Designing The Internet Of Things

Apress is proud to announce that Rethinking the Internet of Things was a 2014 Jolt Award Finalist, the highest honor for a programming book. And the amazing part is that there is no code in the book. Over the next decade, most devices connected to the Internet will not be used by people in the familiar way that personal computers, tablets and smart phones are. Billions of interconnected devices will be monitoring the environment, transportation systems, factories, farms, forests, utilities, soil and weather conditions, oceans and resources. Many of these sensors and actuators will be networked into autonomous sets, with much of the information being exchanged machine-to-machine directly and without human involvement. Machine-to-machine communications are typically terse. Most sensors and actuators will report or act upon small pieces of information - "chirps". Burdening these devices with current network protocol stacks is inefficient, unnecessary and unduly increases their cost of ownership. This must change. The architecture of the Internet of Things must evolve now by incorporating simpler protocols toward at the edges of the network, or remain forever inefficient. Rethinking the Internet of Things describes reasons why we must rethink current approaches to the Internet of Things. Appropriate architectures that will coexist with existing networking protocols are described in detail. An architecture comprised of integrator functions, propagator nodes, and end devices, along with their interactions, is explored.

A comprehensive overview of the Internet of Things' core concepts, technologies, and applications Internet of Things A to Z offers a holistic approach to the Internet of Things (IoT) model. The Internet of Things refers to uniquely identifiable objects and their virtual representations in an Internet-like structure. Recently, there has been a rapid growth in research on IoT communications and networks, that confirms the scalability and broad reach of the core concepts. With contributions from a panel of international experts, the text offers insight into the ideas, technologies, and applications of this subject. The authors discuss recent developments in the field and the most current and emerging trends in IoT. In addition, the text is filled with examples of innovative applications and real-world case studies. Internet of Things A to Z fills the need for an up-to-date volume on the topic. This important book: Covers in great detail the core concepts, enabling technologies, and implications of the Internet of Things Addresses the business, social, and legal aspects of the Internet of Things Explores the critical topic of security and privacy challenges for both individuals and organizations Includes a discussion of advanced topics such as the need for standards and interoperability Contains contributions from an international group of experts in academia, industry, and research Written for ICT researchers, industry professionals, and lifetime IT learners as well as academics and students, Internet of Things A to Z provides a much-needed and comprehensive resource to this burgeoning field.

This book provides a comprehensive guide to the design and prototyping of wearable technology and internet of things (IoT), in addition to their various components, applications, and practical considerations. The book also offers detailed design and prototyping of vital examples of these technologies covering all practical considerations. The authors begin with an introduction and brief history of wearable tech and IoT. They then move on to describe applications of the technology in the fields of biomedicine, civil defense, education, and more. This is followed by a review of electronic and digital circuits and other critical components. Later chapters discuss product development, security and privacy concerns, and software development.

We are now standing at the precipice of the next transformative development: the Internet of Things. Soon, connected technology will be embedded in hundreds of everyday objects we already use: our cars, wallets, watches, umbrellas, even our trash cans. These objects will respond to our needs, come to know us, and learn to think on our behalf. David Rose calls these devices--which are just beginning to creep into the marketplace--Enchanted Objects. Some believe the future will look like more of the same--more smartphones, tablets, screens embedded in every conceivable surface. Rose has a different vision: technology that atomizes, combining itself with the objects that make up the very fabric of daily living. Such technology will be woven into the background of our environment, enhancing human relationships and channeling desires for omniscience, long life, and creative expression. The enchanted objects of fairy tales and science fiction will enter real life. Groundbreaking, timely, and provocative, Enchanted Objects is a blueprint for a better future, where efficient solutions come hand in hand with technology that delights our senses.

Internet of Things and Data Analytics Handbook
RFID Protocol Design, Optimization, and Security for the Internet of Things
Enterprise Information Architecture for A New Age
Towards Smart World
Connecting Objects to the Web
Designing the Internet of Things

This book examines the Internet of Things (IoT) and Data Analytics from a technical, application, and business point of view. Internet of Things and Data Analytics Handbook describes essential technical knowledge, building blocks, processes, design principles, implementation, and marketing for IoT projects. It provides readers with knowledge in planning, designing, and implementing IoT projects. The book is written by experts on the subject matter, including international experts from nine countries in the consumer and enterprise fields of IoT. The text starts with an overview and anatomy of IoT, ecosystem of IoT, communication protocols, networking, and available hardware, both present and future applications and transformations, and business models. The text also addresses big data analytics, machine learning, cloud computing, and consideration of sustainability that are essential to be both socially responsible and successful. Design and implementation processes are illustrated with best practices and case studies in action. In addition, the book: Examines cloud computing, data analytics, and sustainability and how they relate to IoT overs the scope of consumer, government, and enterprise applications Includes best practices, business model, and real-world case studies Hwaiyu Geng, P.E., is a consultant with Amica Research (www.AmicaResearch.org, Palo Alto, California), promoting green planning, design, and construction projects. He has had over 40 years of manufacturing and management experience, working with Westinghouse, Applied Materials, Hewlett Packard, and Intel on multi-million high-tech projects. He has written and presented numerous technical papers at international conferences. Mr. Geng, a patent holder, is also the editor/author of Data Center Handbook (Wiley, 2015).

