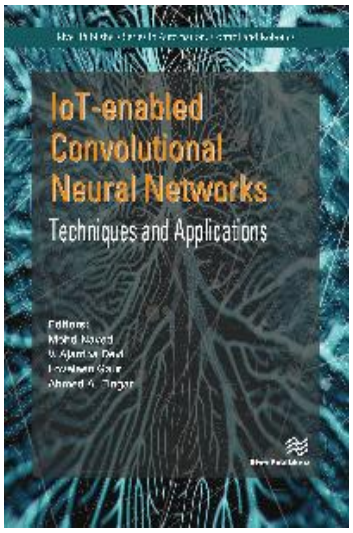
River Publishers

River Publishers Book Catalogue

Series in Automation, Control and Robotics



River Publishers Series in Automation, Control and Robotics

IoT-enabled Convolutional Neural Networks: Techniques and Applications

Editors:
Mohd Naved, Amity International Business School (AIBS), Amity University, Noida, India
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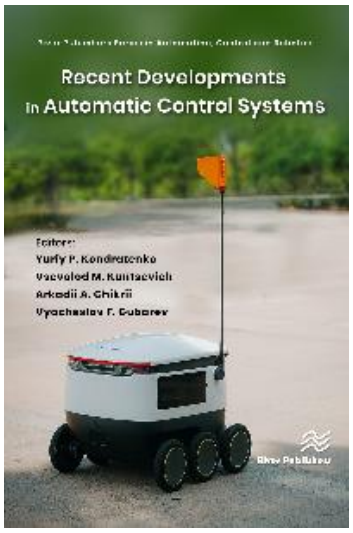
ISBN: 9788770227254
e-ISBN: 9788770227124
Available From: July 2022
Price: € 108.50

Description:
Convolutional neural networks (CNNs), a type of deep neural network that has become dominant in a variety of computer vision tasks, in recent few years has attracted interest across a variety of domains due to their high efficiency at extracting meaningful information from visual imagery. Convolutional neural networks (CNNs) excel at a wide range of machine learning and deep learning tasks. As sensor-enabled internet of things (IoT) devices pervade every aspect of modern life, it is becoming increasingly critical to run CNN inference, a computationally intensive application, on resource-constrained devices.

Through this edited volume we aim to provide a structured presentation of CNN enabled IoT applications in vision, speech, and natural language processing. This book discusses a variety of CNN techniques and applications, including but not limited to, IoT enabled CNN for speech de-noising, a smart app for visually impaired people, disease detection, ECG signal analysis, weather monitoring, texture analysis, etc.

Unlike other books on the market, this book covers the tools, techniques, and challenges associated with the implementation of CNN algorithms, computation time, and the complexity associated with reasoning and modelling various types of data. We have included CNN's current research trends and future directions.

Keywords: Convolutional Neural Network, Internet of Things (IoT), IoT enabled CNN, Data Analysis, Machine Learning.



River Publishers Series in Automation, Control and Robotics

Recent Developments in Automatic Control Systems

Editors:
Yuriy P. Kondratenko, Petro Mohyla Black Sea National University of the Ministry of Education and Science of Ukraine, Ukraine
Vsevolod M. Kuntsevich, Space Research Institute of the National Academy of Sciences of Ukraine and State Space Agency of Ukraine, Ukraine
Arkadii A. Chikrii, Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine, Ukraine
Vyacheslav F. Gubarev, Space Research Institute of the National Academy of Sciences of Ukraine and State Space Agency of Ukraine, Ukraine
ISBN: 9788770226745
e-ISBN: 9788770226738

Description:
This monograph provides an overview of the recent developments in modern control systems including new theoretical findings and successful examples of practical implementation of the control theory in different areas of industrial and special applications.

*Recent Developments in Automatic Control Syste*ms consists of extended versions of selected papers presented at the XXVI International Conference on Automatic Control "Automation 2020" (October 13-15, 2020, Kyiv, Ukraine) which is the main Ukrainian Control Conference organized by the Ukrainian Association on Automatic Control (national member organization of IFAC) and the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute".

