

## Reinforcement Learning For Autonomous Quadrotor Helicopter

This book is a collection of selected papers presented at the First Congress on Intelligent Systems (CIS 2020), held in New Delhi, India, during September 5–6, 2020. It includes novel and innovative work from experts, practitioners, scientists, and decision-makers from academia and industry. It covers topics such as Internet of Things, information security, embedded systems, real-time systems, cloud computing, big data analysis, quantum computing, automation systems, bio-inspired intelligence, cognitive systems, cyber physical systems, data analytics, data/web mining, data science, intelligence for security, intelligent decision making systems, intelligent information processing, intelligent transportation, artificial intelligence for machine vision, imaging sensors technology, image segmentation, convolutional neural network, image/video classification, soft computing for machine vision, pattern recognition, human–computer interaction, robotic devices and systems, autonomous vehicles, intelligent control systems, human motor control, game playing, evolutionary algorithms, swarm optimization, neural network, deep learning, supervised learning, fuzzy logic, rough sets, computational optimization, and neuro-fuzzy systems.

Deep learning algorithms have brought a revolution to the computer vision community by introducing non-traditional and efficient solutions to several image-related problems that had long remained unsolved or partially addressed. This book presents a collection of eleven chapters where each individual chapter explains the deep learning principles of a specific topic, introduces reviews of up-to-date techniques, and presents research findings to the computer vision community. The book covers a broad scope of topics in deep learning concepts and applications such as accelerating the convolutional neural network inference on field-programmable gate arrays, fire detection in surveillance applications, face recognition, action and activity recognition, semantic segmentation for autonomous driving, aerial imagery registration, robot vision, tumor detection, and skin lesion segmentation as well as skin melanoma classification. The content of this book has been organized such that each chapter can be read independently from the others. The book is a valuable companion for researchers, for postgraduate and possibly senior undergraduate students who are taking an advanced course in related topics, and for those who are interested in deep learning with applications in computer vision, image processing, and pattern recognition.

Most of the business sectors consider the Digital Twin concept as the next big thing in the industry. A current state analysis of their digital counterparts helps in the prediction of the future of physical assets. Organizations obtain better insights on their product performance through the implementation of Digital Twins, and the applications of the technology are frequently in sectors such as manufacturing, automobile, retail, health care, smart cities, industrial IoT, etc. This book explores the latest developments and covers the significant challenges, issues, and advances in Digital Twin Technology. It will be an essential resource for anybody involved in related industries, as well as anybody interested in learning more about this nascent technology. This book includes: The future, present, and past of Digital Twin Technology. Digital twin technologies across the Internet of Drones, which developed various perceptive and autonomous capabilities, towards different control strategies such as object detection, navigation, security, collision avoidance, and backup. These approaches help to deal with the expansive growth of big data solutions. The recent digital twin concept in agriculture, which offers the vertical framing by IoT installation development to enhance the problematic food supply situation. It also allows for significant energy savings practices. It is highly required to overcome those challenges in developing advanced imaging methods of disease detection & prediction to achieve more accuracy in large land areas of crops. The welfare of upcoming archetypes such as digitalization in forensic analysis. The ideas of digital twin have arisen to style the corporeal entity and associated facts reachable software and customers over digital platforms. Wind catchers as earth building: Digital Twins vs. green sustainable architecture.

This book is used at the graduate or advanced undergraduate level and by many others. Manned and unmanned ground, aerial and marine vehicles enable many promising and revolutionary civilian and military applications that will change our life in the near future. These applications include, but are not limited to, surveillance, search and rescue, environment monitoring, infrastructure monitoring, self-driving cars, contactless last-mile delivery vehicles, autonomous ships, precision agriculture and transmission line inspection to name just a few. These vehicles will benefit from advances of deep learning as a subfield of machine learning able to endow these vehicles with different capability such as perception, situation awareness, planning and intelligent control. Deep learning models also have the ability to generate actionable insights into the complex structures of large data sets. In recent years, deep learning research has received an increasing amount of attention from researchers in academia, government laboratories and industry. These research activities have borne some fruit in tackling some of the challenging problems of manned and unmanned ground, aerial and marine vehicles that are still open. Moreover, deep learning methods have been recently actively developed in other areas of machine learning, including reinforcement training and transfer/meta-learning, whereas standard, deep learning methods such as recent neural network (RNN) and coevolutionary neural networks (CNN). The book is primarily meant for researchers from academia and industry, who are working on in the research areas such as engineering, control engineering, robotics, mechatronics, biomedical engineering, mechanical engineering and computer science. The book chapters deal with the recent research problems in the areas of reinforcement learning-based control of UAVs and deep learning for unmanned aerial systems (UAS) The book chapters present various techniques of deep learning for robotic applications. The book chapters contain a good literature survey with a long list of references. The book chapters are well written with a good exposition of the research problem, methodology, block diagrams and mathematical techniques. The book chapters are lucidly illustrated with numerical examples and simulations. The book chapters discuss details of applications and future research areas.

