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The book offers unique insight into the modern world of wireless communication that included 5G generation, implementation in Internet of Things (IoT), and emerging biomedical applications. To meet different design requirements, gaining perspective on systems is important. Written by international experts in industry and academia, the intended audience is practicing engineers with some electronics background. It presents the latest research and practices in wireless communication, as industry prepares for the next evolution towards a trillion interconnected devices. The text further explains how modern RF wireless systems may handle such a large number of wireless devices. Covers modern wireless technologies (5G, IoT), and emerging biomedical applications Discusses novel RF systems, CMOS low power circuit implementation, antennae arrays, circuits for medical imaging, and many other emerging technologies in wireless co-space. Written by a mixture of top industrial experts and key academic professors.

Agricultural Internet of Things and Decision Support for Smart Farming reveals how a set of key enabling technologies (KET) related to agronomic management, remote and proximal sensing, data mining, decision-making and automation can be efficiently integrated in one system. Chapters cover how KETs enable real-time monitoring of soil conditions, determine real-time, site-specific requirements of crop systems, help develop a decision support system (DSS) aimed at maximizing the efficient use of resources, and provide planning for agronomic inputs differentiated in time and space. This book is ideal for researchers, academics, post-graduate students and practitioners who want to embrace new agricultural technologies. Presents the science behind smart technologies for agricultural management Reveals the power of data science and how to extract meaningful insights from big data on what is most suitable based on individual time and space Proves how advanced technologies used in agriculture practices can become site-specific, locally adaptive, operationally feasible and economically affordable

Developments at the nanoscale are leading to new possibilities and challenges for nuclear applications in areas ranging from medicine to international commerce to atomic power production/waste treatment. Progress in nanotech is helping the nuclear industry slash the cost of energy production. It also continues to improve application reliability and safety measures, which remain a critical concern, especially since the reactor disasters in Japan. Exploring the new wide-ranging landscape of nuclear function, Atomic Nanoscale Technology in the Nuclear Industry details the breakthroughs in nanoscale applications and methodologies that are revolutionizing power production, biotechnology, and material science. Developments in atomic nanoscale technology have given us the ability to: Use ion beams to Investigate and optimize radiation energy losses at the nanoscopic level Assess nanoscopic safety circumstances involved in a

reactor failure Analyze characteristics of nuclear spacecraft operating in the nanogravity of deep space Evaluate light collection enhancement for digital X-ray detection Apply brachytherapy using radioisotopes for cancer therapy Treat nuclear waste at the nanoscopic level Use systems-thinking decision making to analyze financial progress of nanotech in the energy industry Assess safety (and safety management methods) for nuclear nanomaterials used in plant operations Representing a first step in multi-combinatorial research, this text incorporates advanced studies that use Monte Carlo and solid-state measurement (including radiation detection) methods. Researchers used these to demonstrate the potential to upgrade methods of radiation protection and nuclear reactor operation (safety, waste disposal, etc.). The author also addresses how we can use nanotechnology to address industrial concerns and enhance nuclear medicine techniques. He highlights several nanomaterial systems and devices to illustrate developments in this area. About the Author: Taeho Woo launched the specialized field of atomic multinology (interdisciplinary research of nuclear technology), which combines the application of information technology, biotechnology, and nanotechnology in the nuclear industry.

Advanced concepts for wireless technologies present a vision of technology that is embedded in our surroundings and practically invisible. From established radio techniques like GSM, 802.11 or Bluetooth to more emerging technologies, such as Ultra Wide Band and smart dust motes, a common denominator for future progress is the underlying integrated circuit technology. Wireless Technologies responds to the explosive growth of standard cellular radios and radically different wireless applications by presenting new architectural and circuit solutions engineers can use to solve modern design problems. This reference addresses state-of-the art CMOS design in the context of emerging wireless applications, including 3G/4G cellular telephony, wireless sensor networks, and wireless medical application. Written by top international experts specializing in both the IC industry and academia, this carefully edited work uncovers new design opportunities in body area networks, medical implants, satellite communications, automobile radar detection, and wearable electronics. The book is divided into three sections: wireless system perspectives, chip architecture and implementation issues, and devices and technologies used to fabricate wireless integrated circuits. Contributors address key issues in the development of future silicon-based systems, such as scale of integration, ultra-low power dissipation, and the integration of heterogeneous circuit design style and processes onto one substrate. Wireless sensor network systems are now being applied in critical applications in commerce, healthcare, and security. This reference, which contains 25 practical and scientifically rigorous articles, provides the knowledge communications engineers need to design innovative methodologies at the circuit and system level.

