists a prerequisite of a practical robotization framework, which will be not difficult to carry out. An illustration of such a savvy project has been proposed here. A wheel seat is an electromechanical machine that is constrained by PC program to perform different tasks. Modern wheel seats have intended to diminish human exertion and time to further develop efficiency and to lessen fabricating cost. Today human-machine cooperation is creating some distance from mouse and pen and turning out to be significantly more unavoidable and considerably more viable with the actual world. Android application can handle the wheel seat movement from a significant distance utilizing IOT correspondence to communicate regulator and android. Microcontroller PIC 16F877 P-PU can be communicated to the IOT module however UART convention and code is written in installed C language. According to the orders got from android application the wheel seat movement can be controlled. The result movement of a wheelchair vehicle is exact and repeatable. Pick and Place wheel seats can be reprogrammable and instrument can be traded to accommodate different applications. The motivation behind this work is to plan and execute an Android Controlled IOT Wheel seat which is utilized for Surveillance, home mechanization, wheelchairs, military and prisoners Rescue applications.

II. EXISTING SYSTEM

A reliant client acknowledgment voice framework and ultrasonic and infrared sensor frameworks has been

coordinated in this wheelchair. In this manner we have acquired a wheelchair which can be driven with utilizing voice orders and with the chance of staying away from snags and ground floor or opening discovery. The wheelchair has additionally been created to permit independent driving (for instance, following dividers). The venture, in which two models have been delivered, has been completed absolutely in the Electronics Department of the University of Alcalá (Spain). It has been financed by the ONCE. Electronic framework setup, a sensor framework, a mechanical model, control (low level control, control by voice orders), voice acknowledgment and independent control are thought of. The consequences of the analyses did on the two models are additionally given. The undertaking incorporates electronic eye development controlled wheelchair which is executed for the handicapped individual. Measurements recommend that there are around 40 cases for each million of quadriplegia (Paralysis of four appendages) consistently. Individual experiencing quadriplegia can't work the average wheelchair accessible for handicapped individual. As an endeavor to make lives of individuals experiencing this peculiarity straightforward, the undertaking targets utilizing eye understudy development to control wheelchair.

The web camera connected to the PC put on the wheelchair of the client will catch the picture of the eyes. These eye developments are handled utilizing MATLAB programming and sequential orders are shipped off Arduino circuit which then, at that point, controls the engine joined to the Wheelchair. Ultrasonic sensor is utilized to distinguish obstruction in the way of wheelchair. An extra eye squint controlled camera is connected to the wheelchair utilized for catching unconstrained pictures while meandering. This project thus makes the existence of the incapacitated individual less difficult and wipes out the need of help needed for them. This paper is to foster a wheel seat control which is helpful to the actually handicapped individual with his hand development or his hand motion acknowledgment utilizing Acceleration technology.

III. CONVENTIONAL WHEEL CHAIR

A wheel chair is a precisely worked gadget that permits the client to move about freely. This limits the client's very own work and power needed to move the wheelchair wheels. Moreover, it permits outwardly or genuinely debilitated individuals to move between different locations. Voice orders and fasten controls can be utilized to work wheelchairs. Lately, there has been a great deal of interest in savvy wheelchairs. These contraptions are extremely helpful while going starting with one area then onto the next. The gadgets can likewise be used in nursing homes where the old experience issues moving about. For people who have lost their portability, the devices are a blessing.

IV. SOLAR BASED ELECTRIC WHEEL CHAIR

Solar energy is used to recharge the battery. The battery is protected from overcharging by a battery charge controller or charge regulator. The direction controller and battery bank are both linked, and table 1 depicts the direction controlling procedure. When the joystick is moved to the left, the DC motor R travels ahead while the DC motor L is immobile and cannot spin to the left. Both motors travel forward when the joystick is moved forward, providing a forward speed. When the joystick is pointing in the correct direction, DC motor L advances while DC motor R does not move to spin in the proper direction. Both of the joystick's motors go backward while it is being moved rearward by a driver.

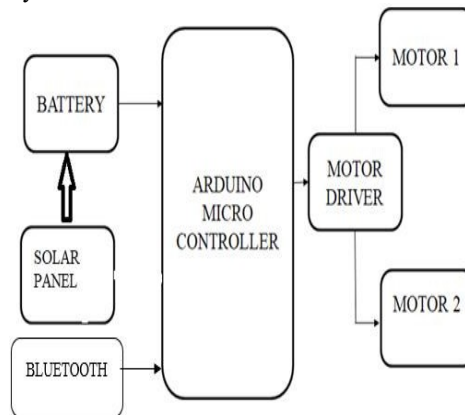


Fig.1. Block Diagram

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A solar cell panel, solar electric panel, or solar panel, also known as a photo-voltaic (PV) module or PV panel, is an assembly of photovoltaic solar cells mounted in a (usually rectangular) frame.



Fig.2.Solar Panel



Fig. 3. Battery

Solar panels capture sunlight as a source of radiant energy, which is converted into electric energy in the form of direct current (DC) electricity. A neatly organized collection of solar panels is called a photovoltaic system or solar array. Arrays of a photovoltaic system can be used to generate solar electricity that supplies electrical equipment directly, or feeds power back into an alternate current (AC) grid via an inverter system.

The lead-acid battery is a type of rechargeable battery first invented in 1859 by French physicist Gaston Planté. It is the first type of rechargeable battery ever created. Compared to modern rechargeable batteries, lead-acid batteries have relatively low energy density. Despite this, their ability to supply high surge currents means that the cells have a relatively large power-to-weight ratio. These features, along with their low cost, make them attractive for use in motor vehicles to provide the high current required by starter motors.



Fig.4. PIC Board

PIC 16F877 is one of the most advanced microcontroller from Microchip. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. This is easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC architecture into a 40- or 44-pin package and is upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming. A microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals.



Fig.5. Bluetooth

V. HARDWARE IMPLEMENTATION



Fig.6.Hardware Module

VI. CONCLUSION

The "Solar Powered Wheelchair" project has been created effectively, and it has met its goals and objectives. With the use of solar electricity, it is possible to regulate the wheelchair mobility for those with disabilities. The wheelchair can be improved by using battery-free direct solar power. The automated "Solar Powered Wheelchair" was created with a microcontroller ATmega16 and sets of relays for direction control, and it may be effectively used on a large scale by the physically challenged and the elderly. The automated wheelchair makes it easier for persons with severe disabilities to live simple lives. The general public actually benefits from this automated wheelchair's affordable assembly cost. The idea might be expanded to include a wireless system. Additionally, sensors can be put in various front, rear, and left parts. It is also possible to implement intelligent home navigation so that elderly or disabled individuals may navigate their way through the entire house with the aid of a technology interface.

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