Select Proceedings of ICCIML 2021

The Complete Reference (Volume 5)

Experimental Robotics

Digital Twin Technology

Volume II

Theoretical Foundation and Applications

Automation Using the IoT and Machine Learning

*This book constitutes the proceedings of the 12th Mexican Conference on Pattern Recognition, MCFR 2020, which was due to be held in Morelia, Mexico, in June 2020. The conference was held virtually due to the COVID-19 pandemic. The 31 papers presented in this volume were carefully reviewed and selected from 67 submissions. They were organized in the following topical sections: pattern recognition techniques; image processing and analysis; computer vision; industrial and medical applications of pattern recognition; natural language processing and recognition; artificial intelligence techniques and recognition.*

*Going beyond the traditional field of robotics to include other mobile vehicles, this reference and "recipe book" describes important theoretical concepts, techniques, and applications that can be used to build truly mobile intelligent autonomous systems (MIAS). With the infusion of neural networks, fuzzy logic, and genetic algorithm paradigms for MIAS, it blends modeling, sensors, control, estimation, optimization, signal processing, and heuristic methods in MIAS and robotics, and includes examples and applications throughout. Offering a comprehensive view of important topics, it helps readers understand the subject from a system-theoretic and practical point of view.*

*These volumes of "Advances in Intelligent Systems and Computing" highlight papers presented at the "Third Iberian Robotics Conference (ROBOT 2017)". Held from 22 to 24 November 2017 in Seville, Spain, the conference is a part of a series of conferences co-organized by SEIDROB (Spanish Society for Research and Development in Robotics) and SFR (Portuguese Society for Robotics). The conference is focused on Robotics scientific and technological activities in the Iberian Peninsula, although open to research and delegates from other countries. Thus, it has more than 500 authors from 21 countries. The volumes present scientific advances but also robotic industrial applications, looking to promote new collaborations between industry and academia.*

*2019 IEEE 2nd International Conference on Automation, Electronics and Electrical Engineering (AUTEEE 2019) will be held in Shenyang during November 22 24, 2019 The aim as well as objective of AUTEEE 2019 is to present the latest research and results of scientists working in the field related to Automation, Electronics and Electrical Engineering topics This conference provides opportunities for the delegates to exchange new ideas and application through face to face discussions, to establish business or research relations and to find global partners for future collaborations AUTEEE 2019 will be an International Forum for those who wish to present their projects and innovations, having also the opportunity to discuss the main aspects and the latest results in the field of Education and Research It focuses on both theory and applications mainly covering the topics of Automation, Electronics and Electrical Engineering*

*Algorithmic Foundations of Robotics XI*

*ROBOT 2017: Third Iberian Robotics Conference*

*Proceedings of 2019 Chinese Intelligent Systems Conference*

*Deep Learning in Computer Vision*

*Data-Driven Science and Engineering*

*Intelligent Systems: Models and Applications*

*IAS-10*

**In this paper, we present the Autonomous Flight Arcade (AFA), a suite of robust environments for end-to-end control of fixed-wing aircraft and quadcopter drones. These environments are playable by both humans and artificial agents, making them useful for varied tasks including reinforcement learning, imitation learning, and human experiments. Additionally, we show that interpretable policies can be learned through the Neural Circuit Policy architecture on these environments. Finally, we present baselines of both human and AI performance on the Autonomous Flight Arcade environments.**

