Emerging Real-World Applications of Internet of Things

The IoT has emerged as a paradigm-shifting technology resulting in many new opportunities for IoT professionals. With this goal, the book will provide most recent and prominent applications of IoT in different domains as well as issues and challenges in developing IoT applications for various new domains.

Emerging Real-World Applications of Internet of Things

CRC Press The Internet of things (IoT) is a network of connected physical objects or things that are working along with sensors, wireless transceiver modules, processors, and software required for connecting, processing, and exchanging data among the other devices over the Internet. These objects or things are devices ranging from simple handheld devices to complex industrial heavy machines. A thing in IoT can be any living or non-living object that can be provided capabilities to sense, process, and exchange data over a network. The IoT provides people with the ability to handle their household works to industrial tasks smartly and efficiently without the intervention of another human. The IoT provides smart devices for home automation as well as business solutions for delivering insights into everything from real-time monitoring of working systems to supply chain and logistics operations. The IoT has become one of the most prominent technological inventions of the 21st century. Due to the versatility of IoT devices, there are numerous real-world applications of the IoT in various domains such as smart home, smart city, health care, agriculture, industry, and transportation. The IoT has emerged as a paradigm-shifting technology that is influencing various industries. Many companies, governments, and civic bodies are shifting to IoT applications to improve their works and to become more efficient. The world is slowly transforming toward a “smart world” with smart devices. As a consequence, it shows many new opportunities coming up in the near “smart” future for IoT professionals. Therefore, there is a need to keep track of advancements related to IoT applications and further investigate several research challenges related to the applicability of IoT in different domains to make it more adaptable for practical and industrial use. With this goal, this book provides the most recent and prominent applications of IoT in different domains as well as issues and challenges in developing IoT applications for various new domains.

Applications of Internet of Things

Proceedings of ICCCIOT 2020

Springer Nature This book features extended versions of selected papers from the International Conference on Computer Communication and Internet of Things (ICCCIOT 2020). Presenting recent research addressing new trends and challenges, and promising technologies and developments, it covers various topics related to IoT (Internet of Things) and communications, and machine learning for applications such as energy management systems, smart asthma alerts, smart irrigation systems, cloud healthcare systems, preventing side channel attacks, and cooperative spectrum sensing in cognitive radio networks.

Internet of Things

Technologies and Applications for a New Age of Intelligence

Academic Press 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.

Internet of Things (IoT) & Its Applications

A Complete Guide on Python Programming for IoT with Practical Exercises for Learners

IoT is the biggest opportunity ever for our industry. With capabilities much greater than today's networks, opportunities beyond our imagination will appear. With IoT, we will be able to digitalize industries and realize the full potential of a networked society. The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The book also looks at all the sub-systems of the Internet of Things, focusing on both the practical and theoretical issues. This text book "Internet of Things (IoT) & Its Applications" is organized into Ten Chapters. Chapter-1: Introduction to IoT for Beginners

Chapter-2: Building Blocks of Internet of Things (IoT) and Their Characteristics

Chapter-3: Domain specific IoT and Their Real-world Applications

Chapter-4: Sensor and Actuator

Chapter-5: Generic Design Methodology and IoT System Management

Chapter-6: Multiple Protocols in IoT Domain

Chapter-7: Common Security Measures used for Designing an IoT Applications

Chapter-8: Python Logical Design of an IoT system

Chapter-9: Laboratory Companion for Designing IoT Applications

Chapter-10: Challenges and Future Scope of IoT

Salient Features


Our sincere thanks are due to all Scientists, Engineers, Authors and Publishers, whose works and text have been the source of enlightenment, inspiration and guidance to us in presenting this small book. I will appreciate any suggestions from students and faculty members alike so that we can strive to make the text book more useful in the edition to come.

Internet of Things in Biomedical Engineering

Academic Press Internet of Things in Biomedical Engineering presents the most current research in Internet of Things (IoT) applications for clinical patient monitoring and treatment. The book takes a systems-level approach for both human-factors and the technical aspects of networking, databases and privacy. Sections delve into the latest advances and cutting-edge technologies, starting with an overview of the Internet of Things and biomedical engineering, as well as a focus on ‘daily life.’ Contributors from various experts then discuss ‘computer assisted anthropology,’ CLOUDFALL, and image guided surgery, as well as bio-informatics and data mining. This comprehensive coverage of the industry and technology is a perfect resource for students and researchers interested in the topic. Presents recent advances in IoT for biomedical engineering, covering biometrics, bioinformatics, artificial intelligence, computer vision and various network applications Discusses big data and data mining in healthcare and other IoT based biomedical data analysis Includes discussions on a variety of IoT applications and medical information systems Includes case studies and applications, as well as examples on how to automate data analysis with Perl R in IoT

Internet of Things A to Z

Technologies and Applications

John Wiley & Sons 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.

