

A Roadmap For Us Robotics From Internet To Robotics

This book reports on cutting-edge research in innovative systems interfaces, with an emphasis on both lifecycle development and human-technology interaction, especially in the cases of virtual, augmented and mixed reality systems. It describes advanced methodologies and tools for evaluating and improving interface usability and covers new models, as well as case studies and good practices. The book reports on considerations of the human, hardware, and software factors in the process of developing interfaces for optimizing total system performance, especially innovative computing technologies for teams dealing with dynamic environments, while minimizing total ownership costs. One of the main purposes is to discuss forces currently shaping the nature of computing and systems including: the needs of decreasing hardware costs; the importance of portability, which translates to the modern tendency of hardware miniaturization and technologies for reducing power requirements; the necessity of a better assimilation of computation in the environment; and social concerns about access to computers and systems for people with special needs. The book, which is based on the AHFE 2016 International Conference on Human Factors and System Interactions, held on July 27-31, 2016, in Walt Disney World®, Florida, USA, offers a timely survey and practice-oriented guide for systems interface users and developers alike.

This book provides the reader with a clear and precise description of robotics and other systems for home automation currently on the market, and discusses their interoperability and perspectives for the near future. It shows the different standards and the development platforms used

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by the main service robots in an international environment. This volume provides a scientific basis for the user who is looking for the best option to suit his or her needs from the available alternatives to integrate modern technology in the digital home.

The availability of very large data sets and the increase in computing power to process them has led to a renewed intensity in corporate and governmental use of Artificial Intelligence (AI) technologies. This groundbreaking book, the first devoted entirely to the growing presence of AI in the legal profession, responds to the necessity of building up a discipline that due to its novelty requires the pooling of knowledge and experiences of well-respected experts in the AI field, taking into account the impact of AI on the law and legal practice. Essays by internationally known expert authors introduce the essentials of AI in a straightforward and intelligible style, offering jurists as many practical examples and business cases as possible so that they are able to understand the real application of this technology and its impact on their jobs and lives. Elements of the analysis include the following: crucial terms: natural language processing, machine learning and deep learning; regulations in force in major jurisdictions; ethical and social issues; labour and employment issues, including the impact that robots have on employment; prediction of outcome in the legal field (judicial proceedings, patent granting, etc.); massive analysis of documents and identification of patterns from which to derive conclusions; AI and taxation; issues of competition and intellectual property; liability and responsibility of intelligent systems; AI and cybersecurity; AI and data protection; impact on state tax revenues; use of autonomous killer robots in the military; challenges related to privacy; the need to embrace transparency and sustainability; pressure brought by clients on prices; minority languages and AI; danger that the existing

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gap between large and small businesses will further increase; how to avoid algorithmic biases when AI decides; AI application to due diligence; AI and non-disclosure agreements; and the role of chatbots. Interviews with pioneers in the field are included, so readers get insights into the issues that people are dealing with in day-to-day actualities. Whether conceiving AI as a transformative technology of the labour market and training or an economic and business sector in need of legal advice, this introduction to AI will help practitioners in tax law, labour law, competition law and intellectual property law understand what AI is, what it serves, what is the state of the art and the potential of this technology, how they can benefit from its advantages and what are the risks it presents. As the global economy continues to suffer the repercussions of a framework that was previously fundamentally self-regulatory, policymakers will recognize the urgent need to formulate rules to properly manage the future of AI.

In immediate responses to the COVID-19 crisis, science and innovation are playing essential roles in providing a better scientific understanding of the virus, as well as in the development of vaccines, treatments and diagnostics. Both the public and private sectors have poured billions of dollars into these efforts, accompanied by unprecedented levels of global cooperation.

This Volume contains the papers presented during the 6th International Conference on Innovations in Bio-Inspired Computing and Applications IBICA 2015 which was held in Kochi, India during December 16-18, 2015. The 51 papers presented in this Volume were carefully reviewed and selected. The 6th International Conference IBICA 2015 has been organized to discuss the state-of-the-art as well as to address various issues in the growing research field of Bio-inspired Computing which is currently one of the most exciting

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research areas, and is continuously demonstrating exceptional strength in solving complex real life problems. The Volume will be a valuable reference to researchers, students and practitioners in the computational intelligence field..