**This book provides the state-of-the-art intelligent methods and techniques for solving real-world problems along with a vision of the future research. The fifth 2020 Future Technologies Conference was organized virtually and received a total of 590 submissions from academic pioneering researchers, scientists, industrial engineers, and students from all over the world. The submitted papers covered a wide range of important topics including but not limited to computing, electronics, artificial intelligence, robotics, security and communications and their applications to the real world. After a double-blind peer review, 218 submissions (including 6 poster papers) have been selected to be included in these proceedings. One of the meaningful and valuable dimensions of this conference is the way it brings together a large group of technology enthusiasts in one venue to not only present breakthrough research in future technologies, but also to promote discussions and debate of relevant issues, challenges, opportunities and research findings. The authors hope that readers find the book interesting, exciting and inspiring.**

**This book features the latest theoretical results and techniques in the field of guidance, navigation, and control (GNC) of vehicles and aircraft. It covers a range of topics, including, but not limited to, intelligent computing communication and control; new methods of navigation, estimation, and tracking; control of multiple moving objects; manned and autonomous unmanned systems; guidance, navigation, and control of miniature aircraft; and sensor systems for guidance, navigation, and control. Presenting recent advances in the form of illustrations, tables, and text, it also provides detailed information of a number of the studies, to offer readers insights for their own research. In addition, the book addresses fundamental concepts and studies in the development of GNC, making it a valuable resource for both beginners and researchers wanting to further their understanding of guidance, navigation, and control.**

**This volume contains the proceedings of the tenth International Conference on Intelligent Autonomous Systems (IAS-10) in Baden Baden, Germany. The IAS conference brings together leading researchers interested in all aspects of autonomy and adaptivity of artificial systems. One of the driving forces of this conference is the observation that intelligence and autonomy is best studied and demonstrated using mobile robots acting autonomously in real-world environments and under challenging conditions. The papers contained in the final program of the conference cover a wide spectrum of research in autonomous intelligent systems including agent robotics, walking robots, motion planning, robot control, multi-robot systems, navigation, perception, applications, learning and adaptation, and humanoid robots, just to mention some of them. The organization of IAS-10 aims to provide the reader with new ideas and to exchange knowledge in relation to the research of autonomous systems. Previous IAS proceedings are available through IOS Press as well.**

**20th EPIA Conference on Artificial Intelligence, EPIA 2021, Virtual Event, September 7–9, 2021, Proceedings**

**Selected Contributions of the Eleventh International Workshop on the Algorithmic Foundations of Robotics**

**Advances in Automation and Robotics Research**

**Modelling and Simulation for Autonomous Systems**

**Proceedings of CIS 2020, Volume 2**

**Approximate Dynamic Programming**

**Robot Operating System (ROS)**

This volume constitutes the proceedings of the 18th Asia Simulation Conference, AsiaSim 2018, held in Kyoto, Japan, in August 2018. The 45 revised full papers presented in this volume were carefully reviewed and selected from 90 submissions. The papers are organized in topical sections on modeling and simulation technology; soft computing and machine learning; high performance computing and cloud computing; simulation technology for industry; simulation technology for intelligent society; simulation of instrumentation and control application; computational mathematics and computational science; flow simulation; visualization and computer vision to support simulation.

Despite the increasing population (the Food and Agriculture Organization of the United Nations estimates 70% more food will be needed in 2050 than was produced in 2006), issues related to food production have yet to be completely addressed. In recent years, Internet of Things technology has begun to be used to address different industrial and technical challenges to meet this growing need. These Agro-IoT tools boost productivity and minimize the pitfalls of traditional farming, which is the backbone of the world's economy. Aided by the IoT, continuous monitoring of fields provides useful and critical information to farmers, ushering in a new era in farming. The IoT can be used as a tool to combat climate change through greenhouse automation; monitor and manage water, soil and crops; increase productivity; control insecticides/pesticides; detect plant diseases; increase the rate of crop sales; cattle monitoring etc. Agricultural Informatics: Automation Using the IoT and Machine Learning focuses on all these topics, including a few case studies, and they give a clear indication as to why these techniques should now be widely adopted by the agriculture and farming industries.

