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| **Abstract:** |  |
| Abstract— An advanced image processing for an automated Internet of Things (IoT)-enabled solar panel cleaning system is presented in this paper as a novel solution. A camera is used to detect the solar panel’s dirtiness employing an advanced image processing technique using NVIDIA Jetson. Once the image of the panel is found dusty, the cleaning process is initiated by the microcontroller. The system takes images incessantly and real time images are used to enhance dust detection effectively thus empowering maintenance actions to be performed immediately. This ensures the maximum possible electrical output power. The cleaning mechanism employs a mechanical brush to run from one side to another side and back again driven by two servo motors. Once the surface is cleaned by the brush, the camera can detect it and stop the cleaning process. An app is used to get notifications via email messages through the internet to the user’s smartphone. As such increased energy output, lower maintenance costs, and enhanced system stability are possible to obtain. The suggested approach helps ensure that solar energy output is sustainable by reducing the need for manual intervention and optimizing cleaning schedules based on real panel conditions. This creative solution tackles the crucial issue of preserving the longevity and effectiveness of solar panels as the globe shifts to greener energy sources. | |