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

Neuro-robotics is one of the most multidisciplinary fields of the last decades, fusing information and knowledge from neuroscience, engineering and computer science. This book focuses on the results from the strategic alliance between Neuroscience and Robotics that help the scientific community to better understand the brain as well as design robotic devices and algorithms for interfacing humans and robots. The first part of the book introduces the idea of neuro-robotics, by presenting state-of-the-art bio-inspired devices. The second part of the book focuses on human-machine interfaces for performance augmentation, which can be seen as augmentation of abilities of healthy subjects or assistance in case of the mobility impaired. The third part of the book focuses on the inverse problem, i.e. how we can use robotic devices that physically interact with the human body, in order

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(a) to understand human motor control and (b) to provide therapy to neurologically impaired people or people with disabilities.

Nearly 45 countries are at different stages of developing robotic weapons or lethal autonomous weapon systems (LAWS). The United States, for example, has recently test launched its robotic vessel Sea Hunter, a self-driving, 132-foot ship designed to travel thousands of miles without a single crew member on board. As reported, the vessel has the capability to detect and destroy stealth diesel-electric submarines and sea mines. However, though the militaries of the developed countries are in a race to develop LAWS to perform varied functions on the battlefield, a large section of robotic engineers, ethical analysts, and legal experts are of the firm belief that robotic weapons will never meet the standards of distinction and proportionality required by the laws of war, and therefore will be illegal. This book provides an insight into lethal autonomous weapon systems and debates whether it would be morally correct to give machines the power to decide who lives and who dies on the battlefield. The new frontiers of robotics research foresee future scenarios where artificial agents will leave the laboratory to progressively take part in the activities of our daily life. This will require robots to have very sophisticated perceptual and action skills in many intelligence-demanding applications, with particular reference to the ability to seamlessly interact with humans. It will be crucial for the next generation of robots to understand their human partners and at the same time to be intuitively understood by them. In this context, a deep understanding of human motion is essential for robotics applications, where the ability to detect, represent and recognize human dynamics and the capability for generating appropriate movements in response sets the scene for higher-level tasks. This book provides a comprehensive overview of

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this challenging research field, closing the loop between perception and action, and between human-studies and robotics. The book is organized in three main parts. The first part focuses on human motion perception, with contributions analyzing the neural substrates of human action understanding, how perception is influenced by motor control, and how it develops over time and is exploited in social contexts. The second part considers motion perception from the computational perspective, providing perspectives on cutting-edge solutions available from the Computer Vision and Machine Learning research fields, addressing higher-level perceptual tasks. Finally, the third part takes into account the implications for robotics, with chapters on how motor control is achieved in the latest generation of artificial agents and how such technologies have been exploited to favor human-robot interaction. This book considers the complete human-robot cycle, from an examination of how humans perceive motion and act in the world, to models for motion perception and control in artificial agents. In this respect, the book will provide insights into the perception and action loop in humans and machines, joining together aspects that are often addressed in independent investigations. As a consequence, this book positions itself in a field at the intersection of such different disciplines as Robotics, Neuroscience, Cognitive Science, Psychology, Computer Vision, and Machine Learning. By bridging these different research domains, the book offers a common reference point for researchers interested in human motion for different applications and from different standpoints, spanning Neuroscience, Human Motor Control, Robotics, Human-Robot Interaction, Computer Vision and Machine Learning. Chapter 'The Importance of the Affective Component of Movement in Action Understanding' of this book is available open access under a CC BY 4.0 license at link.springer.com.

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Robotics technology and the increasing sophistication of artificial intelligence are breakthrough innovations with significant growth prospects and the potential to disrupt existing economic and social facets of everyday life. Few studies have analyzed the developments of robotics innovation. This paper closes this gap by analyzing how innovation in robotics is taking place, how it diffuses, and what role intellectual property plays.

Grasping in Robotics contains original contributions in the field of grasping in robotics with a broad multidisciplinary approach. This gives the possibility of addressing all the major issues related to robotized grasping, including milestones in grasping through the centuries, mechanical design issues, control issues, modelling achievements and issues, formulations and software for simulation purposes, sensors and vision integration, applications in industrial field and non-conventional applications (including service robotics and agriculture). The contributors to this book are experts in their own diverse and wide ranging fields. This multidisciplinary approach can help make Grasping in Robotics of interest to a very wide audience. In particular, it can be a useful reference book for researchers, students and users in the wide field of grasping in robotics from many different disciplines including mechanical design, hardware design, control design, user interfaces, modelling, simulation, sensors and humanoid robotics. It could even be adopted as a reference textbook in specific PhD courses.