Intelligent autonomous systems are emerged as a key enabler for the creation of a new paradigm of services to humankind, as seen by the recent advancement of autonomous cars licensed for driving in our streets, of unmanned aerial and underwater vehicles carrying out hazardous tasks on-site, and of space robots engaged in scientific as well as operational missions, to list only a few. This book aims at serving the researchers and practitioners in related fields with a timely dissemination of the recent progress on intelligent autonomous systems, based on a collection of papers presented at the 12th International Conference on Intelligent Autonomous Systems, held in Jeju, Korea, June 26-29, 2012. With the theme of "Intelligence and Autonomy for the Service to Humankind, the conference has covered such diverse areas as autonomous ground, aerial, and underwater vehicles, intelligent transportation systems, personal/domestic service robots, professional service robots for surgery/rehabilitation, rescue/security and space applications, and intelligent autonomous systems for manufacturing and healthcare. This volume I includes contributions devoted to Autonomous Ground Vehicles and Mobile Manipulators, as well as Unmanned Aerial and Underwater Vehicles and Bio-inspired Robotics.

Get a complete understanding of aircraft control and simulation Aircraft Control and Simulation: Dynamics, Controls Design, and Autonomous Systems, Third Edition is a comprehensive guide to aircraft control and simulation. This updated text covers flight control systems, flight dynamics, aircraft modeling, and flight simulation from both classical design and modern perspectives, as well as two new chapters on the modeling, simulation, and adaptive control of unmanned aerial vehicles. With detailed examples, including relevant MATLAB calculations and FORTRAN codes, this approachable yet detailed reference also provides access to supplementary materials, including chapter problems and an instructor's solution manual. Aircraft control, as a subject area, combines an understanding of aerodynamics with knowledge of the physical systems of an aircraft. The ability to analyze the performance of an aircraft both in the real world and in computer-simulated flight is essential to maintaining proper control and function of the aircraft. Keeping up with the skills necessary to perform this analysis is critical for you to thrive in the aircraft control field. Explore a steadily progressing list of topics, including equations of motion and aerodynamics, classical controls, and more advanced control methods Consider detailed control design examples using computer numerical tools and simulation examples Understand control design methods as they are applied to aircraft nonlinear math models Access updated content about unmanned aircraft (UAVs) Aircraft Control and Simulation: Dynamics, Controls Design, and Autonomous Systems, Third Edition is an essential reference for engineers and designers involved in the development of aircraft and aerospace systems and computer-based flight simulations, as well as upper-level undergraduate and graduate students studying mechanical and aerospace engineering.

First International Workshop, MESAS 2014, Rome, Italy, May 5-6, 2014, Revised Selected Papers

Proceedings of 3rd ICSCSP 2020, Volume 2

Deep Learning for Robot Perception and Cognition

Agricultural Informatics

Deep Learning for Unmanned Systems

Pattern Recognition

Deep Learning for Robot Perception and Cognition introduces a broad range of topics and methods in deep learning for robot perception and cognition together with end-to-end methodologies. The book provides the conceptual and mathematical background needed for approaching a large number of robot perception and cognition tasks from an end-to-end learning point-of-view. The book is suitable for students, university and industry researchers and practitioners in Robotic Vision, Intelligent Control, Mechatronics, Deep Learning, Robotic Perception and Cognition tasks. Presents deep learning principles and methodologies Explains the principles of applying end-to-end learning in robotics applications Presents how to design and train deep learning models Shows how to apply deep learning in robot vision tasks such as object recognition, image classification, video analysis, and more Uses robotic simulation environments for training deep learning models Applies deep learning methods for different tasks ranging from planning and navigation to biosignal analysis

This book showcases new theoretical findings and techniques in the field of intelligent systems and control. It presents in-depth studies on a number of major topics, including: Multi-Agent Systems, Complex Networks, Intelligent Robots, Complex System Theory and Swarm Behavior, Event-Triggered Control and Data-Driven Control, Robust and Adaptive Control, Big Data and Brain Science, Process Control, Intelligent Sensor and Detection Technology, Deep learning and Learning Control, Guidance, Navigation and Control of Aerial Vehicles, and so on. Given its scope, the book will benefit all researchers, engineers, and graduate students who want to learn about cutting-edge advances in intelligent systems, intelligent control, and artificial intelligence.

The book includes select proceedings of the International Conference on Computational Intelligence in Machine Learning (ICCIML 2021). The book constitutes peer-reviewed papers on machine learning, computational intelligence, the internet of things, and smart city applications emphasizing multi-disciplinary research in artificial intelligence and cyber-physical systems. This book addresses the comprehensive nature of computational intelligence, artificial intelligence, machine learning, and deep learning to emphasize its character in modeling, identification, optimization, prediction, forecasting, and control of future intelligent systems. The book will be useful for researchers, research scholars, and students to formulate their research ideas and find future directions in these areas. It will help the readers to solve a diverse range of problems in industries and their real-world applications.

