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Soggetti	Sustainable buildings Sustainable architecture Energy harvesting
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Nota di contenuto	Applications of Energy Harvesting Technologies in Buildings; Contents; 1 Introduction; 1.1 Background and Motivation; 1.2 Home and Building Automation ; 1.2.1 Wireless BAS; 1.2.2 Wireless Home Automation ; 1.3 The Scope of the Book; References; 2 Energy Harvesting in the Built Environments; 2.1 Introduction; 2.2 Energy-Harvesting Sources in Built Environments; 2.2.1 Energy Harvesting from Light Sources; 2.2.2 Energy Harvesting from Thermal Sources; 2.2.3 Energy Harvesting from Periodic Kinetic Sources; 2.2.4 Energy Harvesting from Intermittent Kinetic Sources 2.2.5 Energy Harvesting from Electromagnetic Waves 2.2.6 Energy Harvesting from Inductive Power Transfer; 2.2.7 Energy Harvesting from Airflow; 2.2.8 Hybrid Energy Harvesting; 2.2.9 Summary of Energy Levels in Built Environments; 2.3 Empirical Energy Measurements in the Built Environments; 2.3.1 Energy Levels in Residential and Commercial Buildings; 2.3.2 Comparison of Power Levels Reported in the Literature and Those Obtained Imperially; 2.4 Energy-Harvesting Sources on the Human Body; 2.5 Conclusions; References 3 Solar Cell-Powered Sensor Node for Emotion Monitoring Systems in Ambient-Assisted Living Environment 3.1 Introduction; 3.1.1 Overview

of Ambient-Assisted Living; 3.1.2 Energy Harvesting-Powered Wearable EEG Devices; 3.1.3 Energy Harvesting in the Context of Ambient-Assisted Living; 3.2 Case Study: Wearable Emotion Sensor Node Powered by Energy Harvesting; 3.2.1 System Overview; 3.2.2 EEG Electrodes; 3.2.3 EEG Amplifier; 3.2.4 Wireless Microcontroller; 3.2.5 Energy Harvester Design; 3.2.6 Integration of Electrodes and Energy Harvester on the Headband; 3.3 Results and Discussion
3.3.1 Energy-Harvester Testing Results
3.3.2 Real-Time Emotion Experiment Results; 3.4 Conclusions; References; 4 Thermoelectric Energy Harvesting and Power Management Circuit; 4.1 Introduction; 4.2 Thermoelectric Device; 4.3 Thermoelectric Energy-Harvesting Power Management; 4.3.1 Power Management System Structure; 4.3.2 Charge Pump Converter; 4.3.3 Step-Up DC-DC Switching Regulator; 4.4 Conclusions ; References; 5 Inductive Power Transfer and Case Study; 5.1 Introduction; 5.2 Inductive Link Theory ; 5.2.1 Principle of Operation of an Inductive WPT System
5.2.2 Modeling and Circuit Theory of Inductive Links
5.2.3 Coil Construction and Quality Factor ; 5.2.4 Resonant Coupling; 5.3 Primary-Side Coil Drivers; 5.3.1 Introduction; 5.3.2 Definitions; 5.3.3 Class D Inverters; 5.3.4 Class E Inverters; 5.4 Secondary Coil Receivers ; 5.4.1 Introduction; 5.4.2 Half-Wave and Full-Wave Rectifiers; 5.4.3 Receiver Impedance Emulation ; 5.5 Safety Issues in IPT; 5.5.1 Human Exposure Limits; 5.6 Case Study: Long-Range Inductive Power Transfer ; 5.6.1 Magnetics Design and Measurement ; 5.6.2 Receiver Electronics; 5.6.3 Transmitter Power Control

Sommario/riassunto

This timely new resource explores the available energy sources within commercial and residential buildings and the available technologies for energy harvesting. Energy harvesting within built environments is presented using strong research and commercial examples. This book includes clear and concise case studies on solar cell powered sensor nodes for emotion monitoring systems in ambient assistive living environments and inductive/RF power transfers. Thermoelectric energy harvesting and power management circuit design, airflow and vibration energy harvesting is also explored. The book concludes with a look at the future of energy harvesting in buildings.
