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Nota di contenuto	Preface -- ch. 1. Markets and applications. 1.1. Technology at crossroads. 1.2. The present - MEMS in the news. 1.3. The past - great expectations. 1.4. The Future - maturity and pervasive applications. 1.5. Drivers for progress. 1.6. Progress - device improvement. 1.7. Progress - device integration. 1.8. Smart MEMS - the research agenda. 1.9. Structure of the book -- ch. 2. Microfabrication technologies. 2.1. Introduction. 2.2. Passive components. 2.3. Sensing components. 2.4. Actuating components. 2.5. Materials and growth. 2.6. Fabrication techniques. 2.7. Conclusions -- ch. 3. Sensor electronics. 3.1. Introduction. 3.2. Functions of a sensor system. 3.3. Analogue and

digital design options. 3.4. Digital signal processing. 3.5. Interface configurations for different transducer types. 3.6. Integration. 3.7. Design for power awareness. 3.8. Conclusion -- ch. 4. Sensor signal enhancement. 4.1. Errors in sensor systems and measurement quality (non-linearity, cross-sensitivity, offset, parameter drift). 4.2. Sensor calibration and compensation - techniques and examples. 4.3. System design choices for compensation - closed loop configurations and other designs. 4.4. Summing up on sensor calibration and compensation -- ch. 5. Case study: control systems for capacitive inertial sensors. 5.1. Introduction. 5.2. Open loop accelerometer. 5.3. Closed loop accelerometer. 5.4. Conclusions -- ch. 6. Case study: adaptive optics and smart VLSI/MEMS systems. 6.1. Introduction. 6.2. Adaptive optics and MEMS systems. 6.3. Operational principles. 6.4. Device implementation. 6.5. Closed-loop adaptive optical system. 6.6. Conclusions and future trends -- ch. 7. Artificial intelligence techniques for microsensors identification and compensation. 7.1. Artificial neural networks: what they are and how they are used for microsensor control and identification. 7.2. Open loop, neural transducer prototype for static/low frequency applications. 7.3. Closed-loop neural network controlled accelerometer. 7.4. The neural network non-linear gain controller. 7.5. Micromachined sensor identification using neural networks. 7.6. Concluding remarks -- ch. 8. Smart, intelligent and cogent MEMS based sensors. 8.1. Introduction. 8.2. Smart, intelligent and cogent sensors - what do the terms mean. 8.3. What and where is the added value brought by intelligence? 8.4. ANNs and MEMS. 8.5. AI for MEMS intelligence. 8.6. 'Cogent' sensors - fault detection case study. 8.7. Conclusion -- ch. 9. Sensor arrays and networks. 9.1. Potential of sensor arrays. 9.2. Node design. 9.3. An architectural history of sensor arrays and networks. 9.4. Systems design issues. 9.5. Network technology and topology. 9.6. Conclusion -- ch. 10. Wireless and Ad hoc sensor networks. 10.1. Sensor network applications. 10.2. System designers' role. 10.3. Design assumptions for Ad hoc networks. 10.4. Distributed system design philosophy. 10.5. Network design considerations. 10.6. Layered model. 10.7. Sensor network operating environments. 10.8. Application services. 10.9. Proposed sensor support system architecture. 10.10. Conclusions -- ch. 11. Realising the dream - a case study. 11.1. Introduction. 11.2. The mission. 11.3. Initial rough design. 11.4. Sensor technology. 11.5. Deployment. 11.6. Operation, control and communication. 11.7. Querying the array. 11.8. A cogent sensor. 11.9. A world of applications.

Sommario/riassunto

MEMS have revolutionized the semiconductor industry, with sensors being a particularly buoyant sector. This book presents readers with the means to understand, evaluate, appreciate and participate in the development of the field, from a systems perspective.