

**PREDICTION OF OPERATING PHOTOVOLTAIC MODULE  
TEMPERATURE USING HYBRID CUCKOO SEARCH  
ALGORITHM – ARTIFICIAL NEURAL NETWORK**

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## ABSTRACT

This project presents a hybrid Cuckoo Search-Artificial Neural Network (CS-ANN) for predicting the module operating temperature of a Grid-Connected Photovoltaic (GCPV) system. In this project, the ANN used ambient temperature (AT) and solar irradiance (SI) as the inputs and module temperature (MT) as the main output. Furthermore, Cuckoo Search (CS) was utilized to determine the optimal number of neurons, learning rate and momentum rate in the hidden layer throughout training process of Cuckoo Search such that Mean Absolute Percentage Error (MAPE) of the prediction was minimized. After the training process, testing was performed to validate the ANN training. The results indicated that the proposed hybrid CS-ANN had outperformed a hybrid Artificial Bee Colony-Artificial Neural Network (ABC-ANN) in producing lower MAPE. In addition, the coefficient of determination was discovered to be very close to unity such that a high prediction performance could be guaranteed.

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