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Computing & IT

New Titles - July 2017

COMPUTER SCIENCE, TECHNOLOGY AND APPLICATIONS

Genetic Algorithms

Advances in Research and Applications

Julia Carson
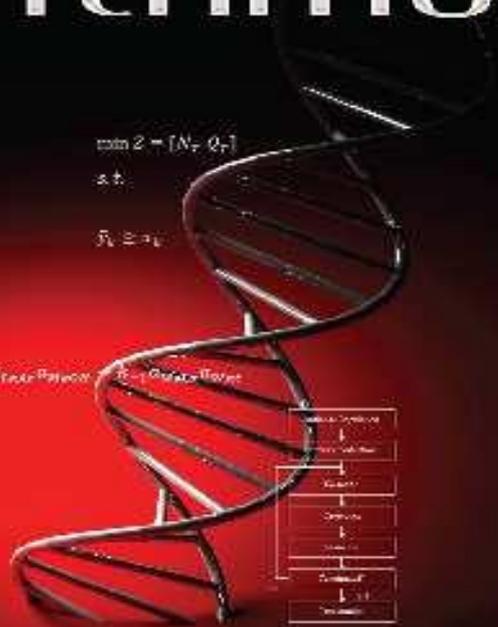
Editor

NOVA

Murach

Nova Science

Scitus Academics
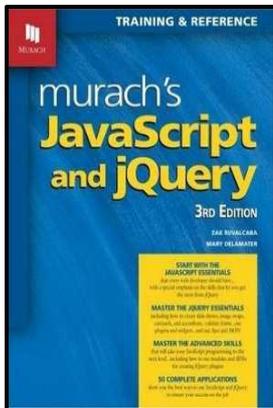
Technics Publications

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CONTENTS

MURACH

Murach's JavaScript & jQuery

Zak Ruvalcaba, Mary Delamater

Today, you will find JavaScript and jQuery used everywhere on the web, from small individual sites to the largest commercial sites like Google, Amazon, and Facebook. That is why every web developer needs to have at least a basic set of JavaScript and jQuery skills. And now, this one book presents the JavaScript and jQuery skills that every web developer needs whether you are a web designer who is coming from a background in HTML and CSS or a server-side programmer who is coded in languages like PHP, C#, Java, and Python. Due to its unique, self-paced approach, this book works regardless of your experience. And when you are through learning from it, this book will become the best quick reference that you have ever used. To make this all possible, section 1 presents a 7-chapter course on JavaScript that will get anyone off to a great start, with a special focus on the skills you need for getting the most from jQuery. Then, section 2 presents all of the jQuery skills that you are likely to need, including how to create slide shows, image swaps, carousels, and accordions... how to validate the data in forms... how to use plugins and widgets... and how to use Ajax and JSON to get data from a web server without reloading the web page. At that point, you will have a solid set of JavaScript and jQuery skills. Then, section 3 lets you expand your skill set as you learn how to work with date and time objects, browser objects, web storage, arrays, your own objects, regular expressions, and more. The last chapter takes your skills to the expert level as you learn how to use modules and IIFEs to build jQuery plugins. Complete coding examples, practice exercises, and Murach's distinctive "paired-pages" format (each topic is presented in a 2-page spread with text and illustrations) all combine to let you tailor the pace and content to your personal learning style.

PB 9781943872053 £54.99 February 2017 Murach (Mike) & Associates 620 pages
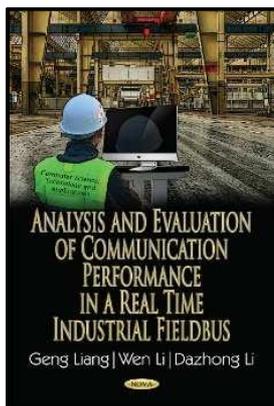
Analysis & Evaluation of Communication Performance in a Real Time Industrial Fieldbus

Geng Liang, Wen Li, Dazhong Li

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

1) Concept and essentiality of timed-token MAC protocol with the effect of its parameter in real-time characteristics.
2) MAC mechanism in Profibus, timing analysis, optimization of acyclic bandwidth allocation, and the approaches to guarantee the real-time behavior of the Profibus protocol.
3) Principles of acyclic data communication, and analysis of the delay performance of time-critical and time-available data in FF fieldbus data link layer token-passing service.
4) Communication models in WorldFIP network, Producer/Distributor/Consumer concept, response time analysis for sporadic traffic and investigation of the worst-case response time issues.
5) Communication mechanism in CAN fieldbus with its performance analysis and evaluation in real-time applications.

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

HB 9781536106404 £185.99 February 2017 Nova Science Publishers 270 pages
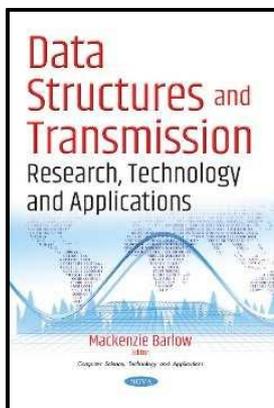
Data Structures & Transmission
Research, Technology & Applications

Edited by Mackenzie Barlow

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

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

PB 9781536110715 £78.50 May 2017 Nova Science Publishers 110 pages
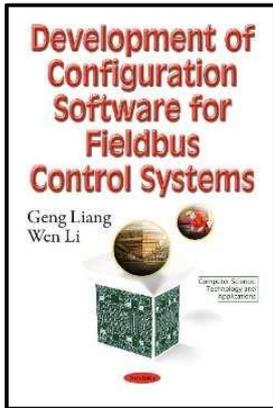
Development of Configuration Software for Fieldbus Control Systems

Geng Liang, Wen Li

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

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

PB 9781634858519 £78.50 February 2017 Nova Science Publishers 130 pages
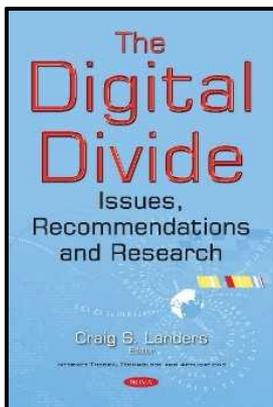
The Digital Divide
Issues, Recommendations & Research