The aim of this book is to provide a platform to readers through which they can access the applications of 'Internet of Things' in the Automotive field. Internet of Things in Automotive Industries and Road Safety provides the basic knowledge of the modules with interfacing, along with the programming. Several examples for rapid prototyping are included, this to make the readers understand about the concept of IoT. The book comprises of ten chapters for designing different independent prototypes for the automotive applications, and it would be beneficial for the people who want to get started with hardware based project prototypes. The text is based on the practical experience of the authors built up whilst undergoing projects with students and industry. Technical topics discussed in the book include: Role of IoT in automotive industriesArduino and its interfacing with I/O devicesTi Launch Pad and its interfacing with I/O devicesNodeMCU and its interfacing with I/O devicesSerial Communication with Arduino and NodeMCU

EVOLVING SOFTWARE PROCESSES The book provides basic building blocks of evolution in software processes, such as DevOps, scaling agile process in GSD, in order to lay a solid foundation for successful and sustainable future processes. One might argue that there are already many books that include descriptions of software processes. The answer is "yes, but." Becoming acquainted with existing software processes is not enough. It is tremendously important to understand the evolution and advancement in software processes so that developers appropriately address the problems, applications, and environments to which they are applied. Providing basic knowledge for these important tasks is the main goal of this book. Industry is in search of software process management capabilities. The emergence of the COVID-19 pandemic emphasizes the industry's need for software-specific process management capabilities. Most of today's products and services are based to a significant degree on software and are the results of largescale development programs. The success of such programs heavily depends on process management capabilities, because they typically require the coordination of hundreds or thousands of developers across different disciplines. Additionally, software and system development are usually distributed across geographical, cultural and temporal boundaries, which make the process management activities more challenging in the current pandemic situation. This book presents an extremely comprehensive overview of the evolution in software processes and provides a platform for practitioners, researchers and students to discuss the studies used for managing aspects of the software process, including managerial, organizational, economic and technical. It provides an opportunity to present empirical evidence, as well as proposes new techniques, tools, frameworks and approaches to maximize the significance of software process management. Audience The book will be used by practitioners, researchers, software engineers, and those in software process management, DevOps, agile and global software development.

The Internet of Things (IoT) is an emerging network superstructure that will connect physical resources and actual users. It will support an ecosystem of smart applications and services bringing hyper-connectivity to our society by using augmented and rich interfaces. Whereas in the beginning IoT referred to the advent of barcodes and Radio Frequency Identification (RFID), which helped to automate inventory, tracking and basic identification, today IoT is characterized by a dynamic trend toward connecting smart sensors, objects, devices, data and applications. The next step will be "cognitive IoT," facilitating object and data re-use across application domains and leveraging hyper-connectivity, interoperability solutions and semantically enriched information distribution. The Architectural Reference Model (ARM), presented in this book by the members of the IoT-A project team driving this harmonization effort, makes it possible to connect vertically closed systems, architectures and application areas so as to create open interoperable systems and integrated environments and platforms. It constitutes a foundation from which software companies can capitalize on the benefits of developing consumer-oriented platforms including hardware, software and services. The material is structured in two parts. Part A introduces the general concepts developed for and applied in the ARM. It is aimed at end users who want to use IoT technologies, managers interested in understanding the opportunities generated by these novel technologies, and system architects who are interested in an overview of the underlying basic models. It also includes several case studies to illustrate how the ARM has been used in real-life scenarios. Part B then addresses the topic at a more detailed technical level and is targeted at readers with a more scientific or technical background. It provides in-depth guidance on the ARM, including a detailed description of a process for generating concrete architectures, as well as reference manuals with guidelines on how to use the various models and perspectives presented to create a concrete architecture. Furthermore, best practices and tips on how system engineers can use the ARM to develop specific IoT architectures for dedicated IoT solutions are illustrated and exemplified in reverse mapping exercises of existing standards and platforms.

Principles and Paradigms
Designing IoT solutions with the IoT Architectural Reference Model
Homes to Cities Using Internet of Things
A Scalable Approach to Connecting Everything
Convergence of Artificial Intelligence and the Internet of Things
Enabling Things to Talk

This book explains the key feature to develop a complex and stable network that helps to gather the data to optimize the asset performance and maximize the production in the Industries leveraging on the cloud infrastructure and services. By the end, you can design the Industrial IoT network and the architecture for processing its data in the cloud.

The ubiquity of modern technologies has allowed for increased connectivity between people and devices across the globe. This connected infrastructure of networks creates numerous opportunities for applications and uses. As the applications of the internet of things continue to progress so do the security concerns for this technology. The study of threat prevention in the internet of things is necessary as security breaches in this field can ruin industries and lives. Securing the Internet of Things: Concepts, Methodologies, Tools, and Applications is a vital reference source that examines recent developments and emerging trends in security and privacy for the internet of things through new models, practical solutions, and technological advancements related to security. Highlighting a range of topics such as cloud security, threat detection, and open source software, this multi-volume book is ideally designed for engineers, IT consultants, ICT procurement managers, network system integrators, infrastructure service providers, researchers, academics, and professionals interested in current research on security practices pertaining to the internet of things.

