

SOLAR POWERED ELECTRIC WHEEL CHAIR

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ABSTRACT

This project is based on solar powered electric wheelchair for physically handicapped people. A user friendly interfacing voice recognition system and obstacle detector sensor and Keypad system has been integrated in this solar powered wheelchair. In this way we have implemented a solar powered wheelchair which can be controlled using voice commands and Keypad with the possibility of detecting obstacles by using obstacle detector sensors. In this wheelchair Keypad is provided for handicapped person for moving easily his/her hand. This project indicates great success not only in business sector but also it helps disabled people for better life. This project contains electronic system configuration, a sensor system, a mechanical model, voice recognition control and Keypad control are considered.

KEYWORDS: solar panel, battery, wheels, voice recognition module and DC motors.

Abbreviations

PIC	Peripheral Interface Controller
IR	Infrared Radiation
DC	Direct Current
CM	Centimeter
RPM	Revolution Per Minute

the lives of many handicapped people, particularly those with severe impairments by increasing their range of mobility. Old wheelchairs were not automatic operated. The handicapped people who don't have legs can be move the wheelchair by using his hands. But the people who don't have hands as well as legs cannot move their wheel chair himself. They need some other person to move their wheel chair. But sometimes such person suffers from so many problems when they didn't get any person to move their wheel chair.

This project "Solar Powered Electric Wheelchair" aims to overcome the above mentioned problem. In this project we are going to implement a solar wheel chair which can be controlled manually as well as automatically. In this project Keypad is provided for smooth operation of chair. By using Keypad the user can move the chair in the direction it wants to move. In automatic control user just need to operate the Keypad for saved destination.



Photograph 1.1: Wheelchair Model.

I. INTRODUCTION

Now days electric wheelchairs extend the capabilities of traditional powered devices by introducing navigational intelligence and control. This type of wheelchairs can ease

Then the wheel chair will automatically move into the direction of saved destination by using encoder wheels. This chair also provide the another feature for those people who don't have hands as well as legs to control the chair. i.e. it can be operated on voice. The proposed Voice Recognition Based Wheelchair Operation allows physically handicapped person to control the wheelchair easily without the need to use hands and legs. Solar panel is provided on the top of the wheelchair for charging the battery which is required for the operation of chair. When user gives the command with respect to stored command then respective coded digital signal would be sent to the microcontroller and then which controls the chair.

II. LITERATURE SURVEY

Now a day many physically disabled people are struggling for their daily life. Manually operated wheelchairs do not fulfill their requirements. The physically disabled people who do not have hands and legs which requires one more person to move the wheelchair. In the society there are many old people who are not able to move from one place to another due to their body weakness. Today wheelchairs are having low efficiency, higher cost, requires more man power and higher maintenance. Most significant technical problem in the currently available wheelchairs is accuracy versus cost. Absence of wheelchairs for particular disability is also a considerable big issue. Also, today systems are not suitable to monitor the surrounding conditions and the health condition of the patient. No wheelchairs are available for mentally challenged people also. One other drawback of present day wheelchairs is it cannot sense the barriers comes in the front side and backside of the chair.

III. SYSTEM DEVELOPEMENT

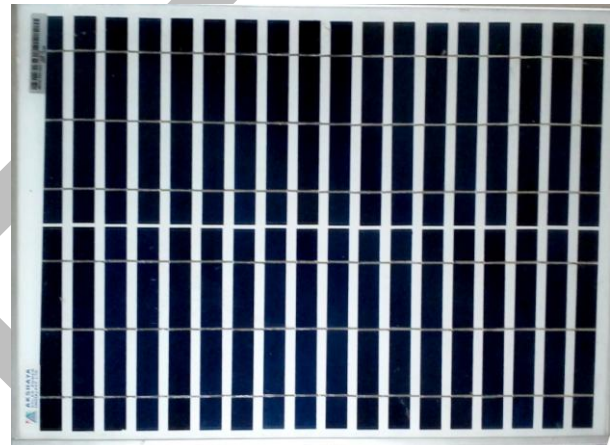
3.1 SOLAR WHEELCHAIR

The solar wheelchair is made up of BLDC motor, a battery, wheels, solar panel. The Solar panel is a charging system which charges the battery while in operation. The D.C. motor forms the heart of the machine and provides the driving force for the drives the wheels. The system is powered by an electrical switch which completes the circuit comprising the BLDC motor and the battery. The IR sensor is finding the path to avoid the obstacles and machine damage. The shaft fitting mechanism with wheels of motors.

Solar Wheelchair are based on the use of small but powerful engine that provides enough torque to carry the weight of person. The IR sensor is located on the base that prevents barriers which are present in the way of wheelchair. In most cases, the motor is situated separately from the wheels with the help of chain but in solar

wheelchair motor is in direct contact with wheels. There also a mechanical support is provided for balance the chair. It uses the photovoltaic panel to generate the energy needed to power the solar wheelchair. Given Photograph 3.2 shows the solar panel structure. The solar panel is having following specifications:

1. The power rating of the panel is 20 watt.
2. The length of panel is 34 cm and width of the panel is 26 cm
3. Height of the panel from base is 5.5 feet.
4. The material used is corrosion resistance.