Edited by Craig S. Landers

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

HB 9781536110708 £90.50 May 2017 Nova Science Publishers 170 pages
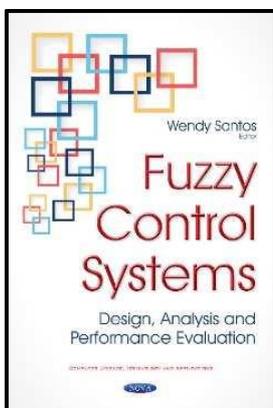
Fuzzy Control Systems
Design, Analysis & Performance Evaluation

Edited by Wendy Santos

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

HB 9781634858892 £180.99 March 2017 Nova Science Publishers 200 pages
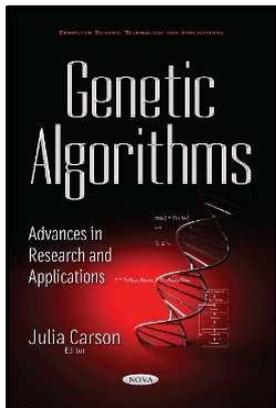
Genetic Algorithms
Advances in Research & Applications
Edited by Julia Carson

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

PB 9781536118568 £78.50 June 2017 Nova Science Publishers 90 pages
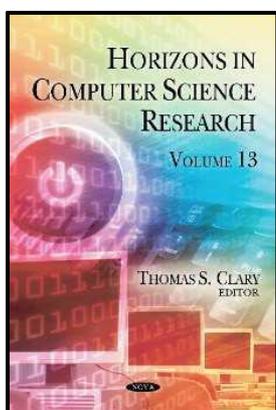
Horizons in Computer Science Research
Edited by Thomas S. Clary

This book presents original results on the leading edge of computer science research. Chapter One reviews a framework for high-dimensional optimization problems. Chapter Two proposes the use of Stable Logical Infrastructures (SLI) for the effective and strategic reuse of architectural designs. Chapter Three discusses the control system design problems for autonomous intelligent robot systems from the viewpoint of a Petri net approach. Chapter Four studies predation tactics on grouping prey via individual-based computational models. Chapter Five defines a rating contribution ratio and quantifies it from the perspective of a collaborative filtering algorithm; discusses a method of efficiently improving the recommendation accuracy by performing several simulations experiments; and defines and formulates the rating contribution ratio based on a user-based collaborative filtering algorithm. Chapter Six proposes a conceptual bilateral Cloud Forensic-as-a-Service model where both consumers and providers can independently collect, verify the equity of the forensic analysis process and try to resolve potential disputes emerging from the independently collected results. Chapter Seven develops a cellular and iridium network based blood pressure and body temperature remote measurement platform for mobile healthcare education.

Volume 13 - HB 9781536105933 £238.50 April 2017 Nova Science Publishers 160 pages
Volume 14 - HB 9781536110074 £238.50 May 2017 Nova Science Publishers

**Handwriting
Recognition, Development & Analysis**

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

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

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

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

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

HB 9781536119374 £219.50 June 2017 Nova Science Publishers 395 pages
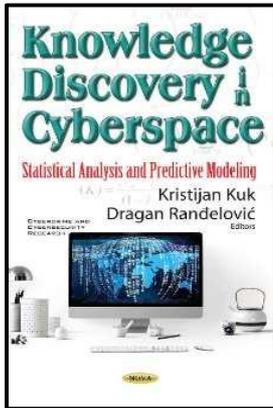
Knowledge Discovery in Cyberspace
Statistical Analysis & Predictive Modeling
Edited by Kristijan Kuk, Dragan Randjelovic

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

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

PB 9781536105667 £78.50 January 2017 Nova Science Publishers 140 pages
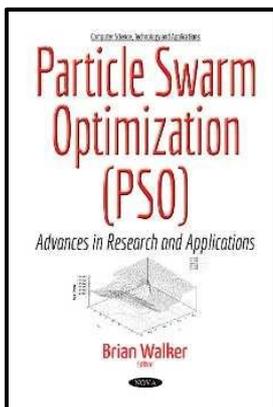
Particle Swarm Optimization (PSO)
Advances in Research & Applications
Edited by Brian Walker

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

PB 9781536108286 £78.50 February 2017 Nova Science Publishers 100 pages
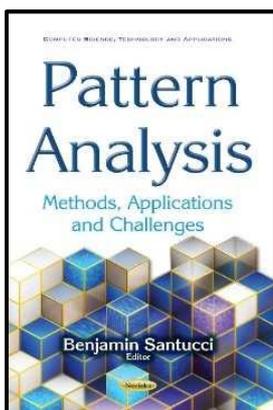
Pattern Analysis
Methods, Applications & Challenges
Edited by Benjamin Santucci

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

PB 9781536106305 £78.50 February 2017 Nova Science Publishers 100 pages
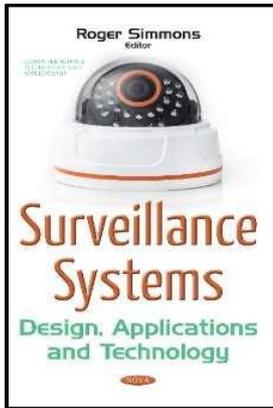
Surveillance Systems
Design, Applications & Technology
Edited by Roger Simmons

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

PB 9781536107036 £90.50 April 2017 Nova Science Publishers 115 pages
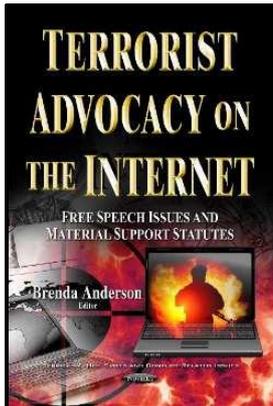
Terrorist Advocacy on the Internet
Free Speech Issues & Material Support Statutes
Edited by Brenda Anderson

The development of the Internet has revolutionized communications. It has never been easier to speak to wide audiences or to communicate with people that may be located more than half a world away from the speaker. However, like any neutral platform, the Internet can be used to many different ends, including illegal, offensive, or dangerous purposes. Terrorist groups, such as the Islamic State (IS, also referred to as ISIS or ISIL), Al Qaeda, Hamas, and Al Shabaab, use the Internet to disseminate their ideology, to recruit new members, and to take credit for attacks around the world. Several U.S. policymakers, including some Members of Congress, have expressed concern about the influence that terrorist advocacy may have upon those who view or read it. The ease with which such speech may be disseminated over the Internet, using popular social media services, has been highlighted by some observers as potentially increasing the ease by which persons who might otherwise have not been exposed to the ideology or recruitment efforts of terrorist entities may become radicalized. These concerns raise the question of whether it would be permissible for the federal government to restrict or prohibit the publication and distribution of speech that advocates the commission of terrorist acts when that speech appears on the Internet. This book discusses relevant precedent concerning the extent to which advocacy of terrorism may be restricted in a manner consistent with the First Amendment's Freedom of Speech Clause. The book also discusses the potential application of the federal ban on the provision of material support to foreign terrorist organizations (FTOs) to the advocacy of terrorism, including as it relates to the dissemination of such advocacy via online services like Twitter or Facebook.

