COMPUTER SCIENCE, TECHNOLOGY AND APPLICATIONS

Brain-Machine Interfaces

Uses and Developments

Carla Bryan ▪ Ivan Rios

EDITORS

Novinka

Computational Mathematics & Analysis

Computer Science, Technology & Applications

Cybercrime & Cybersecurity Research

Disability Studies

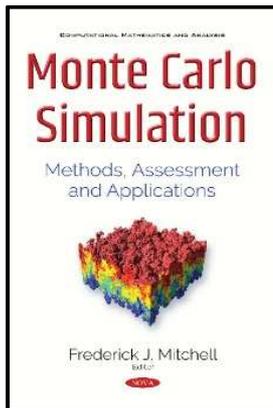**Horizons in Computer Science**

Internet Theory, Technology & Applications

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Contents

Monte Carlo Simulation
Methods, Assessment & Applications
Edited by Frederick J. Mitchell

Chapter One presents a study on application of Monte Carlo simulation in reliability assessment of composite electric power systems. Chapter Two develops a PK/PD model to evaluate, by Monte Carlo simulation as a data maximization strategy, the antiviral activity of two stavudine formulations: conventional stavudine and stavudine-gold nanoparticles (stavudine-AuNPs). In Chapter Three, the magnetic properties of the kagomé lattice is studied with Ruderman–Kittel–Kasuya–Yosida (RKKY) exchange interactions in a spin-7/2 and alternate mixed spin-5/2 and spin-2 Ising model on the Bethe lattice by using the Monte Carlo simulations.

PB 9781536119893 £71.50 July 2017 Nova Science Publishers 55 pages

Scientific Computing
Studies & Applications
Edited by Caj Erling

Stergios Papadimitriou and Lefteris Moussiades begin Chapter One by comparing and contrasting some aspects of ScalaLab and GroovyLab, the MATLAB-like environments for the Java Virtual Machine. Additionally, this chapter highlights the strengths and weaknesses of the two environments while examining the dilemma of whether to use dynamic typing or static typing for scientific programming. Next, Chapter Two by Marija Mitrović Dankulov and Jelena Smiljanić express how computational techniques might be used to determine the structure and dynamics of Meetup social groups. Lastly, Vladimir Lončar, Ivana Vasić, and Antun Balaž review parallel numerical algorithms and programs based on the Crank-Nicolson split-step semi-implicit method in order to solve the nonlinear partial differential equations of the Schrödinger type.

PB 9781536125641 £71.50 November 2017 Nova Science Publishers 128 pages
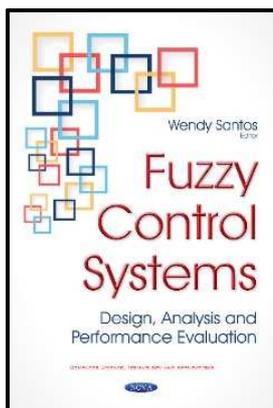
Fuzzy Control Systems
Design, Analysis & Performance Evaluation
Edited by Wendy Santos

This book reviews fuzzy control systems. Chapter One presents a new class of fuzzy logic systems named type-2 fuzzy logic systems (T2FLS). Chapter Two discusses DSP based hardware and software implementation of a sliding mode control for high performance IM drive. Chapter Three examines fuzzy logic based encoder-less speed controls of permanent-magnet synchronous motors (PMSM) for hub motor drives. Chapter Four presents the development and research of fuzzy control system of floating dock docking operations. Chapter Five examines the problem of a robust H ‡ fuzzy control design for a class of nonlinear Markovin jump systems via a LMI-based approach.

HB 9781634858892 £165.50 March 2017 Nova Science Publishers 200 pages
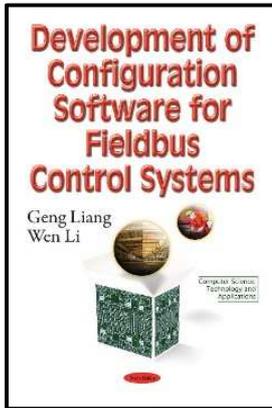
Development of Configuration Software for Fieldbus Control Systems

Geng Liang, Wen Li

Since the beginning of the 1980s, configuration software has developed and evolved. It should be said that configuration software, as a kind of application software, rose with the development of personal computers. The development of configuration software is closely related to the development of the industrial control system. With the rapid development of modern industries, the production process continues to expand in scale, and its complexity is increasing. The process of industrial production is now being transformed from labor intensive, equipment intensive, and information intensive to a more knowledge intensive fashion. Configuration software as a product appeared in the early 80s and was widely used in the late 80s. But before the mid-90s, the configuration software application was not universal.

With the applications of industrial control systems widely used around the world, in the face of larger and more complex control systems, users have become gradually more aware of original host computer programming. This mode is time-consuming. The loss outweighs the gains. At the same time, MIS (management information systems) and CIMS (computer integrated manufacturing systems), and a large number of applications require an industrial site for enterprise production, management, and decision-making to provide more detailed and in-depth data in order to optimize the production and operation of enterprises in all aspects.

PB 9781634858519 £71.50 February 2017 Nova Science Publishers 130 pages
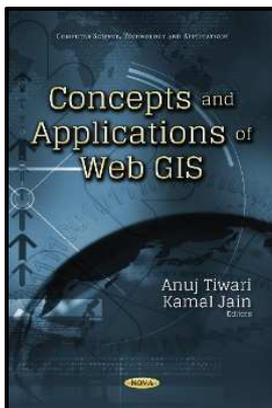
Concepts & Applications of Web GIS

Edited by Anuj Tiwari, Kamal Jain

The evolution of open source Web GIS technology in integration with contemporary commercial solutions not only provides an immediate solution at every level of small and medium-sized industry, but has also attracted students/scholars from a diverse background (computer science, information technology, electronics, civil engineering, geography, geomatics, earth sciences, hydrology, etc.) who are interested in growing their careers in different government (ISRO, DRDO, NIC, State Disaster Mitigation Centers, State Remote Sensing Centers etc) and private organizations (ESRI, Hexagon, Wipro, TCS etc).

Concepts and Application of Web GIS emphasizes both the basic principles and practical application of Web GIS technology for estimating the developments and advances about the use of both the commercial and open source Web GIS technology. It starts with describing the evolution of Web GIS technology, depicts its important uses/applications in conjunction with remote sensing & GIS. It then discusses the role of Web GIS technology in current smart city services and E-governance solutions and guides new developers to establish a complete Web GIS solution for their respective problems. Overall, this book is a comprehensive solution for the academic, commercial and planning communities, which fills a long felt gap in the field of geoinformatics and the Web GIS community. The chapters are written by active researchers and are presented in an accessible way to the public beyond those who are specialists in the topics previously mentioned. Besides these topics, this book will prove as a valuable reference book for graduation as well as post-graduation students to cover the syllabi related to technologies for GIS and Web GIS studies.