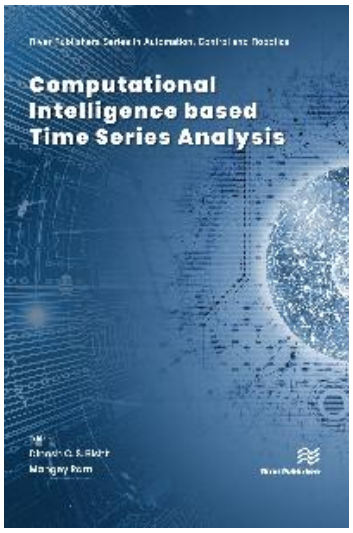
This is the third monograph in the River Publishers series in Automation, Control and Robotics based on the selected papers of the Ukrainian Control Conferences "Automation", in particular, the first monograph Control Systems: Theory and Applications (2018) was published based on "Automation - 2017" and the second monograph Advanced Control Systems: Theory and Applications was based on "Automation - 2018".

The monograph is divided into three main parts: (a) **Advances in Theoretical Research of Control Systems**; (b) *Advances in Control Systems Application*; (c) *Recent Developments in Collaborative Automation*.

The chapters have been structured to provide an easy-to-follow introduction to the topics that are addressed, including the most relevant references, so that anyone interested in this field can get started in the area.

This book may be useful for researchers and students who are interesting in recent developments in modern control systems, robust adaptive systems, optimal control, fuzzy control, motion control, identification, modelling, differential games, evolutionary optimization, reliability control, security control, intelligent robotics and cyber-physical systems.

Keywords: Control systems, robust adaptive systems, optimal control, fuzzy control, motion control, identification, modelling, conflict situation, differential games, evolutionary optimization, reliability control, security control, intelligent robot, cyberâ€“physical systems.



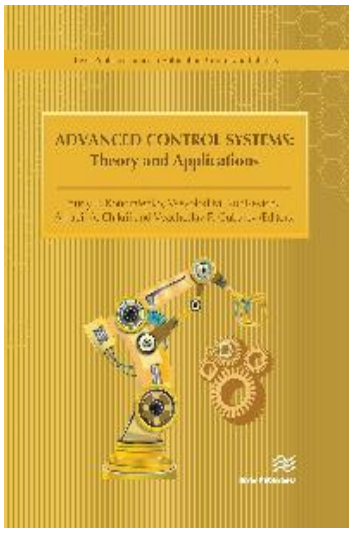
River Publishers Series in Automation, Control and Robotics

Computational Intelligence-based Time Series Analysis

Editors:
Dinesh C. S. Bisht, Jaypee Institute of Information Technology, India
Mangey Ram, Graphic Era (Deemed to be University), India
ISBN: 9788770224178
e-ISBN: 9788770224161
Available From: March 2022
Price: € 95.00

Description:
The sequential analysis of data and information gathered from past to present is called time series analysis. Time series data are of high dimension, large size and updated continuously. A time series depends on various factors like trend, seasonality, cycle and irregular data set, and is basically a series of data points well-organized in time. Time series forecasting is a significant area of machine learning. There are various prediction problems that are time-dependent and these problems can be handled through time series analysis. Computational intelligence (CI) is a developing computing approach for the forthcoming several years. CI gives the litheness to model the problem according to given requirements. It helps to find swift solutions to the problems arising in numerous disciplines. These methods mimic human behavior. The main objective of CI is to develop intelligent machines to provide solutions to real world problems, which are not modelled or too difficult to model mathematically. This book aims to cover the recent advances in time series and applications of CI for time series analysis.

Keywords: Dissimilarity measures, classification analysis, time Series, life estimation, Local Seismic Activity, auto regressive integrated moving averages (ARIMA), artificial neural networks ranking forecasting algorithms, MCDM, rainfall prediction



River Publishers Series in Automation, Control and Robotics

Advanced Control Systems: Theory and Applications

Editors:
Yuriy P. Kondratenko, Petro Mohyla Black Sea National University of the Ministry of Education and Science of Ukraine, Ukraine
Vsevolod M. Kuntsevich, Space Research Institute of the National Academy of Sciences of Ukraine and State Space Agency of Ukraine, Ukraine
Arkadii A. Chikrii, Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine, Ukraine
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ISBN: 9788770223416
e-ISBN: 9788770223409

Description:
Advanced Control Systems: Theory and Applications provides an overview of advanced research lines in control systems as well as in design, development and implementation methodologies for perspective control systems and their components in different areas of industrial and special applications.