The book reveals many different aspects of motion control and a wide multiplicity of approaches to the problem as well. Despite the number of examples, however, this volume is not meant to be exhaustive: it intends to offer some original insights for all researchers who will hopefully make their experience available for a forthcoming publication on the subject.

Recent Advances in Information and Communication Technology 2015

Aircraft Control and Simulation

Motion Control

Intelligent Human Computer Interaction

12th Mexican Conference, MCFR 2020, Morelia, Mexico, June 24–27, 2020, Proceedings

Autonomous Flight Arcade

Revised and Selected Papers from the 9th IEEE International Symposium on Intelligent Systems and Informatics SISY 2011

Photographing small objects with a quadcopter is non-trivial to perform with many common user interfaces, especially when it requires maneuvering an Unmanned Aerial Vehicle (UAV) to difficult angles in order to shoot high perspectives. The aim of this research is to employ machine learning to support better user interfaces for quadcopter photography. Human Robot Interaction (HRI) is supported by visual servoing, a specialized vision system for real-time object detection, and control policies acquired through reinforcement learning (RL). Two investigations of guided autonomy were conducted. In the first, the user directed the quadcopter with a sketch based interface, and periods of user direction were interspersed with periods of autonomous flight. In the second, the user directs the quadcopter by taking a single photo with a handheld mobile device, and the quadcopter autonomously flies to the requested vantage point. This dissertation focuses on the following problems: 1) evaluating different user interface paradigms for dynamic photography in a GPS-denied environment; 2) learning better Convolutional Neural Network (CNN) object detection models to assure a higher precision in detecting human subjects than the currently available state-of-the-art fast models; 3) transferring learning from the Gazebo simulation into the real world; 4) learning robust control policies using deep reinforcement learning to maneuver the quadcopter to multiple shooting positions with minimal human interaction.

Autonomous Landing of Quadrotor on a Moving UGV with the Optimal Control Policies

This book constitutes the refereed proceedings of the 20th EPIA Conference on Artificial Intelligence, EPIA 2021, held virtually in September 2021. The 62 full papers and 6 short papers presented were carefully reviewed and selected from a total of 108 submissions. The papers are organized in the following topical sections: artificial intelligence and IoT in agriculture; artificial intelligence and law; artificial intelligence in medicine; artificial intelligence in power and energy systems; artificial intelligence in transportation systems; artificial life and evolutionary algorithms; ambient intelligence and affective environments; general AI; intelligent robotics; knowledge discovery and business intelligence; multi-agent systems; theory and applications; and text mining and applications.

The theory and applications of intelligent systems is today an important field of research. This book is an up-to-date collection of seventeen chapters, written by recognized experts in the field. In an introductory mathematical foundations part an overview of generalizations of the integral inequalities for nonadditive integrals and a construction of the General Prioritized Fuzzy Satisfaction Problem is given. Then different aspects of robotics are presented, such as the differences between human beings and robots, the motion of bipedal humanoid robots, and an evaluation of different autonomous quadrotor flight controllers. Also Fuzzy Systems are presented by a model of basic planar imprecise geometric objects allowing various applications in image analysis , GIS, and robotics, as well as a type-2 fuzzy logic in a software library for developing perceptual computers, and a two–degree-of–freedom speed control solutions for a brushless Direct Current motor. The book also presents recent applications in medicine such as a Virtual Doctor System, methods for a face to face human machine interaction, and an emotion estimation, with applications for multiple diseases and the effect of the applied therapy. The last part of the book covers different applications in transportation, network monitoring, and localization of pedestrians in images.