This volume presents a collection of papers presented at the 16th International Symposium of Robotic Research (ISRR). ISRR is the biennial meeting of the International Foundation of Robotic Research (IFRR) and its 16th edition took place in Singapore over the period 16th to 19th December 2013. The ISRR is the longest running series of robotics research meetings and dates back to the very earliest days of robotics

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as a research discipline. This 16th ISRR meeting was held in the 30th anniversary year of the very first meeting which took place in Bretton Woods (New Hampshire, USA) in August 1983., and represents thirty years at the forefront of ideas in robotics research. As for the previous symposia, ISRR 2013 followed up on the successful concept of a mixture of invited contributions and open submissions. 16 of the contributions were invited contributions from outstanding researchers selected by the IFRR officers and the program committee, and the other contributions were chosen among the open submissions after peer review. This selection process resulted in a truly excellent technical program which featured some of the very best of robotic research. These papers were presented in a single-track interactive format which enables real conversations between speakers and the audience. The symposium contributions contained in this volume report on a variety of new robotics research results covering a broad spectrum organized into traditional ISRR categories: control; design; intelligence and learning; manipulation; perception; and planning.

Through a series of studies, the overarching aim of this book is to investigate if and how the digitalization/digital transformation process causes (or may cause) the autonomy of various labor functions, and its impact in creating (or stymieing) various job opportunities on the labor market. This book also seeks to illuminate what actors/groups are mostly benefited by the digitalization/digital transformation and which actors/groups that are put at risk by it. This book takes its point of departure from a 2016 OECD report that contends that the impact digitalization has on the future of labor is ambiguous, as on the one hand it is suggested that technological change is labor-saving, but on the other hand, it is suggested that digital technologies have not created new jobs on a scale that it replaces old jobs. Another 2018 OECD

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report indicated that digitalization and automation as such does not pose a real risk of destroying any significant number of jobs for the foreseeable future, although tasks would by and large change significantly. This would affect welfare, as most of its revenue stems from taxation, and particularly so from the taxation on labor (directly or indirectly). For this reason, this book will set out to explore how the future technological and societal advancements impact labor conditions. The book seeks to provide an innovative, enriching and controversial take on how various aspects of the labor market can be (and are) affected the ongoing digitalization trend in a way that is not covered by extant literature. As such, this book intends to cater to a wider readership, from a general audience and students, to specialized professionals and academics wanting to gain a deeper understanding of the possible future developments of the labor market in light of an accelerating digitalization/digital transformation of society at large.

A Roadmap for U.S. Robotics From Internet to Robotics
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This paper is a summary of the main societal opportunities identified, the associated challenges to deliver desired solutions and a presentation of efforts to be undertaken to ensure that US will continue to be a leader in robotics both in terms of research innovation, adoption of the latest technology and adoption of appropriate policy frameworks. The book is an up-to-date basic reference for natural gas hydrate (NGH) in the Arctic Ocean. Geographical, geological, environmental, energy, new technology, and regulatory matters are discussed. The book should be of interest to general readers and scientists and students as well as

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industry and government agencies concerned with energy and ocean management. NGH is a solid crystalline material that compresses gas by about a factor of about 164 during crystallization from natural gas (mainly methane) - rich pore waters over time. NGH displaces water and may form large concentrations in sediment pore space. Its formation introduces changes in the geotechnical character of host sediment that allows it to be distinguished by seismic and electric exploration methods. The chemical reaction that forms NGH from gas and water molecules is highly reversible, which allows controlled conversion of the NGH to its constituent gas and water. This can be achieved rapidly by one of a number of processes including heating, depressurization, inhibitor injection, dissolution, and molecular replacement. The produced gas has the potential to make NGH a valuable unconventional natural gas resource, and perhaps the largest on earth. Estimates for NGH distribution, concentration, economic targets, and volumes in the Arctic Ocean have been carried out by restricting the economic target to deepwater turbidite sands, which are also sediment hosts for more deeply buried conventional hydrocarbon deposits. Resource base estimates are based on NGH petroleum system analysis approach using industry-standard parameters along with analogs from three relatively well known examples (Nankai-Japan, Gulf of Mexico-United States, and Arctic permafrost hydrate). Drilling data has substantiated new geotechnical-level seismic analysis techniques for estimating not just the presence of NGH but prospect volumes. In addition to a volumetric estimate for NGH having economic potential, a sedimentary depositional model is proposed to aid exploration in the five different regions around the deep central Arctic Ocean basin. Related topics are also discussed. Transport and logistics for NGH may also be applicable for stranded conventional gas

