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| **Abstract:** |  |
| Abstract— In this research paper, a novel, fast, and self-adaptive image processing technique is proposed for dust detection and identification, and extraction of solar images this technique uses computer vision algorithms and machine learning models to autonomously recognize dust particles on solar panels using a dust detect camera. An image processing technique was used to detect dust on the solar panel for optimum operation of a PV panel, and hence to increase the generation of renewable energy. After analyzing several image processing techniques, an advanced image processing method has been used for dust identification purposes. This image processing is done by the Visual Studio software. To detect dust on solar panels, various clean and dusty solar panel images were collected, and the database was created. Then image processing technique was applied to detect whether the panel was dusty or clean. The results were analyzed in various ways. The analysis revealed that the image processing techniques can be applied effectively to detect the dust on solar panels. This technique may help to clean the solar panel and thus generate more electrical output power from the solar energy. | |