Real-Life Applications of the Internet of Things
Challenges, Applications, and Advances

Apple Academic Press Incorporated This new volume provides an overview of the Internet of Things along with its architectures, its vital technologies, and their uses in our daily life. The book explores the integration of IoT with other emerging technologies, such as blockchain and cloud. Topics in the volume cover the many powerful features and applications of IoT, such as for weather forecasting, in agriculture, in medical science, in surveillance systems, and much more. The first section of the book covers many of the issues and challenges that arise from the Internet of Things (IoT), exploring security challenges, such as attack detection and prevention systems, as well as energy efficiency and resource management in IoT. The volume also introduces the use of IoT and smart technology in agricultural management, in healthcare diagnosis and monitoring, and in the financial industry. Chapters also focus on surveillance network technology, the technology shift from television to video streaming apps, using IoT-fog computing for smart healthcare, detection of anomalies in climate conditions, and even detection of illegal wood logging activity.

Artificial Intelligence to Solve Pervasive Internet of Things Issues

Academic Press Artificial Intelligence to Solve Pervasive Internet of Things Issues discusses standards and technologies and wide-ranging technology areas and their applications and challenges, including discussions on architectures, frameworks, applications, best practices, methods and techniques required for integrating AI to resolve IoT issues. Chapters also provide step-by-step measures, practices and solutions to tackle vital decision-making and practical issues affecting IoT technology, including autonomous devices and computerized systems. Such issues range from adopting, mitigating, maintaining, modernizing and protecting AI and IoT infrastructure components such as scalability, sustainability, latency, system decentralization and maintainability. The book enables readers to explore, discover and implement new solutions for integrating AI to solve IoT issues. Resolving these issues will help readers address many real-world applications in areas such as scientific research, healthcare, defense, aeronautics, engineering, social media, and many others. Discusses intelligent techniques for the implementation of Artificial Intelligence in Internet of Things Prepared for researchers and specialists who are interested in the use and integration of IoT and Artificial Intelligence technologies

From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence

Academic Press This book outlines the background and overall vision for the Internet of Things (IoT) and Machine-to-Machine (M2M) communications and services, including major standards. Key technologies are described, and include everything from physical instrumentation of devices to the cloud infrastructures used to collect data. Also included is how to derive information and knowledge, and how to integrate it into enterprise processes, as well as system architectures and regulatory requirements. Real-world service use case studies provide the hands-on knowledge needed to successfully develop and implement M2M and IoT technologies sustainably and profitably. Finally, the future vision for M2M technologies is described, including prospective changes in relevant standards. This book is written by experts in the technology and business aspects of Machine-to-Machine and Internet of Things, and who have experience in implementing solutions. Standards included: ETSI M2M, IEEE 802.15.4, 3GPP (GPRS, 3G, 4G), Bluetooth Low Energy/Smart, IETF 6LoWPAN, IETF CoAP, IETF RPL, Power Line Communication, Open Geospatial Consortium (OGC) Sensor Web Enablement (SWE), ZigBee, 802.11, Broadband Forum TR-069, Open Mobile Alliance (OMA) Device Management (DM), ISA100.11a, WirelessHART, M-BUS, Wireless M-BUS, KNX, RFID, Object Management Group (OMG) Business Process Modelling Notation (BPMN) Key technologies for M2M and IoT covered: Embedded systems hardware and software, devices and gateways, capillary and M2M area networks, local and wide area networking, M2M Service Enablement, IoT data management and data warehousing, data analytics and big data, complex event processing and stream analytics, knowledge discovery and management, business process and enterprise integration, Software as a Service and cloud computing Combines both technical explanations together with design features of M2M/IoT and use cases. Together, these descriptions will assist you to develop solutions that will work in the real world Detailed description of the network architectures and technologies that form the basis of M2M and IoT Clear guidelines and examples of M2M and IoT use cases from real-world implementations such as Smart Grid, Smart Buildings, Smart Cities, Participatory Sensing, and Industrial Automation A description of the vision for M2M and its evolution towards IoT
Real-Life Applications of the Internet of Things
Challenges, Applications, and Advances
CRC Press
This new volume provides an overview of the Internet of Things along with its architectures, its vital technologies, and their uses in our daily life. The book explores the integration of IoT with other emerging technologies, such as blockchain and cloud. Topics in the volume cover the many powerful features and applications of IoT, such as for weather forecasting, in agriculture, in medical science, in surveillance systems, and much more. The first section of the book covers many of the issues and challenges that arise from the Internet of Things (IoT), exploring security challenges, such as attack detection and prevention systems, as well as energy efficiency and resource management in IoT. The volume also introduces the use of IoT and smart technology in agricultural management, in healthcare diagnosis and monitoring, and in the financial industry. Chapters also focus on surveillance network technology, the technology shift from television to video streaming apps, using IoT-fog computing for smart healthcare, detection of anomalies in climate conditions, and even detection of illegal wood logging activity.