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and oil deposits. Arising from a discussion of new technology and methodologies that could be applied to developing NGH, suggestions are made for the lowering of exploration and capital expenses that could make NGH competitive on a produced cost basis. The basis for the extraordinarily low environmental risk for exploration and production of NGH is discussed, especially with respect to the environmentally fragile Arctic region. It is suggested that because of the low environmental risk, special regulations could be written that would provide a framework for very low cost and safe development.

Analytics and artificial intelligence (AI), what are they good for? The bandwagon keeps answering, absolutely everything! Analytics and artificial intelligence have captured the attention of everyone from top executives to the person in the street. While these disciplines have a relatively long history, within the last ten or so years they have exploded into corporate business and public consciousness. Organizations have rushed to embrace data-driven decision making. Companies everywhere are turning out products boasting that "artificial intelligence is included." We are indeed living in exciting times. The question we need to ask is, do we really know how to get business value from these exciting tools?

Unfortunately, both the analytics and AI communities have not done a great job in collaborating and communicating with each other to build the necessary synergies. This book bridges the gap between these two critical fields. The book begins by explaining the commonalities and differences in the fields of data science, artificial intelligence, and autonomy by giving a historical perspective for each of these fields, followed by exploration of common technologies and current trends in each field. The book also readers introduces to applications of deep learning in industry with an overview of deep learning and its key architectures, as well as a survey

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and discussion of the main applications of deep learning. The book also presents case studies to illustrate applications of AI and analytics. These include a case study from the healthcare industry and an investigation of a digital transformation enabled by AI and analytics transforming a product-oriented company into one delivering solutions and services. The book concludes with a proposed AI-informed data analytics life cycle to be applied to unstructured data. The book written by Dr. Radu B. Rusu presents a detailed description of 3D Semantic Mapping in the context of mobile robot manipulation. As autonomous robotic platforms get more sophisticated manipulation capabilities, they also need more expressive and comprehensive environment models that include the objects present in the world, together with their position, form, and other semantic aspects, as well as interpretations of these objects with respect to the robot tasks. The book proposes novel 3D feature representations called Point Feature Histograms (PFH), as well as a frameworks for the acquisition and processing of Semantic 3D Object Maps with contributions to robust registration, fast segmentation into regions, and reliable object detection, categorization, and reconstruction. These contributions have been fully implemented and empirically evaluated on different robotic systems, and have been the original kernel to the widely successful open-source project the Point Cloud Library (PCL) -- see <http://pointclouds.org>.

"Building on the highly successful initial Roadmap for U.S. Robotics, which was published in 2009 and inspired the National Robotics Initiative (NRI), announced by President Obama on June 24th 2011, the updated report outlines the progress of robots in multiple industries over the last five years, identifies goals for the coming decade and emphasizes the importance of the robotics research pipeline to maintaining U.S. innovation. Following the President's

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announcement, in 2012, the National Science Foundation (NSF), the National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), and the United States Department of Agriculture (USDA) jointly established a new NRI research program. Together, the agencies issued a solicitation of over \$50 million to develop the science and technology for robots that can safely co-exist and operate in close proximity to humans. Highlighting robotics as a key economic enabler, the roadmap discusses the potential of robotics technology to transform U.S. society by developing new markets and industries, creating new jobs, and addressing a number of issues of national importance."--robotics-vo.us web site.

