Advances In Network And Acoustic Echo Cancellation
Digital Signal Processing | c3c8a77d2411a7dbf0e7e237125e786e

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IoT and Analytics for Sensor Communications for Intelligent Networks of Marine Robots
Recent Advances in Intelligent Information Hiding and Multimedia Signal Processing

Web, Artificial Intelligence and Network Applications

This book constitutes the refereed proceedings of the 7th IAPR TC3 International Workshop on Artificial Neural Networks in Pattern Recognition, ANNPR 2016, held in Ulm, Germany, in September 2016. The 25 revised full papers presented together with 2 invited papers were carefully reviewed and selected from 32 submissions for inclusion in this volume. The workshop will act as a major forum for international researchers and practitioners working in all areas of neural network- and machine learning-based pattern recognition to present and discuss the latest research, results, and ideas in these areas.

Surface Acoustic Wave Devices and Their Signal Processing Applications

This handbook plays a fundamental role in sustainable progress in speech research and development. With an accessible format and with accompanying DVD-Rom, it targets three categories of readers: graduate students, professors and active researchers in academia, and engineers in industry who need to understand or implement some specific algorithms for their speech-related products. It is a superb source of application-oriented, authoritative and comprehensive information about these technologies, this work combines the established knowledge derived from research in such fast evolving disciplines as Signal Processing and Communications, Acoustics, Computer Science and Linguistics.

Computer Vision – ECCV 2020

The aim of the book is to provide latest research findings, innovative research results, methods and development techniques from both theoretical and practical perspectives related to the emerging areas of Web Computing, Intelligent Systems and...
Internet Computing. As the Web has become a major source of information, techniques and methodologies that extract quality information are of paramount importance for many Web and Internet applications. Data mining and knowledge discovery play key roles in many of today's prominent Web applications such as e-commerce and computer security. Moreover, the outcome of Web services delivers a new platform for enabling service-oriented systems. The emergence of large scale distributed computing paradigms, such as Cloud Computing and Mobile Computing Systems, has opened many opportunities for collaboration services, which are at the core of any Information System. Artificial Intelligence (AI) is an area of computer science that build intelligent systems and algorithms that work and react like humans. The AI techniques and computational intelligence are powerful tools for learning, adaptation, reasoning and planning. They have the potential to become enabling technologies for the future intelligent networks. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences are very important for the future development and innovation of Web and Internet applications.

**Avoiding Surprise in an Era of Global Technology Advances**

Collecting and processing data is a necessary aspect of living in a technologically advanced society. Whether it's monitoring events, controlling different variables, or using decision-making applications, it is important to have a system that is both inexpensive and capable of coping with high amounts of data. Technological Breakthroughs in Modern Wireless Sensor Applications brings together new ways to process and monitor data, and to put it to work in everything from intelligent transportation systems to healthcare to multimedia applications. This book is an essential reference source for research and development engineers, graduate students, academics, and researchers interested in intelligent engineering, internetworking, routing, and network planning algorithms.

**Information Processing in Sensor Networks**

This book features original papers from 25th International Symposium on Frontiers of Research in Speech and Music (FRSM 2020), jointly organized by National Institute of Technology, Silchar, India, during 8-9 October 2020. The book is organized in five sections, considering both technological advancement and interdisciplinary nature of speech and music processing. The first section contains chapters covering the foundations of both vocal and instrumental music processing. The second section includes chapters related to computational techniques involved in the speech and music domain. A lot of research is being performed within the music information retrieval domain which is potentially interesting for most users of computers and the Internet. Therefore, the third section is dedicated to the chapters related to music information retrieval. The fourth section contains chapters on the brain signal analysis and human cognition or perception of speech and music. The final section consists of chapters on spoken language processing and applications of speech processing.