It consists of extended versions of the selected papers presented at the XXV International Conference on Automatic Control "Automatics 2018" (September 18-19, 2018, Lviv, Ukraine) which is the main Ukrainian Control Conference organized by Ukrainian Association on Automatic Control (National member organization of IFAC) and Lviv National University "Lvivska Politechnica". More than 100 papers were presented at the conference with topics including: mathematical problems of control, optimization and game theory; control and identification under uncertainty; automated control of technical, technological and biotechnical objects; controlling the aerospace craft, marine vessels and other moving objects; intelligent control and information processing; mechatronics and robotics; information measuring technologies in automation; automation and IT training of personnel; the Internet of things and the latest technologies.

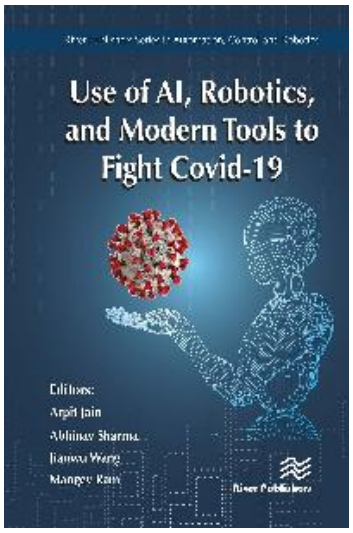
The book is divided into two main parts, the first concerning theory (7 chapters) and the second concerning applications (7 chapters) of advanced control systems.

The first part "Advances in Theoretical Research on Automatic Control" consists of theoretical research results which deal with descriptor control impulsive delay systems, motion control in condition of conflict, inverse dynamic models, invariant relations in optimal control, robust adaptive control, bio-inspired algorithms, optimization of fuzzy control systems, and extremal routing problem with constraints and complicated cost functions,.

The second part "Advances in Control Systems Applications" is based on the chapters which consider different aspects of practical implementation of advanced control systems, in particular, special cases in determining the spacecraft position and attitude using computer vision system, the spacecraft orientation by information from a system of stellar sensors, control synthesis of rotational and spatial spacecraft motion at approaching stage of docking, intelligent algorithms for the automation of complex biotechnical objects, an automatic control system for the slow pyrolysis of organic substances with variable composition, simulation complex of hierarchical systems based on the foresight and cognitive modelling, and advanced identification of impulse processes in cognitive maps.

The chapters have been structured to provide an easy-to-follow introduction to the topics that are addressed, including the most relevant references, so that anyone interested in this field can get started in the area. This book may be useful for researchers and students who are interesting in advanced control systems.

Keywords: Advanced control systems, identification, modelling, fuzzy control, motion control, routing problem, optimal control, robust adaptive systems, control of: spacecraft.



River Publishers Series in Automation, Control and Robotics

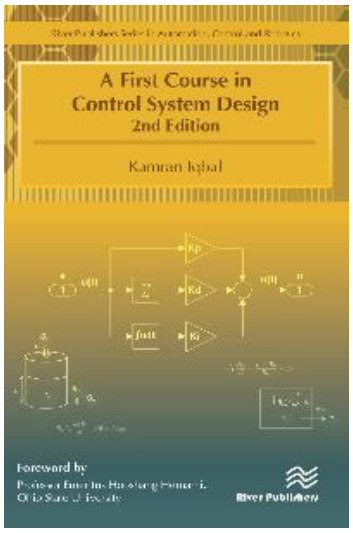
Use of AI, Robotics, and Modern Tools to Fight Covid-19

Editors:
Arpit Jain, University of Petroleum and Energy Studies, India
Abhinav Sharma, University of Petroleum and Energy Studies, India
Jianwu Wang, University of Maryland, Baltimore County, USA
Mangey Ram, Graphic Era Deemed to be University, India

ISBN: 9788770224437
e-ISBN: 9788770224420
Available From: May 2021
Price: € 95.00

