Autonomous Robots From Biological Inspiration To Implementation And Control Intelligent Robotics And Autonomous Agents Series

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Autonomous Robots: From Biological Inspiration to Implementation and Control (Intelligent Robotics and Autonomous Agents series): Bekey, George A.: 9780262534185: Amazon.com: Books. See All Buying Options.

Autonomous Robots: From Biological Inspiration to ...

Living systems can be considered the prototypes of autonomous systems, and Bekey explores the biological inspiration that forms the basis of many recent developments in robotics. He also discusses robot control issues and the design of control architectures.

Autonomous Robots: From Biological Inspiration to ...

Autonomous Robots: From Biological Inspiration to Implementation and Control. Autonomous Robots. : Autonomous robots are intelligent machines capable of performing tasks in the world by themselves,...

Autonomous Robots: From Biological Inspiration to ...
Autonomous robots - from biological inspiration to implementation and control. Intelligent robotics and…. Autonomous robots are intelligent machines capable of performing tasks in the world by themselves, without explicit human control. Examples range from autonomous helicopters to Roomba, the robot vacuum cleaner.

[PDF] Autonomous robots - from biological inspiration to ...
Autonomous Robots: From Biological Inspiration to Implementation and Control. George A. Bekey. (2005, MIT Press.) Hardcover, 577 pages. ISBN 0262025787. 1 A Milestone in the History of Modern Robotics While robotics research has achieved considerable success in the development of rapid, precise, and

Autonomous Robots: From Biological Inspiration to ...
Description. Intelligent robots will soon be ready to serve in our home, hospital, office, and outdoors. One key approach to the development of such intelligent and autonomous robots draws inspiration from the behavior demonstration of biological systems. In fact, using this approach, a number of new application areas have recently received significant interest from the robotics community, including rehabilitation robots, service robots, medical robots, and entertainment robots.

Biologically Inspired and Rehabilitation Robotics 2020 ...
Autonomous Robots: From Biological Inspiration to Implementation and Control (Intelligent Robotics and Autonomous Agents series)

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There are several open problems in autonomous robotics which are special to the field rather than being a part of the general pursuit of AI. According to George A. Bekey's Autonomous Robots: From Biological Inspiration to Implementation and Control, problems include things such as making sure the robot is able to function correctly and not run into obstacles autonomously.

Autonomous robot - Wikipedia

Robotics researchers increasingly agree that ideas from biology and self-organization can strongly benefit the design of autonomous robots. Biological organisms have evolved to perform and survive...

Self-Organization, Embodiment, and Biologically Inspired ...

Living systems can be considered the prototypes of autonomous systems, and Bekey explores the biological inspiration that forms the basis of many recent developments in robotics. He also discusses robot control issues and the design of control architectures.

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Autonomous Robots: From Biological Inspiration to ...

Living systems can be considered the prototypes of autonomous systems, and Bekey explores the biological inspiration that forms the basis of many recent developments in robotics.

0262025787 - Autonomous Robots: from Biological ...

Liu and Hu: Biological Inspiration: From Carangiform Fish to Multi-Joint Robotic Fish 45 5.2 Cruise straight experiments For the cruise

straight swim pattern, the same ki- nematic parameters as in Fig. 9 were applied on G9 robotic fish apart from ?, which is 2.6?, i.e., the tail flapping frequency is 1.3 Hz which is an average flap- ping ...

Biological Inspiration: From Carangiform Fish to Multi ...

In designing the robots the similarities to animal bodies (insects, quadrupeds, humans) are often utilized. Also the actuators are designed using biological inspiration (especially the artificial muscles which are recently becoming more popular). The works on motion synthesis still do not profit enough from the sciences of biology and neurology.

Biological inspiration used for robots motion synthesis ...

RASC's areas of robotics research include humanoid robotics, socially assistive robotics, distributed robotics, sensor-actuator networks, aerial robotics, marine robotics, human-robot interaction, rehabilitation robotics, robot learning, educational robotics, and space robotics. The majority of these efforts are interdisciplinary in nature, involving biological inspiration and a variety of application domains ranging from medicine to art.

Robots – Robotics and Autonomous Systems Center

Fundamental issues associated with autonomous robot control. Emphasizes biological perspective that forms the basis of many current developments in robotics. Textbook(s) G.A. Bekey, Autonomous Robots: From Biological Inspiration to Implementation and Control, MIT Press, 2005. ISBN 0262025787, ISBN 978-0262025782 (required)

An introduction to the science and practice of autonomous robots that reviews over 300 current systems and examines the underlying technology.

An agent is a system capable of perceiving the environment, reasoning with the percepts and then acting upon the world. Agents can be purely software systems, in which case their percepts and output `actions' are encoded binary strings. However, agents can also be realized in hardware, and then they are robots. The Artificial Intelligence community frequently views robots as embodied intelligent agents. The First International Conference on Autonomous Agents was held in Santa Monica, California, in February 1997. This conference brought together researchers from around the world with interests in agents, whether implemented purely in software or in hardware. The conference featured such topics as intelligent software agents, agents in virtual environments, agents in the entertainment industry, and robotic agents. Papers on robotic agents were selected for this volume. Autonomous Agents will be of interest to researchers and students in the area of artificial intelligence and robotics.

