Low-Cost Smart Sensor Interfacing



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S Nihtianov, A. Luque

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Low-Cost Smart Sensor Interfacing Fransiscus Maria Leonardus van der Goes, 1996-01-01 **Smart Sensor Interfaces** Johan Huijsing, Gerard C.M. Meijer, 2012-12-06 Smart Sensor Interfaces brings together in one place important contributions and up to date research results in this fast moving area Smart Sensor Interfaces serves as an excellent reference providing insight into some of the most challenging research issues in the field Smart Sensor Systems Gerard Meijer, Kofi Makinwa, Michiel Pertijs, 2014-06-23 With contributions from an internationally renowned group of experts this book uses a multidisciplinary approach to review recent developments in the field of smart sensor systems covering important system and design aspects It examines topics over the whole range of sensor technology from the theory and constraints of basic elements physics and electronics up to the level of application orientated issues Developed as a complementary volume to Smart Sensor Systems Wiley 2008 which introduces the basics of smart sensor systems this volume focuses on emerging sensing technologies and applications including State of the art techniques for designing smart sensors and smart sensor systems including measurement techniques at system level such as dynamic error correction calibration self calibration and trimming Circuit design for sensor systems such as the design of precision instrumentation amplifiers Impedance sensors and the associated measurement techniques and electronics that measure electrical characteristics to derive physical and biomedical parameters such as blood viscosity or growth of micro organisms Complete sensor systems on a chip such as CMOS optical imagers and microarrays for DNA detection and the associated circuit and micro fabrication techniques Vibratory gyroscopes and the associated electronics employing mechanical and electrical signal amplification to enable low power angular rate sensing Implantable smart sensors for neural interfacing in bio medical applications Smart combinations of energy harvesters and energy storage devices for autonomous wireless sensors Smart Sensor Systems Emerging Technologies and Applications will greatly benefit final year undergraduate and postgraduate students in the areas of electrical mechanical and chemical engineering and physics Professional engineers and researchers in the microelectronics industry including microsystem developers will also find this a thorough and useful volume Low-cost Smart Capacitive Sensors for Position and Speed Measurement Xiujun Li,1997 Ultra Low Power Capacitive Sensor Interfaces Wouter Bracke, Robert Puers, Chris Van Hoof, 2007-06-15 The increasing performance of smart microsystems merging sensors signal processing and wireless communication promises to have a pervasive impact during the coming decade These autonomous microsystems nd applications in sport evaluation health care environmental monitoring and automotive s tems They gather data from the physical world convert them to electrical form compensate for interfering variables or non linearities and either act rectly on them or transfer it to other systems Most often these sensor systems are developed for a speci c application This approach leads to a high rec rent design cost A generic front end architecture where only the sensors and the microcontroller software are customized to the selected application would reduce the costs signi cantly This work