Description:
The COVID-19 pandemic has hit the global at a colossal scale. With worldwide reported cases of 5.34 million it has led to severe impact on humanity. Being a highly contagious disease, it has given global health services their most severe challenge. Various countries are fighting to minimize the losses due to the outbreak, however a common trait is enforcing lockdown, which has become the main defence mechanism. Researchers are working around the clock to find a breakthrough in the diagnostics and treatment of the pandemic.
AI technology is useful for fast drug development and treatment. In the starting phase of COVID-19 pandemic, the medical fraternity in China diagnosed the virus using computed tomography (CT) and X-ray images due to the limitation of testing kits. Deep learning neural network model have also been used for COVID-19 diagnosis. AI assisted intelligent humanoid robots can be used to reduce the human contact and spread of COVID-19. In Italy robots have been used for measuring blood pressure, oxygen saturation and temperature of patients. Robots have also found applications in disinfecting and sterilizing of public places, COVID-19 testing, food and medicine delivery as well as entertaining patients in hospitals and quarantine centers, thereby reducing the workload of doctors and nurses.
Prediction of the spread of virus and providing the guidelines or prevention measures is another AI application in COVID-19. Kaggle and GitHub are the two websites where the real-time data of COVID-19 is aggregated. This includes confirmed cases, active cases, cured cases and deaths in each country. This data set can be used for predicting the active cases across different regions of the world so that appropriate amount of health infrastructure can be made available to these places.

Keywords: COVID-19; Machine Learning; Pandemics; Robotics; Climate change; Nurse scheduling, Time-series distribution; Optimization; Technical barriers to trade



River Publishers Series in Automation, Control and Robotics

A First Course in Control System Design, Second Edition

Author: Kamran Iqbal, University of Arkansas at Little Rock, USA

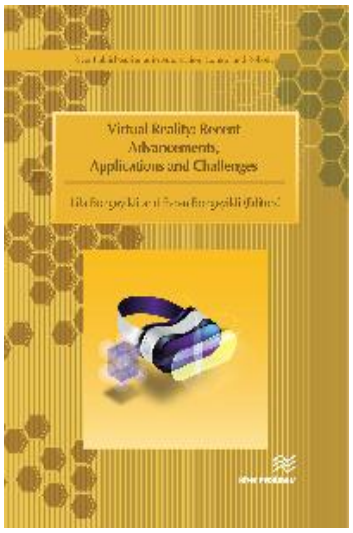
ISBN: 9788770221528
e-ISBN: 9788770221511
Available From: July 2020
Price: € 95.00

Description:
Control systems are pervasive in our lives. Our homes have environmental controls. The appliances we use, such as the washing machine, microwave, etc. carry embedded controllers in them. We fly in airplanes and drive automobiles that extensively use control systems. The industrial plants that produce consumer goods run on process control systems. The recent drive toward automation has increased our reliance on control systems technology.

This book discusses control systems design from a model-based perspective for dynamic system models of single-input single-output type. The emphasis in this book is on understanding and applying the techniques that enable the design of effective control systems in multiple engineering disciplines. The book covers both time-domain and the frequency-domain design methods, as well as controller design for both continuous-time and discrete-time systems. MATLAB© and its Control Systems Toolbox are extensively used for design. Technical topics discussed in the book include:

- Mathematical models of physical systems
- Analysis of transfer function and state variable models
- Control systems design objectives
- Control system design with root locus
- Control system design in the state-space
- Control system design of sampled-data systems
- Compensator design with frequency response methods

Keywords: Model-based control systems, transfer function models, state variable models, controller design with root locus, controller design for sampled-data systems, controller design for state variable models, frequency response ccompensator design



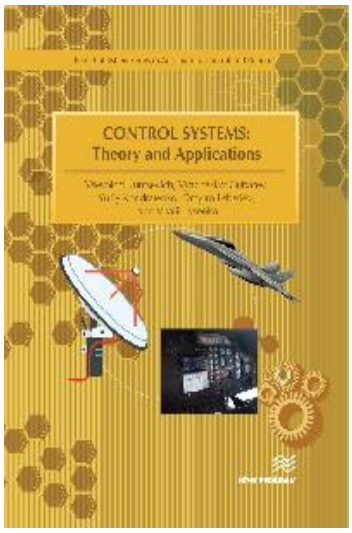
River Publishers Series in Automation, Control and Robotics

Virtual Reality: Recent Advancements, Applications and Challenges

Editors:
Lila Bozgeyikli, University of Arizona, USA
Ren Bozgeyikli, University of Arizona, USA
ISBN: 9788770221429
e-ISBN: 9788770221412
Available From: February 2020
Price: € 95.00

Description:
Although the emergence of virtual reality (VR) goes back to the 1960s, with the recent availability of low-cost and high-accuracy systems it has become increasingly prevalent in a wide variety of areas; with uses ranging from training and education to rehabilitation and entertainment. Nowadays, there are many companies that have their own VR systems with various types of headsets and controllers. This has shaped how VR is being used today and how we interact with the latest generation VR systems. With the rapidly evolving dynamics gained through technological advancements, VR is projected to grow and transform the way humans do everyday tasks both in the workplace and in personal lives. In addition to the VR headsets, there are now augmented reality (AR) headsets that allow the user to see their real-world surroundings while also viewing computer generated imagery. This leads to an enhanced user experience. This book aims to provide a comprehensive update of the latest scientific research, mainly in VR and partly in AR, from the last five years. The content is themed around the application areas of training, education, robotics, health and well-being, and user experience.

