

# Preface

We live in an exciting time for lovers of lego-like sensing devices and remote operation. The availability, interoperability, and price of off-the-shelf sensors and wireless sensor nodes have increased dramatically over the last years. Today, anyone with a reasonable expertise in C++ and a love for lego-like technology can buy an Arduino and some sensors, go to the Internet to learn how to build and configure them, and put them to work in some simple application. Wireless sensing has also been popularized in those platforms and systems.

More professional applications in commercial and industrial settings deploy a possibly very large number of wired and/or wireless sensors and actuators, integrate them into some information system or at least data collection computation device, configure everything to work together by extensive programming and testing, and, finally, deploy the system for operation over the years.

Although wired sensors form the core of many deployments in industrial settings, the use of wireless sensor devices has increased both in industrial and nonindustrial applications due to advantages concerning portability, price, and deployment ease. An important future trend for the increased adoption of wireless sensor devices is the ease of deployment, configuration, and operation. In the future, a distributed sensing system should be developed and deployed without programming. The future should also see an increase in the number of deployments of wireless sensors, and heterogeneity is one of the characteristics of the resulting sensor networks since they will have wireless and wired components that should work together as a single entity, be configurable, and operate as a single homogeneous system.

This book is about middleware architectures for configuring and operating heterogeneous node platforms and whole sensor networks. It reviews existing middleware proposals, advantages, and disadvantages; defines the middleware architecture that should be used to configure and operate those systems; and reports on practical prototypes and experimental results applying the best solutions for the issues that were raised.

Besides discussing how wireless sensors and wireless sensor networks work, some of the subjects that are thoroughly reviewed in this book and for which the

book is a good reference include what different solutions exist in terms of operating software, network layout and routing, application scenarios, middleware solutions, solutions for platform and communication protocol independence, and programming paradigms. But the book also proposes solutions for generic middleware architecture that configures and operates sensor networks on any combination of hardware, software, platform, and communication protocols.

The book can be used as a reference in both introductory and advanced courses in embedded devices, and it is also very useful as a reference work for researchers and scholars alike. Finally, it provides in-depth knowledge for practitioners willing to learn more about how these systems work.

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