Machine learning has become one of the most prevalent topics in recent years. The application of machine learning we see today is a tip of the iceberg. The machine learning revolution has just started to roll out. It is becoming an integral part of all modern electronic devices. Applications in automation areas like automotive, security and surveillance, augmented reality, smart home, retail automation and healthcare are few of them. Robotics is also rising to dominate the automated world. The future applications of machine learning in the robotics area are still undiscovered to the common readers. We are, therefore, putting an effort to write this edited book on the future applications of machine learning on robotics where several applications have been included in separate chapters. The content of the book is technical. It has been tried to cover all possible application areas of Robotics using machine learning. This book will provide the future vision on the unexplored areas of applications of Robotics using machine learning. The ideas to be presented in this book are backed up by original research results. The chapter provided here in-depth look with all necessary theory and mathematical calculations. It will be

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perfect for laymen and developers as it will combine both advanced and introductory material to form an argument for what machine learning could achieve in the future. It will provide a vision on future areas of application and their approach in detail. Therefore, this book will be immensely beneficial for the academicians, researchers and industry project managers to develop their new project and thereby beneficial for mankind. Original research and review works with model and build Robotics applications using Machine learning are included as chapters in this book.

The two volume set LNAI 10984 and LNAI 10985 constitutes the refereed proceedings of the 11th International Conference on Intelligent Robotics and Applications, ICIRA 2018, held in Newcastle, NSW, Australia, in August 2018. The 81 papers presented in the two volumes were carefully reviewed and selected from 129 submissions. The papers in the first volume of the set are organized in topical sections on multi-agent systems and distributed control; human-machine interaction; rehabilitation robotics; sensors and actuators; and industrial robot and robot manufacturing. The papers in the second volume of the set are organized in topical sections on robot grasping and control; mobile robotics and path planning; robotic vision, recognition and reconstruction; and robot intelligence and learning.

This book offers comparative insights into the challenges and opportunities surrounding emerging technology and the internet as it is used and perceived throughout the world, providing students with cross-cultural and cross-national perspectives. The United Arab Emirates has a national goal of colonizing Mars by 2117, and China seeks to modernize its entire manufacturing process to produce cutting-edge technologies and research advances by 2025. How are other countries using the internet and emerging technologies to their advantage? This volume in the Global Viewpoints series

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examines 10 issues pertaining to the internet and technology, including access and censorship, alternative energy technologies, artificial intelligence, autonomous robots, cyberbullying, cybercrime, e-learning, GMO's, online privacy, and virtual and augmented reality. For each topic, the volume features eight country-level perspectives that span the world to allow for comparisons of different nations' specific approaches to the technology or issue. This encyclopedia takes a new direction in understanding the importance and impact of emerging technologies on the world, showing that even when experiencing similar technologically related challenges or advances, these technologies do not form one-size-fits-all solutions for every nation and population. Even when nations develop similar technologies, human dimensions, from policy to social norms to culture, influence people and society across the world too. Shows the similarities and differences of emerging issues and successes surrounding technology development through perspectives from different world regions, allowing readers to make comparisons among the featured countries in each section Provides a brief primer on each technology and internet-related issue that functions as a baseline for each section Highlights that different countries and populations having similar societal needs often need to make dissimilar technology-related choices, usually due to varying internal and external pressures ranging from social values and political systems to economic needs and developmental goals Includes photographs that help to illuminate the text An eye-opening, mind-bending exploration of how mankind is reshaping its genetic future, based on the viral TED Talk series "Will Our Kids Be a Different Species?" and "The Next Species of Human." Are you willing to engineer the DNA of your unborn children and grand-children to be healthier? Better looking? More intelligent? Why are rates of autism,

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asthma, and allergies exploding at an unprecedented pace? Why are humans living longer and having far fewer kids? Futurist Juan Enriquez and scientist Steve Gullans conduct a sweeping tour of how humans are changing the course of evolution for all species—sometimes intentionally, sometimes not. For example: • What if life forms are limited only by the bounds of our imagination? Are designer babies and pets, de-extinction, even entirely newspecies fair game? • As humans, animals, and plants become ever more resistant to disease and aging, what will become the leading causes of death? • Man-machine interfaces may allow humans to live much longer. What will happen when we transfer parts of our “selves” into clones, into stored cells and machines? Though these harbingers of change are deeply unsettling, the authors argue we are also in an epoch of tremendous opportunity. Future humans, perhaps a more diverse, resilient, gentler, and intelligent species, may become better caretakers of the planet—but only if we make the right choices now. Intelligent, provocative, and optimistic, *Evolving Ourselves* is the ultimate guide to the next phase of life on Earth. Chosen by *Nature* magazine as a Fall 2016 season highlight.