**Independent Component Analysis and Signal Separation**

The six volume set LNCS 11361-11366 constitutes the proceedings of the 14th Asian Conference on Computer Vision, ACCV 2018, held in Perth, Australia, in December 2018. The total of 274 contributions was carefully reviewed and selected from 979 submissions during two rounds of reviewing and improvement. The papers focus on motion and tracking, segmentation and grouping, image-based modeling, deep learning, object recognition object recognition, object detection and categorization, vision and language, video analysis and event recognition, face and gesture analysis, statistical methods and learning, performance evaluation, medical image analysis, document analysis, optimization methods, RGBD and depth camera processing, robotic vision, applications of computer vision.
Surface acoustic wave (SAW) devices are recognized for their versatility and efficiency in controlling and processing electrical signals. This has resulted in a multitude of device concepts for a wide range of signal processing functions, such as delay lines, filters, resonators, pulse compressors, convolvers, and many more. As SAW technology has found its way into mass market products such as TV receivers, pagers, keyless entry systems and cellular phones, the production volume has risen to millions of devices produced every day. At the other end of the scale, these are specialized high performance signal processing SAW devices for satellite communication and military applications, such as radar and electronic warfare. This volume, together with Volume 1, presents an overview of recent advances in SAW technology, systems and applications by some of the foremost researchers in this exciting field. Contents: Coupling-of-Modes Analysis of SAW Devices (V Plessky & J Koskela); Theory and Applications of Green's Functions (A R Baghai-Wadji); New Piezoelectric Substrates for SAW Devices (J Kosinski); Pseudo and High Velocity Pseudo SAWs (M P da Cunha); SAW Devices Beyond 5 GHz (H Odagawa & K Yamanouchi); Wireless SAW Identification and Sensor Systems (F Schmidt & G Scholl); Interaction of Surface Acoustic Waves, Electrons, and Light (A Wixforth). Readership: Graduate students, researchers and academics in device and circuit design, as well as designers of mobile communications systems.

**Fundamentals of Voice-Quality Engineering in Wireless Networks**

The annual conference on Neural Information Processing Systems (NIPS) is the flagship conference on neural computation. It draws preeminent academic researchers from around the world and is widely considered to be a showcase conference for new developments in network algorithms and architectures. The broad range of interdisciplinary research areas represented includes neural networks and genetic algorithms, cognitive science, neuroscience and biology, computer science, AI, applied mathematics, physics, and many branches of engineering. Only about 30% of the papers submitted are accepted for presentation at NIPS, so the quality is exceptionally high. All of the papers presented appear in these proceedings.

**The British National Bibliography**

This book features papers presented at IIH-MSP 2018, the 14th International Conference on Intelligent Information Hiding and Multimedia Signal Processing. The scope of IIH-MSP included information hiding and security, multimedia signal processing and networking, and bio-inspired multimedia technologies and systems. The book discusses subjects related to massive image/video compression and transmission for emerging networks, advances in speech and language processing, recent advances in information hiding and signal processing for audio and speech signals, intelligent distribution systems and applications, recent advances in security and privacy for multimodal network environments, multimedia signal processing, and machine learning. Presenting the latest research outcomes and findings, it is suitable for researchers and students who are interested in the corresponding fields. IIH-MSP 2018 was held in Sendai, Japan on 26-28 November 2018. It was hosted by Tohoku University and was co-sponsored by the Fujian University of Technology in China, the Taiwan Association for Web Intelligence Consortium in Taiwan, and the Swinburne University of Technology in Australia, as well as the Fujian Provincial Key Laboratory of Big Data Mining and Applications (Fujian University of Technology) and the Harbin Institute of Technology Shenzhen Graduate School in China.

**Advances in VLSI, Communication, and Signal Processing**

This volume contains the papers presented at the 8th International Conference on Independent Component Analysis (ICA) and Source Separation held in Paraty, Brazil, March 15-18, 2009. This year's event resulted from scientifc collaborations between
a team of researchers from five different Brazilian universities and received the support of the Brazilian Telecommunications Society (SBt) as well as the financial sponsorship of CNPq, CAPES and FAPERJ. Independent component analysis and signal separation is one of the most-citing current areas of research in statistical signal processing and unsupervised machine learning. The area has received attention from several research communities including machine learning, neural networks, statistical signal processing and Bayesian modeling. Independent component analysis and signal separation has applications at the intersection of many science and engineering disciplines concerned with understanding and extracting useful information from data as diverse as neuronal activity and brain images, bioinformatics, communications, the World Wide Web, audio, video, sensor signals, and time series.

