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The Solar Panel Cleaning Droid

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Abstract: This paper is to design and execute a solar panel cleaning robot(droid) which can self charge its battery by which the accumulated dust on the PV panels could be clean.
Keywords: Solar cells, solar panel, Arduino -microcontroller, LDR sensor, L293D driver IC, IR sensor

I.   INTRODUCTION

As the cost of the electricity is mounting upand consternation about the environmental impact of fuels such as fossil fuels, so accomplishment of solar power is rising. The main method for harnessing solar power is with arrays made up of photovoltaic panel.After the invention of the PV cell the solar technology which use the solar energy to generate electrical energy. The renewable energy usage is growing acrossall the areas with the implementation of PV panel. There are number of solar panel connected in an array.

II.   METHODOLOGY

Now the major problem arises with the implementation of number of solar panel is their preservation and cleanliness. The cleaning of number of solar panels that are tied up in a procession is a quit difficult task and it is so time consuming which leads to lots of money and man work. To perpetuate the output efficiency of the solar panel, it is so mandatory to clean the panel thoroughly in proper manner. By using this robot the problem would be solved. Hence, it will ease the man power and will save the time.
After giving power supply to robot will not start cleaning until and unless it is requested to do so. A small PV panel is install in robot to charge the battery. The battery will charge only in day time only with the use of solar panel. In the day time, solar panel will sense the rays of sunlight with the help of Light Dependent Resistor (LDR) and IR sensor. And check whether it is required to cleanse the solar panel or not. As soon as the sun rays reaches the panel is diminishing, it means that the number of photons is also and further abates the flow of the electrons. Consequently, the output of the solar panel and efficiency diminishes. On this account, the cleaning is required in order that the sensor will give the signal to start.

III.   ELECTRONICS

We are using two sensors LDR and IR. The IR sensor execute first and then the LDR sensor. The IR sensor check whether it is a day time or else a night. Afterward the LDR sensor will give signal to rotate to clean solar panel. The main purpose of the IR sensor is only that it will sense the time so that it will abstain from the unwanted cleaning. There are two switches on the either side of the robot(i.e. On left and on right). These switches function is when the robot starts to move over the panel from left toward the right, then it will come across the obstacle which is present near the switches, and it will slightly come backward and stop. Then the sensors will check whether the solar panel is cleaned out or not. And if not then it will again starts moving from where it is stopped towards the opposite side. Whenever there is dust on the solar panel the sensor will detect it and then the sensors will starts their work.

IV.   PROGRAMMING

This entire functioning is done through programming.
1)   After setting on the power supply , the arduino and L293d driver IC will be ON, and it will run continuously as the battery is connected through it.
2)   The arduino microcontroller will check out the output for the IR sensor, whether it is day or night.
3)   If the output from the IR is High the remaining program will not execute and robot won't clean the solar panel.
4)   If the output from the IR sensor is Low the controller will execute the remaining program.
5)   In the above condition, after monitoring the output of the IR sensor is low, the controller will check the output from the LDR sensor.
6)   If the LDR output is High, it means that the dust is accumulated on the solar panel and and it is required to clean it.Then the robot will start moving and the bristle also rotates and it will start cleaning the solar panel.
7)   If the LDR is low and which means that the dust is not accumulated on the solar panel and the robot will be on stand still condition.

V. CONFIGURATION

The body of robot is made up of dc motors, two dummy robots which are installed at the four corners of the robot.The motors are fixed to robot the blisters and base motor which moves robot in forward and backward direction. Here, we are using Arduino.C software for the working of robot. Acrylic material which is intervening in weight, is durable, and economical. The robot consists of two DC motors, two dummy wheels which are installed at the four corners of the robot.

VI. CONCLUSION

To review the prosecution of design on this project is successfully bring about by guidance, efforts, and courage.As the research is demonstrated, the solar panel cleaning robot is must needed. This research is important because it could save the time and man work. By using the LDR and IR sensors it is more reliable for the robot to the cleaning the solar panel . As a result the efficiency of solar panel will remain constant.
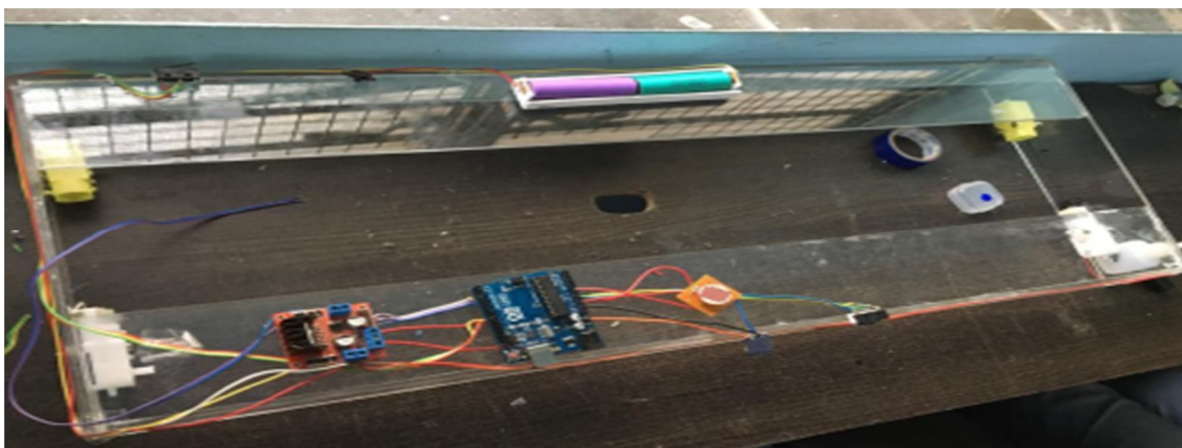
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