HB 9781536127799 £139.50 November 2017 Nova Science Publishers 236 pages
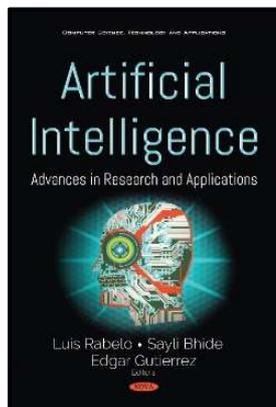
Artificial Intelligence
Advances in Research & Applications
Edited by Luis Rabelo

After decades of basic research and more promises than impressive applications, artificial intelligence (AI) is starting to deliver benefits. A convergence of advances is motivating this new surge of AI development and applications. Computer capability as it has evolved from high throughput and high performance computing systems is increasing. AI models and operations research adaptations are becoming more mature, and the world is breeding big data not only from the web and social media but also from the Internet of Things.

Organizations around the world have been realizing that there are substantial performance gains and increases in productivity for the use of AI and predictive analytics techniques. Their use is bringing a new era of breakthrough innovation and opportunities. This book, compiles research insights and applications in diverse areas such as manufacturing, supply chain management, pricing, autonomous vehicles, healthcare, ecommerce, and aeronautics. Using classical and advanced tools in AI such as deep learning, particle swarm optimization, support vector machines and genetic programming among others.

This is a very distinctive book which discusses important applications using a variety of paradigms from AI and outlines some of the research to be performed. The work supersedes similar books that do not cover as diversified a set of sophisticated applications. The authors present a comprehensive and articulated view of recent developments, identifies the applications gap by quoting from the experience of experts, and details suggested research areas.

Artificial Intelligence: Advances in Research and Applications guides the reader through an intuitive understanding of the methodologies and tools for building and modeling intelligent systems. The book's coverage is broad, starting with clustering techniques with unsupervised ensemble learning, where the optimal combination strategy of individual partitions is robust in comparison to the selection of an algorithmic clustering pool. This is followed by a case in a parallel-distributed simulator using deep learning for its configuration. Chapter Three presents a case for autonomous vehicles. Chapter Four discusses the novel use of genetic algorithms with support vector machines. Chapters Five through Thirteen focus on the applications.

HB 9781536126778 £169.99 December 2017 Nova Science Publishers 291 pages
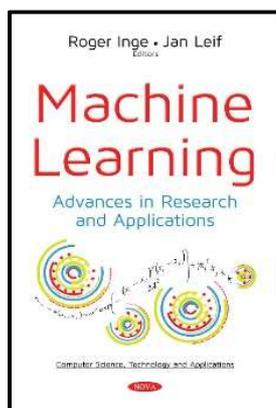
Machine Learning
Advances in Research & Applications
Edited by Roger Inge, Jan Leif

In chapter one, Lei Jia, PhD and Hua Gao, PhD analyze machine learning applications in small molecule and macromolecule drug discovery and development while comparing the similarities and differences between the two. They also examine their advantages and limitations with the intent to encourage further creative machine learning applications in drug discovery and development. During chapter two, Oscar Claveria, Enric Monte, and Salvador Torra present a study on the extrapolative performance of several machine learning models in a multiple-input multiple-output setting that permits cross-correlation between the inputs. Bojan Ploj, Germano Resconi, and Ali Yaghoubi parallel the solution of a system by logic gates and by a neural network, in which considerations are computed by the designated one step method during chapter three. In chapter four, Loris Nannia, Nicolò Zaffonatoa, Christian Salvatoreb, Isabella Castiglionib, and the Alzheimer's Disease Neuroimaging Initiative propose a method that could aid in the early diagnosis of Alzheimer's disease. Afterwards, F. Dornaika and I. Kamal Aldine present and experimentally assess two non-linear data self-representativeness coding schemes based on Hilbert space and column generation. Lastly, Christos Chrysoulas, Grigorios Kalliatakis, and Georgios Stamatiadis give an overview of Apache Hadoop, an open-source software framework used to distribute storage and process big data using the MapReduce programming model.

PB 9781536125702 £71.50 November 2017 Nova Science Publishers 124 pages
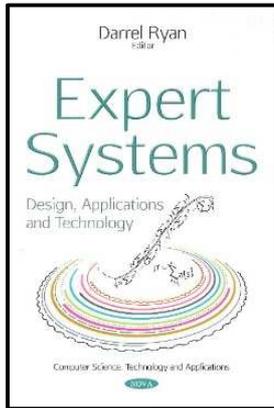
Expert Systems
Design, Applications & Technology
Edited by Darrel Ryan

The use of unconventional methods of artificial intelligence is the modern trend in the computer support of the solution of the decision-making methods. These methods are based on the use of knowledge of skilled professionals – experts, where this knowledge forms the basis for their high-quality knowledge mental models. Chapter One introduces the expert systems used for the simulation of the decision-making activity of experts when dealing with complex tasks. In terms of theory, the expert knowledge method is used. The introduced expert systems are able to effectively use uncertainties which take their source from inaccurate, incomplete, inconsistent input data, vague concepts of linguistic formulations of the rules, and uncertain knowledge. Chapter Two proposes a solution for heterogeneous data source integration in the information standard formats, based on Rule Based Expert System (RBES) to implement a metadata mining process. Later, it describes the process of automatic modelling in which the proposed RBES support in the data mining technique applications, based on the results of metadata mining process. Finally, it describes the application issues of the proposed solution in real cases. Chapter Three presents ARISTON, which is an integrated mathematical framework with all relevant parameters that constitute a fully automated, structured expert psychometric system for occupational guidance, aiming to identify and retrieve the professions which are nearest to the personality of an individual, while at the same time quantify all nearest "neighbouring" professions.

PB 9781536125030 £71.50 October 2017 Nova Science Publishers 133 pages
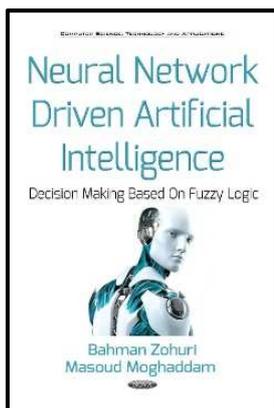
Neural Network Driven Artificial Intelligence
## Decision Making Based on Fuzzy Logic
Bahman Zohuri, Masoud Moghaddam

With today's growing and overloading volume of information, it is becoming tremendously difficult to analyze the huge amounts of data that contain this information. It makes it very strenuous and inconvenient to introduce an appropriate methodology of decision-making fast enough to the point that it can be considered as real-time. The demand for real-time processing information and related data – both structured and unstructured – is on the rise and consequently makes it harder and harder to implement correct decision making at the enterprise level to keep the organization robust and resilient against either manmade threats or natural disasters.

Neural networking and fuzzy systems combined show how Artificial Intelligence (AI) can be driven by these combinations as a trainable system that is more dynamic than static when it comes to machine and deep learning language to deal with both adversary and friendly events in real-time. Dynamic systems of AI that are built around such an innovative approach allows the robots of the future to be more adaptive with mechanisms such as principle adoption, self-organization, and the convergence of global stability from the viewpoint of business and intelligence security needed in today's cyber world.