Management of IoT Open Data Projects in Smart Cities demonstrates a key project management methodology for the implementation of Smart Cities projects: Principles and Regulations for Smart Cities (PaRSC). This methodology adopts a basis in classic Scrum soft management methods with carefully considered expansions. These include design principals for high-level architecture design and recommendations for design at the level of project teams. This approach enables the deployment of rule-based linguistic models for IoT project management, supporting the design of high-level architecture and providing rules for Scrum Smart Cities team. After reading this book, the reader will have a thorough grounding in IoT nodes and methods of their design, the acquisition and use of open data, and the use of project management methods to collect open data and build business models based on them. Presents a unified method for smart urban interventions based on the adjustment of Scrum to the complexity of smart city projects Establishes a key model for intelligent systems verification in Smart Cities projects Demonstrates how practitioners can gain from the adoption of rule-based linguistic models

This book introduces the problems facing Internet of Things developers and explores current technologies and techniques to help you manage, mine, and make sense of the data being collected through the use of the world's most popular database on the Internet - MySQL. The IoT is poised to change how we interact with and perceive the world around us, and the possibilities are nearly boundless. As more and more connected devices generate data, we will need to solve the problem of how to collect, store, and make sense of IoT data by leveraging the power of database systems. The book begins with an introduction of the MySQL database system and storage of sensor data. Detailed instructions and examples are provided to show how to add database nodes to IoT solutions including how to leverage MySQL high availability, including examples of how to protect data from node outages using advanced features of MySQL. The book closes with a comparison of raw and transformed data showing how transformed data can improve understandability and help you cut through a clutter of superfluous data toward the goal of mining nuggets of useful knowledge. In this book, you'll learn to: Understand the crisis of vast volumes of data from connected devices Transform data to improve reporting and reduce volume Store and aggregate your IoT data across multiple database servers Build localized, low-cost MySQL database servers using small and inexpensive computers Connect Arduino boards and other devices directly to MySQL database servers Build high availability MySQL solutions among low-power computing devices

Fundamentals of IoT and Wearable Technology Design
Technologies and Applications
Architecting IoT solutions by implementing sensors, communication infrastructure, edge computing, analytics, and security
Architecting the Internet of Things
Mastering Internet of Things
The Internet of Things

The widespread availability of technologies has increased exponentially in recent years. This ubiquity has created more connectivity and seamless integration among technology devices. Emerging Trends and Applications of the Internet of Things is an essential reference publication featuring the latest scholarly research on the surge of connectivity between computing devices in modern society, as well as the benefits and challenges of this. Featuring extensive coverage on a broad range of topics such as cloud computing, spatial cognition, and ultrasonic sensing, this book is ideally designed for researchers, professionals, and academicians seeking current research on upcoming advances in the Internet of Things (IoT).

Why the Internet was designed to be the way it is, and how it could be different, now and in the future. How do you design an internet? The architecture of the current Internet is the product of basic design decisions made early in its history. What would an internet look like if it were designed, today, from the ground up? In this book, MIT computer scientist David Clark explains how the Internet is actually put together, what requirements it was designed to meet, and why different design decisions would create different internets. He does not take today's Internet as a given but tries to learn from it, and from alternative proposals for what an internet might be, in order to draw some general conclusions about network architecture. Clark discusses the history of the Internet, and how a range of potentially conflicting requirements—including longevity, security, availability, economic viability, management, and meeting the needs of society—shaped its character. He addresses both the technical aspects of the Internet and its broader social and economic contexts. He describes basic design approaches and explains, in terms accessible to nonspecialists, how networks are designed to carry out their functions. (An appendix offers a more technical discussion of network functions for readers who want the details.) He considers a range of alternative proposals for how to design an internet, examines in detail the key requirements a successful design must meet, and then imagines how to design a future internet from scratch. It's not that we should expect anyone to do this; but, perhaps, by conceiving a better future, we can push toward it.

This comprehensive overview of IoT systems architecture includes in-depth treatment of all key components: edge, communications, cloud, data processing, security, management, and uses. Internet of Things: Concepts and System Design provides a reference and foundation for students and practitioners that they can build upon to design IoT systems and to understand how the specific parts they are working on fit into and interact with the rest of the system. This is especially important since IoT is a multidisciplinary area that requires diverse skills and knowledge including: sensors, embedded systems, real-time systems, control systems, communications, protocols, Internet, cloud computing, large-scale distributed processing and storage systems, AI and ML, (preferably) coupled with domain experience in the area where it is to be applied, such as building or manufacturing automation. Written in a reader-minded approach that starts by describing the problem (why should I care?), placing it in context (what does this do and where/how does it fit in the great scheme of things?) and then describing salient features of solutions (how does it work?), this book covers the existing body of knowledge and design practices, but also offers the author's insights and articulation of common attributes and salient features of solutions such as IoT information modeling and platform characteristics.

