

Application of Artificial Neural Network in Initiating Cleaning Of Photovoltaic Solar Panels

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Abstract : Among the challenges facing solar photovoltaic (PV) systems in the United Arab Emirates (UAE), dust accumulation on solar panels is considered the most severe problem that faces the growth of solar power plants. The accumulation of dust on the solar panels significantly degrades output from these panels. Hence, solar PV panels have to be cleaned manually or using costly automated cleaning methods. This paper focuses on initiating cleaning actions when required to reduce maintenance costs. The cleaning actions are triggered only when the dust level exceeds a threshold value. The amount of dust accumulated on the PV panels is estimated using an artificial neural network (ANN). Experiments are conducted to collect the required data, which are used in the training of the ANN model. Then, this ANN model will be fed by the output power from solar panels, ambient temperature, and solar irradiance, and thus, it will be able to estimate the amount of dust accumulated on solar panels at these conditions. The model was tested on different case studies to confirm the accuracy of the developed model.

Keywords : machine learning, dust, PV panels, renewable energy

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