This book focuses on the importance of human factors in the development of safe and reliable unmanned systems. It discusses current challenges such as how to improve the perceptual and cognitive abilities of robots, develop suitable synthetic vision systems, cope with degraded reliability in unmanned systems, predict robotic behavior in case of a loss of communication, the vision for future soldier-robot teams, human-agent teaming, real-world implications for human-robot interaction, and approaches to standardize both the display and control of

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technologies across unmanned systems. Based on the AHFE 2017 International Conference on Human Factors in Robots and Unmanned Systems, held on July 17–21 in Los Angeles, California, USA, this book is expected to foster new discussion and stimulate new advances in the development of more reliable, safer, and highly functional devices for carrying out automated and concurrent tasks. This organizational history relates the role of the National Science Foundation (NSF) in the development of modern computing. Drawing upon new and existing oral histories, extensive use of NSF documents, and the experience of two of the authors as senior managers, this book describes how NSF's programmatic activities originated and evolved to become the primary source of funding for fundamental research in computing and information technologies. The book traces how NSF's support has provided facilities and education for computing usage by all scientific disciplines, aided in institution and professional community building, supported fundamental research in computer science and allied disciplines, and led the efforts to broaden participation in computing by all segments of society. Today, the research and infrastructure facilitated by NSF computing programs are significant economic drivers of American society and industry. For example, NSF supported work that led to the first widely-used web browser, Netscape; sponsored the

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creation of algorithms at the core of the Google search engine; facilitated the growth of the public Internet; and funded research on the scientific basis for countless other applications and technologies. NSF has advanced the development of human capital and ideas for future advances in computing and its applications. This account is the first comprehensive coverage of NSF's role in the extraordinary growth and expansion of modern computing and its use. It will appeal to historians of computing, policy makers and leaders in government and academia, and individuals interested in the history and development of computing and the NSF. This book introduces readers to essential technology assessment and forecasting tools, demonstrating their use on the basis of multiple cases. As organizations in the high-tech industry need to be able to assess emerging technologies, the book presents cases in which formal decision-making models are developed, providing a framework for decision-making in the context of technology acquisition and development. Applications of different technology forecasting tools are also discussed for a range of technologies and sectors, providing a guide to keep R&D organizations abreast of technological trends that affect their business. As such, the book offers a valuable theoretical and practical reference guide for R&D managers responsible for emerging and future technologies.

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This book provides state of the art scientific and engineering research findings and developments in the area of mobile robotics and associated support technologies. The book contains peer reviewed articles presented at the CLAWAR 2011 conference. A great deal of interest is vested in the use of robots outside the factory environment. The CLAWAR conference series, established as a high profile international event, acts as a platform for dissemination of research and development findings and supports the trend to address current interest in mobile robotics to meet the needs of mankind in various segments of the society. Field robotics aims to bring technologies that allow autonomous systems to assist and/or replace humans performing tasks that are difficult, repetitive, unpleasant, or take place in hazardous environments. These robotic systems will bring sociological and economic benefits through improved human safety, increased equipment utilisation, reduced maintenance costs and increased production.

Since 1991, the National Research Council, under the auspices of the Board on Science, Technology, and Economic Policy, has undertaken a program of activities to improve policymakers' understandings of the interconnections of science, technology, and economic policy and their importance for the American economy and its international competitive position. The Board's activities have corresponded

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with increased policy recognition of the importance of knowledge and technology to economic growth. The goal of the this symposium was to conduct two public symposia to review and analyze the potential contributions of public-private partnerships and identify other relevant issues for the Department of Energy, Office of Vehicle Technologies, Energy Storage Team's activities in the energy storage research and development area. The symposia will also identify lessons from these and other domestic and international experiences to help inform DoE as to whether its activities are complete and appropriately focused. Additional topics that emerge in the course of the planning may also be addressed. Building the U.S. Battery Industry for Electric Drive Vehicles: Summary of a Symposium gathers representatives from leading battery manufacturers, automotive firms, university researchers, academic and industry analysts, congressional staff, and federal agency representatives. An individually-authored summary of each symposium will be issued. The symposium was held in Michigan in order to provide direct access to the policymakers and industrial participants drawn from the concentration of battery manufacturers and automotive firms in the region. The symposium reviewed the current state, needs, and challenges of the U.S. advanced battery manufacturing industry; challenges and opportunities in battery R&D,