Unmanned Aerial Systems

Machine Learning, Dynamical Systems, and Control

Volume 1: Proceedings of the 12th International Conference IAS-12, Held June 26-29, 2012, Jeju Island, Korea

18th Asia Simulation Conference, AsiaSim 2018, Kyoto, Japan, October 27-29, 2018, Proceedings

Mobile Intelligent Autonomous Systems

Methods and Applications for Modeling and Simulation of Complex Systems

Proceedings of the 4th International Conference on Electrical Engineering and Control Applications

including but not limited to wireless communications, future networking, signal processing, 5G Beyond, network and information security, optical communications, satellite communications, intelligent informatics and big data and multimedia

This carefully edited volume is the outcome of the eleventh edition of the Workshop on Algorithmic Foundations of Robotics (WAFR), which is the premier venue showcasing cutting edge research in algorithmic robotics. The eleventh WAFR, which was held August 3-5, 2014 at Boʻʔazici University in Istanbul, Turkey continued this tradition. This volume contains extended versions of the 42 papers presented at WAFR. These contributions highlight the cutting edge research in classical robotics problems (e.g. manipulation, motion, path, multi-robot and kinodynamic planning), geometric and topological computation in robotics as well novel applications such as informative path planning, active sensing and surgical planning. This book - rich by topics and authoritative contributors - is a unique reference on the current developments and new directions in the field of algorithmic foundations.

Incorporating papers from the 12th International Symposium on Experimental Robotics (ISER), December 2010, this book examines the latest advances across the various fields of robotics. Offers insights on both theoretical concepts and experimental results.

This book gathers papers presented during the 4th International Conference on Electrical Engineering and Control Applications. It covers new control system models, troubleshooting tips and complex system requirements, such as increased speed, precision and remote capabilities. Additionally, the papers discuss not only the engineering aspects of signal processing and various practical issues in the broad field of information transmission, but also novel technologies for communication networks and modern antenna design. This book is intended for researchers, engineers and advanced postgraduate students in the fields of control and electrical engineering, computer science and signal processing, as well as mechanical and chemical engineering.

Solving the Curses of Dimensionality

Congress on Intelligent Systems

Reinforcement Learning for End-to-end Control of Fixed-wing Aircraft

Proceedings of the 3rd Latin American Congress on Automation and Robotics, Monterrey, Mexico 2021

ICEECA 2019, 17–19 December 2019, Constantine, Algeria

17th EA International Conference, CollaborateCom 2021, Virtual Event, October 16–18, 2021, Proceedings, Part I

2019 11th International Conference on Wireless Communications and Signal Processing (WCSP)

**This book presents recent research work and results in the area of communication and information technologies. The book includes the main results of the 11th International Conference on Computing and Information Technology (IC2IT) held during July 2nd-3rd, 2015 in Bangkok, Thailand. The book is divided into the two main parts Data Mining and Machine Learning as well as Data Network and Communications. New algorithms and methods of data mining asr discussed as well as innovative applications and state-of-the-art technologies on data mining, machine learning and data networking.**

**Unmanned Aerial Systems: Theoretical Foundation and Applications presents some of the latest innovative approaches to drones from the point-of-view of dynamic modeling, system analysis, optimization, control, communications, 3D-mapping, search and rescue, surveillance, farmland and construction monitoring, and more. With the emergence of low-cost UAS, a vast array of research works in academia and products in the industrial sectors have evolved. The book covers the safe operation of UAS, including, but not limited to, fundamental design, mission and path planning, control theory, computer vision, artificial intelligence, applications requirements, and more. This book provides a unique reference of the state-of-the-art research and development of unmanned aerial systems, making it an essential resource for researchers, instructors and practitioners. Covers some of the most innovative approaches to drones Provides the latest state-of-the-art research and development surrounding unmanned aerial systems Presents a comprehensive reference on unmanned aerial systems, with a focus on cutting-edge technologies and recent research trends in the area.**

**This book presents selected research papers on current developments in the fields of soft computing and signal processing from the Third International Conference on Soft Computing and Signal Processing (ICSCSP 2020). The book covers topics such as soft sets, rough sets, fuzzy logic, neural networks, genetic algorithms and machine learning and discusses various aspects of these topics, e.g., technological considerations, product implementation and application issues.**

**Data-driven discovery is revolutionizing the modeling, prediction, and control of complex systems. This textbook brings together machine learning, engineering mathematics, and mathematical physics to integrate modeling and control of dynamical systems with modern methods in data science. It highlights many of the recent advances in scientific computing that enable data-driven methods to be applied to a diverse range of complex systems, such as turbulence, the brain, climate, epidemiology, finance, robotics, and autonomy. Aimed at advanced undergraduate and beginning graduate students in the engineering and physical sciences, the text presents a range of topics and methods from introductory to state of the art.**