New Network Architectures
The Path to the Future Internet
Springer
"Future Internet" is a worldwide hot topic. The Internet has become a critical infrastructure for business development and social interactions. However, the immense growth of the Internet has resulted in additional stresses on its architecture, resulting in a network difficult to monitor, understand, and manage due to its huge scale in terms of connected devices and actors (end users, content providers, equipment vendors, etc.). This book presents and discusses the ongoing initiatives and experimental facilities for the creation of new Future Internet Architectures using alternative approaches like Clean Slate and Incremental improvements: It considers several possible internet network use scenarios that include seamless mobility, ad hoc networks, sensor networks, internet of things and new paradigms like content and user centric networks.

Internet of Things (IoT)
Technologies, Applications, Challenges and Solutions
CRC Press
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. • Discusses 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.

The Fourth Industrial Revolution
Currency
Between the 18th and 19th centuries, Britain experienced massive leaps in technological, scientific, and economical advancement

The ArcGIS Book
10 Big Ideas about Applying the Science of where
ESRI Press
This is a hands-on book about ArcGIS that you work with as much as read. By the end, using Learn ArcGIS lessons, you’ll be able to say you made a story map, conducted geographic analysis, edited geographic data, worked in a 3D web scene, built a 3D model of Venice, and more.

Building Arduino Projects for the Internet of Things
Experiments with Real-World Applications

Apress Gain a strong foundation of Arduino-based device development, from which you can go in any direction according to your specific development needs and desires. You’ll build Arduino-powered devices for everyday use, and then connect those devices to the Internet. You’ll be introduced to the building blocks of IoT, and then deploy those principles to building a variety of useful projects. Projects in the books gradually introduce the reader to key topics such as internet connectivity with Arduino, common IoT protocols, custom web visualization, and Android apps that receive sensor data on-demand and in realtime. IoT device enthusiasts of all ages will want this book by their side when developing Android-based devices. If you’re one of the many who have decided to build your own Arduino-powered devices for IoT applications, then building Arduino Projects for the Internet of Things is exactly what you need. This book is your single resource—a guidebook for the eager-to-learn Arduino enthusiast—that teaches logically, methodically, and practically how the Arduino works and what you can build with it. Written by a software developer and solution architect who got tired of hunting and gathering various lessons for Arduino development as he taught himself all about the topic. For Arduino enthusiasts, this book not only opens up the world of IoT applications, you will also learn many techniques that likely would not be obvious if not for experience with such a diverse group of applications What You’ll Learn Create an Arduino circuit that senses temperature Publish data collected from an Arduino to a server and to an MQTT broker Set up channels in Xively Using Node-RED to define complex flows Publish data visualization in a web app Report motion-sensor data through a mobile app Create a remote control for house lights Set up an app in IBM Bluematrix Who This Book Is For IoT device enthusiasts of all ages will want this book by their side when developing Android-based devices.

Recent Advances in Internet of Things and Machine Learning

Springer This book covers a domain that is significantly impacted by the growth of soft computing. Internet of Things (IoT)-related applications are gaining much attention with more and more devices which are getting connected, and they become the potential components of some smart applications. Thus, a global enthusiasm has sparked over various domains such as health, agriculture, energy, security, and retail. So, in this book, the main objective is to capture this multifaceted nature of IoT and machine learning in one single place. According to the contribution of each chapter, the book also provides a future direction for IoT and machine learning research. The objectives of this book are to identify different issues, suggest feasible solutions to those identified issues, and enable researchers and practitioners from both academia and industry to interact with each other regarding emerging technologies related to IoT and machine learning. In this book, we look for novel chapters that recommend new methodologies, recent advancement, system architectures, and other solutions to prevail over the limitations of IoT and machine learning.

Manual of Digital Earth

Springer Nature This open access book offers a summary of the development of Digital Earth over the past twenty years. By reviewing the initial vision of Digital Earth, the evolution of that vision, the relevant key technologies, and the role of Digital Earth in helping people respond to global challenges, this publication reveals how and why Digital Earth is becoming vital for acquiring, processing, analysing and mining the rapidly growing volume of global data sets about the Earth. The main aspects of Digital Earth covered here include: Digital Earth platforms, remote sensing and navigation satellites, processing and visualizing geospatial information, geospatial information infrastructures, big data and cloud computing, transformation and zooming, artificial intelligence, Internet of Things, and social media. Moreover, the book covers in detail the multi-layered/multi-faceted roles of Digital Earth in response to sustainable development goals, climate changes, and mitigating disasters, the applications of Digital Earth (such as digital city and digital heritage), the citizen science in support of Digital Earth, the economic value of Digital Earth, and so on. This book also reviews the regional and national development of Digital Earth around the world, and discusses the role and effect of education and ethics. Lastly, it concludes with a summary of the challenges and forecasts the future trends of Digital Earth. By sharing case studies and a broad range of general and scientific insights into the science and technology of Digital Earth, this book offers an essential introduction for an ever-growing international audience.

