

Design and Prototype Of Automatic Solar Panel Cleaner

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PROBLEM STATEMENT

The automatic solar panel cleaner project aims to address the challenge of maintaining optimal efficiency and output from solar panels by developing a system that can automatically clean the panels on a regular basis. The accumulation of dust, dirt, and other debris on solar panels can significantly reduce their efficiency, leading to lower energy production. Manual cleaning of solar panels is time-consuming, labor-intensive, and not feasible for large-scale installations, making an automated solution necessary.

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INTRODUCTION

The "Automatic Solar Panel Cleaner" is a project aimed at developing a system that automates the cleaning process of solar panels. The primary objective is to enhance the efficiency and performance of solar panels by removing dirt, dust, and debris that can accumulate on their surface over time. The project seeks to address the challenges of manual cleaning, such as time-consuming and labor-intensive tasks, by implementing an automated mechanism that ensures regular and effective cleaning of solar panels. The system aims to maximize the energy output of solar panels, ultimately contributing to the sustainable utilization of solar power.

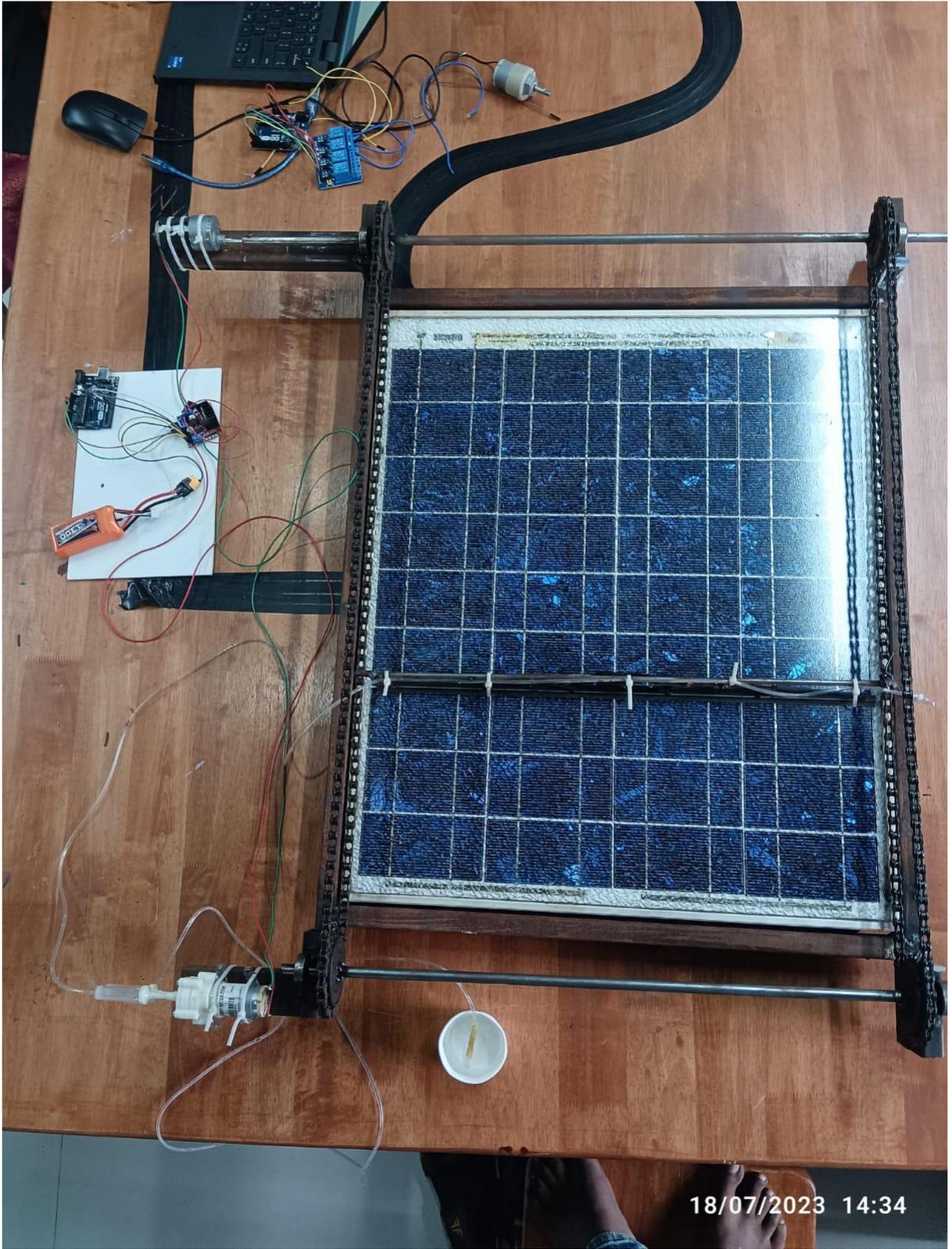
The "Automatic Solar Panel Cleaner" project incorporates a chain and wiper mechanism, driven by a motor and relay, to effectively clean solar panels. The system utilizes an Arduino UNO board to control the various mechanisms. A metallic frame supports the chain and wiper mechanism, ensuring stability and precision during cleaning. Instead of relying on sensors, the system operates based on a programmed sequence of actions on the Arduino. A pump is integrated into the setup to provide a water spraying function, with small holes in the pipes serving as water spraying agents. This comprehensive design allows for an automated and efficient cleaning process without the need for additional sensor technology.

The successful implementation of the "Automatic Solar Panel Cleaner" project would lead to several positive outcomes and future scopes. Firstly, it would improve the overall energy generation efficiency of solar panels by ensuring their optimal cleanliness, resulting in increased power output. Additionally, the automation of the cleaning process would reduce the need for manual labor and maintenance costs associated with regular panel cleaning, making solar energy more economically viable. Furthermore, the project could open doors for advancements in robotic or AI-based cleaning systems and intelligent technologies in the field of solar panel maintenance. Overall, this project holds the potential to enhance the long-term viability and widespread adoption of solar power as a clean and sustainable energy source.

IDEA GENERATION

1. When the dust is accumulated on solar panel then turn on the switch button to supply the current.
2. Then the Arduino is powered up, initially the DC motor cannot run only with the help of Arduino for this reason Motor Driver L298N is used which drives the motor.
3. Here the chain mechanism is used where the motor is connected to the free wheel which drives the chain and the wiper is directly connected to chain.
4. When the motor rotates clockwise the wiper moves forward linearly on the solar panel.
5. And when it rotates counterclockwise then the wiper returns backward linearly on the solar panel.
6. When the wiper moves forward the pressurized water is sprinkled on the panel so that after wiping the dirt gets removed completely.
7. And when the wiper comes backward the pressurized water is turned off.
8. Once the solar panel gets clean the rate of power generation will increase.

PROTOTYPE IMAGES



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