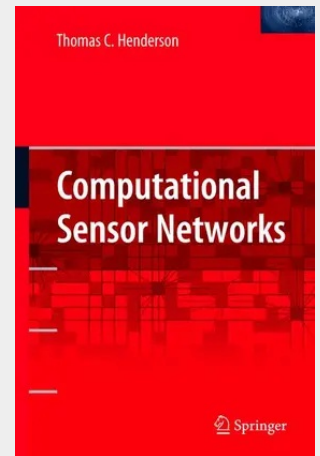


Computational Sensor Networks

A model-based approach to the design and implementation of Computational Sensor Networks (CSNs) is proposed. This high-level paradigm for the development and application of sensor device networks provides a strong scientific computing foundation, as well as the basis for robust software engineering practice. The three major components of this approach include (1) models of phenomena to be monitored, (2) models of sensors and actuators, and (3) models of the sensor network computation. We propose guiding principles to identify the state or structure of the phenomenon being sensed, or of the sensor network itself. This is called computational modeling. These methods are then incorporated into the operational system of the sensor network and adapted to system performance requirements to produce a mapping of the computation onto the system architecture. This is called real-time computational mapping and allows modification of system parameters according to real-time performance measures. This book deals with the development of a mathematical and modular software development framework to achieve computational sensor networks.

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