Rechargeable Sensor Networks: Technology, Theory, and Application:Introducing Energy Harvesting to Sensor Networks

He Shibo & Sun Youxian Chen Jiming

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The harvesting of energy from ambient energy sources to power electronic devices has been recognized as a promising solution to the issue of powering the ever-growing number of mobile devices around us.

Key technologies in the rapidly growing field of energy harvesting focus on developing solutions to capture ambient energy surrounding the mobile devices and convert it into usable electrical energy for the purpose of recharging said devices. Achieving a sustainable network lifetime via battery-aware designs brings forth a new frontier for energy optimization techniques. These techniques had, in their early stages, resulted in the development of low-power hardware designs. Today, they have evolved into power-aware designs and even battery-aware designs.

This book covers recent results in the field of rechargeable sensor networks, including technologies and protocol designs to enable harvesting energy from alternative energy sources such as vibrations, temperature variations, wind, solar, and biochemical energy and passive human power.

Contents:

- Wind Energy Harvesting for Recharging Wireless Sensor Nodes: Brief Review and a Case Study *(Yen Kheng Tan, Dibin Zhu and Steve Beeby)*
- Rechargeable Sensor Networks with Magnetic Resonant Coupling *(Liguang Xie, Yi Shi, Y Thomas Hou, Wenjing Lou, Hanif D Sherali and Huaibei Zhou)*
- Cross-Layer Resource Allocation in Energy-Harvesting Sensor Networks *(Zhoujia Mao, C Emre Koksal and Ness B Shroff)*
- Energy-Harvesting Technique and Management for Wireless Sensor Networks *(Jianhui Zhang and Xiangyang Li)*
- Information Capacity of an AWGN Channel Powered by an Energy-Harvesting Source *(R Rajesh, P K Deekshith and Vinod Sharma)*
- Energy Harvesting in Wireless Sensor Networks *(Nathalie Mitton and Riaan Wolhuter)*
- Topology Control for Wireless Sensor Networks and Ad Hoc Networks *(Sunil Jardosh)*
- An Evolutionary Game Approach for Rechargeable Sensor Networks *(Majed Haddad, Eitan Altman, Dieter Fiems and Julien Gaillard)*
- Marine Sediment Energy Harvesting for Sustainable Underwater Sensor Networks *(Baikun Li, Lei Wang and Jun-Hong Cui)*
- Wireless Rechargeable Sensor Networks in the Smart Grid *(Melike Erol-Kantarci and Hussein T Mouftah)*
- Energy-Harvesting Methods for Medical Devices *(Pedro Dinis Gaspar, Virginie Felizardo and Nuno M Garcia)*

Readership: Graduates, researchers, and professionals studying/dealing with networking, computer engineering, parallel computing, and electrical & electronic engineering.

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