Robotics and Artificial Intelligence

#1. Definition

Robotics

The field of robotics is concerned with the design and operation of robots. Robots are programmed robots that really can perform tasks independently or semi-autonomously.

Artificial Intelligence

Artificial intelligence (AI) is an area of computer science that develops systems that can solve issues and help in the same way that humans do.

#2. Requirements

Robotics

Needs hardware.

Artificial Intelligence

Needs Software.

#3. Discipline

Robotics

Electronics, Mechatronics, nanotechnology.

Artificial Intelligence

Computer Science, Mathematics Computational concepts.

#4. Mode of operation

Robotics

They function in the actual world. Involves building a complete robot.

Artificial Intelligence

They usually work in computer-assisted environments. It is all about Programming intelligence.

#5. Components

Robotics

Deals with computers, effectors and sensors.

Artificial Intelligence

Its logic and vision are aided by artificial intelligence.

#6. Input/Output

Robotics

Analog signals in the form of voice waveforms or pictures are used as inputs to robots.

Artificial Intelligence

An AI programme receives its input in the form of symbols and rules.

#7. Applications

Robotics

Robots are utilised in a variety of applications, including packaging, medical surgery, space exploration, defence weaponry, and so on.

Artificial Intelligence

Netflix, Apple's Siri, Spotify, and other AI-based apps are examples.

Robotics An Artificial Intelligence Applications Series Overviews

Manuel Cardona

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Application of Artificial Intelligence in Wastewater Treatment Shikha Gulati,2024-09-09 This book offers a comprehensive exploration of the integration of artificial intelligence AI techniques in addressing challenges and optimizing processes within wastewater treatment The coverage of the book spans a spectrum of applications including AI driven monitoring and control systems predictive modeling for pollutant removal and the development of smart sensor networks for real time data analysis in wastewater treatment plants By amalgamating AI methodologies with wastewater treatment processes the book provides insights into enhancing efficiency reducing costs and mitigating environmental impacts In the current research scenario the theme of the book is highly pertinent as it responds to the pressing need for sustainable and efficient wastewater treatment solutions The book defines the theme by elucidating how AI technologies such as machine learning algorithms and data analytics can revolutionize wastewater treatment processes by enabling proactive decision making optimizing resource allocation and predicting potential system failures This intersection of AI and wastewater treatment not only addresses operational challenges but also contributes to the broader goal of achieving environmentally conscious and economically viable solutions **Artificial Intelligence and the Perspective of Autonomous Surgery** Konrad Karcz,Zbigniew Nawrat,Andrew A. Gumbs,2024-12-23 This book has two heroes the surgeon and the robot The education system and intelligence can create a human who is specialized in surgery While the accurate analysis of data with machine learning AI can create a more autonomous robot for surgery Currently robots still require human input in the decision making loop whether or not this will always be the case is an issue that still needs to be debated analyzed and studied preferably by computer scientists AND surgeons Surgeons and their patients are increasingly opting for less invasive surgeries However among their many advantages there is an important issue less invasiveness always means limited access to direct information from the operating field 3D image local palpation sensations all information about the whole patient and feedback from the accompanying team during teleoperation To increase precision we are increasingly using surgical robots and mechatronic instruments The less invasive the surgery and the greater the precision of robotic micro instruments the greater the role of artificial intelligence methods especially machine learning which supports the surgeon in making decisions planning and performing the procedure The development of artificial intelligence and further evidence of its effectiveness in various application fields mean that the work of a doctor is changing today In the book we address the issue of AI surgery asking whether this means that an AI surgeon will be created A key question about autonomous surgical robots

will come up regularly how far can we go with their autonomy while maintaining safe and effective procedures The book provides useful information on both early successes failures and expectations related to the development of new technologies in surgery It is a guide written by various experts intended for a wide audience from medical development planners through students to doctors and decision makers **Rehabilitation Robotics and Healthcare Devices** Manuel Cardona,2024-11-20 Rehabilitation Robotics and Healthcare Devices presents cutting edge topics in rehabilitation robotics and healthcare devices covering basic concepts and providing readers with enough information to solve various practical problems The book proves to be an excellent source to study the different emerging paradigms in rehabilitation robotics and healthcare areas including related technologies such as sensors wearable devices internet of medical things big data machine learning for eHealth edible sensors robots in medicine and exoskeleton robots for rehabilitation Edited by globally known researchers Provides fundamental concepts for emerging rehabilitation and healthcare technologies Shows different applications and cases in rehabilitation and healthcare technologies Artificial Intelligence Applications for Brain–Computer Interfaces Abdulhamit Subasi,Saeed Mian Qaisar,Akash Kumar Bhoi,Parvathaneni Naga Srinivasu,2025-01-10 Artificial Intelligence Applications for Brain Computer Interfaces focuses on the advancements challenges and prospects of future technologies involving noninvasive brain computer interfaces BCIs It includes the processing and analysis of multimodal signals integrated computation acquisition devices and implantable neuro techniques This book not only provides cross disciplinary research in BCI but also presents divergent applications on telerehabilitation emotion recognition neuro rehabilitation cognitive workload assessments and ambient assisted living solutions In 15 chapters this book describes how BCIs connect the brain with external devices like computers and electronic gadgets It analyzes the neural signals from the brain to obtain insights from the brain patterns using multiple noninvasive wearable sensors It gives insight into how sensor outcomes are processed through machine intelligent models to draw inferences Each chapter starts with the importance problem statement and motivation A description of the proposed methodology is provided and related works are also presented Each chapter can be read independently and therefore the book is a valuable resource for researchers health professionals postgraduate students postdoc researchers and academicians in the fields of BCI prosthesis computer vision and mental state estimation and all those who wish to broaden their knowledge in the allied field Focuses on the advancements challenges and prospects for future technologies over noninvasive brain computer interfaces BCIs including the processing and analysis of multimodal signals integrated calculation acquisition devices and implantable technologies Presents theories algorithms realizations applications approaches and challenges that will have their impact and contribution in the design and development of modern and effective BCIs Assists in understanding the predominance of BCI technology in various applications **Scientific and Technical Aerospace Reports** ,1995 Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into