Emerging Computing Paradigms

Principles, Advances and Applications

John Wiley & Sons This book presents a holistic overview of major new computing paradigms of the 21st Century In Emerging Computing Paradigms: Principles, Advances and Applications, international scholars offer a compendium of essential knowledge on new promising computing paradigms. The book examines the characteristics and features of emerging computing technologies and provides insight into recent technological developments and their potential
real-world applications that promise to shape the future. This book is a useful resource for all those who wish to quickly grasp new concepts of and insights on emerging computer paradigms and pursue further research or innovate new novel applications harnessing these concepts. Key Features Presents a comprehensive coverage of new technologies that have the potential to shape the future of our world -- quantum computing, computational intelligence, advanced wireless networks and blockchain technology. Revisits mainstream ideas now being widely adopted, such as cloud computing, the Internet of Things (IoT) and cybersecurity Offers recommendations and practical insights to assist the readers in the application of these technologies Aimed at IT professionals, educators, researchers, and students, Emerging Computing Paradigms: Principles, Advances and Applications is a comprehensive knowledge resource to get ahead of the curve in examining and exploiting emerging new concepts and technologies. Business executives will also find the book valuable and gain an advantage over competitors in harnessing the concepts examined therein.

Encyclopedia of Internet Technologies and Applications
IGI Global Provides the most thorough examination of Internet technologies and applications for researchers in a variety of related fields. For the average Internet consumer, as well as for experts in the field of networking and Internet technologies.

When Things Start to Think
Integrating Digital Technology into the Fabric of Our Lives
Henry Holt and Company This is a book for people who want to know what the future is going to look like and for people who want to know how to create the future. Gershenfeld offers a glimpse at the brave new post-computerized world, where microchips work for us instead of against us. He argues that we waste the potential of the microchip when we confine it to a box on our desk: the real electronic revolution will come when computers have all but disappeared into the walls around us. Imagine a digital book that looks like a traditional book printed on paper and is pleasant to read in bed but has all the mutability of a screen display. How about a personal fabricator that can organize digitized atoms into anything you want, or a musical keyboard that can be woven into a denim jacket? In When Things Start to Think, Gershenfeld tells the story of his Things that Think group at MIT’s Media Lab, the group of innovative scientists and researchers dedicated to integrating digital technology into the fabric of our lives.

Networking Health
Prescriptions for the Internet
National Academies Press Consumer health websites have garnered considerable media attention, but only begin to scratch the surface of the more pervasive transformations the Internet could bring to health and health care. Networking Health examines ways in which the Internet may become a routine part of health care delivery and payment, public health, health education, and biomedical research. Building upon a series of site visits, this book: Weighs the role of the Internet versus private networks in uses ranging from the transfer of medical images to providing video-based medical consultations at a distance. Reviews technical challenges in the areas of quality of service, security, reliability, and access, and looks at the potential utility of the next generation of online technologies. Discusses ways health care organizations can use the Internet to support their strategic interests and explores barriers to a broader deployment of the Internet. Recommends steps that private and public sector entities can take to enhance the capabilities of the Internet for health purposes and to prepare health care organizations to adopt new Internet-based applications.

Great Global Grid
Emerging Technology Strategies
Trafford Publishing Emerging Technology Strategies and the Great Global Grid The next generation of the Internet will produce dramatic economic and social changes exceeding even the World Wide Web. Several emerging technologies are converging to create a Great Global Grid infrastructure where universal connectivity to large computing resources will be available for consumers and enterprises. The goal of this book is to provide a systematic survey of the full spectrum of Great Global Grid technologies from an enterprise viewpoint. The Great Global Grid - The range of technologies comprising the Great Global Grid is very wide. One of the main contributions of the book is to categorize these technologies in detail and to explain the dependencies among them. The technologies include: Application Servers and Portals Enterprise Application Integration and B2B Middleware Web Services and XML Messaging Peer-to-Peer Collaboration Pervasive Computing: Middleware and Software Platforms Distributed Resource Managers, Clusters
and Grids Global Grid Middleware Conclusions for the Future Emerging Technology Strategies - The book does not hype these technologies or their benefits. Section 1 of the book describes examples of past emerging technologies that failed to realize their initial vision. Based on the lessons learned from these experiences, a pragmatic technology evaluation template is created that includes: Overview of the technology Relationships to other technologies Important technical and business trends Specific applications Industry and official standards Vendor overview by application area Leading implementation approaches Advice on deployment Future technical and business directions Recommendations