**Advances in Guidance, Navigation and Control**

**Principles and Applications**

**Collaborative Computing, Networking, Applications and Worksharing**

**Dynamics, Controls Design, and Autonomous Systems**

**Progress in Artificial Intelligence**

**Proceedings of 2020 International Conference on Guidance, Navigation and Control, ICGNC 2020, Tianjin, China, October 23-25, 2020**

**2019 IEEE 2nd International Conference on Automation, Electronics and Electrical Engineering (AUTEEE)**

This thesis proposes an offline method that uses an integral reinforcement learning (IRL) technique along with the system identification to determine the optimal control of a system with completely unknown dynamics. Unmanned aerial vehicles (UAV) that are particularly deployed to track and land on an arbitrarily moving unmanned ground vehicles (UGV), demand a high performance controller to perform precise tracking. One way of designing an optimal tracking controller is developing linear quadratic integrators (LQI) with a quadratic type of cost function that minimizes the linearized UAV system dynamics. We overcome this problem by employing an IRL technique that solves LQI through system identification. Usually, IRL techniques adopt a conventional way of solving the Hamilton/Jacobi/Bellman (HJB) equation with value function approximation. The proposed approach evaluates the optimal control using IRL that solves the HJB equation using system identification instead of value function approximation. Assuming that the UAV system dynamics are linear time-invariant over a particular flight condition, the input and output data samples from a linear regression perspective, where we use the conjugate gradient descent optimization algorithm. This approach addresses the challenge to compute optimal control without the need to know UAV dynamics.We have rigorously tested and simulated the proposed method on various flight trajectories. The test results have shown significant improvement in the control policy over each iteration of IRL. After validating the proposed method in simulation, we have implemented this approach on a real UAV to track and land on

This book is the fifth volume in the successful book series Robot Operating System: The Complete Reference. The objective of the book is to provide the reader with comprehensive coverage on the Robot Operating System (ROS), which is currently considered to be the primary development framework for robotics applications, and the latest trends and contributing systems. The content is divided into six parts. Part I presents for the first time the emerging ROS 2.0 framework, while Part II focuses on multi-robot systems, namely on SLAM and Swarm coordinat systems, namely self-driving cars and unmanned aerial systems. In turn, Part IV addresses the contributions of simulation frameworks for ROS. In Part V, two chapters explore robotic manipulators and legged robots. Finally, Part VI presents emerging topics in monocular SLAM and a chapter on fault tolerance systems for ROS. Given its scope, the book will offer a valuable companion for ROS users and developers, helping them deepen their knowledge of ROS capabilities and features.

This book constitutes the thoroughly refereed post-workshop proceedings of the First International Workshop on Modelling and Simulation for Autonomous Systems, MESAS 2014, held in Rome, Italy, in May 2014. The 32 revised full papers included in the volume were carefully reviewed and selected from 50 submissions, of which 46 were presented at the workshop. They are organized in the following topical sections: unmanned aerial vehicle, distributed simulation, robot system, military application, validation, human-machine communication, gazebo simulator.

This carefully edited volume aims at providing readers with the most recent progress on intelligent autonomous systems, with its particular emphasis on intelligent autonomous ground, aerial and underwater vehicles as well as service robots for home and healthcare under the context of the aforementioned convergence. "Frontiers of Intelligent Autonomous Systems" includes thoroughly revised and extended papers selected from the 12th International Conference on Intelligent Autonomous Systems (IAS-12), held in Jeju, Korea, June 26-29, 2012. The editors c

IAS-12 which are organized into three chapters: Chapter 1 is dedicated to autonomous navigation and mobile manipulation, Chapter 2 to unmanned aerial and underwater vehicles and Chapter 3 to service robots for home and healthcare. To help the readers to easily access this volume, each chapter starts with a chapter summary introduced by one of the editors: Chapter 1 by Sukhan Lee, Chapter 2 by Kwang Joon Yoon and Chapter 3 by Jangmyung Lee.

Soft Computing and Signal Processing

Proceedings of the Future Technologies Conference (FTC) 2020, Volume 2

Intelligent Autonomous Systems 10

The 12th International Symposium on Experimental Robotics

Proceedings of 2021 International Conference on Autonomous Unmanned Systems (ICAUS 2021)

Computational Intelligence in Machine Learning

Frontiers of Intelligent Autonomous Systems