This book presents the combined proceedings of the 12th International Conference on Multimedia and Ubiquitous Engineering (MUE 2018) and the 13th

International Conference on Future Information Technology (Future Tech 2018), both held in Salerno, Italy, April 23 - 25, 2018. The aim of these two meetings was to promote discussion and interaction among academics, researchers and professionals in the field of ubiquitous computing technologies. These proceedings reflect the state of the art in the development of computational methods, involving theory, algorithms, numerical simulation, error and uncertainty analysis and novel applications of new processing techniques in engineering, science, and other disciplines related to ubiquitous computing.

This volume interrogates the popularity of problematic theories in the study of Africa and Africans in the 21st century. The book provides ethnographic and intellectual material for scholars seeking to rethink and reimagine a number of externally imposed theories used (un-)consciously in Africa, with the intention of raising awareness and fostering critical thinking amongst scholars theorising Africa. With its theorising focus and contributors drawn from diverse disciplines and geographical locations, the book is both a pacesetter on how to think, research and theorise Africa, and an invaluable asset for social scientists, development practitioners, civil society activists and leaders in the politics and economy of everyday life on the continent. It poses an invitation to those seeking to re-embrace and reconnect with theory as an indispensable ingredient and determinant of quality in critical production and consumption of knowledge on Africa and of relevance to Africans.

This book discusses the unique nature and complexity of fog data analytics (FDA) and develops a comprehensive taxonomy abstracted into a process model. The exponential increase in sensors and smart gadgets (collectively referred as smart devices or Internet of things (IoT) devices) has generated significant amount of heterogeneous and multimodal data, known as big data. To deal with this big data, we require efficient and effective solutions, such as data mining, data analytics and reduction to be deployed at the edge of fog devices on a cloud. Current research and development efforts generally focus on big data analytics and overlook the difficulty of facilitating fog data analytics (FDA). This book presents a model that addresses various research challenges, such as accessibility, scalability, fog nodes communication, nodal collaboration, heterogeneity, reliability, and quality of service (QoS) requirements, and includes case studies demonstrating its implementation. Focusing on FDA in IoT and requirements related to Industry 4.0, it also covers all aspects required to manage the complexity of FDA for IoT applications and also develops a comprehensive taxonomy.

Satellite communications, Cable and optical communications, Mobile communications, Computational electromagnetic, Antennas and propagation, RF and microwave technique, Electromagnetic compatibility, Broadcasting and digital television, Digital signal processing, Multimedia communications, Broadband wireless access, Telecommunication networks, Modulations and coding, Internet technologies, New telecommunications technologies and

services, other

This book presents the advancements made in applied metrology in the field of Urban Drainage and Storm water Management over the past two decades in scientific research as well as in practical applications. Given the broadness of this subject (measuring principles, uncertainty in data, data validation, data storage and communication, design, maintenance and management of monitoring networks, technical details of sensor technology), the focus is on water quantity and a sound metrological basis. The book offers common ground for academics and practitioners when setting up monitoring projects in urban drainage and storm water management. This will enable an easier exchange of results so as to allow for a faster scientific progress in the field. A second, but equally important goal, is to allow practitioners access to scientific developments and gained experience when it comes to monitoring urban drainage and storm water systems. In-depth description of international case studies covering all aspects discussed in the book are presented, along with self-training exercises and codes available for readers on a companion website.

Semiconductor Radiation Detection Systems addresses the state-of-the-art in the design of semiconductor detectors and integrated circuit design, in the context of medical imaging using ionizing radiation. It addresses exciting new opportunities in X-ray detection, Computer Tomography (CT), bone dosimetry, and nuclear medicine (PET, SPECT). In addition to medical imaging, the book explores other applications of semiconductor radiation detection systems in security applications such as luggage scanning, dirty bomb detection, and border control. Features a chapter written by well-known Gamma-Ray Imaging authority Tadayuki Takahashi Assembled by a combination of top industrial experts and academic professors, this book is more than just a product manual. It is practical enough to provide a solid explanation of presented technologies, incorporating material that offers an optimal balance of scientific and academic theory. With less of a focus on math and physical details, the author concentrates more on exploring exactly how technologies are being used. With its combined coverage of new materials and innovative new system approaches, as well as a succinct overview of recent developments, this book is an invaluable tool for any engineer, professional, or student working in electronics or an associated field.