Advances in Computational Intelligence

The book Green, Energy-Efficient and Sustainable Networks provides insights and solutions for a range of problems in the field of obtaining greener, energy-efficient, and sustainable networks. The book contains the outcomes of the Special Issue on “Green, Energy-Efficient and Sustainable Networks” of the Sensors journal. Seventeen high-quality papers published in the Special Issue have been collected and reproduced in this book, demonstrating significant achievements in the field. Among the published papers, one paper is an editorial and one is a review, while the remaining 15 works are research articles. The published papers are self-contained peer-reviewed scientific works that are authored by more than 75 different contributors with both academic and industry backgrounds. The editorial paper gives an introduction to the problem of information and communication technology (ICT) energy consumption and greenhouse gas emissions, presenting the state of the art and future trends in terms of improving the energy-efficiency of wireless networks and data centers, as the major energy consumers in the ICT sector. In addition, the published articles aim to improve energy efficiency in the fields of software-defined networking, Internet of things, machine learning, authentication, energy harvesting, wireless relay systems, routing metrics, wireless sensor networks, device-to-device communications, heterogeneous wireless networks, and image sensing. The last paper is a review that gives a detailed overview of energy-efficiency improvements and methods for the implementation of fifth-generation networks and beyond. This book can serve as a source of information in industrial, teaching, and/or research and development activities. The book is a valuable source of information, since it presents recent advances in different fields related to greening and improving the energy-efficiency and sustainability of those ICTs particularly addressed in this book.

Technological Breakthroughs in Modern Wireless Sensor Applications

The 30-volume set, comprising the LNCS books 12346 until 12375, constitutes the refereed proceedings of the 16th European Conference on Computer Vision, ECCV 2020, which was planned to be held in Glasgow, UK, during August 23-28, 2020. The conference was held virtually due to the COVID-19 pandemic. The 1360 revised papers presented in these proceedings were carefully reviewed and selected from a total of 5025 submissions. The papers deal with topics such as computer vision; machine learning; deep neural networks; reinforcement learning; object recognition; image classification; image processing; object detection; semantic segmentation; human pose estimation; 3d reconstruction; stereo vision; computational photography; neural networks; image coding; image reconstruction; object recognition; motion estimation.

Computer Methods and Advances in Geomechanics

This book constitutes the thoroughly refereed post-conference proceedings of the 4th International ICST Conference on Sensor Systems and Software, S-Cube 2013, held in Lucca, Italy, 2013. The 8 revised full papers and 2 invited papers presented cover
contributions on different technologies for wireless sensor networks, including security protocols, middleware, analysis tools and frameworks.

**Advances in Surface Acoustic Wave Technology, Systems and Applications**

A detailed review of underwater channel characteristics, Underwater Acoustic Sensor Networks investigates the fundamental aspects of underwater communication. Prominent researchers from around the world consider contemporary challenges in the development of underwater acoustic sensor networks (UW-ASNs) and introduce a cross-layer approach for effective integration of all communication functionalities. Discussing architectures for two- and three-dimensional sensor networks, this authoritative resource clearly delineates the main differences between terrestrial and underwater sensor networks—covering the wide range of topics related to UW-ASNs. It examines efficient distributed routing algorithms for delay-insensitive and delay-sensitive applications and introduces a realistic acoustic model characterized by channel utilization efficiency that enables proper setting of the optimal packet size for underwater communication. It also: Provides efficient sensor communication protocols for the underwater environment Addresses the topology control problem for sparse and dense 3D networks Presents a novel distributed MAC protocol that incorporates a unique closed-loop distributed algorithm for setting the optimal transmit power and code length The book includes coverage of routing, fault tolerance, time synchronization, optimal clustering, medium access control, software, hardware, and channel modeling. Exploring the need to design an energy-efficient cross-layer protocol suite, this resource provides the understanding required to achieve high-performance channel access, routing, event transport reliability, and data flow control with underwater acoustic sensors.