To deal with uncertainty, vagueness, and imprecision, Lofti A. Zadeh introduced fuzzy sets and fuzzy logic. In the present book, fuzzy classification is applied to extend portfolio analysis, scoring methods, customer segmentation and performance measurement, and thus improves managerial decisions. As an integral part of the book, case studies show how, fuzzy classification - with its query facilities - can extend customer equity, enable mass customization, and refine marketing campaigns

HB 9781536121148 £199.99 July 2017 Nova Science Publishers 435 pages
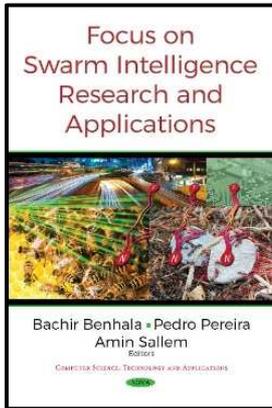
Focus on Swarm Intelligence Research & Applications

Edited by Bachir Benhala, Pedro Pereira, Amin Sallem

Swarm intelligence techniques are among the most talented and successful approaches that gained a lot of popularity over the past two decades. They are inspired by animal behavior (such as ants, termites and bees) and insect conduct (by swarm, herd, flock and shoal phenomena) in order to develop these techniques in terms of mimicking their problem/solution abilities. These techniques provide good approximate solutions in a reasonable time for solving hard and complex problems in many engineering fields. This book is intended for researchers, engineers and graduate students with interests in swarm intelligence algorithms and their applications. It discusses and describes the various swarm intelligence techniques as useful tools for solving practical problems, such as urban traffic optimization, electrical engineering problems and the design of integrated analog circuits.

PB 9781536124521 £82.99 October 2017 Nova Science Publishers 229 pages
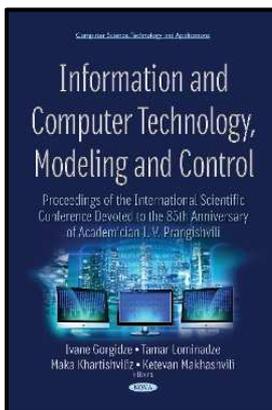
Information & Computer Technology, Modeling & Control

Edited by Ivane Gorgidze, Tamar Lominadze, Maka Khartishvili, Ketevan Makhashvili

In the near future, information technology is likely to be one of the most potent growth areas in advanced industrialized countries. Indeed, it is now widely recognized that long-term economic prosperity will crucially depend upon people's success in developing, mastering, exploiting and marketing information systems.

Modeling, analysis, and control of complex systems have interested scientists and engineers for a long time. With the invention of digital computers, modeling and control have taken great importance with numerous applications in various spheres.

Although the argument for the rapid development and introduction of information technology into the many aspects of our everyday existence is extremely strong, unfortunately it remains the case that at present the technology is being used effectively by only a small proportion of the people who could benefit from it.

In this book, the papers of the Georgian scientists and engineers are presented. Currently novel technologies include information technology, nanotechnology, biotechnology, cognitive science, robotics and artificial intelligence. The purpose of the investigations in these fields is the consolidation and support of Georgian scientists and the experts working in the field of advanced technologies, expansion of international scientific communications, and assistance in the introduction of high-tech technologies.

This collection of articles examines the following questions: problems of control, computer-aided engineering, information and communication systems, prospects of new technologies, systems analysis, intellectual control and decision-making systems, mathematical modelling and computer simulation, problems of sustainable development, parallel computing and its applications, control systems, monitoring systems and measuring systems, theoretical computer science, the paradigm of creativity management, and pedagogy, psychology and spiritual dimensions of scientific paradigms.

HB 9781536120752 £199.99 September 2017 Nova Science Publishers 375 pages
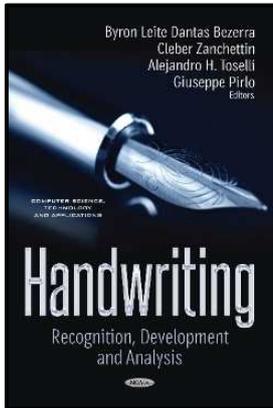
Handwriting
Recognition, Development & Analysis

Edited by Byron Leite Dantas Bezerra, Cleber Zanchettin, Alejandro H. Toselli, Giuseppe Pirlo

This book has the primary goal of presenting and discussing some recent advances and ongoing developments in the Handwritten Text Recognition (HTR) field, resulting from works done on different HTR-related topics for the achievement of more accurate and efficient recognition systems. Nowadays, there is an enormous worldwide interest in HTR systems, which is mostly driven by the emergence of new portable devices incorporating handwriting recognition functions. Others interests are the biometric identification systems employing handwritten signatures, as well as the requirements from cultural heritage institutions like historical archives and libraries in order to preserve their large collections of historical (handwritten) documents. The book is organized into two sections: the first one is mainly devoted to describing the current state-of-the-art applications in HTR and the last advances in some of the steps involved in HTR workflow (that is, preprocessing, feature extraction, recognition engines, etc.), whereas the second focuses more on some relevant HTR-related applications.

In more depth, the first part offers an overview of the current state-of-the-art applications of HTR technology and introduces the new challenges and research opportunities in the field. Besides, it provides a general discussion of currently ongoing approaches towards solving the underlying search problems on the basis of existing methods for HTR in terms of both accuracy and efficiency. In particular, there are chapters especially focused on image thresholding and enhancement, text image preprocessing techniques for historical handwritten documents and feature extraction methods for HTR. Likewise, in line with the breakout success of Deep Neural Networks (DNNs) in the field, a whole chapter is devoted to describing the designing of HTR systems based on DNNs. Finally, a chapter listing the most used benchmarking datasets for HTR is also included, providing detailed information about which types of HTR systems (on/offline) and features are commonly considered for each of them.

In the second part, several systems — also developed on the basis of the fundamental concepts and general approaches outlined in the first part — are described for several HTR-related applications. Presented in the corresponding chapters, these applications cover a wide spectrum of scenarios: mathematical formulae recognition, scripting language recognition, multimodal handwriting-speech recognition, hardware design for online HTR, student performance evaluation through handwriting analysis, performance evaluation methods, keyword spotting, and handwritten signature verification systems.

Last but not least, it is important to remark that to a large extent, this book is the result of works carried out by several researchers in the Handwritten Text Recognition field. Therefore, it owes credit to these researchers that have directly contributed to their ideas, discussions and technical collaborations, and in general who, in one manner or another, have made it possible.

HB 9781536119374 £199.99 July 2017 Nova Science Publishers 395 pages
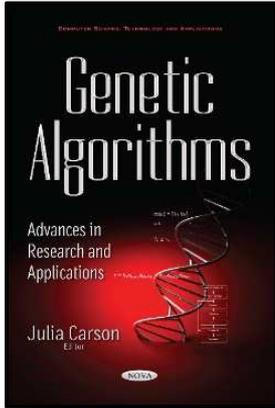
Genetic Algorithms
Advances in Research & Applications
Edited by Julia Carson

In Chapter One, a revision and complementary analysis of three interesting cases where stochastic strategies are applied to get the optimal design of intensified schemes is presented. The revisited cases include multicomponent, extractive and reactive thermally coupled distillation. Chapter Two performs parameter optimization on a genetic algorithm to skip the tuning parameter process during unmanned aerial vehicle path planning. Results show that truncation selection at 20% is highly recommended for genetic algorithm path planning application because of its low average path and computational costs. Chapter 3 describes the calibration of the numerical model of the Monte da Virgem telecommunications tower, located near the city of Porto, Portugal. The calibration of the numerical model of the tower relies on the application of an iterative method based on a genetic algorithm. Chapter 4 describes the genetic algorithm-based calibration procedure for a microscopic traffic simulation model, focusing on freeways and modern roundabouts. For both case studies, the genetic algorithm tool in MATLAB® was applied in order to reach the convergence between the outputs from Aimsun microscopic simulator and the observed data.