As rapid technological developments occur in electronics, photonics, mechanics, chemistry, and biology, the demand for portable, lightweight integrated microsystems is relentless. These devices are getting exponentially smaller, increasingly used in everything from video games, hearing aids, and pacemakers to more intricate biomedical engineering and military applications. Edited by Kris Iniewski, a revolutionary in the field of advanced semiconductor materials, *Integrated Microsystems: Electronics, Photonics, and Biotechnology* focuses on techniques for optimized design and fabrication of these intelligent miniaturized devices and systems. Composed of contributions from experts in academia and industry around the world, this reference covers processes compatible with

CMOS integrated circuits, which combine computation, communications, sensing, and actuation capabilities. Light on math and physics, with a greater emphasis on microsystem design and configuration and electrical engineering, this book is organized in three sections—Microelectronics and Biosystems, Photonics and Imaging, and Biotechnology and MEMs. It addresses key topics, including physical and chemical sensing, imaging, smart actuation, and data fusion and management. Using tables, figures, and equations to help illustrate concepts, contributors examine and explain the potential of emerging applications for areas including biology, nanotechnology, micro-electromechanical systems (MEMS), microfluidics, and photonics.

This book constitutes the refereed proceedings of the 22nd International Conference on Distributed and Computer and Communication Networks, DCCN 2019, held in Moscow, Russia, in September 2019. The 50 full papers and 2 short papers were carefully reviewed and selected from 174 submissions. The papers cover the following topics: Computer and Communication Networks and Technologies, Analytical Modeling of Distributed Systems, and Distributed Systems Applications.

There are fewer grounds today than in the past to deplore a North-South divide in research and innovation. This is one of the key findings of the UNESCO Science Report: towards 2030. A large number of countries are now incorporating science, technology and innovation in their national development agenda, in order to make their economies less reliant on raw materials and more rooted in knowledge. Most research and development (R&D) is taking place in high-income countries, but innovation of some kind is now occurring across the full spectrum of income levels according to the first survey of manufacturing companies in 65 countries conducted by the UNESCO Institute for Statistics and summarized in this report. For many lower-income countries, sustainable development has become an integral part of their national development plans for the next 10–20 years. Among higher-income countries, a firm commitment to sustainable development is often coupled with the desire to maintain competitiveness in global markets that are increasingly leaning towards ‘green’ technologies. The quest for clean energy and greater energy efficiency now figures among the research priorities of numerous countries. Written by more than 50 experts who are each covering the country or region from which they hail, the UNESCO Science Report: towards 2030 provides more country-level information than ever before. The trends and developments in science, technology and innovation policy and governance between 2009 and mid-2015 described here provide essential baseline information on the concerns and priorities of countries that could orient the implementation and drive the assessment of the 2030 Agenda for Sustainable Development in the years to come.

This book constitutes the joint refereed proceedings of the 18th International Conference on Next Generation Wired/Wireless Advanced Networks and

Systems, NEW2AN 2018, the 11th Conference on Internet of Things and Smart Spaces, ruSMART 2018. The 64 revised full papers presented were carefully reviewed and selected from 186 submissions. The papers of NEW2AN focus on advanced wireless networking and applications; lower-layer communication enablers; novel and innovative approaches to performance and efficiency analysis of ad-hoc and machine-type systems; employed game-theoretical formulations, Markov chain models, and advanced queuing theory; grapheme and other emerging material, photonics and optics; generation and processing of signals; and business aspects. The ruSMART papers deal with fully-customized applications and services.