Photograph 3.1: Solar Panel.

3.3 CONTROLLER UNIT

Fig. 3.1 shows the block diagram of the solar powered wheelchair. The block diagram consist of various components like PIC 16F877A which is the heart of this system which contains program to give command to the relay.

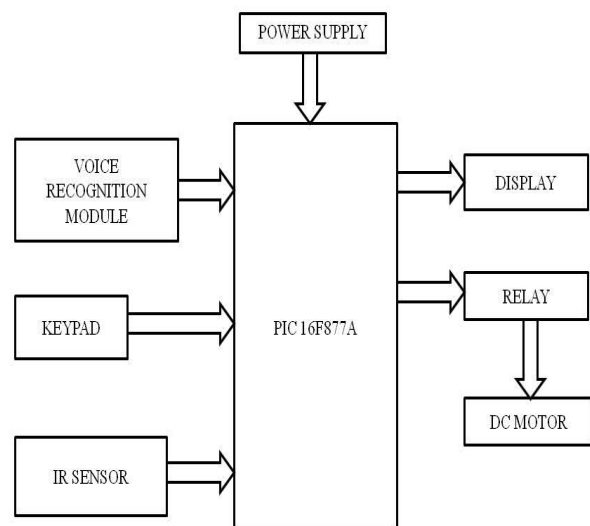
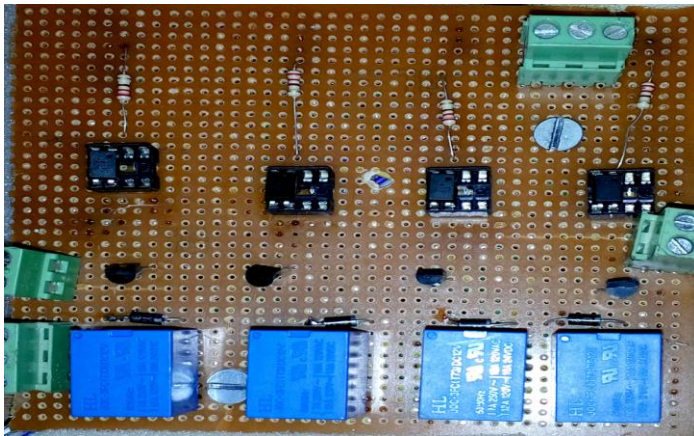


Figure 3.1: Block Diagram.

The relay is used for the controlling the motor direction as forward and backward as per the user requirement, by switching the relay with the help of PIC controller. Following photograph 3.3 shows the relay controller circuit.



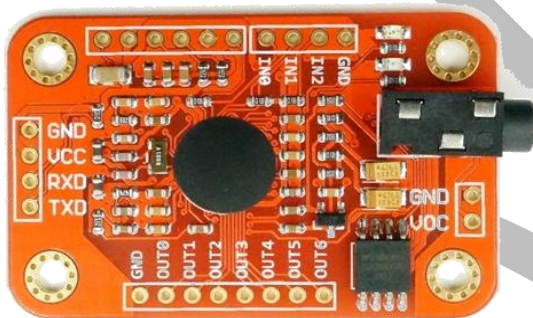
Photograph 3.2: Relay Circuit.



Photograph 3.4: BLDC Motor.

3.4 VOICE RECOGNITION MODULE

Voice recognition module is the speech recognition sensor. This module can control the wheelchair by the user voice commands like forward, backward, left, right and stop. We can store command up to 80 in this module.



Photograph 3.3: Voice Recognition Module V3

FEATURES:

1. Recognize maximum 7 voice commands at same time
2. Store maximum 255 records of voice
3. Group control and external group select pin
4. Auto load records when power on
5. Signature function, help to make out voice record
6. LED indicate

BRUSHLESS DC MOTOR

In order to make the operation more reliable, more efficient, and less noisy the recent trend has been to use brushless D.C (BLDC) motors. They are also lighter compared to brushed motors with the same power output. This article gives an illustrative introduction on the working of BLDC motor.

SPECIFICATIONS OF BLDC MOTOR:

1. The rated speed of the motor is 150 rpm.
2. The rated torque of the motor is 109 kg-Nm.
3. It has high starting torque.

IV. RESULT



Photograph 4.1: Project Model

V. CONCLUSION

We are going to implement a solar powered wheelchair which has various advantages. This wheelchair operates in two different modes i.e. Keypad mode and voice recognition mode. Therefore on the basis of hospital

survey and society survey we implement a best design of wheelchair for physically handicapped people. This Wheelchair is economical and affordable to common people. We have also added a new technology in this wheelchair i.e. such wheelchairs operates on the solar system. Two infrared sensors are connected to detect the obstacle. The running cost of this system is much lower as compare to other systems used for the same purpose.

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