

1. Record Nr.	UNINA9911018833803321
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Titolo	Self-Powered Cyber Physical Systems
Pubbl/distr/stampa	Newark : , : John Wiley & Sons, Incorporated, , 2023 ©2023
ISBN	9781119842026 1119842026 9781119842019 1119842018
Edizione	[1st ed.]
Descrizione fisica	1 online resource (415 pages)
Altri autori (Persone)	SinghChandra AgrawalRajeev SerraoFelcy Jyothi
Disciplina	621.39
Soggetti	Data centers - Energy consumption
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Chapter 3 The Emergence of Cyber-Physical System in the Context of Self-Powered Soft Robotics
Nota di contenuto	Cover -- Title Page -- Copyright Page -- Contents -- Preface -- Acknowledgements -- Chapter 1 Self-Powered Sensory Transducers: A Way Toward Green Internet of Things -- 1.1 Introduction -- 1.2 Need of the Work -- 1.3 Energy Scavenging Schemes in WSN -- 1.3.1 Photovoltaic or Solar Cell -- 1.3.2 Temperature Gradient -- 1.3.3 Pressure Variations -- 1.3.4 Plant Microbial Fuel -- 1.3.5 Wind/Liquid Flow -- 1.3.6 Vibrations -- 1.3.7 Friction -- 1.4 Self Powered Systems and Green IoT (G-IoT) -- 1.5 Application Area and Scope of Self-Powered System in G-IoT -- 1.5.1 Terrestrial Applications -- 1.5.1.1 Agriculture -- 1.5.1.2 Smart Home and Cities -- 1.5.1.3 Industry -- 1.5.1.4 Medicines -- 1.5.1.5 Environment Monitoring -- 1.5.1.6 Structural Monitoring -- 1.5.1.7 Indoor Applications -- 1.5.1.8 Aerial Vehicles -- 1.5.1.9 Military Applications -- 1.5.1.10 Underwater Applications -- 1.5.1.11 Submarine and Event Localization -- 1.5.1.12 Water Contamination -- 1.5.1.13 Intelligent Water Distribution and Smart Meter -- 1.5.1.14 Underground Applications -- 1.5.1.15 Coal and Petroleum Mining Application -- 1.5.1.16 Underground Structural

Monitoring -- 1.6 Challenges and Future Scope of the Self-Powered G-IoT -- 1.6.1 Challenges Pertain to Energy Efficient Design and Protocols -- 1.6.2 Size and Cost of the Harvester -- 1.6.3 Energy-Efficient Routing and Scheduling Protocols -- 1.6.4 Design of Application-Specific Passive Wake-Up Receivers -- 1.6.5 Redefined Protocol with Application-Specific Goals -- 1.6.6 Embedded Operating Systems -- 1.6.7 AI and Cloud-Assisted Lifetime Prediction Techniques -- 1.6.8 Design of Energy-Efficient/Harvested Service-Oriented Architecture -- 1.6.9 Smart Web Interfaces for Monitoring -- 1.6.10 Cross Layer Exploitations with Energy Harvesting -- 1.6.11 Security Aspects and Need of Standardization. 1.6.12 Challenges Related to Energy Harvesting Techniques -- 1.6.13 Generic Energy Generator -- 1.6.14 Hybrid Energy Sources -- 1.6.15 Cooperation Among Different Energy Sources -- 1.6.16 Energy Storage -- 1.6.17 Intelligent Prediction Model for Amount of Harvested Energy -- 1.6.18 Focus on Energy Generator for Underwater and Underground Applications -- 1.7 Conclusion -- References -- Chapter 2 Self-Powered Wireless Sensor Networks in Cyber Physical System -- 2.1 Introduction -- 2.2 Wireless Sensor Networks in CPS -- 2.3 Architecture of WSNs with Energy Harvesting -- 2.4 Energy Harvesting for WSN -- 2.5 Energy Harvesting Due to Mechanical Vibrations -- 2.6 Piezoelectric Generators -- 2.7 Piezoelectric Materials -- 2.8 Types of Piezoelectric Structures -- 2.8.1 Nanogenerators -- 2.8.2 Piezoelectric Nanogenerators -- 2.8.3 Triboelectric Nanogenerators -- 2.8.4 Pyroelectric Nanogenerators -- 2.8.5 Thermoelectric Nanogenerator -- 2.9 Hybridized Nanogenerators for Energy Harvesting -- 2.10 Conclusion -- References -- Chapter 3 The Emergence of Cyber-Physical System in the Context of Self-Powered Soft Robotics -- 3.1 Introduction -- 3.2 Actuators and Its Types -- 3.2.1 Nature of Actuation -- 3.2.1.1 Actuators Based on Thermal Materials -- 3.2.1.2 Actuators Based on Pressure -- 3.2.1.3 Actuators Based on Photo Responsivity -- 3.2.1.4 Actuators Based on Explosive Function -- 3.2.1.5 Electric Actuation Methods -- 3.3 Soft Actuator Electrodes -- 3.4 Sensors -- 3.5 Soft Robotic Structures and Control Methods -- 3.6 Soft Robot Applications -- 3.7 Future Scope -- 3.8 Conclusion -- References -- Chapter 4 Dynamic Butterfly Optimization Algorithm-Based Task Scheduling for Minimizing Energy Consumption in Distributed Green Data Centers -- 4.1 Introduction -- 4.2 Related Work -- 4.2.1 Green Data Centers -- 4.2.2 Energy-Aware Task Scheduling. 4.3 Improved Dynamic Butterfly Optimization Algorithm (IDBOA)-Based Task Scheduling (IDBOATS) -- 4.3.1 Problem Definition -- 4.3.2 Delay Constraint -- 4.3.3 Green Energy Model -- 4.3.4 Energy Consumption Model -- 4.3.5 Constraint-Imposed Optimization Problem -- 4.3.6 Primitives of Dynamic Butterfly Optimization Algorithm (DBOA) -- 4.3.7 Classical Butterfly Optimization Algorithm -- 4.3.8 Transformation of BOA into DBOA using Mutation-Based Local Searching Strategy (MLSS) -- 4.4 Results and Discussion -- 4.5 Conclusion -- References -- Chapter 5 Wireless Power Transfer for IoT Applications-A Review -- 5.1 Introduction -- 5.2 Sensors -- 5.3 Actuators -- 5.4 Energy Requirement in Wireless Sensor Networks (WSNs) -- 5.5 Wireless Sensor Network and Green IoT (G-IoT) -- 5.6 Purpose of G-IoT -- 5.7 Motivation -- 5.8 Contribution -- 5.9 Need of the Work -- 5.10 Energy Transferring Schemes in WSN -- 5.11 Electromagnetic Induction -- 5.11.1 Electrodynamics and Electrostatic -- 5.11.2 Electrostatic Field -- 5.11.3 Electrostatic Force -- 5.11.4 Electromagnetic -- 5.11.5 Electromagnetic Field -- 5.12 Inductive Coupling -- 5.13 Resonance Inductive Coupling -- 5.14 Wireless Power Transmission Using Microwaves -- 5.15 Electromagnetic Radiations -- 5.16 Conclusion --