PB 9781536118568 £71.50 June 2017 Nova Science Publishers 90 pages
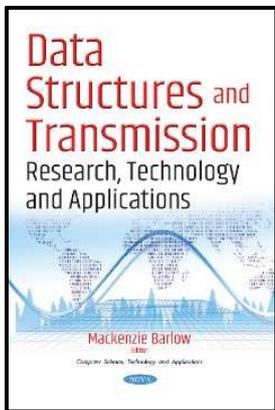
Data Structures & Transmission
Research, Technology & Applications
Edited by Mackenzie Barlow

The recent advances in computer networks and the widespread use of the Internet, together with other developments in telecommunications technology have made it possible to send messages and exchange information around the whole world.

The high variety and the large amount of data exchanged across communication networks have increased over the last few years. This means the threat of interception during data transmission has become a major concern. Important research aimed at designing algorithms to help prevent interception and enhance data security is currently of primary relevance. This advanced technology requires new and efficient encryption methodologies. These algorithms can assure security for fast evolving communication and storage applications that must be secured against intrusion threats, which unfortunately are increasing in sophistication and frequency. This book analyzes new research on the technology and applications of data structures and data transmission.

PB 9781536110715 £71.50 May 2017 Nova Science Publishers 110 pages
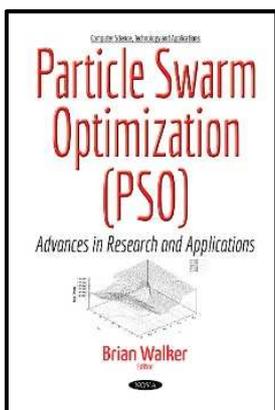
Particle Swarm Optimization (PSO)
Advances in Research & Applications
Edited by Brian Walker

Particle swarm optimization (PSO) is one of the recently developed swarm intelligent optimization technologies that offer the advantages of simplicity and fast biological convergence. The technique originated from the theory of artificial life and evolution, which is based on the optimization that is achieved as a result of swarm behaviour. PSO can be easily implemented due to fewer parameters for adjustment hence it has been applied broadly in various engineering fields. This book reviews advances in research and applications of PSO.

PB 9781536108286 £71.50 February 2017 Nova Science Publishers 100 pages
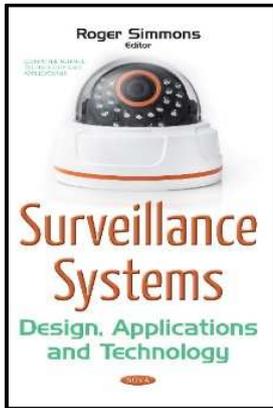
Surveillance Systems
Design, Applications & Technology
Edited by Roger Simmons

In this book, Chapter One reviews basis elementary of residence security, classical residence security and health care surveillance system versus computer vision technique system, as well as directional versus omnidirectional imaging. Chapter Two provides practical guidelines for specialists who design, tune and evaluate video surveillance systems based on the automated tracking of moving objects. Chapter Three presents a methodology for tracker evaluation that quantifies performance against variations of the tracker input (data and configuration).

PB 9781536107036 £82.99 April 2017 Nova Science Publishers 115 pages
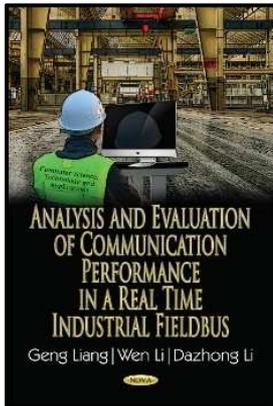
Analysis & Evaluation of Communication Performance in a Real Time Industrial Fieldbus
Geng Liang, Wen Li, Dazhong Li

This book provides comprehensive research on the communication performance of a real time industrial fieldbus. Several important topics were investigated, such as how to ensure the transmission of real-time messages within a maximum bound time along the industrial fieldbus mentioned in this book. Profibus, FF, WorldFIP and CAN are all well-proved solutions for real-time communication systems, based on a simplified timed token (TT) protocol and bus scheduling. The following subjects dealing with the real-time communication performance of an industrial fieldbus were investigated and studied in this book.

1) Concept and essentiality of timed-token MAC protocol with the effect of its parameter in real-time characteristics.

2) MAC mechanism in Profibus, timing analysis, optimization of acyclic bandwidth allocation, and the approaches to guarantee the real-time behavior of the Profibus protocol.

3) Principles of acyclic data communication, and analysis of the delay performance of time-critical and time-available data in FF fieldbus data link layer token-passing service.

4) Communication models in WorldFIP network, Producer/Distributor/Consumer concept, response time analysis for sporadic traffic and investigation of the worst-case response time issues.
5) Communication mechanism in CAN fieldbus with its performance analysis and evaluation in real-time applications.

The academic level of this book is relatively high and professional. It is suitable as a reference for university graduates, lecturers and researchers.

HB 9781536106404 £169.99 February 2017 Nova Science Publishers 270 pages
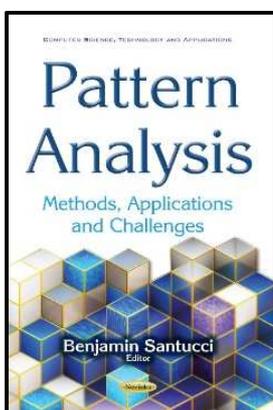
Pattern Analysis
Methods, Applications & Challenges
Edited by Benjamin Santucci

This book reviews methods, applications and challenges of pattern analysis. Chapter One addresses the identification problem of the printed medieval documents origin. The authors of Chapter Two perform a review on current cheiloscopic techniques, addressing the study methodology and usefulness of lip print patterns study. Chapter Three examines theoretical bases of human identification using palatal rugae pattern, and addresses the study methodology and techniques, potentialities and future usefulness of palatal rugae patterns. Chapter Four focuses on variable-scale-based pattern analysis for time series of wind speed, atmospheric pressure, and atmospheric temperature.

PB 9781536106305 £71.50 February 2017 Nova Science Publishers 100 pages
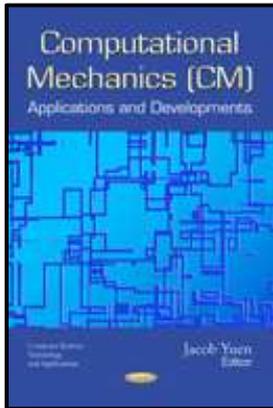
Computational Mechanics (CM)
Applications and Developments
Edited by Jacob Yuen

In this collection, a model based on the modified strain gradient theory for the free vibration analysis of microbeams considering the effect of rotatory inertia and of shear deformation is presented. An analysis of the effects of boundary supports of the microbeams on the natural non-dimensional frequencies is performed. The results are obtained using the Ritz method with sets of admissible functions that can best model the microbeam boundary conditions. The following work employs a physically interpretable notation called strain gradient notation to study the sources and effects of locking. Such notation allows for the physical meanings of the polynomials coefficients to be identified early in the formulation procedure. Strain gradient notation guarantees that the sources of locking can be eliminated a-priori, rendering efficient finite element models. Another study is included in which the evolutionary process accounts for the threshold values for the Von Mises stress. Thus, the regions with lower Von Mises stresses intensity have removal condition whereas the higher Von Mises stresses regions have addition condition. This study aims to evaluate the reliability of structures optimized topologically as well as to determine the robustness of the solutions provided by the topology optimization schemes. In the closing work, the microwave heating of a liquid product inside a tank (reactor) with and without mechanical agitation was analyzed. A mathematical model was developed that includes the resolution of the microscopic energy balance in which a source term is used to consider the interaction between food and microwaves. From numerical simulations it was possible to evaluate the effect of the agitation rate, the position and number of the microwave-generators inside the cavity in the temperature profiles of the liquid products.