Learn to design, implement and secure your IoT infrastructure Key Features Build a complete IoT system that is the best fit for your organization Learn about different concepts, technologies, and tradeoffs in the IoT architectural stack Understand the theory, concepts, and implementation of each element that comprises IoT design—from sensors to the cloud Implement best practices to ensure the reliability, scalability, robust communication systems, security, and data analysis in your IoT infrastructure Book Description The Internet of Things (IoT) is the fastest growing technology market. Industries are embracing IoT technologies to improve operational expenses, product life, and people's well-being. An architectural guide is necessary if you want to traverse the spectrum of technologies needed to build a successful IoT system, whether that's a single device or millions of devices. This book encompasses the entire spectrum of IoT solutions, from sensors to the cloud. We start by examining modern sensor systems and focus on their power and functionality. After that, we dive deep into communication theory, paying close attention to near-range PAN, including the new Bluetooth® 5.0 specification and mesh networks. Then, we explore IP-based communication in LAN and WAN, including 802.11ah, 5G LTE cellular, Sigfox, and LoRaWAN. Next, we cover edge routing and gateways and their role in fog computing, as well as the messaging protocols of MQTT and CoAP. With the data now in internet form, you'll get an understanding of cloud and fog architectures, including the OpenFog standards. We wrap up the analytics portion of the book with the application of statistical analysis, complex event processing, and deep learning models. Finally, we conclude by providing a holistic view of the IoT technology stack and the anatomical details of IoT exploits while countering them with software defined perimeters and blockchains. What you will learn Understand the role and scope of architecting a successful IoT deployment, from sensors to the cloud Scan the landscape of IoT technologies that span everything from sensors to the cloud and everything in between See the trade-offs in choices of protocols and communications in IoT deployments Build a repertoire of skills and the vernacular necessary to work in the IoT space Broaden your skills in multiple engineering domains necessary for the IoT architect Who this book is for This book is for architects, system designers, technologists, and technology managers who want to understand the IoT ecosphere, various technologies, and tradeoffs and develop a 50,000-foot view of IoT architecture.

Trends and Future Directions
Foundation for Smart Cities, eHealth, and Ubiquitous Computing
Internet of Things for Architects
Internet of Things
Big Data and The Internet of Things
Internet of Things: Concepts and System Design

Enterprise Information Architecture for a New Age: Big Data and The Internet of Things, provides guidance in designing an information architecture to accommodate increasingly large amounts of data, massively large amounts of data, not only from traditional sources, but also from novel sources such everyday objects that are fast becoming wired into global Internet. No business can afford to be caught out by missing the value to be mined from the increasingly large amounts of available data generated by everyday devices. The text provides background as to how analytical solutions and enterprise architecture methodologies and concepts have evolved (including the roles of data warehouses, business intelligence tools, predictive analytics, data discovery, Big Data, and the impact of the Internet of Things). Then you're taken through a series of steps by which to define a future state architecture and create a plan for how to reach that future state. Enterprise Information Architecture for a New Age: Big Data and The Internet of Things helps you gain an understanding of the following: Implications of Big Data from a variety of new data sources (including data from sensors that are part of the Internet of Things) upon an information architecture How establishing a vision for data usage by defining a roadmap that aligns IT with line-of-business needs is a key early step The importance and details of taking a step-by-step approach when dealing with shifting business challenges and changing technology capabilities How to mitigate risk when evaluating existing infrastructure and designing and deploying new infrastructure Enterprise Information Architecture for a New Age: Big Data and The Internet of Things combines practical advice with technical considerations. Author Robert Stackowiak and his team are recognized worldwide for their expertise in large data solutions, including analytics. Don't miss your chance to read this book and gain the benefit of their advice as you look forward in thinking through your own choices and designing your own architecture to accommodate the burgeoning explosion in data that can be analyzed and converted into valuable information to drive your business forward toward success.

Internet of Things: Technologies and Applications for a New Age of Intelligence outlines the background and overall vision for the Internet of Things (IoT) and Cyber-Physical Systems (CPS), as well as associated emerging technologies. Key technologies are described including device communication and interactions, connectivity of devices to cloud-based infrastructures, distributed and edge computing, data collection, and methods to derive information and knowledge from connected devices and systems using artificial intelligence and machine learning. Also included are system architectures and ways to integrate these with enterprise architectures, and considerations on potential business impacts and regulatory requirements. Presents a comprehensive overview of the end-to-end system requirements for successful IoT solutions Provides a robust framework for analyzing the technology and market requirements for a broad variety of IoT solutions Covers in-depth security solutions for IoT systems Includes a detailed set of use cases that give examples of real-world implementation

Augment your IoT skills with the help of engaging and enlightening tutorials designed for Raspberry Pi 3 Key Features Design and implement state-of-the-art solutions for the Internet of Things Build complex projects using motions detectors, controllers, sensors, and

Raspberry Pi 3 A hands-on guide that provides interoperable solutions for sensors, actuators, and controllers Book Description The Internet of Things (IoT) is the fastest growing technology market. Industries are embracing IoT technologies to improve operational expenses, product life, and people's well-being. Mastering Internet of Things starts by presenting IoT fundamentals and the smart city. You will learn the important technologies and protocols that are used for the Internet of Things, their features, corresponding security implications, and practical examples on how to use them. This book focuses on creating applications and services for the Internet of Things. Further, you will learn to create applications and services for the Internet of Things. You will discover various interesting projects and understand how to publish sensor data, control devices, and react to asynchronous events using the XMPP protocol. The book also introduces chat, to interact with your devices. You will learn how to automate your tasks by using Internet of Things Service Platforms as the base for an application. You will understand the subject of privacy, requirements they should be familiar with, and how to avoid violating any of the important new regulations being introduced. At the end of the book, you will have mastered creating open, interoperable and secure networks of things, protecting the privacy and integrity of your users and their information. What you will learn Create your own project, run and debug it Master different communication patterns using the MQTT, HTTP, CoAP, LWM2M and XMPP protocols Build trust-based as hoc networks for open, secure and interoperable communication Explore the IoT Service Platform Manage the entire product life cycle of devices Understand and set up the security and privacy features required for your system Master interoperability, and how it is solved in the realms of HTTP,CoAP, LWM2M and XMPP Who this book is for If you're a developer or electronic engineer and are curious about the Internet of Things, this is the book for you. With only a rudimentary understanding of electronics and Raspberry Pi 3, and some programming experience using managed code, such as C# or Java, you will be taught to develop state-of-the-art solutions for the Internet of Things.