presents a new generic architecture for autonomous sensor nodes. The modular design methodology provides a exible way to build a complete sensor interface out of con gurable blocks. The settings of these blocks can be optimized according to the varying needs of the application Furthermore the system can easily be expanded with new building blocks The modular system is illustrated in a Generic Sensor Interface Chip GSIC for capa tive sensors Many con guration settings adapt the interface to a broad range of applications The GSIC is optimized for ultra low power consumption It achieves an ON state current consumption of 40 A Smart Sensors and MEMS S Nihtianov, A. Luque, 2018-02-27 Smart Sensors and MEMS Intelligent Devices and Microsystems for Industrial Applications Second Edition highlights new important developments in the field including the latest on magnetic sensors temperature sensors and microreaction chambers The book outlines the industrial applications for smart sensors covering direct interface circuits for sensors capacitive sensors for displacement measurement in the sub nanometer range integrated inductive displacement sensors for harsh industrial environments advanced silicon radiation detectors in the vacuum ultraviolet VUV and extreme ultraviolet EUV spectral range among other topics New sections include discussions on magnetic and temperature sensors and the industrial applications of smart micro electro mechanical systems MEMS The book is an invaluable reference for academics materials scientists and electrical engineers working in the microelectronics sensors and micromechanics industry In addition engineers looking for industrial sensing monitoring and automation solutions will find this a comprehensive source of information Contains new chapters that address key applications such as magnetic sensors microreaction chambers and temperature sensors Provides an in depth information on a wide array of industrial applications for smart sensors and smart MEMS Presents the only book to discuss both smart sensors and MEMS for industrial applications Dierct Sensor-to-Microcontroler Interface Circuits Ferran Reverter, Ramón Pallás Areny, 2005-11-18 This book describes the design and characterisation of interface circuits for the direct connection of sensors with a time based output signal to a microcontroller. The topics analysed are a the performance of microcontrollers in timing signals b the susceptibility of IC quasi digital sensors to supply voltage changes and c the performanceof direct modulating sensor to microcontroller interfaces based on measuring the charging discharging time of na RC circuit The authors analyse the features and limitations of these interface circuits and offer design rules and guidelines for improving their performance This book interestes designers of microcontrollers and IC sensors which can apply the theoretical models developed herein to predict and reduce the effects of power supply interference It also interests electronic circuit designers which can apply the test circuits measurement methods and design rules to their own designs Finally the book being the result of doctoral thesis it may inspire other researchers to engage in gaining further insight in some of the topics considered and help them in learning a systematic approach to hypothesis formulation and testing Integrated Smart Sensors Gert van der Horn, Johan Huijsing, 2012-12-06 1 1 1 Introduction The signal processing and storage capacity of the human brain enables us to become powerful autonomous beings but only if our brains operate in conjunction with at

least some of our senses and muscles Using these organs we can interact with our environment learn to adapt and improve important aspects of our life Similarly the signal processing capabilities of modern electronics computers could be combined with electronic sensors and actuators to enable interaction with and adaptation to the non electrical environment This willlead to smarter and more powerful automated tools and machines To facilitate and stimulate such a development easy to use low cost sensors are needed The combination of electronic interface functions and a sensor in an integrated smart sensor that provides a standard digital and bus compatible output would simplify the connection of sensors to standard electronic signal processors microcontrollers computers etc Currently the calibration procedure required for standardization of the sensor output signal level contributes largely to the production costs of accurate sensors To enable automation of the calibration procedure and hence reduce the sensor fabrication costs a digital calibration junction should be included in the smart sensor INTEGRATED SMART SENSORS Design and Calibration Introduction 1 2 Sensors and actuators In industry many processes are electronically controlled As depicted in Fig **Proceedings of the 11th Italian Conference on Sensors and Microsystems, Lecce, Italy, 8-10 February 2006** Pietro Siciliano, 2008 This volume presents the new objectives of physics on self organizing systems composed of multi components in order to create a new field and establish universal comprehension in physics The book covers broad topics such as the thermodynamic time asymmetry in both transient and stationary nonequilibrium states the seriousness of auxiliary conditions in physicochemical processes and biological systems the quantum classical and micro macro interfaces which are familiar in mesoscopic physics the purification scheme of quantum entanglement topics on gamma ray bursts and the walking mechanism of single molecular Analog Circuits and Systems for Voltage-Mode and Current-Mode Sensor Interfacing Applications motors Andrea De Marcellis, Giuseppe Ferri, 2011-06-29 Analog CMOS Microelectronic Circuits describes novel approaches for analog electronic interfaces design especially for resistive and capacitive sensors showing a wide variation range with the intent to cover a lack of solutions in the literature After an initial description of sensors and main definitions novel electronic circuits which do not require any initial calibrations are described they show both AC and DC excitation voltage for the employed sensor and use both voltage mode and current mode approaches. The proposed interfaces can be realized both as prototype boards for fast characterization in this sense they can be easily implemented by students and researchers and as integrated circuits using modern low voltage low power design techniques in this case specialist analog microelectronic researchers will find them useful The primary audience of Analog CMOS Microelectronic Circuits are analog circuit designers sensor companies Ph D students on analog microelectronics undergraduate and postgraduate students in electronic engineering

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