Space applications, nuclear physics, military operations, medical imaging, and especially electronics (modern silicon processing) are obvious fields in which radiation damage can have serious consequences, i.e., degradation of MOS devices and circuits. Zeroing in on vital aspects of this broad and complex topic, *Radiation Effects in Semiconductors* addresses the ever-growing need for a clear understanding of radiation effects on semiconductor devices and circuits to combat potential damage it can cause. Features a chapter authored by renowned radiation authority Lawrence T. Clark on Radiation Hardened by Design SRAM Strategies for TID and SEE Mitigation This book analyzes the radiation problem, focusing on the most important aspects required for comprehending the degrading effects observed in semiconductor devices, circuits, and systems when they are irradiated. It explores how radiation interacts with solid materials, providing a detailed analysis of three ways this occurs: Photoelectric effect, Compton effect, and creation of electron-positron pairs. The author explains that the probability of these three effects occurring depends on the energy of the incident photon and the atomic number of the target. The book also discusses the effects that photons can have on matter—in terms of ionization effects and nuclear displacement Written for post-graduate researchers, semiconductor engineers, and nuclear and space engineers with some electronics background, this carefully constructed reference explains how ionizing radiation is creating damage in semiconducting devices and circuits and systems—and how that damage can be avoided in areas such as military/space missions, nuclear applications, plasma damage, and X-ray-based techniques. It features top-notch international experts in industry and academia who address emerging detector technologies, circuit design techniques, new materials, and innovative system approaches.

The dominant medium for soliton propagation in electronics, nonlinear transmission line (NLTL) has found wide application as a testbed for nonlinear dynamics and KdV phenomena as well as for practical applications in ultra-sharp pulse/edge generation and novel nonlinear communication schemes in electronics. While many texts exist covering solitons in general, there is as yet no source that provides a comprehensive treatment of the soliton in the electrical domain. Drawing on the award winning research of Carnegie Mellon's David S.

Ricketts, *Electrical Solitons Theory, Design, and Applications* is the first text to focus specifically on KdV solitons in the nonlinear transmission line. Divided into three parts, the book begins with the foundational theory for KdV solitons, presents the core underlying mathematics of solitons, and describes the solution to the KdV equation and the basic properties of that solution, including collision behaviors and amplitude-dependent velocity. It also examines the conservation laws of the KdV for loss-less and lossy systems. The second part describes the KdV soliton in the context of the NLTL. It derives the lattice equation for solitons on the NLTL and shows the connection with the KdV equation as well as the governing equations for a lossy NLTL. Detailing the transformation between KdV theory and what we measure on the oscilloscope, the book demonstrates many of the key properties of solitons, including the inverse scattering method and soliton damping. The final part highlights practical applications such as sharp pulse formation and edge sharpening for high speed metrology as well as high frequency generation via NLTL harmonics. It describes challenges to realizing a robust soliton oscillator and the stability mechanisms necessary, and introduces three prototypes of the circular soliton oscillator using discrete and integrated platforms.

There is a growing need to understand and combat potential radiation damage problems in semiconductor devices and circuits. Assessing the billion-dollar market for detection equipment in the context of medical imaging using ionizing radiation, *Electronics for Radiation Detection* presents valuable information that will help integrated circuit (IC) designers and other electronics professionals take full advantage of the tremendous developments and opportunities associated with this burgeoning field. Assembling contributions from industrial and academic experts, this book— Addresses the state of the art in the design of semiconductor detectors, integrated circuits, and other electronics used in radiation detection Analyzes the main effects of radiation in semiconductor devices and circuits, paying special attention to degradation observed in MOS devices and circuits when they are irradiated Explains how circuits are built to deal with radiation, focusing on practical information about how they are being used, rather than mathematical details Radiation detection is critical in space applications, nuclear physics, semiconductor processing, and medical imaging, as well as security, drug development, and modern silicon processing techniques. The authors discuss new opportunities in these fields and address emerging detector technologies, circuit design techniques, new materials, and innovative system approaches. Aimed at postgraduate researchers and practicing engineers, this book is a must for those serious about improving their understanding of electronics used in radiation detection. The information presented here can help you make optimal use of electronic detection equipment and stimulate further interest in its development, use, and benefits.

