Title:	A Reliable Open-Switch Fault Diagnosis Strategy for Grid-tied Photovoltaic Inverter Topology
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Abstract:
In order to increase the availability and reliability of photovoltaic (PV) systems, fault diagnosis and condition monitoring of inverters are of crucial means to meet the goals. Numerous methods are implemented for fault diagnosis of PV inverters, providing robust features and handling massive amount of data. However, existing methods rely on simplistic frameworks that are incapable of inspecting a wide range of intrinsic and explicit features, as well as being time-consuming. In this paper, a novel method based on a multilayer deep belief network (DBN) is suggested for fault diagnosis, which allows the framework to discover the probabilistic reconstruction across its inputs. This approach equips a robust hierarchical generative model for exploiting features associated with faults, interprets functions that are highly variable, and needs lesser prior information. Moreover, the method instantaneously categorizes the fault conditions, which eventually strengthens the adaptability of applying it on a variety of diagnostic problems in an inverter domain. The proposed method is evaluated using multiple input signals at different sampling frequencies. To evaluate the efficacy of DBN, a test model based on a three-phase 2-level grid-tied PV inverter was used. The results show that the method is capable of achieving precise diagnosis operations.

Keywords: Photovoltaic (PV) inverter, open-circuit faults, fault diagnosis, deep belief network