Keywords: Virtual reality, augmented reality, education, training, health, well-being, user experience, interaction, latest generation virtual reality systems, data visualization, recent advancements in virtual reality.



River Publishers Series in Automation, Control and Robotics

Control Systems: Theory and Applications

Editors:
Vsevolod Kuntsevich, Space Research Institute of NAS and NSA of Ukraine, Ukraine
Vyacheslav Gubarev, Space Research Institute of NAS and NSA of Ukraine, Ukraine
Yuriy Kondratenko, Petro Mohyla Black Sea National University, Ukraine)
Dmytro Lebedev, National Academy of Sciences and Ministry of Education and Sciences of Ukraine, Ukraine
Vitalii Lysenko, National University of Life and Environmental Sciences, Ukraine
ISBN: 9788770220248
e-ISBN: 9788770220255
Available From: December 2018
Price: € 95.00

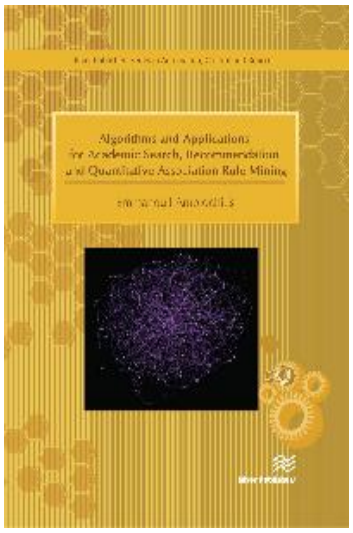
Description:
In recent years, a considerable amount of effort has been devoted, both in industry and academia, towards the development of advanced methods of control theory with focus on its practical implementation in various fields of human activity such as space control, robotics, control applications in marine systems, control processes in agriculture and food production.

Control Systems: Theory and Applications consists of selected best papers which were presented at XXIV International conference on automatic control "Automatics 2017" (September 13-15, 2017, Kyiv, Ukraine) organized by Ukrainian Association on Automatic Control (National member organization of IFAC - International Federation on Automatic Control) and National University of Life and Environmental Sciences of Ukraine. More than 120 presentations where discussed at the conference, with participation of the scientists from the numerous countries.

The book is divided into two main parts, a first on Theory of Automatic Control (5 chapters) and the second on Control Systems Applications (8 chapters). The selected chapters provide an overview of challenges in the area of control systems design, modeling, engineering and implementation and the approaches and techniques that relevant research groups within this area are employing to try to resolve these.

This book on advanced methods of control theory and successful cases in the practical implementation is ideal for personnel in modern technological processes automation and SCADA systems, robotics, space and marine industries as well as academic staff and master/research students in computerized control systems, automatized and computer-integrated systems, electrical and mechanical engineering

Keywords: Invariant sets, bounded perturbations, discrete control systems, nonlinear systems; set-valued mapping, conflict-controlled process, Pontryagin's condition, superpositional measurability, fractional derivative, Mittag-Leffler function; cognitive map, impulse process, identification problem, subspace method, ill-posed problem, closed-loop control system; supply network, inventory control, guaranteed cost control, invariant ellipsoid, Lyapunov-Krasovskii functional, linear matrix inequality, semidefinite programming; method of non-dimensionization, nonlinear dynamics problems, analytical solution, experimental data, Buckingham's theorem; energy efficiency, smart control, situational models, logical conditions, energy consumption, oscillatory regime, relay system, fuzzy control, simulation; pose estimation, uncooperative spacecraft, computer vision, machine learning, ellipsoidal estimation, guaranteed estimation; fuzzy controller; synthesis; optimization; automatic control system; floating dock; docking operations; automation of control processes, multi-assortment production, logical-dynamic models, intelligent systems, case control; coordinate determination, space images, orbital data, calibration procedure, sub-satellite polygon, point landmarks; control algorithms, microclimate, robotic complexes, greenhouse; UAV, stress indices, nitrogen, harvesting routes, NDVI.