This book is focused on an emerging area, i.e. combination of IoT and semantic technologies, which should enable breaking the silos of local and/or domain-specific IoT deployments. Taking into account the way that IoT ecosystems are realized, several challenges can be identified. Among them of definite importance are (this list is, obviously, not exhaustive): (i) How to provide common representation and/or shared understanding of data that will enable analysis across (systematically growing)

ecosystems? (ii) How to build ecosystems based on data flows? (iii) How to track data provenance? (iv) How to ensure/manage trust? (v) How to search for things/data within ecosystems? (vi) How to store data and assure its quality? Semantic technologies are often considered among the possible ways of addressing these (and other, related) questions. More precisely, in academic research and in industrial practice, semantic technologies materialize in the following contexts (this list is, also, not exhaustive, but indicates the breadth of scope of semantic technology usability): (i) representation of artefacts in IoT ecosystems and IoT networks, (ii) providing interoperability between heterogeneous IoT artefacts, (iii) representation of provenance information, enabling provenance tracking, trust establishment, and quality assessment, (iv) semantic search, enabling flexible access to data originating in different places across the ecosystem, (v) flexible storage of heterogeneous data. Finally, Semantic Web, Web of Things, and Linked Open Data are architectural paradigms, with which the aforementioned solutions are to be integrated, to provide production-ready deployments. .

This book addresses decision making in reverse logistics, which concerns the integration of used and obsolete products back into the supply chain as valuable resources. It covers a wide range of aspects, related to distribution, production and inventory management, and supply chain management. For each topic, it highlights key managerial issues in real-life examples and explains which quantitative models are available for addressing them. By treating a broad range of issues in a unified way, the book offers the reader a comprehensive view on the field of reverse logistics.

This book constitutes the refereed post-conference proceedings of the 23rd International Conference on Distributed and Computer and Communication Networks, DCCN 2020, held in Moscow, Russia, in September 2020. The 54 revised full papers and 1 revised short paper were carefully reviewed and selected from 167 submissions. The papers cover the following topics: computer and communication networks; analytical modeling of distributed systems; and distributed systems applications.

This book constitutes the refereed proceedings of the 18th International Conference on Ad-Hoc, Mobile, and Wireless Networks, ADHOC-NOW 2019, held in Luxembourg, in October 2019. The 37 full and 10 short papers presented were carefully reviewed and selected from 64 submissions. The papers provide an in-depth and stimulating view on the new frontiers in the field of mobile, ad hoc and wireless computing. They are organized in the following topical sections: IoT for emergency and disaster management; scheduling and synchronization in WSN; routing strategies for WSN; LPWANs and their integration with satellite; performance improvement of wireless and sensor networks; optimization schemes for increasing sensors lifetime; vehicular and UAV networks; body area networks, IoT security and standardization.

This book aims to provide a broad overview of various topics of Internet of Things (IoT), ranging from research, innovation and development priorities to enabling technologies, nanoelectronics, cyber-physical systems, architecture, interoperability and industrial applications. All this is happening in a global context, building towards intelligent, interconnected decision making as an essential driver for new growth and co-competition across a wider set of markets. It is intended to be a standalone book in a series that covers the Internet of Things activities of the IERC – Internet of Things European Research Cluster from research to technological innovation, validation and deployment. The book builds on the ideas put forward by the European Research

Cluster on the Internet of Things Strategic Research and Innovation Agenda, and presents global views and state of the art results on the challenges facing the research, innovation, development and deployment of IoT in future years. The concept of IoT could disrupt consumer and industrial product markets generating new revenues and serving as a growth driver for semiconductor, networking equipment, and service provider end-markets globally. This will create new application and product end-markets, change the value chain of companies that creates the IoT technology and deploy it in various end sectors, while impacting the business models of semiconductor, software, device, communication and service provider stakeholders. The proliferation of intelligent devices at the edge of the network with the introduction of embedded software and app-driven hardware into manufactured devices, and the ability, through embedded software/hardware developments, to monetize those device functions and features by offering novel solutions, could generate completely new types of revenue streams. Intelligent and IoT devices leverage software, software licensing, entitlement management, and Internet connectivity in ways that address many of the societal challenges that we will face in the next decade.