PB 9781536104578 £59.50 January 2017 Nova Science Publishers 86 pages
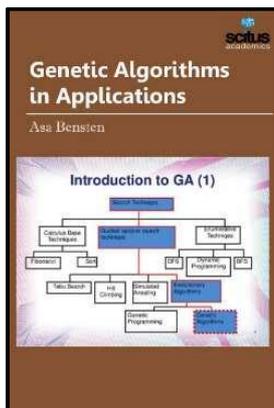
Genetic Algorithms in Applications

Edited by Asa Bensten

Genetic Algorithm (GA) is an artificial intelligence procedure. It is based on the theory of natural selection and evolution. It is a heuristic search technique used in computing and Artificial Intelligence to find optimized solutions to search problems using techniques inspired by evolutionary biology: mutation, selection, reproduction and recombination. Genetic Algorithms have been applied in science, engineering, business and social sciences. Traditional methods of search and optimization are too slow in finding a solution in a very complex search space, even implemented in supercomputers. Genetic Algorithm is a robust search method requiring little information to search effectively in a large or poorly-understood search space. In particular a genetic search progress through a population of points in contrast to the single point of focus of most search algorithms. Moreover, it is useful in the very tricky area of nonlinear problems. Its intrinsic parallelism (in evaluation functions, selections and so on) allows the uses of distributed processing machines. This book, *Genetic Algorithms in Applications*, may be of immense useful to engineers and scientists in various fields of specialization, who need some optimization techniques in their work and who may be using Genetic Algorithms in their applications for the first time. These applications may be of useful to many other people who are getting familiar with the subject of Genetic Algorithms.

HB 9781681172637 £160.99 January 2017 Scitus Academics 320 pages
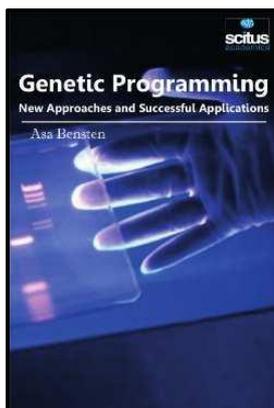
Genetic Programming
New Approaches & Successful Applications

Edited by Asa Bensten

Genetic programming is a branch of genetic algorithms. The main difference between genetic programming and genetic algorithms is the representation of the solution. Genetic programming creates computer programs in the lisp or scheme computer languages as the solution. Genetic programming is an automatic technique for producing a computer program that solves, or approximately solves, a problem. Genetic programming addresses the challenge of getting a computer to solve a problem without explicitly programming it. This challenge calls for an automatic system whose input is a high-level statement of a problem's requirements and whose output is a working program that solves the problem. Genetic programming progressively breeds a population of computer programs over a series of generations by starting with a primordial ooze of thousands of randomly created computer programs and using the Darwinian principle of natural selection, recombination (crossover), mutation, gene duplication, gene deletion, and certain mechanisms of developmental biology. Specifically, genetic programming starts with an initial population of randomly generated computer programs composed of the given primitive functions and terminals. The programs in the population are, in general, of different sizes and shapes. The creation of the initial random population is a blind random search of the space of computer programs composed of the problem's available functions and terminals. The aim of *Genetic Programming - New Approaches and Successful Applications* is to show topical advances in the arena of GP, both the development of new theoretical approaches and the development of applications that have successfully solved different real world problems. The book is mainly aimed at postgraduates, researchers and academics, even though it is hoped that it may be of immense useful to undergraduates who aspire to learn about the leading techniques in genetic programming.

HB 9781681172644 £141.50 January 2017 Scitus Academics 298 pages
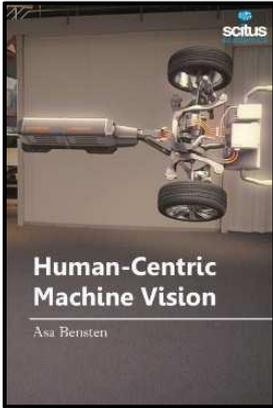
Human-Centric Machine Vision

Edited by Asa Bensten

Machine vision (MV) is the technology and methods used to provide imagingbased automatic inspection and analysis for such applications as automatic inspection, process control, and robot guidance in industry. Machine vision is the ability of a computer to "see." A machine-vision system employs one or more video cameras, analog-to-digital conversion, and digital signal processing. The resulting data goes to a computer or robot controller. Machine vision is similar in complexity to voice recognition. The scope of machine vision is broad. It is related to, though distinct from, computer vision. Machine vision methods are defined as both the process of defining and creating an MV solution, and as the technical process that occurs during the operation of the solution. Recently, the algorithms for the processing of the visual information have greatly evolved, providing efficient and effective solutions to cope with the variability and the complexity of real-world environments. These achievements yield to the development of Machine Vision systems that overwhelmed the distinctive industrial solicitations, where the environments are controlled and the tasks are very precise, towards the use of state-of-the-art solutions to face with everyday desires of people. This book entitled *Human-Centric Machine Vision* can help to solve the problems raised by the needs of our society, e.g. security and safety, health care, medical imaging, and human machine interface. In such solicitations it is required to handle changing, impulsive and multifaceted situations, and to deal with the presence of humans.