References -- Chapter 6 Adaptive Energy Intelligence Using AI/ML Techniques -- 6.1 Introduction -- 6.2 Evolution of Cyber Physical System -- 6.3 Relationship With Internet of Things -- 6.4 Challenges in Design and Integration of Cyber Physical Systems -- 6.5 Future Challenges and Promises -- 6.6 Machine Learning Models -- 6.7 Estimation of Building Energy Consumption -- 6.8 Development of Artificial Intelligence -- 6.9 Usage of AI/ML in Adaptive Energy Management -- 6.10 Use of Hybrid/Ensemble Machine Learning Algorithm for Better Prediction -- 6.11 Conclusion -- References.

Chapter 7 Renewable Energy Smart Grids for Electric Vehicles -- 7.1 Introduction -- 7.2 Integration of Electric Vehicles (EVs) into the Power Grid -- 7.3 EV Charging and Electric Grid Interaction -- 7.4 EVs with V2G System Architecture -- 7.5 EVs and Smart Grid Infrastructure -- 7.6 Renewable Energy Sources Integration With EVs -- 7.6.1 PV Solar Energy With EVs -- 7.6.2 Wind Energy With EVs -- 7.7 Application in Transport Sector -- 7.8 Application in Micro-Grid -- 7.9 State-of-the-Art Review -- 7.10 Future Trends -- References -- Chapter 8 Recent Advances in Integrating Renewable Energy Micro-Grid Systems With Electric Vehicles -- 8.1 Introduction -- 8.2 Electric Vehicles and Renewable Energy Sources: A General Overview -- 8.2.1 Electric Vehicles -- 8.2.2 Battery Electric Vehicles -- 8.2.3 Parallel Hybrid Electric Vehicles -- 8.2.4 Battery Chargers for EVs -- 8.2.5 Renewable Energy Sources -- 8.2.5.1 Wind Energy -- 8.2.5.2 Solar Energy -- 8.3 Microgrid -- 8.3.1 Domestic Use -- 8.3.2 Industrial Use -- 8.3.3 Benefits of Microgrids -- 8.3.4 Locations of Microgrid -- 8.4 Interactions Between Cost-Conscious EVs and RESs -- 8.4.1 Operational Cost Reduction -- 8.4.2 Lowering the Electricity Generation Cost -- 8.4.3 Growth in Profit or Benefit -- 8.4.4 Reduction in Charging Cost for EVs Owners -- 8.4.5 Other Cost-Conscious Efforts -- 8.5 Interaction Between Efficiency-Conscious EVs and RESs -- 8.5.1 Microgrid Implementation -- 8.5.2 Increasing the Use of RESs -- 8.5.3 Other Works With a Focus on Efficiency -- 8.6 Open Problems -- 8.6.1 Grid Integration of RESs on a Large Scale -- 8.6.2 The Use of EV Batteries in Conjunction With RESs -- 8.6.3 V2G's Ability to Allow the Interaction of RESs -- 8.7 Conclusion -- References -- Chapter 9 Overview of Fast Charging Technologies of Electric Vehicles -- 9.1 Introduction.