**Advances in Network and Acoustic Echo Cancellation**

Surface Acoustic Wave Devices and Their Signal Processing Applications is a textbook that combines experiment and theory in assessing the signal processing applications of surface acoustic wave (SAW) devices. The operating principles of SAW devices are described from a circuit design viewpoint. This book is comprised of 18 chapters and begins with a historical background on surface acoustic waves and a discussion on the merits of SAW devices as well as their applications. The next chapter introduces the reader to the basics of acoustic waves and piezoelectricity, together with the effect of acoustic bulk waves on the performance of SAW filters. The principles of linear phase SAW filter design and equivalent circuit models for a SAW filter are then described. The remaining chapters focus on trade-offs in linear phase SAW filter design; compensation for second-order effects; harmonic SAW delay lines for gigahertz frequencies; and coding techniques using linear SAW transducers. The final chapter highlights some other significant alternative design techniques and applications for SAW devices. This monograph will be suitable for engineering or physics students as well as engineers, scientists, and technical staff in industry who seek further information on SAW-based circuits, systems, and applications.

**Green, Energy-Efficient and Sustainable Networks**

Advances in Delay-Tolerant Networks: Architecture and Enhanced Performance, Second Edition provides an important overview of delay-tolerant networks (DTNs) for researchers in electronics, computer engineering, telecommunications and networking for those in academia and R&D in industrial sectors. Part I reviews the technology involved and the prospects for improving performance, including different types of DTN and their applications, such as satellite and deep-space communications and vehicular communications. Part II focuses on how the technology can be further improved, addressing topics, such as data bundling, opportunistic routing, reliable data streaming, and the potential for rapid selection and dissemination of urgent messages. Opportunistic, delay-tolerant networks address the problem of intermittent connectivity in a network where there are long delays between sending and receiving.
messages, or there are periods of disconnection. Reviews the different types of DTN and shows how they can be applied in satellite and deep-space communications, vehicular communications (including unmanned aerial), and during large-scale disasters. Considers security concerns for DTN and potential for rapid selection and dissemination of urgent messages. Reviews the breadth of areas in which DTN is already providing solutions. Covers the prospects for DTN's wider adoption and development of standards.

**Underwater Acoustic Sensor Networks**

This SpringerBrief describes how to build a rigorous end-to-end mathematical framework for deep neural networks. The authors provide tools to represent and describe neural networks, casting previous results in the field in a more natural light. In particular, the authors derive gradient descent algorithms in a unified way for several neural network structures, including multilayer perceptrons, convolutional neural networks, deep autoencoders and recurrent neural networks. Furthermore, the authors developed framework is both more concise and mathematically intuitive than previous representations of neural networks. This SpringerBrief is one step towards unlocking the black box of Deep Learning. The authors believe that this framework will help catalyze further discoveries regarding the mathematical properties of neural networks. This SpringerBrief is accessible not only to researchers, professionals and students working and studying in the field of deep learning, but also to those outside of the neutral network community.

**Advances in Delay-Tolerant Networks (DTNs)**

Modern noise research and assessment techniques are commonly used in the workplace and our personal living environment. Occupational Noise and Workplace Acoustics presents new, innovative, advanced research and evaluation methods of parameters characterizing acoustic field and noise in the working environment, as well as acoustic properties of rooms and noise reduction measures. This includes acoustic field visualization methods, field imaging techniques, wireless sensor networks, and the Internet of Things (IoT); optimization methods using genetic algorithms; acoustic quality assessment methods for rooms; and methods for measuring ultrasonic noise in the frequency range of 10-40 kHz. This book is a valuable resource for individuals and students interested in the areas of acoustic and sound engineering as it provides: The latest techniques and methods in the field of noise reduction and improvement of acoustic comfort, Innovative and advanced acoustic field visualization techniques for those with an auditory impairment, Explains noise reduction through proper workplace design, Discusses use of wireless sensor networks and the IoT for monitoring noise, and Provides acoustic quality assessment methods.