Managing the Web of Things

Linking the Real World to the Web

Morgan Kaufmann Managing the Web of Things: Linking the Real World to the Web presents a consolidated and holistic coverage of engineering, management, and analytics of the Internet of Things. The web has gone through many transformations, from traditional linking and sharing of computers and documents (i.e., Web of Data), to the current connection of people (i.e., Web of People), and to the emerging connection of billions of physical objects (i.e., Web of Things). With increasing numbers of electronic devices and systems providing different services to people, Web of Things applications present numerous challenges to research institutions, companies, governments, international organizations, and others. This book compiles the newest developments and advances in the area of the Web of Things, ranging from modeling, searching, and data analytics, to software building, applications, and social impact. Its coverage will enable effective exploration, understanding, assessment, comparison, and the selection of WoT models, languages, techniques, platforms, and tools. Readers will gain an up-to-date understanding of the Web of Things systems that accelerates their research. Offers a comprehensive and systematic presentation of the methodologies, technologies, and applications that enable efficient and effective management of the Internet of Things Provides an in-depth analysis on the state-of-the-art Web of Things modeling and searching technologies, including how to collect, clean, and analyze data generated by the Web of Things Covers system design and software building principles, with discussions and explorations of social impact for the Web of Things through real-world applications Acts as an ideal reference or recommended text for graduate courses in cloud computing, service computing, and more

Handbook of Research on Emerging Technologies for Effective Project Management

IGI Global Driven by such tools as big data, cognitive computing, new business models, and the internet of things, the overall demand for innovation is becoming more critical for competitiveness and emerging technologies. These technologies have become real alternatives for the market and offer new perspectives for modern project management applications. The Handbook of Research on Emerging Technologies for Effective Project Management is an essential research publication that proposes innovations for firms and markets through the exploration of project management principles and methods and the effective integration of knowledge and innovation. It encompasses academic and scientific propositions, reviews for conceptual bases, applications of theories in new market solutions, and cases of successful insertion of disruptive technologies and business models in new competitive market offers. Featuring a range of topics such as innovation management, business administration, and marketing, this book is ideal for project managers, IT specialists, software developers, executives, practitioners, managers, marketers, researchers, and industry professionals.

Digitising the Industry - Internet of Things Connecting the Physical, Digital and Virtual Worlds

River Publishers This book provides an overview of the current Internet of Things (IoT) landscape, ranging from the research, innovation and development priorities to enabling technologies in a global context. A successful deployment of IoT technologies requires integration on all layers, be it cognitive and semantic aspects, middleware components, services, edge devices/machines and infrastructures. 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 and the IoT European Platform Initiative (IoT-EPI) and presents global views and state of the art results on the challenges facing the research, innovation, development and deployment of IoT in the next years. The IoT is bridging the physical world with virtual world and requires sound information processing capabilities for the “digital shadows” of these real
things. The research and innovation in nanoelectronics, semiconductor, sensors/actuators, communication, analytics technologies, cyber-physical systems, software, swarm intelligent and deep learning systems are essential for the successful deployment of IoT applications. The emergence of IoT platforms with multiple functionalities enables rapid development and lower costs by offering standardised components that can be shared across multiple solutions in many industry verticals. The IoT applications will gradually move from vertical, single purpose solutions to multi-purpose and collaborative applications interacting across industry verticals, organisations and people, being one of the essential paradigms of the digital economy. Many of those applications still have to be identified and involvement of end-users including the creative sector in this innovation is crucial. The IoT applications and deployments as integrated building blocks of the new digital economy are part of the accompanying IoT policy framework to address issues of horizontal nature and common interest (i.e. privacy, end-to-end security, user acceptance, societal, ethical aspects and legal issues) for providing trusted IoT solutions in a coordinated and consolidated manner across the IoT activities and pilots. In this, context IoT ecosystems offer solutions beyond a platform and solve important technical challenges in the different verticals and across verticals. These IoT technology ecosystems are instrumental for the deployment of large pilots and can easily be connected to or build upon the core IoT solutions for different applications in order to expand the system of use and allow new and even unanticipated IoT end uses. Technical topics discussed in the book include: IntroductionDigitising industry and IoT as key enabler in the new era of Digital EconomyIoT Strategic Research and Innovation Agenda IoT in the digital industrial context: Digital Single MarketIntegration of heterogeneous systems and bridging the virtual, digital and physical worldsFederated IoT platforms and interoperabilityEvolution from intelligent devices to connected systems of systems by adding new layers of cognitive behaviour, artificial intelligence and user interfaces. Innovation through IoT ecosystemsTrust-based IoT end-to-end security, privacy frameworkUser acceptance, societal, ethical aspects and legal issuesInternet of Things Applications

Remote Healthcare Systems and Applications

Springer Nature This book looks at the growing segment of Internet of Things technology (IoT) known as Internet of Medical Things (IoMT), an automated system that aids in bridging the gap between isolated and rural communities and the critical healthcare services that are available in more populated and urban areas. Many technological aspects of IoT are still being researched and developed, with the objective of minimizing the cost and improving the performance of the overall healthcare system. This book focuses on innovative IoT methods and solutions being developed for use in the application of healthcare services, including post-surgery care, virtual home assistance, smart real-time patient monitoring, implantable sensors and cameras, and diagnosis and treatment planning. It also examines critical issues around the technology, such as security vulnerabilities, IoT machine learning approaches, and medical data compression for lossless data transmission and archiving. Internet of Medical Things is a valuable reference for researchers, students, and postgraduates working in biomedical, electronics, and communications engineering, as well as practicing healthcare professionals.