9.2 Different Levels of Charging Electric Vehicles -- 9.2.1 Level I -- 9.2.2 Level II -- 9.2.3 Level III -- 9.2.4 DC vs AC -- 9.2.5 Fast Charging -- 9.3 State-of-the-Art Fast-Charging Implementation -- 9.4 DC Fast-Charging Structure -- 9.5 Fast Chargers -- 9.5.1 Fast Chargers Working -- 9.5.2 DC Plug Connectors -- 9.5.3 EV Fast-Charging Infrastructure -- 9.6 Today's Situation and Future Needs -- 9.7 Fast-Charging Point Power Requirements -- 9.8 Recent Technologies in Fast Charging, Machine Learning, and Artificial Intelligence -- 9.8.1 Machine Learning -- 9.8.2 Artificial Intelligence -- 9.8.3 Energy Storage Materials -- 9.9 Effect of Fast Charging on EV Powertrain Systems -- 9.9.1 Battery Technology Gap and Lithium Plating -- 9.9.2 Thermal Management Systems -- 9.9.3 Battery Cycle Life -- 9.10 Grid Impacts Caused by EV Charging -- 9.10.1 Impact on Load Profile -- 9.10.2 Impact on Grid Components -- 9.10.3 Impact on Power Losses -- 9.10.4 Impact on Voltage Profile -- 9.10.5 Harmonic Impact -- 9.11 Fast-Charging Technologies on the Self-Powered Automotive Cyber-Physical Systems -- 9.12 Conclusions -- References -- Chapter 10 A Survey of VANET Routing Attacks and Defense Mechanisms in Intelligent Transportation System -- 10.1 Introduction -- 10.2 Attacks in VANET -- 10.2.1 Attack on V2V Communication -- 10.2.2 Various Attacks on Safety Applications -- 10.2.3 Attack on Infotainment

Applications -- 10.3 Impacts of Attacks on VANET Routing -- 10.4 Nonintentional Misbehavior -- 10.5 Intentional Misbehavior -- 10.6 Defence Mechanism of Routing Attacks in VANET Routing -- 10.7 Intrusion Detection Techniques in VANETs -- 10.8 Anonymous Routing in VANETs -- 10.9 Challenges and Future Directions -- 10.10 Conclusion -- References -- Chapter 11 ANN-Based Cracking Model for Flexible Pavement in the Urban Roads -- 11.1 Introduction -- 11.2 Literature Review.
11.3 Methodology.

Sommario/riassunto

This book is an attempt to aim at a very futuristic vision of achieving self-powered cyber-physical systems by applying a multitude of current technologies such as ULP electronics, thin film electronics, ULP transducers, autonomous wireless sensor networks using energy harvesters at the component level and energy efficient clean energy for powering data centers and machines at the system level. This is the need of the hour for cyber-physical systems since data requires energy when it is stored, transmitted, or converted to other forms. Cyber-physical systems will become energy hungry since the industry trend is towards ubiquitous computing with massive deployment of sensors and actuators. This is evident in using blockchain technologies such as Bitcoin or running epochs for artificial intelligence (AI) applications. Hence, there is a need for research to understand energy patterns and distribution in cyber-physical systems and adopt new technologies to transcend to self-powered cyber-physical systems. This book explores the recent trends in energy management, self-powered devices, and methods in the cyber-physical world. Written and edited by a team of experts in the field, this book tackles a multitude of subjects related to cyber physical systems (CPSs), including self-powered sensory transducers, ambient energy harvesting for wireless sensor networks, actuator methods and non-contact sensing equipment for soft robots, alternative optimization strategies for DGDCs to improve task distribution and provider profits, wireless power transfer methods, machine learning algorithms for CPS and IoT applications, integration of renewables, electric vehicles (EVs), smart grids, RES micro-grid and EV systems for effective load matching, self-powered car cyber-physical systems, anonymous routing and intrusion detection systems for VANET security, data-driven pavement distress prediction methods, the impact of autonomous vehicles on industries and the auto insurance market, Intelligent transportation systems and associated security concerns, digital twin prototypes and their automotive applications, farming robotics for CPS farming, self-powered CPS in smart cities, self-powered CPS in healthcare and biomedical devices, cyber-security considerations, societal impact and ethical concerns, and advances in human-machine interfaces and explore the integration of self-powered CPS in industrial automation.