"The authors’ intention to expound on advanced issues in a lucid and accessible way was rewarded with success. In the book, an expert will find a number of hints helpful in solving actual problems, whereas a layperson will be able to form a view on challenges facing contemporary technology. What should also be emphasized is the book’s soundness in documenting these advanced theses and postulates with diligently conducted empirical research. Despite a wide thematic range, the book is written consistently and under no circumstances can be considered a collection of randomly selected problems. The content corresponds fully to the title. The authors are consistent in acquainting the reader with topical scientific issues concerning assessment of acoustic hazards and the methodology of combating them." —Professor Zbigniew Dąbrowski, BEng, PhD, DSc, Warsaw University of Technology

**Swarm Intelligence Optimization**

This Special Issue titled "Recent Advances in Sensing Technology" in the book series of "Lecture Notes in Electrical Engineering" contains the extended version of the papers selected from those that were presented at the 3rd International Conference on Sensing Technology (ICST 2008) which was held in November 30 to December 3, 2008.
at National Cheng-Kung University, Tainan, Taiwan. A total of 131 papers were presented at ICST 2008, of which 19 papers have been selected for this special issue. This Special Issue has focussed on the recent advancements of the different aspects of sensing technology, i.e. information processing, adaptability, recalibration, data fusion, validation, high reliability and integration of novel and high performance sensors. The advancements are in the areas of magnetic, ultrasonic, vision and image sensing, wireless sensors and network, microfluidic, tactile, gyro, flow, surface acoustic wave, humidity, gas, MEMS thermal and ultra-wide band. While future interest in this field is ensured by the constant supply of emerging modalities, techniques and engineering solutions, many of the basic concepts and strategies have already matured and now offer opportunities to build upon.

**Artificial Neural Networks in Pattern Recognition**

This book constitutes the refereed proceedings of the IberSPEECH 2016 Conference, held in Lisbon, Portugal, in November 2016. The 27 papers presented were carefully reviewed and selected from 48 submissions. The selected articles in this volume are organized into four different topics: Speech Production, Analysis, Coding and Synthesis; Automatic Speech Recognition; Paralinguistic Speaker Trait Characterization; Speech and Language Technologies in Different Application Fields

**Dual Learning**

Covering a wide range of topics involving both research developments and applications, resulting from the 10th International Conference on Computer Methods and Advances in Geomechanics (IACMAG) held in January 2001 in Tucson, Arizona, USA. The theme of the conference was Fundamentals through Applications. The up-to-date research results and applications in this 2-volume work (> 1900 pages) should serve as a valuable source of information for those engaged in research, analysis and design, practical application, and education in the fields of geomechanics and geotechnical engineering.

**Occupational Noise and Workplace Acoustics**

This handbook is the definitive reference for the interdisciplinary field that is ocean engineering. It integrates the coverage of fundamental and applied material and encompasses a diverse spectrum of systems, concepts and operations in the maritime environment, as well as providing a comprehensive update on contemporary, leading-edge ocean technologies. Coverage includes an overview on the fundamentals of ocean science, ocean signals and instrumentation, coastal structures, developments in ocean energy technologies and ocean vehicles and automation. It aims at practitioners in a range of offshore industries and naval establishments as well as academic researchers and graduate students in ocean, coastal, offshore and marine engineering and naval architecture. The Springer Handbook of Ocean Engineering is organized in five parts: Part A: Fundamentals, Part B: Autonomous Ocean Vehicles, Subsystems and Control, Part C: Coastal Design, Part D: Offshore Technologies, Part E: Energy Conversion

**Springer Handbook of Speech Processing**

This two-volume set LNCS 12861 and LNCS 12862 constitutes the refereed proceedings of the 16th International Work-Conference on Artificial Neural Networks, IWANN 2021, held virtually, in June 2021. The 85 full papers presented in this two-volume set were carefully reviewed and selected from 134 submissions. The papers are organized in topical sections on Deep Learning for Biomedicine, Intelligent Computing Solutions for SARS-CoV-2 Covid-19, Advanced Topics in Computational Intelligence, Biosignals Processing, Neuro-Engineering and much more.
Advances in Speech and Language Technologies for Iberian Languages

This book aims to provide an international forum for scholarly researchers, practitioners and academic communities to explore the role of information and communication technologies and its applications in technical and scholarly development. The conference attracted a total of 464 submissions, of which 152 submissions (including 4 poster papers) have been selected after a double-blind review process. Academic pioneering researchers, scientists, industrial engineers and students will find this series useful to gain insight into the current research and next-generation information science and communication technologies. This book discusses the aspects of communication, data science, ambient intelligence, networking, computing, security and Internet of things, from classical to intelligent scope. The authors hope that readers find the volume interesting and valuable; it gathers chapters addressing tate-of-the-art intelligent methods and techniques for solving real-world problems along with a vision of the future research.