Current Status and Future Trends

BoD - Books on Demand This book shows a vision of the present and future of Industry 4.0 and identifies and examines the most pressing research issue in Industry 4.0. Containing the contributions of leading researchers and academics, this book includes recent publications in key areas of interest, for example: a review on the Industry 4.0: What is the Industry 4.0, the pillars of Industry 4.0, current and future trends, technologies, taxonomy, and some case studies (A.U.T.O 4.0, stabilization of digitized process). This book also provides an essential tool in the process of migration to Industry 4.0. The book is suitable as a text for graduate students and professionals in the industrial sector and general engineering areas. The book is organized into two sections: 1. Reviews 2. Case Studies Industry 4.0 is likely to play an important role in the future society. This book is a good reference on Industry 4.0 and includes some case studies. Each chapter is written by expert researchers in the sector, and the topics are broad; from the concept or definition of Industry 4.0 to a future society 5.0.

Enabling Real-Time Mobile Cloud Computing through Emerging Technologies

IGI Global Today’s smartphones utilize a rapidly developing range of sophisticated applications, pushing the limits of mobile processing power. The increased demand for cell phone applications has necessitated the rise of mobile cloud computing, a technological research arena which combines cloud computing, mobile computing, and wireless networks to maximize the computational and data storage capabilities of mobile devices. Enabling Real-Time Mobile Cloud Computing through Emerging Technologies is an authoritative and accessible resource that incorporates surveys, tutorials, and the latest scholarly research on cellular technologies to explore the latest developments in mobile and wireless computing technologies. With its exhaustive coverage of emerging techniques, protocols, and computational
Emerging Real World Applications Of Internet Of Things

theoretical and practical aspects of implementing new AI techniques in a variety of sectors, including Big Data, intelligent optimization methods. Contributions from leading experts in the field present original research on both the evolution of AI technology innovation and its various components are rapidly engulfing almost every professional industry. Specific features of AI that have proven to be vital solutions to numerous real-world issues are machine learning and deep learning. These intelligent agents unlock higher levels of performance and efficiency, creating a wide span of industrial applications. However, there is a lack of research on the specific uses of machine/deep learning in the professional realm. Machine Learning and Deep Learning in Real-Time applications provides emerging research exploring the theoretical and practical aspects of machine learning and deep learning and their implementations as well as their ability to solve real-world problems within several professional disciplines including healthcare, business, and computer science. Featuring coverage on a broad range of topics such as image processing, medical improvements, and smart grids, this book is ideally designed for researchers, academicians, scientists, industry experts, scholars, IT professionals, engineers, and students seeking current research on the multifaceted uses and implementations of machine learning and deep learning across the globe.

Artificial Intelligence in Industry 4.0 and 5G Technology

John Wiley & Sons Artificial Intelligence in Industry 4.0 and 5G Technology Explores innovative and value-added solutions for application problems in the commercial, business, and industry sectors. As the pace of Artificial Intelligence (AI) technology innovation continues to accelerate, identifying the appropriate AI capabilities to embed in key decision processes has never been more critical to establishing competitive advantage. New and emerging analytics tools and technologies can be configured to optimize business value, change how an organization gains insights, and significantly improve the decision-making process across the enterprise. Artificial Intelligence in Industry 4.0 and 5G Technology helps readers solve real-world technological engineering optimization problems using evolutionary and swarm intelligence, mathematical programming, multi-objective optimization, and other cutting-edge intelligent optimization methods. Contributions from leading experts in the field present original research on both the theoretical and practical aspects of implementing new AI techniques in a variety of sectors, including Big Data...
analytics, smart manufacturing, renewable energy, smart cities, robotics, and the Internet of Things (IoT). Presents detailed information on meta-heuristic applications with a focus on technology and engineering sectors such as smart manufacturing, smart production, innovative cities, and 5G networks. Offers insights into the use of metaheuristic strategies to solve optimization problems in business, economics, finance, and industry where uncertainty is a factor. Provides guidance on implementing metaheuristics in different applications and hybrid technological systems. Describes various AI approaches utilizing hybrid meta-heuristics optimization algorithms, including meta-search engines for innovative research and hyper-heuristics algorithms for performance measurement. Artificial Intelligence in Industry 4.0 and 5G Technology is a valuable resource for IT specialists, industry professionals, managers and executives, researchers, scientists, engineers, and advanced students an up-to-date reference to innovative computing, uncertainty management, and optimization approaches.