HB 9781681172651 £141.50 January 2017 Scitus Academics 294 pages
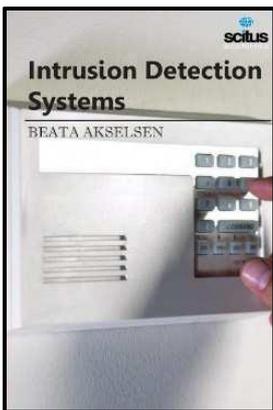
Intrusion Detection Systems

Edited by Beata Akselsen

An intrusion detection system inspects all inbound and outbound network activity and identifies suspicious patterns that may indicate a network or system attack from someone attempting to break into or compromise a system. Intrusion detection (ID) is a type of security management system for computers and networks. An intrusion detection system gathers and analyzes information from various areas within a computer or a network to identify possible security breaches, which include both intrusions (attacks from outside the organization) and misuse (attacks from within the organization). Intrusion detection and prevention systems (IDPS) are primarily focused on identifying possible incidents, logging information about them, and reporting attempts. In addition, organizations use IDPSes for other purposes, such as identifying problems with security policies, documenting existing threats and deterring individuals from violating security policies. IDPSes have become a necessary addition to the security infrastructure of nearly every organization Intrusion detection system uses vulnerability assessment (sometimes refered to as scanning), which is a technology developed to assess the security of a computer system. The safeguarding of security is becoming increasingly difficult, because the possible technologies of attack are becoming ever more sophisticated; at the same time, less technical ability is required for the novice attacker, because proven past methods are easily accessed through the Web. This book, *Intrusion Detection Systems*, presents the practical application and results obtained for existing networks as well as results of experiments confirming efficacy of a synergistic analysis of anomaly detection and signature detection, and application of interesting solutions, such as an analysis of the anomalies of user behaviors and many others.

HB 9781681172668 £160.99 January 2017 Scitus Academics 338 pages
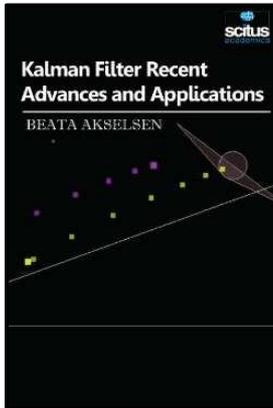
Kalman Filter Recent Advances and Applications
Edited by Beata Akselsen

The Kalman filter is an algorithm that estimates the state of a system from measured data. It was predominantly developed by the Hungarian engineer Rudolf Kalman, for whom the filter is named. The filter's algorithm is a two-step process: the first step predicts the state of the system, and the second step uses noisy measurements to refine the estimate of system state. There are now several variations of the original Kalman filter. The Kalman filter has plentiful applications in technology. A common application is for guidance, navigation and control of vehicles, particularly aircraft and spacecraft. Furthermore, the Kalman filter is a widely applied concept in time series analysis used in fields such as signal processing and econometrics. Kalman filters also are one of the main topics in the field of robotic motion planning and control, and they are sometimes included in trajectory optimization. Kalman filters are used for object tracking to predict an object's future location, to account for noise in an object's detected location, and to help associate multiple objects with their corresponding tracks. The output of the Kalman filter is denoted by the red circles and the object detection is denoted in black. Notice when the ball is occluded and there are no detections; the filter is used to predict its location. The purpose of the book entitled *Kalman Filter Recent Advances and Applications* is to provide an overview of recent developments in Kalman filter theory and their applications in engineering and scientific fields. This book corresponding to modern advances in Kalman filtering theory, solicitations in medical and biological sciences, tracking and positioning systems, electrical engineering and, finally, industrial processes and communication networks.

HB 9781681172675 £160.99 January 2017 Scitus Academics 308 pages
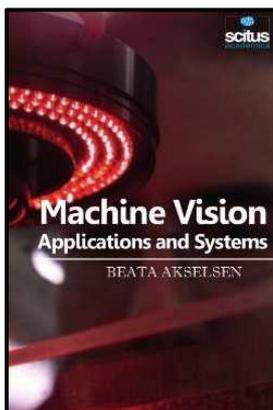
Machine Vision
Applications & Systems
Beata Akselsen

Vision plays an ultimate role for living beings by allowing them to cooperate with the environment in an actual and competent way. The crucial objective of Machine Vision is to provide artificial systems with adequate capabilities to cope with not a priori predetermined situations. While computer vision is focused mainly on image processing at the level of hardware, machine vision most often requires the use of additional hardware and computer networks to transmit information generated by the other process components, such as a robot arm. Machine vision is a subcategory of engineering machinery, dealing with issues of information technology, optics, mechanics and industrial automation. One of the most common applications of machine vision is inspection of the products such as microprocessors, cars, food and pharmaceuticals. Machine vision systems are used increasingly to solve problems of industrial inspection, allowing for complete automation of the inspection process and to increase its accuracy and efficiency. As is the case for inspection of products on the production line, made by people, so in case of application for that purpose machine vision systems are used digital cameras, smart cameras and image processing software. This book entitled *Machine Vision - Applications and Systems* presents the possible applications of machine vision in the present. The book places particular emphasis on the engineering and technology aspects of image processing and computer vision. Machine Vision is not restricted any more to industrial environments, where situations and tasks are shortened and very specific, but it is now prevalent to support system solutions of routine life problems.

HB 9781681172682 £160.99 January 2017 Scitus Academics 320 pages
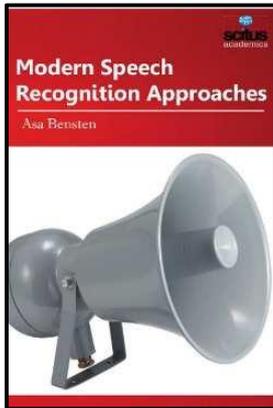
Modern Speech Recognition Approaches

Edited by Asa Bensten

Voice or speech recognition is the ability of a machine or program to receive and interpret dictation, or to understand and carry out spoken commands. The task of speech recognition is to convert speech into a sequence of words by a computer program. As the most natural communication modality for humans, the ultimate dream of speech recognition is to enable people to communicate more naturally and effectively. Speech recognition is often regarded as the front-end for many NLP components discussed in this book. In practice, the speech system typically uses context-free grammar (CFG) or statistic n-grams for the same reason that hidden Markov models (HMMs) are used for acoustic modelling. Although it initially addressed applications requiring the scanning of audio data for occurrences of particular keywords, the technology has become an effective approach to speech recognition for a wide range of applications. Speech recognition applications are different from any other kind of computer application. It opens up a world of possibilities for developers, especially those building interactive voice responses (IVRs) and other telephony applications, but speech recognition also has some challenges. Speech recognition is also affected by the quality of the input. If a user is calling a system, a bad cell phone connection or overly compressed Internet audio may throw off recognition. Handling these sorts of cases becomes very important when designing speech recognition applications.