In the not too distant future, internet access will be dominated by wireless networks. With that, wireless edge using optical core next-generation networks will become as ubiquitous as traditional telephone networks. This means that telecom engineers, chip designers, and engineering students must prepare to meet the challenges and opportunities that the development and deployment of these technologies will bring. Bringing together cutting-edge coverage of wireless and optical networks in a single volume, *Internet Networks Wired, Wireless, and Optical Technologies* provides a concise yet complete introduction to these dynamic technologies. Filled with case studies, illustrations, and practical examples from industry, the text explains how wireless, wireline, and optical networks work together. It also: Covers WLAN, WPAN, wireless access, 3G/4G cellular, RF transmission Details optical networks involving long-haul and metropolitan networks, optical fiber, photonic devices, and VLSI chips Provides clear instruction on the application of wireless and optical networks Taking into account recent advances in storage, processing, sensors, displays, statistical data analyses, and autonomic systems, this reference provides forward thinking engineers and students with a realistic vision of how the continued evolution of the technologies that touch wireless communication will soon reshape markets and business models around the world.

The Symposium is aimed at presenting and discussing the latest scientific and technical advances in communication systems and vehicular communication technology This year s symposium is themed around the Internet of Things and Machine to Machine communications

ISMICT 2021 aims to establish a forum to present new research and development results, exchange ideas, discuss practices, and share experiences among Technology and Medicine sides including healthcare, wellness, clinical therapy, and surgery as well as ICT, mechanical, and biomedical engineering Moreover, activities of standards, regulations, and business for medical ICT devices, systems and services will be promoted by national and global governments and industry

The term IoT, which was first proposed by Kevin Ashton, a British technologist, in 1999 has the potential to impact everything from new product opportunities to shop floor optimization to factory worker efficiency gains, that will power top-line and bottom-line gains. As IoT

technology is being put to diversified use, the current technology needs to be improved to enhance privacy and built secure devices by adopting a security-focused approach, reducing the amount of data collected, increasing transparency and providing consumers with a choice to opt out. Therefore, the current volume has been compiled, in an effort to draw the various issues in IoT, challenges faced and existing solutions so far. Key Points: • Provides an overview of basic concepts and technologies of IoT with communication technologies ranging from 4G to 5G and its architecture. • Discusses recent security and privacy studies and social behavior of human beings over IoT. • Covers the issues related to sensors, business model, principles, paradigms, green IoT and solutions to handle relevant challenges. • Presents the readers with practical ideas of using IoT, how it deals with human dynamics, the ecosystem, the social objects and their relation. • Deals with the challenges involved in surpassing diversified architecture, protocol, communications, integrity and security.

Circuits for Emerging Technologies Beyond CMOS New exciting opportunities are abounding in the field of body area networks, wireless communications, data networking, and optical imaging. In response to these developments, top-notch international experts in industry and academia present Circuits at the Nanoscale: Communications, Imaging, and Sensing. This volume, unique in both its scope and its focus, addresses the state-of-the-art in integrated circuit design in the context of emerging systems. A must for anyone serious about circuit design for future technologies, this book discusses emerging materials that can take system performance beyond standard CMOS. These include Silicon on Insulator (SOI), Silicon Germanium (SiGe), and Indium Phosphide (InP). Three-dimensional CMOS integration and co-integration with Microelectromechanical (MEMS) technology and radiation sensors are described as well. Topics in the book are divided into comprehensive sections on emerging design techniques, mixed-signal CMOS circuits, circuits for communications, and circuits for imaging and sensing. Dr. Krzysztof Iniewski is a director at CMOS Emerging Technologies, Inc., a consulting company in Vancouver, British Columbia. His current research interests are in VLSI circuits for medical applications. He has published over 100 research papers in international journals and conferences, and he holds 18 international patents granted in the United States, Canada, France, Germany, and Japan. In this volume, he has assembled the contributions of over 60 world-reknown experts who are at the top of their field in the world of circuit design, advancing the bank of knowledge for all who work in this exciting and burgeoning area.

Internet of things (IoT) is a new type of network that combines communication technology, expanded applications, and physical devices. Among them, agriculture is one of the most important areas in the application of the IoT technology, which has its unique requirements and integration features. Compared to the information technology in traditional agriculture, the agricultural IoT mainly refers to industrialized production and sustainable development under relatively controllable conditions. Agricultural IoT applies sensors, RFID, visual capture terminals and other types of sensing devices to detect and collect site information, and with broad applications in field planting, facility horticulture, livestock and poultry breeding, aquaculture and agricultural product logistics. It utilizes multiple information transmission channels such as wireless sensor networks, telecommunications networks and the internet to achieve reliable transmission of agricultural information at multiple scales and intelligently processes the acquired, massive information. The goals are to achieve (i) optimal control of agricultural production process, (ii) intelligent electronic trading of agricultural products circulation, and (iii) management of systematic logistics, quality and safety traceability. This book focuses on three levels of agricultural IoT network: information perception technology, information transmission technology and application technology. .