A comprehensive introduction to new approaches in artificial intelligence and robotics that are inspired by self-organizing biological processes and structures. New approaches to artificial intelligence spring from the idea that intelligence emerges as much from cells, bodies, and societies as it does from evolution, development, and learning. Traditionally, artificial intelligence has been concerned with reproducing the abilities of human brains; newer approaches take inspiration from a wider range of biological structures that that are capable of autonomous self-organization. Examples of these new approaches include evolutionary computation and evolutionary electronics, artificial neural networks, immune systems, biorobotics, and swarm intelligence—to mention only a few. This book offers a comprehensive introduction to the emerging field of biologically inspired artificial intelligence that can be used as an upper-level text or as a reference for researchers. Each chapter presents computational approaches inspired by a different

biological system; each begins with background information about the biological system and then proceeds to develop computational models that make use of biological concepts. The chapters cover evolutionary computation and electronics; cellular systems; neural systems, including neuromorphic engineering; developmental systems; immune systems; behavioral systems—including several approaches to robotics, including behavior-based, bio-mimetic, epigenetic, and evolutionary robots; and collective systems, including swarm robotics as well as cooperative and competitive co-evolving systems. Chapters end with a concluding overview and suggested reading.

An overview of the basic concepts and methodologies of evolutionary robotics, which views robots as autonomous artificial organisms that develop their own skills in close interaction with the environment and without human intervention.

Robotic engineering inspired by biology—biomimetics—has many potential applications: robot snakes can be used for rescue operations in disasters, snake-like endoscopes can be used in medical diagnosis, and artificial muscles can replace damaged muscles to recover the motor functions of human limbs. Conversely, the application of robotics technology to our understanding of biological systems and behaviors—biorobotic modeling and analysis—provides unique research opportunities: robotic manipulation technology with optical tweezers can be used to study the cell mechanics of human red blood cells, a surface electromyography sensing system can help us identify the relation between muscle forces and hand movements, and mathematical models of brain circuitry may help us understand how the cerebellum achieves movement control. Biologically Inspired Robotics contains cutting-edge material—considerably expanded and with additional analysis—from the 2009 IEEE International Conference on Robotics and Biomimetics (ROBIO). These 16

chapters cover both biomimetics and biorobotic modeling/analysis, taking readers through an exploration of biologically inspired robot design and control, micro/nano bio-robotic systems, biological measurement and actuation, and applications of robotics technology to biological problems. Contributors examine a wide range of topics, including: A method for controlling the motion of a robotic snake The design of a bionic fitness cycle inspired by the jaguar The use of autonomous robotic fish to detect pollution A noninvasive brain-activity scanning method using a hybrid sensor A rehabilitation system for recovering motor function in human hands after injury Human-like robotic eye and head movements in human–machine interactions A state-of-the-art resource for graduate students and researchers.

This is one of three reports on the study of micro-robots. This document describes the design and construction of a series of small robotic vehicles. The designs incorporate biological inspiration from the cricket. The goal is a micro autonomous legged robot capable of traveling over a variety of terrains. The development of many components needed to build the robot, such as micro-McKibben artificial muscles, micro compressors, and MEMS (micro-electro-mechanical systems) - fabricated valves is also discussed. These components were first used in the design and construction of several prototype sub-systems such as a prototype leg and a simple non-autonomous hybrid vehicle that tests individual components before use in the fully integrated vehicles. From these prototypes two versions of an autonomous vehicle that use a combination of legs and wheels to locomote were developed. Two wheels support the front of the vehicles and two rear legs propel them. The valves distribute air, supplied by the compressor, from the plenum to the actuators on the rear legs. A six-legged non-autonomous vehicle was designed, constructed and tested. It was demonstrated to walk in a tripod gait. A second report (NATICK/TR-05/011) focuses on the investigation of a micro-joint

angle sensor using MEMS Cilia, and a third report (NATICK/TR-05/012) examines micro-robots on abstracted biological principles.

The multidisciplinary issues involved in the development of biologically inspired intelligent robots include materials, actuators, sensors, structures, functionality, control, intelligence, and autonomy. This book reviews various aspects ranging from the biological model to the vision for the future.

Artificial intelligence (AI) is taking an increasingly important role in our society. From cars, smartphones, airplanes, consumer applications, and even medical equipment, the impact of AI is changing the world around us. The ability of machines to demonstrate advanced cognitive skills in taking decisions, learn and perceive the environment, predict certain behavior, and process written or spoken languages, among other skills, makes this discipline of paramount importance in today's world. Although AI is changing the world for the better in many applications, it also comes with its challenges. This book encompasses many applications as well as new techniques, challenges, and opportunities in this fascinating area.

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