The book aims to provide a broad overview of various topics of the Internet of Things (IoT) from the research and development priorities to enabling technologies, architecture, security, privacy, interoperability and industrial applications. It is intended to be a stand-alone book in a series that covers the Internet of Things activities of the IERC - Internet of Things European Research Cluster - from technology to international cooperation and the global "state of play." 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 views and state of the art results on the challenges facing the research, development and deployment of IoT at the global level. Today we see the integration of Industrial, Business and Consumer Internet which is bringing together the Internet of People, Internet of Things, Internet of Energy, Internet of Vehicles, Internet of Media, Services and Enterprises in forming the backbone of the digital economy, the digital society and the foundation for the future knowledge and innovation based economy. These developments are supporting solutions for the emerging challenges of public health, aging population, environmental protection and climate change, the conservation of energy and scarce materials, enhancements to safety and security and the continuation and growth of economic prosperity. Penetration of smartphones and advances in nanoelectronics, cyber-physical systems, wireless communication, software, and Cloud computing technology will be the main drivers for IoT development. The IoT contribution is seen in the increased value of information created by the number of interconnections among things and the transformation of the processed information into knowledge shared into the Internet of Everything. The connected devices are part of ecosystems connecting people, processes, data, and things which are communicating in the Cloud using the increased storage and computing power while attempting to standardize communication and metadata. In this context, the next generation of Cloud computing technologies will need to be flexible enough to scale autonomously, adaptive enough to handle constantly changing connections and resilient enough to stand up to the huge flows of data that will occur. In 2025, analysts forecast that there will be six devices per human on the planet, which means around 50 billion more connected devices over the next 12 years. The Internet of Things market is connected to this anticipated device growth from industrial Machine to Machine (M2M) systems, smart meters and wireless sensors. Internet of Things technology will generate new services and new interfaces by creating smart environments and smart spaces with applications ranging from Smart Cities, Smart Transport, Buildings, Energy, Grid, to Smart Health and Life.

Internet of Things for Human-Centered Design

Enchanted Objects

Management of IOT Open Data Projects in Smart Cities

MySQL for the Internet of Things

Designing Connected Products

Internet of Things A to Z

Networked thermostats, fitness monitors, and door locks show that the Internet of Things can (and will) enable new ways for people to interact with the world around them. But designing connected products for consumers brings new challenges beyond conventional software UI and interaction design. This book provides experienced UX designers and technologists with a clear and practical roadmap for approaching consumer product strategy and design in this novel market. By drawing on the best of current design practice and academic research, Designing Connected Products delivers sound advice for working with cross-device interactions and the complex ecosystems inherent in IoT technology.

Towards Smart World: Homes to Cities Using Internet of Things provides an overview of basic concepts from the rising of machines and communication to IoT for making cities smart, real-time applications domains, related technologies, and their possible solutions for handling relevant challenges. This book highlights the utilization of IoT for making cities smart and its underlying technologies in real-time application areas such as emergency departments, intelligent traffic systems, indoor and outdoor securities, automotive industries, environmental monitoring, business entrepreneurship, facial recognition, and motion-based object detection. Features The book covers the challenging issues related to sensors, detection, and tracking of moving objects, and solutions to handle relevant challenges. It contains the most recent research analysis in the domain of communications, signal processing, and computing sciences for facilitating smart homes, buildings, environmental conditions, and cities. It presents the readers with practical approaches and future direction for using IoT in smart cities and discusses how it deals with human dynamics, the ecosystem, and social objects and their relation. It describes the latest technological advances in IoT and visual surveillance with their implementations. This book is an ideal resource for IT professionals, researchers, undergraduate or postgraduate students, practitioners, and technology developers who are interested in gaining deeper knowledge and implementing IoT for smart cities, real-time applications areas, and technologies, and a possible set of solutions to handle relevant challenges. Dr. Lavanya Sharma is an Assistant Professor in the Amity Institute of Information Technology at Amity University UP, Noida, India. She has been a recipient of several prestigious awards during her academic career. She is an active nationally recognized researcher who has published numerous papers in her field.

Many of the initial developments towards the Internet of Things have focused on the combination of Auto-ID and networked infrastructures in business-to-business logistics and product lifecycle applications. However, the Internet of Things is more than a business tool for managing business processes more efficiently and more effectively – it will also enable a more convenient way of life. Since the term Internet of Things first came to attention when the Auto-ID Center launched their initial vision for the EPC network for automatically identifying and tracing the flow of goods within supply-chains, increasing numbers of researchers and practitioners have further developed this vision. The authors in this book provide a research perspective on current and future developments in the Internet of Things. The different chapters cover a broad range of topics from system design aspects and core architectural approaches to end-user participation, business perspectives and applications. Internet of Things: Connecting Objects puts forward the technologies and the networking architectures which make it possible to support the Internet of Things. Amongst these technologies, RFID, sensor and PLC technologies are described and a clear view on how they enable the Internet of Things is given. This book also provides a good overview of the main issues facing the Internet of Things such as the issues of privacy and security, application and usage, and standardization.