River Publishers Series in Automation, Control and Robotics

Algorithms and Applications for Academic Search, Recommendation and Quantitative Association Rule Mining

Author: Emmanouil Amolochitis, Aalborg University, Denmark

ISBN: 9788793609648
e-ISBN: 9788793609631
Available From: February 2018
Price: € 80.00

Description:

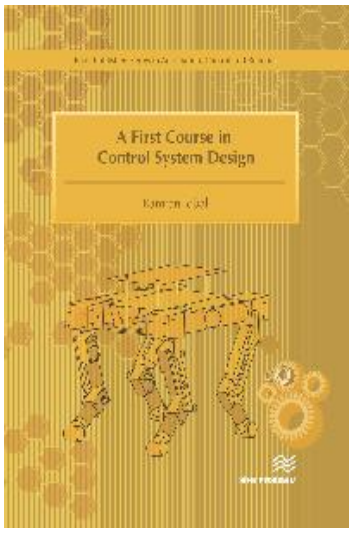
Algorithms and Applications for Academic Search, Recommendation and Quantitative Association Rule Mining presents novel algorithms for academic search, recommendation and association rule mining that have been developed and optimized for different commercial as well as academic purpose systems. Along with the design and implementation of algorithms, a major part of the work presented in the book involves the development of new systems both for commercial as well as for academic use.

In the first part of the book the author introduces a novel hierarchical heuristic scheme for re-ranking academic publications retrieved from standard digital libraries. The scheme is based on the hierarchical combination of a custom implementation of the term frequency heuristic, a time-depreciated citation score and a graph-theoretic computed score that relates the paper's index terms with each other. In order to evaluate the performance of the introduced algorithms, a meta-search engine has been designed and developed that submits user queries to standard digital repositories of academic publications and re-ranks the top-n results using the introduced hierarchical heuristic scheme.

In the second part of the book the design of novel recommendation algorithms with application in different types of e-commerce systems are described. The newly introduced algorithms are a part of a developed Movie Recommendation system, the first such system to be commercially deployed in Greece by a major Triple Play services provider. The initial version of the system uses a novel hybrid recommender (user, item and content based) and provides daily recommendations to all active subscribers of the provider (currently more than 30,000). The recommenders that we are presenting are hybrid by nature, using an ensemble configuration of different content, user as well as item-based recommenders in order to provide more accurate recommendation results.

The final part of the book presents the design of a quantitative association rule mining algorithm. Quantitative association rules refer to a special type of association rules of the form that antecedent implies consequent consisting of a set of numerical or quantitative attributes. The introduced mining algorithm processes a specific number of user histories in order to generate a set of association rules with a minimally required support and confidence value. The generated rules show strong relationships that exist between the consequent and the antecedent of each rule, representing different items that have been consumed at specific price levels. This research book will be of appeal to researchers, graduate students, professionals, engineers and computer programmers.

Keywords: Recommender Algorithms, Academic Search, Ranking Algorithms, Data and Association Rule Mining



River Publishers Series in Automation, Control and Robotics

A First Course in Control System Design

Author: Kamran Iqbal, University of Arkansas at Little Rock, USA

ISBN: 9788793609051
e-ISBN: 9788793609044
Available From: December 2017
Price: € 85.00

Description:
Control systems are pervasive in our lives. Our homes have environmental controls. The appliances we use at home, such as the washing machine, microwave, etc. have embedded controllers. We fly in airplanes and drive automobiles, which make extensive use of control systems. The increasing automation in the past few decades has increased our reliance on control systems.

A First Course in Control System Design discusses control systems design from a model-based perspective as applicable to single-input single-output systems. The emphasis in this book is on understanding and applying the techniques that enable the design of effective control systems. The book covers the time-domain and the frequency-domain design methods, as well as the design of continuous-time and discrete-time systems.