PB 9781536136722 £71.50 June 2018 Nova Science Publishers 135 pages
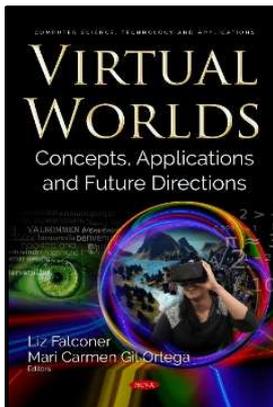
Virtual Worlds
Concepts, Applications and Future Directions
Edited by Liz Falconer, Maricarmen Gil Ortega

Virtual Worlds: Concepts, Applications and Future Directions explores the rich and fascinating topic of virtual worlds by bringing together research findings and discussion pieces from an international group of leading practitioners in the field. There are many different definitions of virtual worlds, but they all share the characteristic of enabling real-time interaction between users who are present in these worlds in the form of avatars, i.e., digital projections of ourselves into virtual environments. A particular theme of the book is how our activities in virtual worlds continue to develop our understanding of the nature of virtual experience, and particularly what it means to be digitally human. These ideas are explored from a diverse and engaging range of perspectives that include archaeology, languages, teacher training, computing, meditation and well-being, forensic science, performance art and artificial intelligence. Each chapter provides an in-depth discussion and analysis, and practical examples of successful implementations of virtual world technologies are also included. The book will be invaluable to researchers and practitioners in the fields of virtual worlds, virtual reality, augmented reality and artificial intelligence. It presents evidence, discussion and advice on some of the underpinning concepts relating to virtuality, on the application of virtual technologies to our daily lives, and encourages us to ponder the possible futures of these types of technology.

HB 9781536130997 £199.99 January 2018 Nova Science Publishers 317 pages
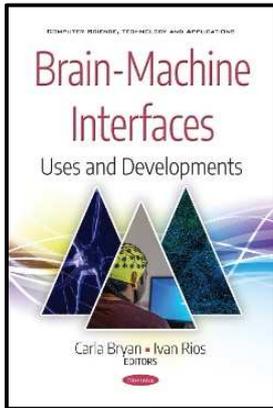
Brain-Machine Interfaces
Uses and Developments
Edited by Carla Bryan, Ivan Rios

Brain-Machine Interfaces: Uses and Developments reports on advances in the development of a speech prosthetic, building on previous data as well as the results of detecting phonemes, words and phrases during overt and covert speech. The following study aims to quantify and qualify the electroencephalographic (EEG) patterns of commonly used control tasks in BCI systems under different task states. The analysed control tasks were: left hand MI, right hand MI, and a relaxed but focused mental state. The original feasibility study within this manuscript aimed to evaluate the scope of applications for a novel neurorehabilitation intervention. Important observations from that initial study and considers possible applications of TLNS Technology in the future are examined. The closing opinion piece seeks to outline why the development of an electrode that does not encourage growth into the electrode tip is ill-advised, with the core reasons being rejection and "less is more".

PB 9781536133684 £71.50 April 2018 Nova Science Publishers 99 pages
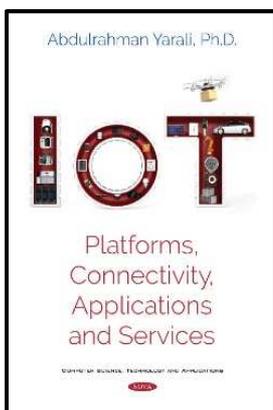
IoT
Platforms, Connectivity, Applications and Services
Abdulrahman Yarali

Telecommunications is currently one of the fastest changing industries with broadband networks and service providers aggressively competing in their mature subscription points for churn and value-added services to provide consumer experience for a sustainable return on their extensive investments. The shift from voice and basic data to bundles of content in streaming, video, HDTV, etc. happened too fast for the industry to cope with the demand. A large portion of this is attributed to the broad range of computation being done by smart mobile handheld devices. The confluence of standards/technologies and ability to connect massive smaller devices, objects, and sensors, inexpensively and easily have created a hyper-connected world bridging the virtual and physical to generate, process, exchange and consume data for the Internet of Things (IoT). The Internet of Things is a union of standards, technologies, and connection of devices in the real world that are able to communicate in the virtual world. This type of technology is used in generating, processing, exchanging data and decision making. With its many implications and massive proliferation of devices, IoT is widely considered to be one of the largest revolutions in the Information age. Its effect has the potential to be felt on a global scale in all sectors and occupations. Many companies have different classifications of IoT platforms based on their applications and services. Firms producing goods and services categorize their IoT applications as "Industrial IoT" while others define their IoT applications based on devices like wearables or locations such as "Smart Home" and "Smart City". IoT devices are not only replacing people, but they are overcoming the limits of people. Drone usage with cameras and sensors will be able to travel the places where humans cannot reach to gather, store and send data to a smart device instantly. As device players are manufacturing IoT devices for remote and conditioned–based monitoring and asset tracking, there are inherent challenges such as time to market, interoperability, authentication, security, digital data protection and overcoming technical issues such as power consumption, and limited computing process. With low-cost sensors and new supporting technologies such as 4G LET Cat-M1 network, IoT brings an increase of efficiency and quality to almost every sector. In this book, there are 16 chapters which cover a broad range of topics such as platforms, technologies, generating business value, delivering smart, sustainable energy solutions, smart communities and citizens, manufacturing, healthcare, security and privacy, commercial drones and many other related IoT topics.

This book is intended for network managers and engineers, graduate and senior undergraduate students in telecommunication and computer science majors.

HB 9781536134001 £199.99 April 2018 Nova Science Publishers 384 pages

Gesture Recognition
Performance, Applications and Features
Edited by Gilberto Coleman, Roosevelt Ward

In the opening chapter of *Gesture Recognition: Performance, Applications and Features*, the authors discuss gesture recognition and its role in the developing world of technology. The possibility of implementing a gesture detection application that works with people with special needs is examined, such as recognition of sign language for the hearing-impaired. Following this, the authors present their approach for face detection and tracking, user identification, facial feature extraction and head pose estimation as the low-level representation of facial gesture atomics. Additionally, an approach for a movement-based facial gestures recognition is presented, with results demonstrated through practical approaches. A later work explores spectral features from algebraic graph theory in static hand gesture recognition. Specifically, we apply a technique that uses the elements of the spectral matrix of the Laplacian to construct symmetric polynomials that are permutation invariants. The values of these polynomials can be used as graph features in a statistical learning pipeline that has the ability of distinguishing between distinct graphs and can reveal graph clusters. In the closing study, the authors developed two algorithms for the detection of pointing gestures and one approach for waving on this technological base and studied their functionality. The goal was to determine whether a combination of both strategies improves and stabilizes detection rates.

