

Preface

In recent years, there has been increasing interest in human behavior understanding motivated by several societal needs that include security, natural interfaces, gaming, affective computing, and assisted living. Hundreds of papers have been published on the subject in the past, mostly focusing on single-device monitoring activities. Now, thanks to both the decreasing cost of sensors and the increasing performance of devices, the possibility of performing integration of forest of (homogeneous and heterogeneous) sensors is not only a theoretical issue but also a makeable solution in real contexts.

The exact aim of this book is to provide an overview of both the technical challenges in sensor network development (network discovery, control and routing, collaborative signal and information processing, tasking and querying), and real applications of them. Different aspects of distributed computing in large-scale networked sensor systems (including algorithms and applications, systems design techniques and tools, in-network signals and information processing) in the human behavior understanding context are analyzed. In addition, application scenarios ranging from surveillance to indexing and retrieval, from patient care to industrial safety, from social and ambient intelligence to sports analysis are introduced. The target audience is not only graduate students, but also scholars, researchers, and practitioners from different communities (such as Computer Vision, networked embedded sensing, artificial intelligence, and so on).

The book is a collection of chapters written specifically for this book by leading experts in the field. The chapters are organized into three parts.

Part I Distributed Sensing: Architectures (five chapters);

Part II Distributed Sensing: Applications (eight chapters);

Part III Multi-robot Systems (seven chapters).

All chapters are on topics related to the aim of the book, that is, applications of distributed systems. However, chapters belonging to the first part provide also a good analysis of some theoretic aspects: the design, implementation, and development

of a distributed sensor network, as well as communication and computational remarks. The chapters in the second part are mostly focused on application of distributed sensing in the field of human behavior understanding, while in the third part specific distributed applications based on multi-robots (considered as a general term for autonomous intelligent vehicle) are presented. The first chapter in the first part can be considered as a high-level introduction to the argument of distributed sensing.

To support the reading of the book, in the final part a glossary with most used terms, and an analytic index are provided. In addition, the list of acronyms is present in the first part.

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