Advances in Speech and Music Technology

A concise and clear guide to the concepts and applications of wireless sensor networks, ideal for students, practitioners and researchers.

Challenges and Innovations in Ocean In Situ Sensors

This book brings together many advanced topics in network and acoustic echo cancellation aimed towards enhancing the echo cancellation performance of next-generation telecommunication systems. The resulting compendium provides a coherent treatment of such topics not found otherwise in journals or other books.

Proceeding of the International Conference on Computer Networks, Big Data and IoT (ICCBI – 2018)

This book constitutes the refereed proceedings of the Second International Workshop on Information Processing in Sensor Networks, IPSN 2003, held in Palo Alto, CA, USA, in April 2003. The 23 revised full papers and 21 revised poster papers presented were carefully reviewed and selected from 73 submissions. Among the topics addressed are wireless sensor networks, query processing, decentralized sensor platforms, distributed databases, distributed group management, sensor network design, collaborative signal processing, adhoc sensor networks, distributed algorithms, distributed sensor network control, sensor network resource management, data service middleware, random sensor networks, mobile agents, target tracking, sensor network protocols, large scale sensor networks, and multicast.

Progresses in Artificial Intelligence and Neural Systems

Challenges and Innovations in Ocean In-Situ Sensors: Measuring Inner Ocean Processes and Health in the Digital Age highlights collaborations of industry and academia in identifying the key challenges and solutions related to ocean observations. A new generation of sensors is presented that addresses the need for higher reliability (e.g. against biofouling), better integration on platforms in terms of size and communication, and data flow across domains (in-situ, space, etc.). Several developments are showcased using a broad diversity of measuring techniques and technologies. Chapters address different sensors and approaches for measurements, including applications, quality monitoring and initiatives that will guide the need for monitoring. Integrates information across key marine and maritime sectors and supports regional policy requirements on monitoring programs Offers tactics for enabling early detection and more effective monitoring of the marine environment and implementation of appropriate management actions Presents new technologies driving the next generation of sensors, allowing readers to understand new capabilities for
monitoring and opportunities for another generation of sensors. Includes a global vision for ocean monitoring that fosters a new perspective on the direction of ocean measurements.

**Oceans 2001 MTS/IEEE**

"An excellent book for those who are interested in learning the current status of research and development . . . [and] who want to get a comprehensive overview of the current state-of-the-art." —E-Streams

This book provides up-to-date information on research and development in the rapidly growing area of networks based on the multihop ad hoc networking paradigm. It reviews all classes of networks that have successfully adopted this paradigm, pointing out how they penetrated the mass market and sparked breakthrough research. Covering both physical issues and applications, Mobile Ad Hoc Networking: Cutting Edge Directions offers useful tools for professionals and researchers in diverse areas wishing to learn about the latest trends in sensor, actuator, and robot networking, mesh networks, delay tolerant and opportunistic networking, and vehicular networks. Chapter coverage includes: Multihop ad hoc networking; Enabling technologies and standards for mobile multihop wireless networking; Resource optimization in multiradio multichannel wireless mesh networks; QoS in mesh networks; Routing and data dissemination in opportunistic networks; Task farming in crowd computing; Mobility models, topology, and simulations in VANET MAC protocols for VANET Wireless sensor networks with energy harvesting nodes; Robot-assisted wireless sensor networks; recent applications and future challenges.

Advances in underwater acoustic networking; Security in wireless ad hoc networks; Mobile Ad Hoc Networking will appeal to researchers, developers, and students interested in computer science, electrical engineering, and telecommunications.

**Springer Handbook of Ocean Engineering**

This book provides an overview of the current advances in artificial intelligence and neural nets. Artificial intelligence (AI) methods have shown great capabilities in modelling, prediction and recognition tasks supporting human-machine interaction. At the same time, the issue of emotion has gained increasing attention due to its relevance in achieving human-like interaction with machines. The real challenge is taking advantage of the emotional characterization of humans' interactions to make computers interfacing with them emotionally and socially credible. The book assesses how and to what extent current sophisticated computational intelligence tools might support the multidisciplinary research on the characterization of appropriate system reactions to human emotions and expressions in interactive scenarios. Discussing the latest recent research trends, innovative approaches and future challenges in AI from interdisciplinary perspectives, it is a valuable resource for researchers and practitioners in academia and industry.

