

Remote sensing and fault diagnosis of photovoltaic plants using Internet of Things and Artificial Intelligence techniques: Challenges and recommendations

Abstract

Faults in any components of photovoltaic (PV) plants (modules, connection lines, converters, inverters, etc) can seriously affect the efficiency, energy yield as well as the security and reliability of the entire PV plant, if not detected. In addition, if some faults persist such as arc fault, ground fault, etc they can lead to risk of fire. Recently, monitoring and remote sensing systems played very important role in fault detection of PV plants. So, fault detection and diagnosis (FDD) methods are indispensable for reliability, efficiency, and safety of PV plants. In this talk, the types and causes of PV systems failures will be presented, then some methods proposed in the literature for fault detection and diagnosis of PV systems will be also discussed. Special attention will be paid to methods that can accurately detect, and classify possible faults occurring in DC side of PV plants. Applications of Internet of Things (IoT) and artificial intelligence (AI) in this area will be also presented. Advantages and limits of methods in terms of feasibility, complexity, cost-effectiveness and generalization capability for large-scale integration, as well as the applications of AI and IoT techniques will be also discussed in this talk. The conclusion of the talk will highlight the challenges, trends, and recommendations on the implementation of the FDD methods in real time.