The Internet of Things and Big Data Analytics

Integrated Platforms and Industry Use Cases

CRC Press This book comprehensively conveys the theoretical and practical aspects of IoT and big data analytics with the solid contributions from practitioners as well as academicians. This book examines and expounds the unique capabilities of the big data analytics platforms in capturing, cleansing and crunching IoT device/sensor data in order to extricate actionable insights. A number of experimental case studies and real-world scenarios are incorporated in this book in order to instigate our book readers. This book Analyzes current research and development in the domains of IoT and big data analytics Gives an overview of latest trends and transitions happening in the IoT data analytics space Illustrates the various platforms, processes, patterns, and practices for simplifying and streamlining IoT data analytics

The Internet of Things and Big Data Analytics: Integrated Platforms and Industry Use Cases examines and accentuates how the multiple challenges at the cusp of IoT and big data can be fully met. The device ecosystem is growing steadily. It is forecast that there will be billions of connected devices in the years to come. When these IoT devices, resource-constrained as well as resource-intensive, interact with one another locally and remotely, the amount of multi-structured data generated, collected, and stored is bound to grow exponentially. Another prominent trend is the integration of IoT devices with cloud-based applications, services, infrastructures, middleware solutions, and databases. This book examines the pioneering technologies and tools emerging and evolving in order to collect, pre-process, store, process and analyze data heaps in order to disentangle actionable insights.

Improving Quality of Service in Emerging IoT and ML Applications Through Fog Computing

The recent advances in the Internet of Things (IoT), Big Data, and Machine Learning (ML) have contributed to the rise of a growing number of complex and intelligent applications. Examples of such applications are real-time disease detection, self-driving vehicles, drone package delivery, and smart manufacturing. These emerging applications are often realtime, data-intensive, and delay-sensitive, and ensuring Quality of Service (QoS) for these applications is a challenge. Fog computing is seen as one promising solution for providing QoS for these applications, as it puts compute, storage, and networking resources closer to the user. In this dissertation, we showcase how fog computing can improve the QoS in several emerging IoT and ML applications. To do so, we first provide a tutorial on fog computing and its related computing paradigms, such as edge computing and cloudlets, discussing their similarities and differences. Secondly, we propose two novel schemes, ResiliNet and deepFogGuard, for improving the QoS of deep learning applications that are deployed over network devices, such as fog nodes and edge devices. Specifically, the two schemes are for improving the failure-resiliency of inference in distributed neural network in the presence of physical node failures. deepFogGuard’s design is based on the concept of skip connections, whereas ResiliNet uses a novel technique, introduced in this dissertation, called failout, which is inspired by dropout in neural networks. Next, we propose two fog-based frameworks, FogPlan and FogOffload, that can improve the QoS in terms of the reduced service delay. FogPlan is a planning framework, for the dynamic deployment or release of application services on fog nodes, in order to meet the low latency and the QoS requirements of applications while minimizing the cost. FogOffload is a delay-minimizing collaboration and offloading policy for fog-capable devices that aims to reduce the service delay of IoT applications. The above four frameworks are designed to improve the QoS in emerging IoT and ML applications through Fog Computing. The former two frameworks improve failure-resiliency, whereas the latter two reduce the service delay. The outcomes of this research have appeared in the proceedings of a conference and a workshop, three journal papers, and a paper in preparation. A website has been created to serve as a hub for the details of fog computing conference and journals. This research has also attracted the attention of our industry partner, Fujitsu, who partially funded this research. Additionally, two graduate Master’s students and seven undergraduate students were mentored and actively involved in various research projects, which were defined based on the topics of this dissertation. This dissertation has also been selected to be funded by the Dissertation Research Award at UT Dallas.
Funding a Revolution
Government Support for Computing Research

National Academies Press The past 50 years have witnessed a revolution in computing and related communications technologies. The contributions of industry and university researchers to this revolution are manifest; less widely recognized is the major role the federal government played in launching the computing revolution and sustaining its momentum. Funding a Revolution examines the history of computing since World War II to elucidate the federal government’s role in funding computing research, supporting the education of computer scientists and engineers, and equipping university research labs. It reviews the economic rationale for government support of research, characterizes federal support for computing research, and summarizes key historical advances in which government-sponsored research played an important role. Funding a Revolution contains a series of case studies in relational databases, the Internet, theoretical computer science, artificial intelligence, and virtual reality that demonstrate the complex interactions among government, universities, and industry that have driven the field. It offers a series of lessons that identify factors contributing to the success of the nation’s computing enterprise and the government’s role within it.