Modern Speech Recognition Approaches reflect important research on the approaches of speech recognition. The book focuses primarily on speech recognition and the related tasks such as speech enhancement and modelling. Thorough reading of this book will provide comprehensive knowledge on modern speech recognition approaches to the readers

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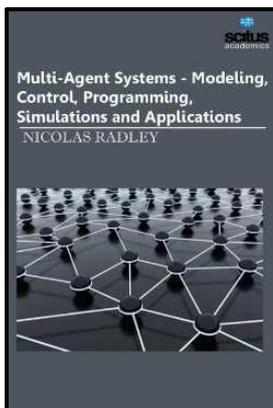
Multi-Agent Systems
Modeling, Control, Programming, Simulations & Applications

Nicolas Radley

Multiagent systems consist of multiple autonomous entities having different information and/or diverging interests. The study of multiagent systems (MAS) focuses on systems in which many intelligent agents interact with each other. The agents are considered to be autonomous entities, such as software programs or robots. Their interactions can be either cooperative or selfish. That is, the agents can share a common goal (e.g. an ant colony), or they can pursue their own interests. Multi-agent systems can be used to solve problems that are difficult or impossible for an individual agent or a monolithic system to solve. Intelligence may include some methodic, functional, procedural approach, algorithmic search or reinforcement learning. Although there is considerable overlap, a multi-agent system is not always the same as an agent-based model (ABM). The goal of an ABM is to search for explanatory insight into the collective behavior of obeying simple rules, typically in natural systems, rather than in solving specific practical or engineering problems. Topics where multi-agent systems research may deliver an appropriate approach include online trading, disaster response, and modelling social structures. Multi-agent systems consist of agents and their environment. Typically multi-agent systems research refers to software agents. However, the agents in a multi-agent system could equally well be robots, humans or human teams. A multi-agent system may contain combined humanagent teams. Agent systems are open and extensible systems that allow for the deployment of autonomous and proactive software components. Multi-agent systems have been brought up and used in several application domains. This book, *Multi-Agent Systems - Modeling, Control, Programming, Simulations and Applications*, is intended to provide an emphasize on the multi-agent technology, products and industrial applications.

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Multivariate Analysis in Management, Engineering and the Sciences

Edited by Beata Akselsen

Many statistical techniques focus on just one or two variables; Multivariate analysis (MVA) techniques allow more than two variables to be analysed at once. Recently statistical knowledge has become an important requirement and occupies a prominent position in the exercise of various professions. In the real world, the processes have a large volume of data and are naturally multivariate and as such, require a proper treatment. For these conditions it is difficult or practically impossible to use methods of univariate statistics. Researchers use multivariate procedures in studies that involve more than one dependent variable (also known as the outcome or phenomenon of interest), more than one independent variable (also known as a predictor) or both. This type of analysis is desirable because researchers often hypothesize that a given outcome of interest is effected or influenced by more than one thing. Uses for multivariate analysis include: design for capability (also known as capability-based design); inverse design, where any variable can be treated as an independent variable; analysis of alternatives (AoA), the selection of concepts to fulfil a customer need; analysis of concepts with respect to changing scenarios; identification of critical designdrivers and correlations across hierarchical levels.

Multivariate Analysis in Management, Engineering and the Sciences presents significant topics on fundamental theoretical aspects of the field as well as on other aspects concerned with significant applications of new theoretical methods. Through real-life applications of statistical methodology, this book elucidates the implications of behavioural science studies for statistical analysis. In addition to helping to stimulate research in multivariate analysis, the book aims to bring about interactions among mathematical statisticians, probabilists, and scientists in other disciplines broadly interested in the area.

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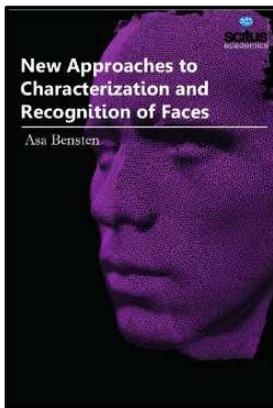
New Approaches to Characterization and Recognition of Faces

Edited by Asa Bensten

The human face plays an important role in our social interaction, conveying people's identity. Using the human face as a key to security, biometric face recognition technology has received significant attention in the past several years due to its potential for a wide variety of applications in both law enforcement and non-law enforcement. As compared with other biometrics systems using fingerprint/palmprint and iris, face recognition has distinct advantages because of its non-contact process. Facial recognition (or face recognition) is a type of biometric software application that can identify a specific individual in a digital image by analyzing and comparing patterns. Facial recognition systems are commonly used for security purposes but are increasingly being used in a variety of other applications. The Kinect motion gaming system, for example, uses facial recognition to differentiate among players. Most current facial recognition systems work with numeric codes called faceprints. Such systems identify 80 nodal points on a human face.

New Approaches to Characterization and Recognition of Faces is arranged around a number of clustered themes covering different aspects of face recognition. This book explores subspace methods for dimensionality reduction in face image processing, statistical methods applied to face detection, and intelligent face detection methods dominated by the use of artificial neural networks. This text should be of immense valuable tool for post graduate students, researchers and professors as well as for those employed in this field.

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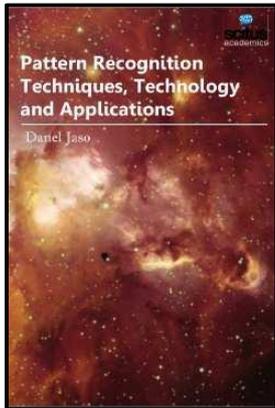
Pattern Recognition Techniques, Technology and Applications

Edited by Danel Jaso

Pattern Recognition Techniques, Technology and Applications disclose recent advances and new ideas in promoting the techniques, technology and applications of pattern recognition. The book provides comprehensive overview of the developments of techniques and approaches on pattern recognition.

