A wireless visualization monitoring, evaluation system for commercial photovoltaic modules solely in MATLAB/Simulink environment

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ABSTRACT
This paper proposes a wireless photovoltaic (PV) visualization monitoring, evaluation, and fault detection system based on the STM32F4DISCOVERY board with Bluetooth data transmission in the MATLAB/Simulink platform. All of the irradiance, the cell temperature, voltage, and current of PV devices are acquired through the microcontroller-based DAQ board. These measurements data are transferred to a host computer by both Bluetooth slave module and Bluetooth master one built in a laptop. These measurement data are visually displayed in the form of dashboard in the MATLAB/Simulink environment and are simultaneously input to PV model for theoretical simulation. The functions of evaluation and fault detection for PV modules under practical working conditions are conducted and displayed at the same software platform.

The proposed system has been proved with sufficient accuracy and confidence in the functions of visualization monitoring, evaluation, and fault detection. As compared with the well-developed ones, the proposed system has the advantages such as: reduce both cable and hardware configuration and integrate the all visualization monitoring, evaluation, and fault detection solely in the MATLAB/Simulink environment.

Keywords: PV monitoring, evaluation, fault detection system
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MATLAB/Simulink
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