Securing the Internet of Things: Concepts, Methodologies, Tools, and Applications

Getting Started with the Internet of Things

Create a powerful Industrial IoT infrastructure using Industry 4.0

Design and create your own IoT applications using Raspberry Pi 3

Designing an Internet

Connecting Sensors and Microcontrollers to the Cloud

The Book presents the state of the art of the Internet of Things (IoT), applied to Human-Centered Design (HCD) projects addressed to ageing users, from the perspective of health, care and well-being. The current focus on the ageing population is opening up new opportunities for the development of niche solutions aimed at the niche category of older users who are beginning to experience physical and cognitive decline but are still independent and need to maintain their autonomy for as long as possible. The combination between the needs expressed by older users and the opportunities offered by the recent innovative technologies related to the Internet of Things allows research institutions, stakeholders, and academia to target and design new solutions for older users, safeguarding their well-being, health, and care, improving their quality of life. This book discusses and analyses the most recent services, products, systems and environments specifically conceived for older users, in order to enhance health, care, well-being and improve their quality of life. This approach is coherent with the percept of AAL or enhanced living environment, looking to the users' comfort, autonomy, engagement and healthcare. The book describes and analyses aspects of HCD with older users looking to the emerging technologies, products, services, and environments analysed in their actual application in different areas, always concerning the design for the elderly related to the IoT, just as the development of biomonitoring devices, tools for activity recognition and simulation, creation of smart living environments, solutions for their autonomy, assistance and engagement enhancing health, care and wellbeing. The book is intended for researchers, designers, engineers, and practitioners in healthcare to connect academia, stakeholders, and research institutions to foster education, research and innovation.

Internet of Things (IoT) is a new generation of various physical objects or "things equipped with sensors, electronics, smart devices, software, and network connections. IoT represents a new revolution of the Internet network which is driven by the recent advances of technologies such as sensor networks (wearable and implantable), mobile devices, networking, and cloud computing technologies. IoT permits these the smart devices to collect, store and analyze the collected data with limited storage and processing capacities. Swarm Intelligence for Resource Management in the Internet of Things presents a new approach in Artificial Intelligence that can be used for resources management in IoT, which is considered a critical issue for this network. The authors demonstrate these resource management applications using swarm intelligence techniques. Currently, IoT can be used in many important applications which include healthcare, smart cities, smart homes, smart hospitals, environment monitoring, and video surveillance. IoT devices cannot perform complex on-site data processing due to their limited battery and processing. However, the major processing unit of an application can be transmitted to other nodes, which are more powerful in terms of storage and processing. By applying swarm intelligence algorithms for IoT devices, we can provide major advantages for energy saving in IoT devices. Swarm Intelligence for Resource Management in the Internet of Things shows the reader how to overcome the problems and challenges of creating and implementing swarm intelligence algorithms for each application Examines the development and application of swarm intelligence systems in artificial intelligence as applied to the Internet of Things Discusses intelligent techniques for the implementation of swarm intelligence in IoT Prepared for researchers and specialists who are interested in the use and integration of IoT and cloud computing technologies

The Internet of Things (IoT) is a global network that links physical objects using Cloud computing, web applications, and network communications. It allows devices to communicate with each other, access information on the Internet, store and retrieve data, and interact with users, creating smart, pervasive and always-connected environments. Despite the Internet of Things being a relatively new concept, there are already a few open platforms available that enable remote and seamless management and visualization of sensor data: Cosm, Nimbits, and ThingSpeak are just a few examples. And Arduino works with all of them. The Arduino is an incredibly flexible micro-controller and development environment that cannot only be used to control devices, but can also be used to read data from all kinds of sensors. Its simplicity and extensibility, in addition to its great success and adoption by users, has led to the development of a variety of hardware extensions and software libraries that enable wired and wireless communication with the Internet. Arduino is the ideal open hardware platform for experimenting with the world of the Internet of Things. Make your Arduino talk to the world! This book will provide you with all the information you need to design and create your own Internet of Things (IoT) applications using the Arduino platform. More specifically, you will learn: About the Internet of Things and Cloud Computing concepts About open platforms that allow you to store your sensor data on the Cloud (like Cosm, Nimbits and many more) The basic usage of Arduino environment for creating your own embedded projects at low cost How to connect your Arduino with your Android phone and send data over the Internet How to connect your Arduino directly to the Internet and talk to the Cloud How to reprogram your Arduino microcontroller remotely through the Cloud Detailed Table of Contents can be found at: http://www.buildinginternetofthings.com Updated version (v1.1): Contains corrections, improvements and updates about IoT Platforms!