Pattern recognition is the science of making inferences from perceptual data, using tools from statistics, probability, computational geometry, machine learning, signal processing, and algorithm design. A wealth of advanced pattern recognition algorithms are emerging from the interdiscipline between technologies of effective visual features and the human-brain cognition process. Effective visual features are made possible through the rapid developments in appropriate sensor equipments, novel filter designs, and viable information processing architectures. While the understanding of human-brain cognition process broadens the way in which the computer can perform pattern recognition task. Pattern recognition is the imposition of identity on input data, such as speech, images, or a stream of text, by the recognition and delineation of patterns it contains and their relationships. Stages in pattern recognition may involve measurement of the object to identify distinguishing attributes, extraction of features for the defining attributes, and comparison with known patterns to determine a match or mismatch. Pattern recognition has extensive application in astronomy, medicine, robotics, and remote sensing by satellites.

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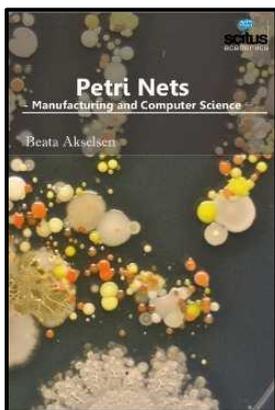
Petri Nets
Manufacturing & Computer Science

Beata Akselsen

Petri Nets are graphical and mathematical tool used in many different science domains. Their characteristic features are the intuitive graphical modeling language and advanced formal analysis method. The concurrence of performed actions is the natural phenomenon due to which Petri Nets are perceived as mathematical tool for modeling concurrent systems. The nets whose model was extended with the time model can be applied in modeling real-time systems. Petri Nets were developed originally by Carl Adam Petri, and were the subject of his dissertation in 1962. Since then, Petri Nets and their concepts have been extended and developed, and applied in a variety of areas: office automation, work-flows, flexible manufacturing, programming languages, protocols and networks, hardware structures, real-time systems, performance evaluation, operations research, embedded systems, defence systems, telecommunications, Internet, e-commerce and trading, railway networks, biological systems. Like industry standards such as UML activity diagrams, Business Process Model and Notation and EPCs, Petri nets offer a graphical notation for stepwise processes that include choice, iteration, and concurrent execution.

Petri Nets - Manufacturing and Computer Science focuses on Petri Nets applications in two main areas: manufacturing and computer science. These two areas have still huge influence on our lives and our world. The theory of Petri Nets is still developing. Although many other models of concurrent and distributed systems have been developed since the introduction in 1964 Petri nets are still an essential model for concurrent systems with respect to both the theory and the applications.

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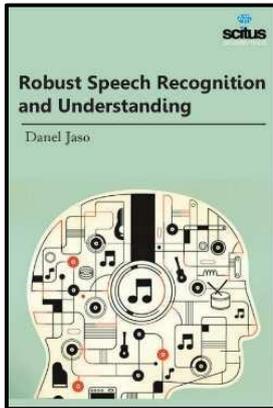
Robust Speech Recognition and Understanding

Edited by Danel Jaso

Speech recognition systems have become much more robust in recent years with respect to both speaker variability and acoustical variability. Automatic speech recognition (ASR) systems are finding increasing use in everyday life. Many of the commonplace environments where the systems are used are noisy, for example users calling up a voice search system from a busy cafeteria or a street. This can result in degraded speech recordings and adversely affect the performance of speech recognition systems. In addition to achieving speaker independence, many current systems can also automatically compensate for modest amounts of acoustical degradation caused by the effects of unknown noise and unknown linear filtering. As speech recognition and spoken language technologies are being transferred to real applications, the need for greater robustness in recognition technology is becoming increasingly apparent. Substantial progress has also been made over the last decade in the dynamic adaptation of speech recognition systems to new speakers, with techniques that modify or warp the systems' phonetic representations to reflect the acoustical characteristics of individual speakers. Speech recognition systems have also become more robust in recent years, particularly with regard to slowly-varying acoustical sources of degradation. As the use of ASR systems increases, knowledge of the state-of-the-art in techniques to deal with such problems becomes critical to system and application engineers and researchers who work with or on ASR technologies. *Robust Speech Recognition and Understanding* brings together many different aspects of the current research on automatic speech recognition and language understanding. Additionally, it presents a comprehensive survey of the state-ofthe-art in techniques used to improve the robustness of speech recognition systems to these degrading external influences.

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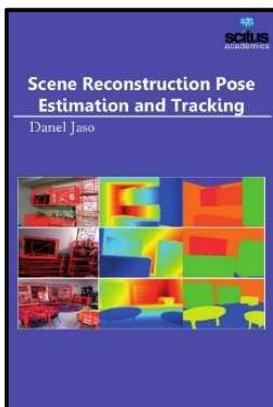
Scene Reconstruction Pose Estimation & Tracking

Edited by Danel Jaso

This book envisages contemporary advances in the use of pattern recognition techniques for computer and robot vision. The disciplines of pattern recognition and computational vision have been intimately entangled since their early days, some four decades ago with the development of fast digital computing. It is generally easy for a person to differentiate the sound of a human voice, from that of a violin; a handwritten numeral "3" from an "8"; and the aroma of a rose, from that of an onion. Though, it is difficult for a programmable computer to solve these kinds of perceptual problems. These problems are difficult because each pattern usually contains a large amount of information, and the recognition problems typically have an inconspicuous, high-dimensional, structure. Pattern recognition is the science of making inferences from perceptual data, using tools from statistics, probability, computational geometry, machine learning, signal processing, and algorithm design. Thus, it is of central importance to artificial intelligence and computer vision, and has far-reaching applications in engineering, science, medicine, and business. In particular, advances made during the last half century, now allow computers to interact more effectively with humans and the natural world (e.g., speech recognition software). However, the most important problems in pattern recognition are yet to be solved. Pattern recognition is generally categorised according to the type of learning procedure used to generate the output value. Supervised learning assumes that a set of training data (the training set) has been provided, consisting of a set of instances that have been properly labeled by hand with the correct output. All computer vision techniques could be regarded as a form of pattern recognition, in the broadest sense of the term.

