

Power Management System And Method Thereof For Solar Powered Sensor Node

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ABSTRACT

Disclosed is a power management system for managing power supply and power consumption of a sensor node of a solar powered WSN. A control-unit checks if a photovoltaic panel (PV) panel operates in a day mode. During the day mode, a supercapacitor operates in a first mode or a second mode. Furthermore, an MPPT controller is enabled when the supercapacitor operates in the first mode. Moreover, the PV panel enables charging of the supercapacitor and provides power to the sensor node in the first mode of the day mode. Furthermore, during the second mode, charging of a battery is enabled and the power is provided to the sensor node. During the night mode, the sensor node is checked for a mode of operation i.e. an active mode or a sleep mode, wherein in the active mode, the supercapacitor provides the operating power to the sensor node, and in the sleep mode, the battery trickle-charges the supercapacitor and provide operating power to the sensor node.

KEY APPLICATION AREAS

1. Wireless Sensor Networks (WSNs).
2. Solar-powered IoT sensor nodes.
3. Environmental and habitat monitoring
4. Military surveillance systems.
5. Smart buildings and climate monitoring.

POTENTIAL USE

1. Intelligent power management for solar-powered sensor nodes.
2. Hybrid battery-supercapacitor energy storage and control.
3. Extending battery life through optimized charging/discharging.
4. Continuous sensor operation under varying solar conditions.

5. Peak power buffering and energy-efficient sensor operation.
6. Autonomous monitoring systems in remote locations.