Many argue that telecommunications network infrastructure is the most impressive and important technology ever developed. Analyzing the telecom market's constantly evolving

trends, research directions, infrastructure, and vital needs, Telecommunication Networks responds with revolutionized engineering strategies to optimize network construction. Omnipresent in society, telecom networks integrate a wide range of technologies. These include quantum field theory for the study of optical amplifiers, software architectures for network control, abstract algebra required to design error correction codes, and network, thermal, and mechanical modeling for equipment platform design. Illustrating how and why network developers make technical decisions, this book takes a practical engineering approach to systematically assess the network as a whole—from transmission to switching. Emphasizing a uniform bibliography and description of standards, it explores existing technical developments and the potential for projected alternative architectural paths, based on current market indicators. The author characterizes new device and equipment advances not just as quality improvements, but as specific responses to particular technical market necessities. Analyzing design problems to identify potential links and commonalities between different parts of the system, the book addresses interdependence of these elements and their individual influence on network evolution. It also considers power consumption and real estate, which sometimes outweigh engineering performance data in determining a product's success. To clarify the potential and limitations of each presented technology and system analysis, the book includes quantitative data inspired by real products and prototypes. Whenever possible, it applies mathematical modeling to present measured data, enabling the reader to apply demonstrated concepts in real-world situations. Covering everything from high-level architectural elements to more basic component physics, its focus is to solve a problem from different perspectives, and bridge descriptions of well-consolidated solutions with newer research trends.

With contributions from top international experts from both industry and academia, *Nano-Semiconductors: Devices and Technology* is a must-read for anyone with a serious interest in future nanofabrication technologies. Taking into account the semiconductor industry's transition from standard CMOS silicon to novel device structures—including carbon nanotubes (CNT), graphene, quantum dots, and III-V materials—this book addresses the state of the art in nano devices for electronics. It provides an all-encompassing, one-stop resource on the materials and device structures involved in the evolution from micro- to nanoelectronics. The book is divided into three parts that address: Semiconductor materials (i.e., carbon nanotubes, memristors, and spin organic devices) Silicon devices and technology (i.e., BiCMOS, SOI, various 3D integration and RAM technologies, and solar cells) Compound semiconductor devices and technology This reference explores the groundbreaking opportunities in emerging materials that will take system performance beyond the capabilities of traditional CMOS-based microelectronics. Contributors cover topics ranging from electrical propagation on CNT to GaN HEMTs technology and applications. Approaching the trillion-dollar nanotech industry from the perspective of real market needs and the repercussions of technological barriers, this resource provides vital information about elemental device architecture alternatives that will lead to massive strides in future development.

This book considers all aspects of managing the complexity of Multimedia Big Data Computing (MMBD) for IoT applications and develops a comprehensive taxonomy. It also discusses a process model that addresses a number of research challenges associated with MMBD, such as scalability, accessibility, reliability, heterogeneity, and Quality of Service (QoS) requirements, presenting case studies to demonstrate its application. Further, the book examines the layered architecture of MMBD computing and compares the life cycle of both big data and MMBD. Written by leading experts, it also includes numerous solved examples, technical descriptions, scenarios, procedures, and algorithms.