As more and more devices become interconnected through the Internet of Things (IoT), there is an even greater need for this book,which explains the technology, the internetworking, and applications that are making IoT an everyday reality. The book begins with a discussion of IoT "ecosystems" and the technology that enables them, which includes: Wireless Infrastructure and Service Discovery Protocols Integration Technologies and Tools Application and Analytics Enablement Platforms A chapter on next-generation cloud infrastructure explains hosting IoT platforms and applications. A chapter on data analytics throws light on IoT data collection, storage, translation, real-time processing, mining, and analysis, all of which can yield actionable insights from the data collected by IoT applications. There is also a chapter on edge/fog computing. The second half of the book presents various IoT ecosystem use cases. One chapter discusses smart airports and highlights the role of IoT integration. It explains how mobile devices, mobile technology, wearables, RFID sensors, and beacons work together as the core technologies of a smart airport. Integrating these components into the airport ecosystem is examined in detail, and use cases and real-life examples illustrate this IoT ecosystem in operation. Another in-depth look is on envisioning smart healthcare systems in a connected world. This chapter focuses on the requirements, promising applications, and roles of cloud computing and data analytics. The book also examines smart homes, smart cities, and smart governments. The book concludes with a chapter on IoT security and privacy. This chapter examines the emerging security and privacy requirements of IoT environments. The security issues and an assortment of surmounting techniques and best practices are also discussed in this chapter.

Designing for Emerging Technologies

Hands-On Industrial Internet of Things

UX for the Consumer Internet of Things

Internet of Things in Automotive Industries and Road Safety

Building Internet of Things with the Arduino

Rethinking the Internet of Things

This book provides a dual perspective on the Internet of Things and ubiquitous computing, along with their applications in healthcare and smart cities. It also covers other interdisciplinary aspects of the Internet of Things like big data, embedded Systems and wireless Sensor Net architecture, framework, and state-of the art methodologies form the core of the book.

This book gathers recent research work on emerging Artificial Intelligence (AI) methods for processing and storing data generated by cloud-based Internet of Things (IoT) infrastructures. Major topics covered include the analysis and development of AI-powered mechanisms in fu Further, the book addresses new technological developments, current research trends, and industry needs. Presenting case studies, experience and evaluation reports, and best practices in utilizing AI applications in IoT networks, it strikes a good balance between theoretical and technical/scientific information on various aspects of AI technologies, ranging from basic concepts to research grade material, including future directions. The book is intended for researchers, practitioners, engineers and scientists involved in the design and development of prote devices. As the book covers a wide range of mobile applications and scenarios where IoT technologies can be applied, it also offers an essential introduction to the field.

Explores the platforms available for developing hardware or software, offers unique design concepts, and shows the ways to scale up from a single prototype to mass production.

The recent digital and mobile revolutions are a minor blip compared to the next wave of technological change, as everything from robot swarms to skin-top embeddable computers and bio printable organs start appearing in coming years. In this collection of inspiring essays, des their approaches to experience design for groundbreaking technologies. Design not only provides the framework for how technology works and how it's used, but also places it in a broader context that includes the total ecosystem with which it interacts and the possibility of u designer or engineer open to complexity and dissonant ideas, this book is a revelation. Contributors include: Stephen Anderson, PoetPainter, LLC Lisa Caldwell, Brazen UX Martin Charlier, Independent Design Consultant Jeff Faneuff, Carbonite Andy Goodman, Fjord US Camille Goude University of Illinois at Urbana-Champaign Bill Hartman, Essential Design Steven Keating, MIT Media Lab, Mediated Matter Group Brook Kennedy, Virginia Tech Dirk Knemeyer, Involution Studios Barry Kudrowitz, University of Minnesota Gershom Kutliroff, Omek Studio at Intel Micha Lapidus, Normative Erin Rae Hoffer, Autodesk Marco Righetto, SumAll Juhan Sonin, Involution Studios Scott Stropkay, Essential Design Scott Sullivan, Adaptive Path Hunter Whitney, Hunter Whitney and Associates, Inc. Yaron Yanai, Omek Studio at Intel

Application to Elderly Healthcare

Swarm Intelligence for Resource Management in Internet of Things

Converging Technologies for Smart Environments and Integrated Ecosystems

Concepts, Methodologies, Tools, and Applications

UX for Genomics, Robotics, and the Internet of Things

Evolving Software Processes

Take your idea from concept to production with this unique guide Whether it's called physical computing, ubiquitous computing, or the Internet of Things, it's a hot topic in technology: how to channel your inner Steve Jobs and successfully combine hardware, embedded software, web services, electronics, and cool design to create cutting-edge devices that are fun, interactive, and practical. If you'd like to create the next must-have product, this unique book is the perfect place to start. Both a creative and practical primer, it explores the platforms you can use to develop hardware or software, discusses design concepts that will make your products eye-catching and appealing, and shows you ways to scale up from a single prototype to mass production. Helps software engineers, web designers, product designers, and electronics engineers start designing products using the Internet-of-Things approach Explains how to combine sensors, servos, robotics, Arduino chips, and more with various networks or the Internet, to create interactive, cutting-edge devices Provides an overview of the necessary steps to take your idea from concept through production If you'd like to design for the future, Designing the Internet of Things is a great place to start.