Technical topics discussed in the book include:

- Modeling of physical systems
- Analysis of transfer function and state variable models
- Control system design via root locus
- Control system design in the state-space
- Control design of sampled-data systems
- Compensator design via frequency response modification

Keywords: Model-based control systems, transfer function models, state variable models, design via root locus, sampled-data systems, design in the state-space, and design via frequency response modification

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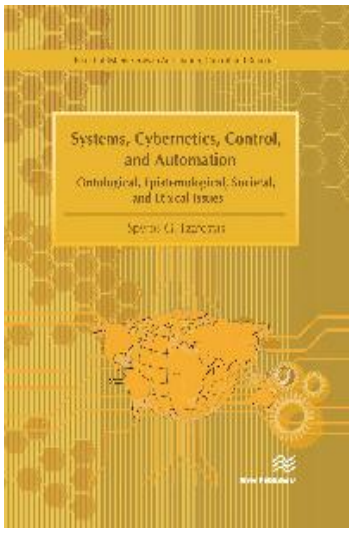

River Publishers Series in Automation, Control and Robotics

Systems, Cybernetics, Control, and Automation

Ontological, Epistemological, Societal, and Ethical Issues

Author: Spyros G. Tzafestas, National Technical University of Athens, Greece

ISBN: 9788793609075

e-ISBN: 9788793609068

Available From: July 2017

Price: € 85.00

Description:

Systems, cybernetics, control, and automation (SCCA) are four interrelated and overlapping scientific and technological fields that have contributed substantially to the development, growth, and progress of human society. A large number of models, methods, and tools were developed that assure high efficiency of SCCA applied to practical situations. The real-life applications of SCCA encompass a wide range of man-made or biological systems, including transportations, power generation, chemical industry, robotics, manufacturing, cybernetics organisms (cyborgs), aviation, economic systems, enterprise, systems, medical/health systems, environmental applications, and so on. The SCCA fields exhibit strong influences on society and rise, during their use and application, many ethical concerns and dilemmas.

This book provides a consolidated and concise overview of SCCA, in a single volume for the first time, focusing on ontological, epistemological, social impact, ethical, and general philosophical issues. It is appropriate for use in engineering courses as a convenient tutorial source providing fundamental conceptual and educational material on these issues, or for independent reading by students and scientists.

Included in the book is:

- Background material on philosophy and systems theory
- Major ontological, epistemological, societal and ethical/philosophical aspects of the four fields that are considered in the book
- Over 400 references and a list of 130 additional books in the relevant fields
- Over 100 colored photos and 70 line figures that illustrate the text

Keywords: Systems, general systems theory, cybernetics, control, networked control, industrial automation, office automation, societal systems, ethics, philosophy

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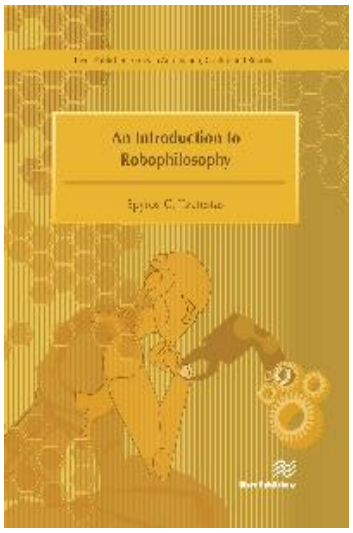

River Publishers Series in Automation, Control and Robotics

An Introduction to Robophilosophy

Cognition, Intelligence, Autonomy, Consciousness, Conscience and Ethics

Author: Spyros G. Tzafestas, National Technical University of Athens, Greece

ISBN: 9788793379572
e-ISBN: 9788793379565
Available From: June 2016
Price: € 75.00

Description:
Modern robots have arrived at a very matured state both in their mechanical / control aspects and their mental aspects. An Introduction to Robophilosophy explores the philosophical questions that arise in the development, creation, and use of mental – anthropomorphic and zoomorphic- robots that are capable of semiautonomous / autonomous operation, decision making and human-like action, being able to socially interact with humans and exhibit behavior similar to human beings or animals. Coverage first presents fundamental concepts, and an overview of philosophy, philosophy of science, and philosophy of technology. The six principal mental capabilities of modern robots, namely cognition, intelligence, autonomy, consciousness, conscience, and ethics are then studied from a philosophical point of view. They actually represent the product of technological embodiment of cognitive features to robots. Overall, readers are provided a consolidated thorough investigation of the philosophical aspects of these mental capabilities when embedded to robots. This book will serve as an ideal educational source in engineering and robotics courses as well as an introductory reference for researchers in the field of robotics, and it includes a rich bibliography.

Keywords: Robot Cognition; Robot Intelligence; Robot Autonomy; Robot Consciousness; Robot philosophy, Robots' Mental Features, Artificial Intelligence, Zoomorphic Robots, Autonomous Robot Functioning.