the NASA Scientific and Technical Information Database Frontiers in robotics and AI editor's picks 2022 Kostas J. Kyriakopoulos,2023-03-10 **Artificial Intelligence & Robotics** William B. Gevarter,1984 **Handbook of Security and Privacy of AI-Enabled Healthcare Systems and Internet of Medical Things** Agbotiname Lucky Imoize,Valentina Emilia Balas,Vijender Kumar Solanki,Cheng-Chi Lee,Mohammad S. Obaidat,2023-10-25 The fast growing number of patients suffering from various ailments has overstretched the carrying capacity of traditional healthcare systems This handbook addresses the increased need to tackle security issues and preserve patients privacy concerns in Artificial Intelligence of Medical Things AIoMT devices and systems Handbook of Security and Privacy of AI Enabled Healthcare Systems and the Internet of Medical Things provides new insights into the deployment application management and benefits of AIoMT by examining real world scenarios The handbook takes a critical look at existing security designs and offers solutions to revamp traditional security architecture including the new design of effi cient intrusion detection algorithms attack prevention techniques and both cryptographic and noncryptographic solutions The handbook goes on to discuss the critical security and privacy issues that affect all parties in the healthcare ecosystem and provides practical AI based solutions This handbook offers new and valuable information that will be highly beneficial to educators researchers and others **Explainable AI for Education: Recent Trends and Challenges** Tanu Singh,Soumi Dutta,Sonali Vyas,Álvaro Rocha,2024-11-27 Explainable AI for Education Recent Trends and Challenges is a comprehensive exploration of the intersection between artificial intelligence AI and education In this book we delve into the critical need for transparency and interpretability in AI systems deployed within educational contexts Key Themes Understanding AI in Education We provide a concise overview of AI techniques commonly used in educational settings including recommendation systems personalized learning and assessment tools Readers will gain insights into the potential benefits and risks associated with AI adoption in education The Black Box Problem AI models often operate as black boxes making it challenging to understand their decision making processes We discuss the implications of this opacity and emphasize the importance of explainability Explainable AI XAI Techniques From rule based approaches to neural network interpretability we explore various methods for making AI models more transparent Examples and case studies illustrate how XAI can enhance educational outcomes Ethical Considerations As AI becomes more integrated into education ethical dilemmas arise We address issues related to bias fairness and accountability emphasizing responsible AI practices Future Directions Our book looks ahead considering the evolving landscape of AI and its impact on education We propose research directions and practical steps to promote XAI adoption in educational institutions

Computer Books and Serials in Print ,1985 Artificial Intelligence Applications in Agriculture and Food Quality Improvement Khan, Mohammad Ayoub,Khan, Rijwan,Praveen, Pushkar,2022-05-27 Food is a necessary aspect of human life and agriculture is crucial to any country s global economy Because the food business is essential to both a country s economy and global economy artificial intelligence AI based smart solutions are needed to assure product quality and food safety The

agricultural sector is constantly under pressure to boost crop output as a result of population growth This necessitates the use of AI applications Artificial Intelligence Applications in Agriculture and Food Quality Improvement discusses the application of AI machine learning and data analytics for the acceleration of the agricultural and food sectors It presents a comprehensive view of how these technologies and tools are used for agricultural process improvement food safety and food quality improvement Covering topics such as diet assessment research crop yield prediction and precision farming this premier reference source is an essential resource for food safety professionals quality assurance professionals agriculture specialists crop managers agricultural engineers food scientists computer scientists AI specialists students libraries government officials researchers and academicians **Digital Transformation in Education and Artificial Intelligence Application** Tomislav Volarić,Boris Crnokić,Daniel Vasić,2024-07-02 This book constitutes selected papers presented during the Second International Conference on Digital Transformation in Education and Artificial Intelligence Applications MoStart 2024 held in Mostar Bosnia and Herzegovina in April 2024 The 17 papers were selected from the 32 submissions The proceedings cover a broad range of topics computer vision natural language processing and the latest advancements in the digital transformation of education Notably the application of artificial intelligence the incorporation of gamification and robotics into learning processes and innovative technologies such as IoT have been thoroughly explored *Research and Technology Objectives and Plans Summary* ,1993 A compilation of the summary portions of each of the RTOPs used for management review and control of research currently in progress throughout NASA P i NBS Special Publication ,1968

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