Internet of Things: Principles and Paradigms captures the state-of-the-art research in Internet of Things, its applications, architectures, and technologies. The book identifies potential future directions and technologies that facilitate insight into numerous scientific, business, and consumer applications. The Internet of Things (IoT) paradigm promises to make any electronic devices part of the Internet environment. This new paradigm opens the doors to new innovations and interactions between people and things that will enhance the quality of life and utilization of scarce resources. To help realize the full potential of IoT, the book addresses its numerous challenges and develops the conceptual and technological solutions for tackling them. These challenges include the development of scalable architecture, moving from closed systems to open systems, designing interaction protocols, autonomic management, and the privacy and ethical issues around data sensing, storage, and processing. Addresses the main concepts and features of the IoT paradigm Describes different architectures for managing IoT platforms Provides insight on trust, security, and privacy in IoT environments Describes data management techniques applied to the IoT environment Examines the key enablers and solutions to enable practical IoT systems Looks at the key developments that support next generation IoT platforms Includes input from expert contributors from both academia and industry on building and deploying IoT platforms and applications

Break through the hype and learn how to extract actionable intelligence from the flood of IoT data About This Book Make better business decisions and acquire greater control of your IoT infrastructure Learn techniques to solve unique problems associated with IoT and examine and analyze data from your IoT devices Uncover the business potential generated by data from IoT devices and bring down business costs Who This Book Is For This book targets developers, IoT professionals, and those in the field of data science who are trying to solve business problems through IoT devices and would like to analyze IoT data. IoT enthusiasts, managers, and entrepreneurs who would like to make the most of IoT will find this book equally useful. A prior knowledge of IoT would be helpful but is not necessary. Some prior programming experience would be useful What You Will Learn Overcome the challenges IoT data brings to analytics Understand the variety of transmission protocols for IoT along with their strengths and weaknesses Learn how data flows from the IoT device to the final data set Develop techniques to wring value from IoT data Apply geospatial analytics to IoT data Use machine learning as a predictive method on IoT data Implement best strategies to get the most from IoT analytics Master the economics of IoT analytics in order to optimize business value In Detail We start with the perplexing task of extracting value from huge amounts of barely intelligible data. The data takes a convoluted route just to be on the servers for analysis, but insights can emerge through visualization and statistical modeling techniques. You will learn to extract value from IoT big data using multiple analytic techniques. Next we review how IoT devices generate data and how the information travels over networks. You'll get to know strategies to collect and store the data to optimize the potential for analytics, and strategies to handle data quality concerns. Cloud resources are a great match for IoT analytics, so Amazon Web Services, Microsoft Azure, and PTC ThingWorx are reviewed in detail next. Geospatial analytics is then introduced as a way to leverage location information. Combining IoT data with environmental data is also discussed as a way to enhance predictive capability. We'll also review the economics of IoT analytics and you'll discover ways to optimize business value. By the end of the book, you'll know how to handle scale for both data storage and analytics, how Apache Spark can be leveraged to handle scalability, and how R and Python can be used for analytic modeling. Style and approach This book follows a step-by-step, practical approach to combine the power of analytics and IoT and help you get results quickly.

What is the Internet of Things? It's billions of embedded computers, sensors, and actuators all connected online. If you have basic programming skills, you can use these powerful little devices to create a variety of useful systems—such as a device that waters plants when the soil becomes dry. This hands-on guide shows you how to start building your own fun and fascinating projects. Learn to program embedded devices using the .NET Micro Framework and the Netduino Plus board. Then connect your devices to the Internet with Pachube, a cloud platform for sharing real-time sensor data. All you need is a Netduino Plus, a USB cable, a couple of sensors, an Ethernet connection to the Internet—and your imagination. Develop programs with simple outputs (actuators) and inputs (sensors) Learn about the Internet of Things and the Web of Things Build client programs that push sensor readings from a device to a web service Create server programs that allow you to control a device over the Web Get the .NET classes and methods needed to implement all of the book's examples

Innovation, Design, and the Future of Technology

Enabling Technologies, Platforms, and Use Cases

Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed

Analytics for the Internet of Things (IoT)

Technologies and Applications for a New Age of Intelligence

Emerging Trends and Applications of the Internet of Things

A comprehensive and accessible introduction to the development of embedded systems and Internet of Things devices using ARM mbed Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed offers an accessible guide to the development of ARM mbed and includes a range of topics on the subject from the basic to the advanced. ARM mbed is a platform and operating system based on 32-bit ARM Cortex-M microcontrollers. This important resource puts the focus on ARM mbed NXP LPC1768 and FRDM-K64F evaluation boards. NXP LPC1768 has powerful features such as a fast microcontroller, various digital and analog I/Os, various serial communication interfaces and a very easy to use Web based compiler. It is one of the most popular kits that are used to study and create projects. FRDM-K64F is relatively new and largely compatible with NXP LPC1768 but with even more powerful features. This approachable text is an ideal guide that is divided into four sections; Getting Started with the ARM mbed, Covering the Basics, Advanced Topics and Case Studies. This getting started guide: Offers

a clear introduction to the topic Contains a wealth of original and illustrative case studies Includes a practical guide to the development of projects with the ARM mbed platform Presents timely coverage of how to develop IoT applications Designing Embedded Systems and the Internet of Things (IoT) with the ARM mbed offers students and R&D engineers a resource for understanding the ARM mbed NXP LPC1768 evaluation board. This book covers the topic of RFID protocol design and optimization and the authors aim to demystify complicated RFID protocols and explain in depth the principles, techniques, and practices in designing and optimizing them.