**Principles of Wireless Sensor Networks**

Autonomous marine vehicles are increasingly used in clusters for an array of oceanographic tasks. The effectiveness of this collaboration is often limited by communications: throughput, latency, and ease of reconfiguration. This thesis argues that improved communication on intelligent marine robotic agents can be gained from acting on knowledge gained by improved awareness of the physical acoustic link and higher network layers by the AUV's decision making software. This thesis presents a modular acoustic networking framework, realized through a C++ library called goby-acoms, to provide collaborating underwater vehicles with an efficient short-range single-hop network. goby-acoms is comprised of four components that provide: 1) losslessly compressed encoding of short messages; 2) a set of message queues that dynamically prioritize messages based on overall importance and time sensitivity; 3) Time Division Multiple Access (TDMA) Medium Access Control (MAC) with automatic discovery; and 4) an abstract acoustic modem driver. Building on this networking framework, two approaches that use the vehicle's "intelligence" to...
improve communications are presented. The first is a "non-disruptive" approach which is a novel technique for using state observers in conjunction with an entropy source encoder to enable highly compressed telemetry of autonomous underwater vehicle (AUV) position vectors. This system was analyzed on experimental data and implemented on a fielded vehicle. Using an adaptive probability distribution in combination with either of two state observer models, greater than 90% compression, relative to a 32-bit integer baseline, was achieved. The second approach is "disruptive," as it changes the vehicle's course to effect an improvement in the communications channel. A hybrid data- and model-based autonomous environmental adaptation framework is presented which allows autonomous underwater vehicles (AUVs) with acoustic sensors to follow a path which optimizes their ability to maintain connectivity with an acoustic contact for optimal sensing or communication.

**Recent Advances in Sensing Technology**

The global spread of science and technology expertise and the growing commercial access to advanced technologies with possible military application are creating potentially serious threats to the technological superiority underpinning U.S. military strength. Key to dealing with this situation is the ability of the U.S. intelligence community to be able to provide adequate and effective warning of evolving, critical technologies. To assist in performing this task, the Technology Warning Division of the Defense Intelligence Agency (DIA) asked the National Research Council (NRC) to undertake a study examining technology warning issues. This report provides the first part of that study. It presents an assessment of critical, evolving technologies; postulates ways potential adversaries could disrupt these technologies; and provides indicators for the intelligence community to determine if such methods are under development. The intention of this report is to establish the foundation for a long-term relationship with the technology warning community to support the examination of technology warning issues.

**Deep Neural Networks in a Mathematical Framework**

Resource optimization has always been a thrust area of research, and as the Internet of Things (IoT) is the most talked about topic of the current era of technology, it has become the need of the hour. Therefore, the idea behind this book was to simplify the journey of those who aspire to understand resource optimization in the IoT. To this end, included in this book are various real-time/offline applications and algorithms/case studies in the fields of engineering, computer science, information security, and cloud computing, along with the modern tools and various technologies used in systems, leaving the reader with a high level of understanding of various techniques and algorithms used in resource optimization.

**Advances in Neural Information Processing Systems 9**

Many AI (and machine learning) tasks present in dual forms, e.g., English-to-Chinese translation vs. Chinese-to-English translation, speech recognition vs. speech synthesis, question answering vs. question generation, and image classification vs. image generation. Dual learning is a new learning framework that leverages the primal-dual structure of AI tasks to obtain effective feedback or regularization signals in order to enhance the learning/inference process. Since it was first introduced four years ago, the concept has attracted considerable attention in multiple fields, and been proven effective in numerous applications, such as machine translation, image-to-image translation, speech synthesis and recognition, (visual) question answering and generation, image captioning and generation, and code summarization and generation. Offering a systematic and comprehensive overview of dual learning, this book enables interested researchers (both established and
newcomers) and practitioners to gain a better understanding of the state of the art in the field. It also provides suggestions for further reading and tools to help readers advance the area. The book is divided into five parts. The first part gives a brief introduction to machine learning and deep learning. The second part introduces the algorithms based on the dual reconstruction principle using machine translation, image translation, speech processing and other NLP/CV tasks as the demo applications. It covers algorithms, such as dual semi-supervised learning, dual unsupervised learning and multi-agent dual learning. In the context of image translation, it introduces algorithms including CycleGAN, DualGAN, DiscoGAN cdGAN and more recent techniques/applications. The third part presents various work based on the probability principle, including dual supervised learning and dual inference based on the joint-probability principle and dual semi-supervised learning based on the marginal-probability principle. The fourth part reviews various theoretical studies on dual learning and discusses its connections to other learning paradigms. The fifth part provides a summary and suggests future research directions.