Emerging Technology Trends in Internet of Things and Computing
First International Conference, TIOTC 2021, Erbil, Iraq, June 6–8, 2021, Revised Selected Papers

Springer Nature This volume constitutes selected papers presented at the First International Conference on Emerging Technology Trends in IoT and Computing, TIOTC 2021, held in Erbil, Iraq, in June 2021. The 26 full papers were thoroughly reviewed and selected from 182 submissions. The papers are organized in the following topical sections: Internet of Things (IOT): services and applications; Internet of Things (IOT) in healthcare industry; IOT in networks, communications and distributed computing; real world application fields in information science and technology.

How People Learn
Brain, Mind, Experience, and School: Expanded Edition

National Academies Press First released in the Spring of 1999, How People Learn has been expanded to show how the theories and insights from the original book can translate into actions and practice, now making a real connection between classroom activities and learning behavior. This edition includes far-reaching suggestions for research that could increase the impact that classroom teaching has on actual learning. Like the original edition, this book offers exciting new research about the mind and the brain that provides answers to a number of compelling questions. When do infants begin to learn? How do experts learn and how is this different from non-experts? What can teachers and schools do—with curricula, classroom settings, and teaching methods—to help children learn most effectively? New evidence from many branches of science has significantly added to our understanding of what it means to know, from the neural processes that occur during learning to the influence of culture on what people see and absorb. How People Learn examines these findings and their implications for what we teach, how we teach it, and how we assess what our children learn. The book uses exemplary teaching to illustrate how approaches based on what we now know result in in-depth learning. This new knowledge calls into question concepts and practices firmly entrenched in our current education system. Topics include: How learning actually changes the physical structure of the brain. How existing knowledge affects what people notice and how they learn. What the thought processes of experts tell us about how to teach. The amazing learning potential of infants. The relationship of classroom learning and everyday settings of community and workplace. Learning needs and opportunities for teachers. A realistic look at the role of technology in education.

Internet of Things and Advanced Application in Healthcare

IGI Global The ubiquitous nature of the Internet of Things allows for enhanced connectivity between people in modern society. When applied to various industries, these current networking capabilities create opportunities for new applications. Internet of Things and Advanced Application in Healthcare is a critical reference source for emerging research on the implementation of the latest networking and technological trends within the healthcare industry.
Featuring in-depth coverage across the broad scope of the Internet of Things in specialized settings, such as context-aware computing, reliability, and healthcare support systems, this publication is an ideal resource for professionals, researchers, upper-level students, practitioners, and technology developers seeking innovative material on the Internet of Things and its distinct applications.

**Intelligent Internet of Things**

**From Device to Fog and Cloud**

Springer This holistic book is an invaluable reference for addressing various practical challenges in architecting and engineering Intelligent IoT and eHealth solutions for industry practitioners, academic and researchers, as well as for engineers involved in product development. The first part provides a comprehensive guide to fundamentals, applications, challenges, technical and economic benefits, and promises of the Internet of Things using examples of real-world applications. It also addresses all important aspects of designing and engineering cutting-edge IoT solutions using a cross-layer approach from device to fog, and cloud covering standards, protocols, design principles, reference architectures, as well as all the underlying technologies, pillars, and components such as embedded systems, network, cloud computing, data storage, data processing, big data analytics, machine learning, distributed ledger technologies, and security. In addition, it discusses the effects of Intelligent IoT, which are reflected in new business models and digital transformation. The second part provides an insightful guide to the design and deployment of IoT solutions for smart healthcare as one of the most important applications of IoT. Therefore, the second part targets smart healthcare-wearable sensors, body area sensors, advanced pervasive healthcare systems, and big data analytics that are aimed at providing connected health interventions to individuals for healthier lifestyles.

**Impact Evaluation in Practice, Second Edition**

World Bank Publications The second edition of the Impact Evaluation in Practice handbook is a comprehensive and accessible introduction to impact evaluation for policy makers and development practitioners. First published in 2011, it has been used widely across the development and academic communities. The book incorporates real-world examples to present practical guidelines for designing and implementing impact evaluations. Readers will gain an understanding of impact evaluations and the best ways to use them to design evidence-based policies and programs. The updated version covers the newest techniques for evaluating programs and includes state-of-the-art implementation advice, as well as an expanded set of examples and case studies that draw on recent development challenges. It also includes new material on research ethics and partnerships to conduct impact evaluation. The handbook is divided into four sections: Part One discusses what to evaluate and why; Part Two presents the main impact evaluation methods; Part Three addresses how to manage impact evaluations; Part Four reviews impact evaluation sampling and data collection. Case studies illustrate different applications of impact evaluations. The book links to complementary instructional material available online, including an applied case as well as questions and answers. The updated second edition will be a valuable resource for the international development community, universities, and policy makers looking to build better evidence around what works in development.