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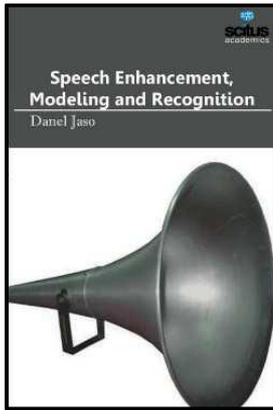
Speech Enhancement, Modeling and Recognition
Danel Jaso

Communication via speech is one of the essential functions of human beings. Humans possess varied ways to retrieve information from the outside world or to communicate with each other and the three most important sources of information are speech, images and written text. For many purposes, speech stands out as the most efficient and convenient one. Speech not only conveys linguistic contents, but also communicates other useful information like the mood of the speaker. When speaker and listener are near to each other in a quiet environment, communication is generally easy and accurate. However, at a distance or in a noisy background, the listener's ability to understand suffers. Speech enhancement aims to improve speech quality by using various algorithms. The objective of enhancement is improvement in intelligibility and/or overall perceptual quality of degraded speech signal using audio signal processing techniques. Enhancing of speech degraded by noise, or noise reduction, is the most important field of speech enhancement, and used for many applications such as mobile phones, VoIP, teleconferencing systems, speech recognition, and hearing aids. *Speech Enhancement, Modeling and Recognition* covers important fields in speech processing such as speech enhancement, noise cancellation, multi resolution spectral analysis, voice conversion, speech recognition and emotion recognition from speech in addition to applications. This book will be of immense useful for advanced graduate students, researchers and practicing engineers employed in speech processing.

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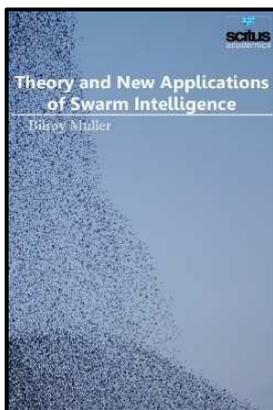
Theory and New Applications of Swarm Intelligence
Edited by Bilroy Muller

A single ant or bee isn't smart, but their colonies are. The study of swarm intelligence is providing insights that can help humans manage complex systems, from truck routing to military robots. A colony can solve problems unthinkable for individual ants, such as finding the shortest path to the best food source, allocating workers to different tasks, or defending a territory from neighbors. As individuals, ants might be tiny dummies, but as colonies they respond quickly and effectively to their environment. They do it with something called swarm intelligence. Swarm intelligence is the discipline that deals with natural and artificial systems composed of many individuals that coordinate using decentralized control and self-organization. In particular, the discipline focuses on the collective behaviors that result from the local interactions of the individuals with each other and with their environment. Swarm intelligence has a marked multidisciplinary character since systems with the above mentioned characteristics can be observed in a variety of domains. SI systems are typically made up of a population of simple agents interacting locally with one another and with their environment. The inspiration often comes from nature, especially biological systems. The agents follow very simple rules, and although there is no centralized control structure dictating how individual agents should behave, local, and to a certain degree random, interactions between such agents lead to the emergence of "intelligent" global behavior, unknown to the individual agents.

Theory and New Applications of Swarm Intelligence allows the reader to know more both theoretical and technical aspects and applications of Swarm Intelligence that reflect the emerging trends in state-of-the-art algorithms. Hence, this book presents some recent advances on Swarm Intelligence, especially on new swarm-based optimization methods and hybrid algorithms for several applications.

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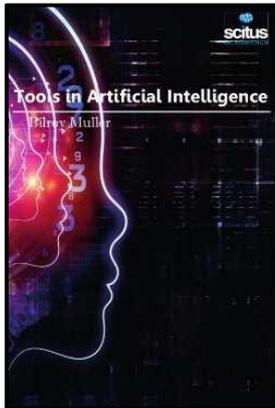
Tools in Artificial Intelligence
Edited by Bilroy Muller

Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using the rules to reach approximate or definite conclusions), and self-correction. Particular applications of AI include expert systems, speech recognition, and machine vision. There are a large number of tools used in AI, including versions of search and mathematical optimization, logic, methods based on probability and economics, and many others. The AI field is interdisciplinary, in which a number of sciences and professions converge, including computer science, mathematics, psychology, linguistics, philosophy and neuroscience, as well as other specialized fields such as artificial psychology. Today AI techniques have become an essential part of the technology industry, providing the heavy lifting for many of the most challenging problems in computer science. *Tools in Artificial Intelligence* emphasize on some potential applications and give a partial picture of the current state-of-the-art of AI. The book provides technical aspects of specifying, developing, and evaluating the theoretical underpinnings and applied mechanisms of AI tools. Furthermore, it is convenient to inspire some future research ideas by identifying potential research directions. It is devoted to students, researchers and practitioners in this area or in related fields.

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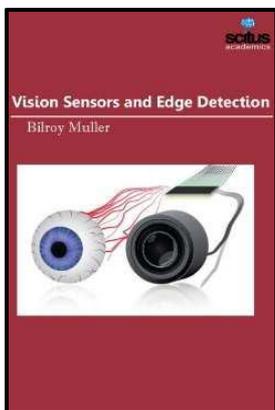
Vision Sensors and Edge Detection
Edited by Bilroy Muller

Vision Sensors/Machine Vision Systems analyze images to perform appearance inspections, character inspections, positioning, and defect inspections. Vision sensors are products consisting of a video camera, display and interface, and computer processor to automate industrial processes and decisions. These are commonly used for measurement, pass/fail decisions, and other observable characteristics relating to product quality. When the camera has an integral processor, it is called a smart camera. Edge detection is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in areas such as image processing, computer vision, and machine vision. *Vision Sensors and Edge Detection* provides a comprehensive overview of recent developments within the area of vision sensors and edge detection. It emphasizes on vision sensors with applications to panoramic vision sensors, wireless vision sensors, and automated vision sensor inspection, and image processing techniques.

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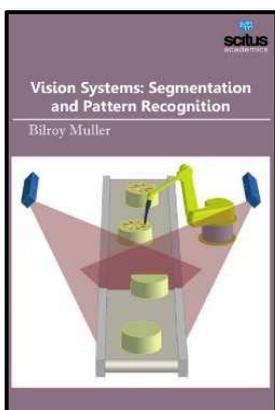
Vision Systems
Segmentation & Pattern Recognition
Edited by Bilroy Muller

Computer vision is the most important key in developing autonomous navigation systems for interaction with the environment. It also leads us to marvel at the functioning of our own vision system. Research in computer vision has exponentially improved in the last two decades because of the convenience of cheap cameras and fast processors. This increase has also been accompanied by a blurring of the boundaries between the different applications of vision, making it truly interdisciplinary. Vision systems can be thought of as computers with eyes that can identify, inspect and communicate critical information to eliminate costly errors, improve productivity and enhance customer satisfaction through the consistent delivery of quality products. Primarily used for online inspection, vision systems can perform complex or mundane repetitive tasks at high speed with high accuracy and high consistency.