This book constitutes the refereed proceedings of the 16th International Conference on Ad-hoc, Mobile, and Wireless Networks, ADHOC-NOW 2018, held in St. Malo, France, in

September 2018. The 21 full and 6 short papers plus 2 invited talks presented in this volume were carefully reviewed and selected from 52 submissions. The contributions were organized in topical sections named: on ad-hoc, mobile and wireless sensor, networks and computing. The key technology to delivering maximum bandwidth over networks is Dense Wave-length Division Multiplexing (DWDM) Describes in detail how DWDM works and how to implement a range of transmission protocols Covers device considerations, the pros and cons of various network layer protocols, and quality of service (QoS) issues The authors are leading experts in this field and provide real-world implementation examples First book to describe the interplay between the physical and IP (Internet Protocol) layers in optical networks Internet-of-Things (IoT) Analytics are an integral element of most IoT applications, as it provides the means to extract knowledge, drive actuation services and optimize decision making. IoT analytics will be a major contributor to IoT business value in the coming years, as it will enable organizations to process and fully leverage large amounts of IoT data, which are nowadays largely underutilized. The Building Blocks of IoT Analytics is devoted to the presentation of the main technology building blocks that comprise advanced IoT analytics systems. It introduces IoT analytics as a special case of BigData analytics and accordingly presents leading edge technologies that can be deployed in order to successfully confront the main challenges of IoT analytics applications. Special emphasis is paid in the presentation of technologies for IoT streaming and semantic interoperability across diverse IoT streams. Furthermore, the role of cloud computing and BigData technologies in IoT analytics are presented, along with practical tools for implementing, deploying and operating non-trivial IoT applications. Along with the main building blocks of IoT analytics systems and applications, the book presents a series of practical applications, which illustrate the use of these technologies in the scope of pragmatic applications. Technical topics discussed in the book include: Cloud Computing and BigData for IoT analytics Searching the Internet of Things Development Tools for IoT Analytics Applications IoT Analytics-as-a-Service Semantic Modelling and Reasoning for IoT Analytics IoT analytics for Smart Buildings IoT analytics for Smart Cities Operationalization of IoT analytics Ethical aspects of IoT analytics This book contains both research oriented and applied articles on IoT analytics, including several articles reflecting work undertaken in the scope of recent European Commission funded projects in the scope of the FP7 and H2020 programmes. These articles present results of these projects on IoT analytics platforms and applications. Even though several articles have been contributed by different authors, they are structured in a well thought order that facilitates the reader either to follow the evolution of the book or to focus on specific topics depending on his/her background and interest in IoT and IoT analytics technologies. The compilation of these articles in this edited volume has been largely motivated by the close collaboration of the co-authors in the scope of working groups and IoT events organized by the Internet-of-Things Research Cluster (IERC), which is

currently a part of EU's Alliance for Internet of Things Innovation (AIOTI). LPWAN Technologies for IoT and M2M Applications provides insight into LPWAN technologies, also presenting a wide range of applications and a discussion on security issues and future challenges and research directions. This book is a beneficial and insightful resource for university researchers, graduate students and R&D engineers who are designing networks and implementing IoT applications. To support new requirements for this emerging industry, a new paradigm of Low Power Wide Area Networks (LPWAN) has recently evolved, including LoRa, Sigfox and NB-IoT, hence this book presents the latest updates. This monograph length report, first published in 1970, originated from a program of research at Resources for the Future that dealt with the management of residuals and of environmental quality. It presents some of the broad concepts that the program was based on and represents the effort to break out of the traditional approach in pollution and policy research, which had treated air, water, and solid waste problems as separate categories. This book will be of interest to students of economics and environmental studies.

Building Blocks for IoT Analytics River Publishers

This book develops the core system science needed to enable the development of a complex industrial internet of things/manufacturing cyber-physical systems (IIoT/M-CPS). Gathering contributions from leading experts in the field with years of experience in advancing manufacturing, it fosters a research community committed to advancing research and education in IIoT/M-CPS and to translating applicable science and technology into engineering practice. Presenting the current state of IIoT and the concept of cybermanufacturing, this book is at the nexus of research advances from the engineering and computer and information science domains. Readers will acquire the core system science needed to transform to cybermanufacturing that spans the full spectrum from ideation to physical realization.

This book constitutes the refereed proceedings of the 15th European Conference on Ambient Intelligence, Aml 2019, held in Rome, Italy, in November 2019. The 20 full papers presented together with 10 short papers were carefully reviewed and selected from 50 submissions. The papers cover topics such as embedded devices that can merge unobtrusively and in natural ways using information and intelligence hidden in the network connecting these devices (e.g., the Internet of Things). The main topic of Aml 2019 was "Data-driven Ambient Intelligence," which follows the vision of Calm Technology, where technology is useful but does not demand our full attention or interfere with our usual behavior and activities.

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