PB 9781536134919 £73.50 May 2018 Nova Science Publishers 126 pages
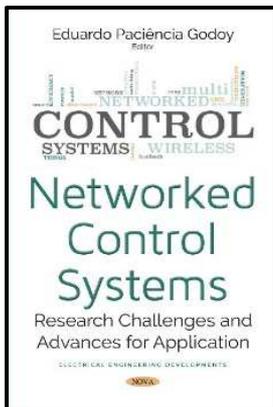
Networked Control Systems
Research Challenges and Advances for Application
Edited by Eduardo Paciencia Godoy

The research topic of networked control systems has been the focus over the last 15 years for the academic and industrial sectors. Networked control systems (NCSs) are distributed control systems in which the sensors, actuators, and controllers are physically separated and connected through an industrial network. NCSs represent the evolution of control architectures, providing greater modularity and control decentralization, maintenance ease and diagnosis, and lower cost of implementation. The R&D on NCSs has been overcoming the effects of the network delays, packet losses and message sampling intervals on NCS performance and stability. The advances in wireless networking technology and the proliferation of industrial wireless sensors have led to an increasing interest in using wireless networks for closed loop control. The main advantages of Wireless Networked Control Systems (WNCSs) are the reconfigurability, easy commissioning and the possibility of installation in places where cabling is impossible. Despite these advantages, a major problem must be considered for practical implementations of WNCSs. The technological concern in WNCSs is the energy efficiency of the devices. As the sensors are powered by batteries, the lowest possible consumption is required to extend battery lifetime without compromising the WNCS control performance. Recently, there has been great interest in the development of IoT-based NCSs. This new type of architecture in which control systems are integrated with IoT-based infrastructures represents the next evolution of networked control architectures. Even though this idea enables a whole range of novel functionalities, feedback control design and architectures for IoT imposes significant challenges that have not been addressed yet. This book compiles the last theoretical and experimental results in the topics of NCSs and WNCSs and starts discussing the last trend of IoT-based NCSs. The book focuses on presenting the research challenges within these topics and the last advances to enable their application in the industry.

PB 9781536131055 £71.50 January 2018 Nova Science Publishers 133 pages
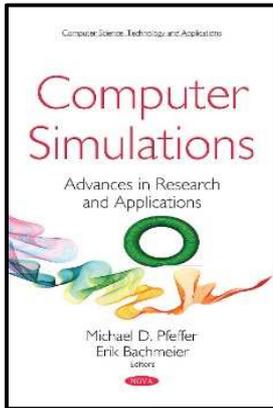
Computer Simulations
Advances in Research and Applications
Edited by Michael D Pfeffer, Erik Bachmeier

Computer Simulations: Advances in Research and Applications begins with a concise overview and background of the topic during the past decade. The finite element method and the commercial available codes are introduced with an emphasis on Abaqus as the mostly used software in this field. The next part deals with the tire geometry and creation of a consistent and computationally effective finite element mesh from 2D and 3D drawings. The material models used for the description of the mechanical behavior of tire constituents are also examined. The following paper is dedicated to the computer simulation modeling as a method of solution of differential games where analytical investigation is problematic. The main idea is that a very small number of scenarios including both control variables and parameters can provide a sufficiently good qualitative representation of dynamics of the modeled system. The Tablot Effect, which was first experimentally observed by Henry Talbot in 1836, is discussed. It is the repeated self-imaging of a diffraction grating at regular distances in the near-field behind the grating. If the observed diffraction images are laid out as a function of distance, a beautiful and repetitive pattern is observed; this is known as the Talbot carpet. The methodology of how the IFIM method was applied for the simulation of Talbot effect is described explicitly followed by a systematic synthesis of the Talbot carpet from the generated data. After this, Beckmann's scattering model is adopted to simulate the light scattering from the yarn surface and to analyze the relation between the scattering pattern and the surface twist angle. The solution of the scattering intensity distribution for the yarn surface profile is derived and numerical results indicate that the highest light intensity on the backward light scattering pattern lies along the direction perpendicular to the surface fibers regardless of the fiber or yarn parameters. The result of this chapter can serve as the theoretical basis for the measurement of yarn surface twist angle based on backward light scattering by the yarn. The authors go on to present a numerical study of the unsteady airflow characteristics inside a solar chimney power plant. Ansys Fluent 17.0 is used to simulate the air flow within the solar setup.

PB 9781536130959 £139.50 March 2018 Nova Science Publishers 136 pages
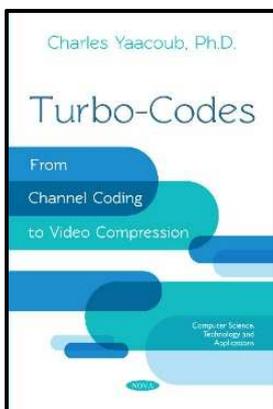
Turbo-Codes
From Channel Coding to Video Compression
Charles Yaacoub

This book presents the journey of Turbo-Codes from their first invention and initial design as error correcting codes to their application as video compression tools.

This journey is presented in three milestones. First, Turbo-Codes are introduced as a channel coding tool. Different encoding structures and decoding algorithms are discussed from theoretical and practical aspects, for binary and non-binary Turbo-Codes. Slepian-Wolf and Wyner-Ziv theorems are then discussed, as they constitute the main theory behind distributed source coding (DSC). Turbo-Codes are then presented as a practical tool for distributed source compression. The study of Turbo-Codes application in DSC is also extended to the case of joint source-channel coding (JSCC), where these codes are jointly used for both source compression and error correction. Theoretical models for DSC and JSCC are thoroughly discussed along with the necessary modifications to the initial turbo encoder-decoder system. Different simulation setups are considered and results are presented and analyzed. Finally, Turbo-Code-based distributed video coding (DVC) techniques are discussed. The motivation behind DVC is first presented, followed by a general description of the DVC system model. Different techniques used to generate the side information needed for practical DVC systems are then discussed. Theoretical compression bounds are derived for both error-free and erroneous transmissions. Applications of DVC in the context of single user and multiuser setups are finally presented with different simulation scenarios and performance analysis.

PB 9781536131147 £71.50 January 2018 Nova Science Publishers 82 pages
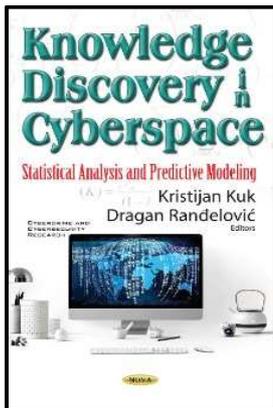
Knowledge Discovery in Cyberspace
Statistical Analysis & Predictive Modeling
Edited by Kristijan Kuk, Dragan Randjelovic

This book is a practical handbook of research on dealing with mathematical methods in crime prevention for special agents and discusses their capabilities and benefits that stem from integrating statistical analysis and predictive modeling. It consists of a current collection of research with contributions by authors from different nations in different disciplines. After reading this book, the reader should be able to understand the fundamental nature of cyberspace; understand the role of cyber-attacks; learn analytical techniques and the challenges of predicting events; learn how languages and culture are influenced by cyberspace; and learn techniques of the cyberspace public opinion detection and tracking process. Understanding cyberspace is the key to defending against digital attacks. This book takes a global perspective, examining the skills needed to collect and analyze event information and perform threat or target analysis duties in an effort to identify sources for signs of compromise, unauthorized activity and poor security practices. The ability to understand and react to events in cyberspace in a timely and appropriate manner will be key to future success. Most of the collections are research-based practices that have been done throughout the years.