Vision Systems: Segmentation and Pattern Recognition attempted to put together state-of-the-art research and developments in segmentation and pattern recognition.

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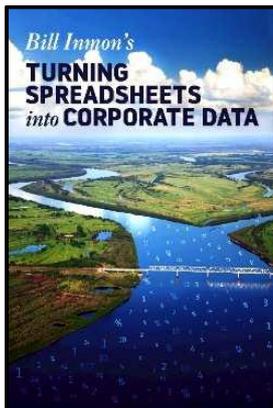
## Turning Spreadsheets into Corporate Data
Bill Inmon

For years, business users have leveraged spreadsheets for storing and communicating data. Although spreadsheets may be easy to create and update, making important corporate decisions based on spreadsheets is risky due to the lack of data credibility. Whether you are a manager, developer, end user, or student, this book will help you turn spreadsheet data into credible, useful, reliable data that can be trusted in order to make important decisions.

A chapter is dedicated to each of the following topics:
• Brief history of spreadsheets
• Spreadsheet paradox
• Spreadsheet varieties
• The PDF spreadsheet
• Spreadsheet formatting
• Spreadsheet disambiguation
• The intermediate database
• The ssdef database
• The corporate database
• The metadata database (mnemonic database)
• Political considerations
• Data modeling and the spreadsheet
• Case study

About the Author: Bill Inmon - the "father of data warehouse" -- has written 57 books published in nine languages. Bill's latest adventure is the building of technology known as textual disambiguation -- technology that reads raw text in a narrative format and allows the text to be placed in a conventional database so that it can be analysed by standard analytical technology, thereby creating unique business value for Big Data/unstructured data.

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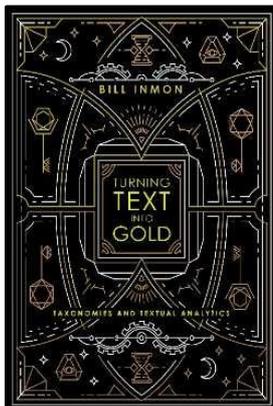
Turning Text into Gold
Taxonomies & Textual Analytics
Bill Inmon

In our distant past, we attempted to create wealth by turning everyday substances into gold. This was early alchemy, and ultimately it did not work. But the world has changed. Today we have a type of "modern alchemy" that really can create gold. We can transform voluminous text into a wealth of knowledge.

Text is a common fabric   of society, yet it is still challenging for our technology to make sense of text. This is where taxonomies can help. In this book, legendary Bill Inmon will introduce you to the concept of taxonomies and how they are used to simplify and understand text. We emphasize the practical aspects of taxonomies, and the subsequent usage of taxonomies as a basis for textual analytics.

This book is for managers who have to deal with text, students of computer science, programmers who need to understand taxonomies, systems analysts who hope to draw business value out of a body of text, and especially those who are struggling to decode data lakes. Hopefully for those individuals (and many more), this book will serve as both an introduction to taxonomies and a guide to how taxonomies can be used to bring text into the realm of corporate decision-making.

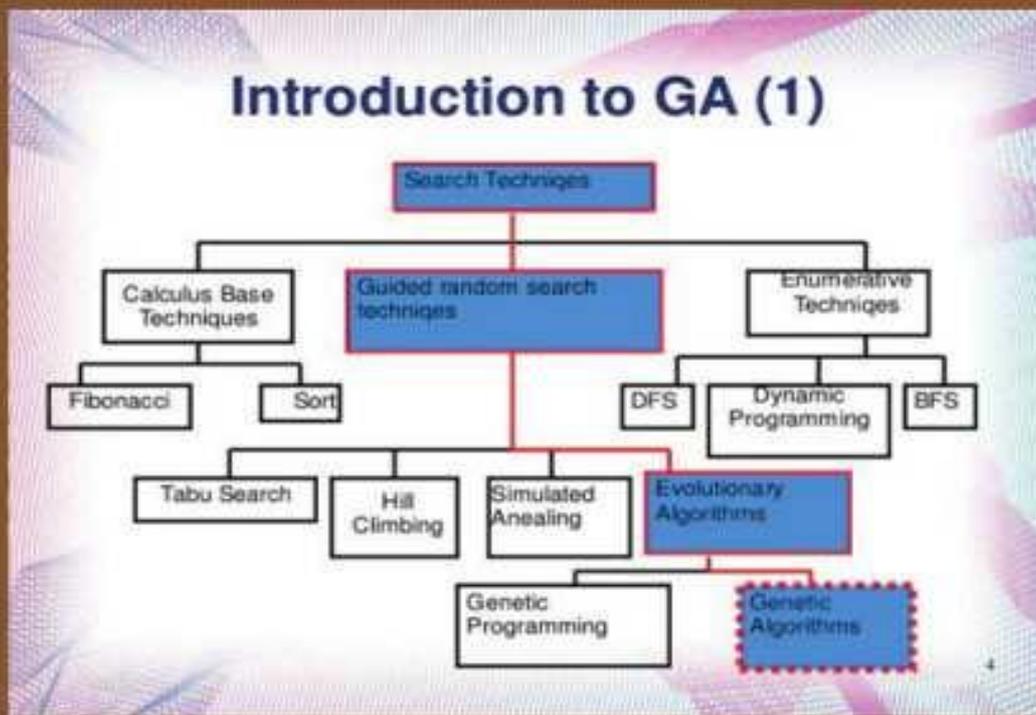PB 9781634621663 £23.99 January 2017 Technics Publications 140 pages

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Genetic Algorithms in Applications

Asa Bensten

Introduction to GA (1)

Search Techniques

Calculus Base Techniques | Guided random search techniqes | Enumerative Techniques

Fibonacci | Sort | DFS | Dynamic Programming | BFS

Tabu Search | Hill Climbing | Simulated Anealing | Evolutionary Algorithms

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