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commercialization, and deployment; collaborations between the automotive industry and battery industry; workforce issues, and supply chain development. It also focused on the impact of DoE's investments and the role of state and federal programs in support of this growing industry. This task of this report is to summarize the presentations and discussions that took place at this symposium. Needless to say, the battery industry has evolved very substantially since the conference was held, and indeed some of the caveats raised by the speakers with regard to overall demand for batteries and the prospects of multiple producers now seem prescient. At the same time, it is important to understand that it is unrealistic to expect that all recipients of local, state, or federal support in a complex and rapidly evolving industry will necessarily succeed. A number of the firms discussed here have been absorbed by competitors, others have gone out of business, and others continue to progress.

This book reports on the application of advanced models of the human binaural hearing system in modern technology, among others, in the following areas: binaural analysis of aural scenes, binaural de-reverberation, binaural quality assessment of audio channels, loudspeakers and performance spaces, binaural perceptual coding, binaural processing in hearing aids and cochlea implants, binaural systems

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in robots, binaural/tactile human-machine interfaces, speech-intelligibility prediction in rooms and/or multi-speaker scenarios. An introduction to binaural modeling and an outlook to the future are provided. Further, the book features a MATLAB toolbox to enable readers to construct their own dedicated binaural models on demand.

Robotic surgery is still in the early stages even though robotic assisted surgery is increasing continuously. Thus, exact and careful understanding of robotic surgery is necessary because chaos and confusion exist in the early phase of anything.

Especially, the confusion may be increased because the robotic equipment, which is used in surgery, is different from the robotic equipment used in the automobile factory. The robots in the automobile factory just follow a program. However, the robot in surgery has to follow the surgeon's hand motions. I am convinced that this In-Tech Robotic Surgery book will play an essential role in giving some solutions to the chaos and confusion of robotic surgery. The In-Tech Surgery book contains 11 chapters and consists of two main sections. The first section explains general concepts and technological aspects of robotic surgery. The second section explains the details of surgery using a robot for each organ system. I hope that all surgeons who are interested in robotic surgery will find the proper knowledge in this book. Moreover, I hope the book

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will perform as a basic role to create future perspectives. Unfortunately, this book could not cover all areas of robotic assisted surgery such as robotic assisted gastrectomy and pancreaticoduodenectomy. I expect that future editions will cover many more areas of robotic assisted surgery and it can be facilitated by dedicated readers. Finally, I appreciate all authors who sacrificed their time and effort to write this book. I must thank my wife NaYoung for her support and also acknowledge MiSun Park's efforts in helping to complete the book.

In order to achieve human-like performance, this book covers the four steps of reasoning a robot must provide in the concept of intelligent physical compliance: to represent, plan, execute, and interpret compliant manipulation tasks. A classification of manipulation tasks is conducted to identify the central research questions of the addressed topic. It is investigated how symbolic task descriptions can be translated into meaningful robot commands. Among others, the developed concept is applied in an actual space robotics mission, in which an astronaut aboard the International Space Station (ISS) commands the humanoid robot Rollin' Justin to maintain a Martian solar panel farm in a mock-up environment

While technologies continue to advance in different directions, there still holds a constant evolution of

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interdisciplinary development. Robotics and mechatronics is a successful fusion of disciplines into a unified framework that enhances the design of products and manufacturing processes. Engineering Creative Design in Robotics and Mechatronics captures the latest research developments in the subject field of robotics and mechatronics and provides relevant theoretical knowledge in this field. Providing interdisciplinary development approaches, this reference source prepares students, scientists, and professional engineers with the latest research development to enhance their skills of innovative design capabilities.