The authors hope that the presented work will be of great use to police investigators and cyber special agents interested in predictive analytics.

PB 9781536105667 £71.50 January 2017 Nova Science Publishers 140 pages
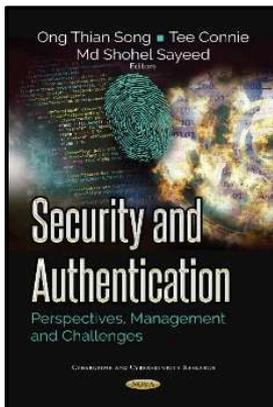
Security and Authentication
Perspectives, Management and Challenges
Edited by Ong Thian Song, Tee Connie, Mohd Shohel Sayeed

Issues around security and privacy have received greater attention as the world becomes more digitized and interconnected. There are a myriad of technological advances like smart mobile devices, wearable devices, Internet of Things (IoTs), cloud computing and social networks that benefit people all over the world, transforming how they work and communicate with each other. However, these new technologies also bring new security and privacy challenges. For example, there are massive attacks by malicious malware like WannaCry that cost great financial loss to individuals and institutions. Besides, there are ample amounts of software and programs that quitely collect, share and sometimes disclose huge amounts of personal information.

This book presents the current popular issues in information security and privacy, covering human users, hardware and software, the Internet and also communication protocols. The book provides a comprehensive combination of studies that offer integrated solutions to security and authentication problems. The topics covered in the book include mobile authentication systems, security in wireless sensor networks and IoTs, network-based intrusion detection systems, privacy protection in machine learning, deep learning for surveillance, and also targeted image forensics. An understanding of these areas ensures the ability to adapt to and address new challenges in the technological dependent world as these fields evolve.

The primary target audiences of this book are students and researchers from security technology and information technology management. The editors have been blessed by the assistance of many people concerning all aspects for the preparation of this book. The editors would like to express their sincere gratitude to the anonymous reviewers for their professional support and dedication to reviewing the chapters of this book. Last but not least, special thanks also go out to Nova Science Publishers for presenting the opportunity to prepare and publish this book.

HB 9781536129427 £169.99 March 2018 Nova Science Publishers 152 pages
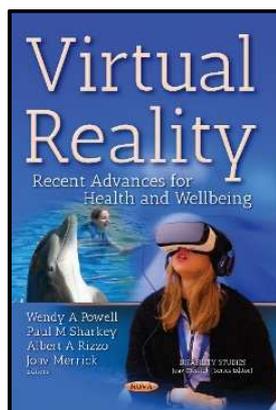
Virtual Reality
Recent Advances for Health & Wellbeing
Edited by Wendy Powell, Paul M. Sharkey

Virtual reality and human interaction with it is a complex topic, and certainly not one which will be mastered overnight; but across the world, there is excellent research being carried out for all of these important domains. As humanity extends its understanding of the interplay with these system components, developers will be well-positioned to design better and more effective virtual reality interventions and come closer to realising the full potential of virtual reality for health and well-being. In this book, the authors present a number of short papers from research groups around the world working in this important and complex field. The chapters explore a range of issues, suggesting routes forward and offering insights into both the potential and the challenges of this rapidly maturing technology.

PB 9781536124545 £71.50 October 2017 Nova Science Publishers 130 pages

Horizons in Computer Science Series
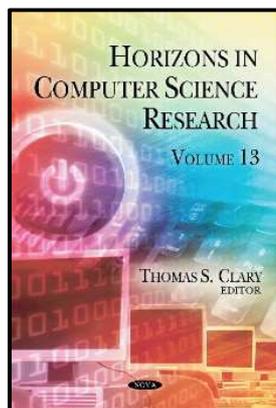
Horizons in Computer Science Research
Edited by Thomas S. Clary

In the first chapter of this book, José M. Chaves-González discusses DNA sequence design and proposes a multiobjective approach using swarm intelligence to solve optimization issues. In the second chapter, Alina Andreica suggests the significance of using systematically applied mathematical algorithms to design and implement software. Additionally, she proposes specific mathematical models of problems of equivalence and simplification. Next, Galina M. Antonova provides a supplement of findings presented in the book Pattern Recognition: Practices, Perspectives and Challenges (Vincent, D. B.; Ed.; Nova Science Publishers, Inc.: New York, USA, 2013) in the third chapter. In the fourth chapter, Mohammed Blej and Mostafa Azizi propose the use of fuzzy logic in order to efficiently schedule in realtime systems. Following this, in the fifth chapter José F. L. Naranjo, Julio C. B. Torres, and Roberto A. Tenenbaum explore an advantageous configuration for spatial interpolation of Head Related Impulse Responses, or HRIRs, through artificial neural networks, making this appropriate for auralization systems. Márcia Horn, Sandro Sawicki, Fabricia Roos-Frantz, Rafael Z. Frantz, and Igor G. Haugg examine the performance of application integration solutions through the development of formal models of simulation established on Markov chains in the sixth chapter. Next, the seventh chapter by Alexsandro Q. Lencina, Roberto S. Cargnin, Fabricia Roos-Frantz, Rafael Z. Frantz, and Sandro Sawicki presents a case study on an integration solution to a real-world problem of integration in managing research results. Following this, the eighth chapter by Seiichi Nakamori explores continual temperature regulation in a closed space using the Arduino program. In the ninth and final chapter, Jonghoek Kim discusses the building of an information (sensor) network through numerous robots setting out information nodes.

Volume 13 HB 9781536105933 £217.50 April 2017 Nova Science Publishers 160 pages
Volume 14 HB 9781536110074 £217.50 May 2017 Nova Science Publishers 248 pages
Volume 15 HB 9781536127577 £217.99 December 2017 Nova Science Publishers 198 pages
Volume 16 HB 9781536133271 £217.50 April 2018 Nova Science Publishers 240 pages
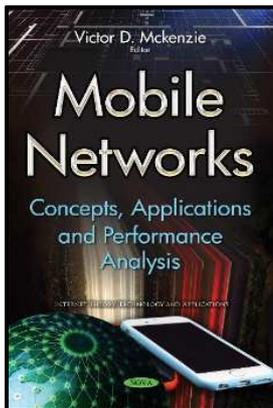
Mobile Networks
Concepts, Applications & Performance Analysis
Edited by Victor D. McKenzie

The mobile network is continuously evolving to fulfill subscribers' requirements; however, there are still restrictions. In Chapter One, the authors propose a step-by-step revolution method and path for the mobile backhaul, backbone, core and service network adopting SDN, NFV and cloud technologies. This chapter is to illustrate the deficiencies of current 4G mobile network, and the candidate solutions for conquering them are proposed. At the same time, the suggested migration steps to the 5G mobile network are also emphasized. How to benefit from key features of on demand services, network slicing, open API, and big data analysis is vital for mobile operators. Chapter Two covers the importance of TCP/IP protocol stack and its design on future mobile network, beyond 4G, with emphasis on the TCP which is used for transfer of the most user data for the most used Internet services nowadays (e.g., web-based services including social networking, file sharing, cloud computing, email and etc.). Chapter Three presents several advanced mechanisms, concepts, performance analysis for QoS (Quality of Service) provisioning in future fifth generation (5G) terminals. Finally, the authors of Chapter Four describe the main components of Human Activity Recognition in wireless networks.