**Mobile Ad Hoc Networking**

This book presents the proceedings of the International Conference on Computer Networks, Big Data and IoT (ICCBI-2018), held on December 19-20, 2018 in Madurai, India. In recent years, advances in information and communication technologies [ICT] have collectively aimed to streamline the evolution of internet applications. In this context, increasing the ubiquity of emerging internet applications with an enhanced capability to communicate in a distributed environment has become a major need for existing networking models and applications. To achieve this, Internet of Things [IoT] models have been developed to facilitate a smart interconnection and information exchange among modern objects - which plays an essential role in every aspect of our lives. Due to their pervasive nature, computer networks and IoT can easily connect and engage effectively with their network users. This vast network continuously generates data from heterogeneous devices, creating a need to utilize big data, which provides new and unprecedented opportunities to process these huge volumes of data. This International Conference on Computer Networks, Big Data, and Internet of Things [ICCBI] brings together state-of-the-art research work, which briefly describes advanced IoT applications in the era of big data. As such, it offers valuable insights for researchers and scientists involved in developing next-generation, big-data-driven IoT applications to address the real-world challenges in building a smartly connected environment.

**IoT and Analytics for Sensor Networks**

**Computer Vision – ACCV 2018**

Network operators are faced with the challenge of maximizing the quality of voice transmissions in wireless communications without impairing speech or data transmission. This book, first published in 2006, provides a comprehensive survey of voice quality algorithms, features, interactions and trade-offs at the device and system levels. The book elaborates on the root cause of impairments and ways for resolving them, as well as methodologies for measuring and quantifying voice quality before and after applying the remedies. A 'troubleshooting and case studies' chapter provides a useful approach to identifying and solving network impairments. Avoiding complex mathematics, the approach is based on real and sizable field experience supported by scientific and laboratory analysis. This title is suitable for practitioners in the wireless communications industry and graduate students in electrical engineering. Further resources, including a range of audio examples, are available online at www.cambridge.org/ 9781107407183.

**Advances in Integrating Autonomy with Acoustic Communications for Intelligent Networks of Marine Robots**
This book includes high-quality research papers presented at the 1st International Conference on Wireless Sensor Networks, Ubiquitous Computing and Applications (ICWSNUCA, 2021), which is held at Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad, India, during 26-27 February, 2021. This volume focuses on the applications, use-cases, architectures, deployments, and recent advances of wireless sensor networks as well as ubiquitous computing. Different research topics are illustrated in this book, like wireless sensor networks for the Internet of Things; IoT applications for eHealth; smart cities; architectures for WSNs and IoT, WSNs hardware and new devices; low-power wireless technologies; wireless ad hoc sensor networks; routing and data transfer in WSNs; multicast communication in WSNs; security management in WSNs and in IoT systems; and power consumption optimization in WSNs.

Recent Advances in Intelligent Information Hiding and Multimedia Signal Processing

This book comprises select peer-reviewed papers from the International Conference on VLSI, Communication and Signal Processing (VCAS) 2019, held at Motilal Nehru National Institute of Technology (MNNIT) Allahabad, Prayagraj, India. The contents focus on latest research in different domains of electronics and communication engineering, in particular microelectronics and VLSI design, communication systems and networks, and signal and image processing. The book also discusses the emerging applications of novel tools and techniques in image, video and multimedia signal processing. This book will be useful to students, researchers and professionals working in the electronics and communication domain.

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