The changing manufacturing environment requires more responsive and adaptable manufacturing systems. The theme of the 4th International Conference on Changeable, Agile, Reconfigurable and Virtual production (CARV2011) is “Enabling Manufacturing Competitiveness and Economic Sustainability”. Leading edge research and best implementation practices and experiences, which address these important issues and challenges, are presented. The proceedings include advances in manufacturing systems design, planning, evaluation, control and evolving paradigms such as mass customization, personalization, changeability, re-configurability and flexibility. New and important concepts such as the dynamic product families and platforms, co-evolution of products and systems, and

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methods for enhancing manufacturing systems' economic sustainability and prolonging their life to produce more than one product generation are treated. Enablers of change in manufacturing systems, production volume and capability scalability and managing the volatility of markets, competition among global enterprises and the increasing complexity of products, manufacturing systems and management strategies are discussed. Industry challenges and future directions for research and development needed to help both practitioners and academicians are presented.

A social robot is a robot that interacts and communicates with humans or other autonomous physical agents by following social behaviors and rules attached to its role. We seem to accept the use of robots that perform dull, dirty, and dangerous jobs. But how far do we want to go with the automation of care for children and the elderly, or the killin

This book constitutes the thoroughly refereed post-workshop proceedings of the Second International Workshop on Modelling and Simulation for Autonomous Systems, MESAS 2015, held in Prague, Czech Republic, in April 2015. The 18 revised full papers included in the volume were carefully reviewed and selected from 33 submissions. They are organized in the following topical sections: state of the art and future of AS; MS experimental frameworks for AS; methods and

algorithms for AS.

Wireless networks of moving objects have drawn significant attention recently. These types of networks consist of a number of autonomous or semi-autonomous wireless nodes/objects moving with diverse patterns and speeds while communicating via several radio interfaces simultaneously. To overcome current shortcomings, a number of research challenges have to be addressed in this area, ranging from initial conceptualization and modelling, to protocols and architectures engineering, and development of suitable tools, applications and services, and to the elaboration of realistic use-case scenarios by taking into account corresponding societal and economic aspects. By applying a systematic approach the objective of this book is to assess the state of the art and consolidate the main research results achieved in this area. It was prepared as the Final Publication of the COST Action IC0906 “Wireless Networking for Moving Objects (WiNeMO)”. The book contains 15 chapters and is a show-case of the main outcomes of the action in line with its scientific goals. The book will serve as a valuable reference for undergraduate students, post-graduate students, educators, faculty members, researchers, engineers, and research strategists working in this field.

Robots: A Reference Handbook differs from most other books on robotics in the variety of resources

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that it provides to readers of all ages. • Walks the reader through the surprisingly rich history of robotics • Details how robots have developed across the globe • Introduces the reader to a variety of technical, social, political, ethical, and economic issues related to the widespread use of robots today • Provides a variety of resources that can be used in further study of robotics

This book comprehensively describes the status quo of artificial intelligence technology applications in the judicial field in China. Written by Cui Yadong, the former President of Shanghai Senior People's Court, it is divided into three parts: the first part focuses mainly on the theoretical issues related to artificial intelligence and judicial applications. The second part highlights practical aspects, discussing the research and development process, the implementation of the "206 system" and the major breakthroughs. The third part then addresses lessons learned and the thinking, particularly the thinking on "building the future rule of law of artificial intelligence", a new topic that responds to people's concerns about the risks and challenges of the development of artificial intelligence. In this context, the book argues that the judicial task is twofold: On the one hand, it should actively promote the integration and application of AI in the judiciary, judicial intelligence, and judicial modernization. On the other hand, it should encourage the construction

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of a future rule of law system of artificial intelligence, highlight the role of the judiciary in dealing with future risks and challenges, bring the development of artificial intelligence into line with the rule of law, and use the rule of law to promote, standardize and guarantee the safe, reliable and controllable development of artificial intelligence.

This book provides state-of-the-art scientific and engineering research findings and developments in the area of mobile robotics and associated support technologies around the theme of cooperative robotics. The book contains peer reviewed articles presented at the CLAWAR 2016 conference. The book contains a strong stream of papers on multi-legged locomotion and cooperative robotics. There is also a strong collection of papers on human assistive devices, notably wearable exoskeletal and prosthetic devices, and personal care robots and mobility assistance devices designed to meet the growing challenges due to the global ageing society. Robot designs based on biological inspirations and ethical concerns and issues related to the design, development and deployment of robots are also strongly featured.

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