HB 9781536121230 £139.50 July 2017 Nova Science Publishers 90 pages
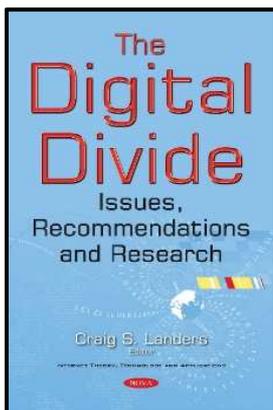
The Digital Divide
Issues, Recommendations & Research
Edited by Craig S. Landers

The emergence of the Internet as a world wide web in the late 1990s made access to information and knowledge significantly easier. Soon after the Internet started reaching the masses, concerns about its unequal distribution appeared. The digital divide that is manifested in access and usage differences between individuals, groups, regions and even countries is created between those who have access to information and communication technologies and know how to utilize them, and those who do not. Empirical studies supply strong evidence that many of those who are digitally excluded are also socially excluded, i.e., digital inequality is strongly related to economic and social stratification. Specifically, empirical studies have examined the digital divide as reflected in gaps in digital access, digital literacy, digital competence, digital, Internet and computer skills, attitudes towards computer and Internet and digital uses between different population groups. This book further reviews the issues, recommendations and new research on the digital divide.

HB 9781536110708 £82.99 May 2017 Nova Science Publishers 170 pages

## Management Science - Theory & Applications Series
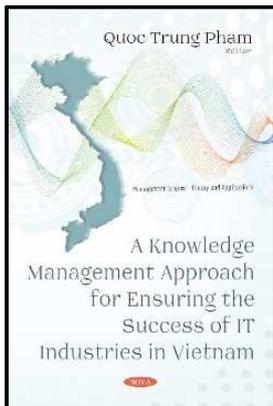
A Knowledge Management Approach for Ensuring the Success of IT Industries in Vietnam
Edited by Quoc Trung Pham

In society, knowledge becomes more and more important, and knowledge management becomes one of the best approaches for ensuring the success of any business. This book investigates some current problems in the management of IT businesses in Vietnam and explores the possibility for solving these problems by focusing on KM practices, such as: human resource management, training and development, social capital development, the use of a web 2.0 platform for KMS or collaboration, knowledge sharing encouragement and e-business solutions. Through an empirical study in the context of Vietnam, some case studies and lessons learnt are withdrawn for ensuring the success of other IT businesses in Vietnam and in other countries with the same conditions.

HB 9781536128734 £82.99 December 2017 Nova Science Publishers 131 pages

## Media & Communications - Technologies, Policies & Challenges Series
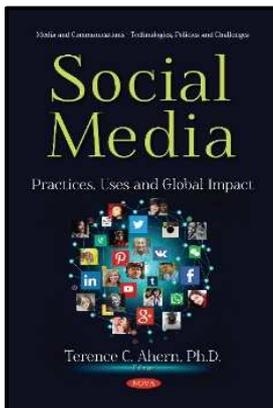
Social Media
Practices, Uses & Global Impact
Edited by Terence C. Ahern

Over 50 years ago, Pepsi sponsored the UNICEF pavilion at the 1964 New York World's Fair's. They worked with the Walt Disney Company to develop an attraction called the "Children of the World" which boasted a song and included a boat ride that passed by "animated figures frolicking in miniature settings of many lands of the world". This song correctly anticipated the effect communication technology has on how people interact with one another. A line in the song declares that "Though the mountains divide and the oceans are wide / It's a small world after all". Indeed, computer mediated-communication technologies, through cell phones, satellite phones, or the computer-based technologies of Skype or Facetime have trivialized the ability to connect to anyone at anytime, anywhere on the planet.

Fast forward 25 years and the software phenomenon known as social media has further compressed not only time and space but has also democratized news and information. Pundits talk about the 24/7 news cycles where news is available from anyone around the world and from around the clock. This new software has made the local global and the global local.

PB 9781536127348 £82.99 December 2017 Nova Science Publishers 166 pages
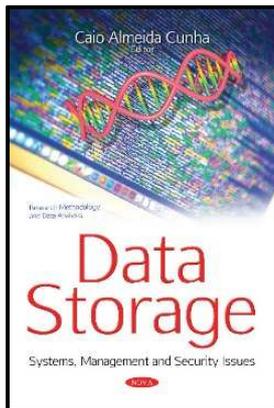
Data Storage
Systems, Management & Security Issues
Edited by Caio Almeida Cunha

Data Storage: Systems, Management and Security Issues begins with a chapter comparing digital or electronic storage systems, such as magnetic, optical, and flash, with biological data storage systems, like DNA and human brain memory. In the main part of the chapter, the following quantitative storage traits are discussed: data organization, functionality, data density, capacity, power consumption, redundancy, integrity, access time, data transfer rate. Afterwards, various facets of data warehouses as well as the necessity for security measures are reviewed. Because the significance of security tools is greater than ever before, the pertinent strategies and economics are discussed. The final chapter supplements this by discussing media and storage systems reliability and confidentiality in order to make a greater claim about storage security. Confidentiality, integrity and availability are three aspects of security identified as ones that should be preserved during data transmission, processing and storage.

PB 9781536128277 £71.50 November 2017 Nova Science Publishers 121 pages
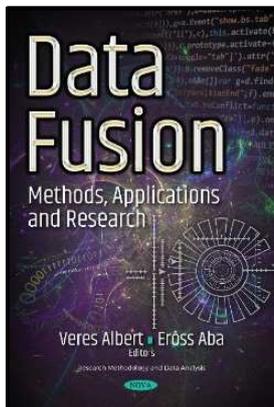
Data Fusion
Methods, Applications & Research
Edited by Veres Albert, Erôss Aba

In the first chapter, Sergey A. Sakulin, PhD and Alexander N. Alfimtsev, PhD discuss fuzzy integral, a powerful metaoperator, and its applications. In the second chapter, Bruno G. Botelho and Adriana S. Franca discuss the concept of data fusion and how it might be applied in different areas of food analysis to improve the information range regarding samples. In the third and final chapter, Carlo Quaranta and Giorgio Balzarotti compare a new data fusion equation with an approach that has been familiarized in previous literature.

PB 9781536127201 £71.50 December 2017 Nova Science Publishers 108 pages

COMPUTER SCIENCE, TECHNOLOGY AND APPLICATIONS

VIRTUAL WORLDS

Concepts, Applications and Future Directions

Liz Falconer

Mari Carmen Gil Ortega

Editors

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