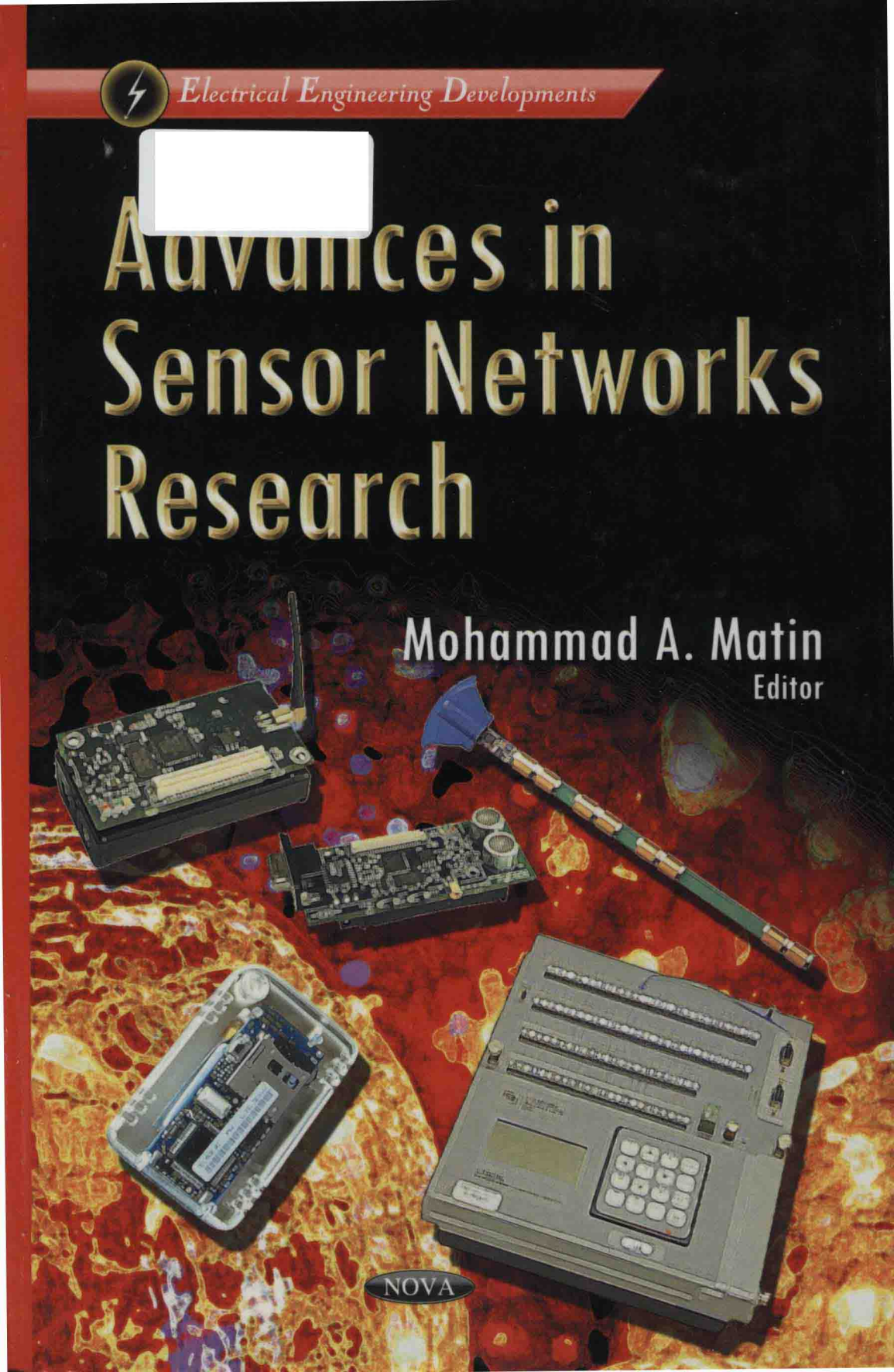
Electrical Engineering Developments
Advances in Sensor Networks Research
Mohammad A. Matin
Editor
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ELECTRICAL ENGINEERING DEVELOPMENTS

ADVANCES IN SENSOR NETWORKS RESEARCH

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PREFACE

Wireless sensor network comprises of a large number of inexpensive battery-powered, self-organizing sensor nodes and it has been gained a lot of attention for a decade. It is often deployed in hostile or inaccessible areas to collect environmental data for analysis and decision making. Due to the deployment cost, wireless sensor networks are mostly planned to run for a long time once deployed. This book offers the basics as well as advance research materials for sensor networks.

Chapter 1 addresses the cutting–edge research issues and challenges in wireless sensor networks.

Chapter 2 reviews various schemes and protocols that achieve network reprogramming while meeting three requirements- reliability, energy efficiency and low latency to some extent, including incremental reprogramming schemes and data dissemination protocols.

Chapter 3 presents modeling and characterization of wireless communication channel which is important to achieve a successful deployment of WSN systems. It intends to focus free space, inside the buildings, forest and vegetation environment, underground scenario and also underwater acoustic propagation. The author tries to produce a catalogue of propagation models in their respective scenarios in this chapter.

Chapter 4 presents a novel active approach for WSN routing which is based on the explicit optimization of utility function that homogenizes the WSN battery levels and thus enhance WSN lifetime.

Chapter 5 presents various cooperative techniques for cognitive sensor networks, which can avoid the damage to primary users, decrease the number of collisions in secondary networks, and dynamically allocate resources' usage.

Chapter 6 briefly introduces the IEEE 802.15.4 standard for Personal Area Networks, especially IEEE 802.15.4 Beacon Enabled mode for low power consumption and low data-rate applications.

Chapter 7 introduces an information fusion algorithm for target tracking in wireless sensor networks (WSNs). Through the introduction of measurement information quantification, the algorithm effectively solves the problem of resources constraint in wireless sensor network.

Chapter 8 presents two applications of WSNs under two different real scenarios: i) monitoring the setting and hardening processes of cementitious materials and ii) study of the decay assessment in architectural heritage conservation.

Chapter 9 presents an overview of wireless sensor network (WSN), the architecture of a sensor node, and the main components of a WSN. It also presents the main constraints of a WSN and possible attacks. These constraints must be considered while designing any security technique to overcome the potential attacks.

It is believed that the students who seek to learn the latest advance research in sensor networks will need this book.

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