1. Record Nr. UNINA9910676647503321

Titolo	AI and IoT-based intelligent automation in robotics / / editors, Ashutosh Kumar Dubey [et al.]
Pubbl/distr/stampa	John Wiley & Sons, Ltd Hoboken, New Jersey ; ; Beverly, Massachusetts : , : Scrivener Publishing : , : Wiley, , [2021] ©2021
ISBN	1-119-71123-1 1-5231-4317-7 1-119-71122-3 1-119-71121-5
Descrizione fisica	1 online resource (432 pages) : illustrations (chiefly color)
Disciplina	629.892
Soggetti	Artificial intelligence - Industrial applications Autonomous robots Internet of things
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Half-Title Page -- Series Page -- Title Page -- Copyright Page -- Contents -- Preface -- 1 Introduction to Robotics -- 1.1 Introduction -- 1.2 History and Evolution of Robots -- 1.3 Applications -- 1.4 Components Needed for a Robot -- 1.5 Robot Interaction and Navigation -- 1.5.1 Humanoid Robot -- 1.5.2 Control -- 1.5.3 Autonomy Levels -- 1.6 Conclusion -- References -- 2 Techniques in Robotics for Automation Using AI and IoT -- 2.1 Introduction -- 2.2 Brief History of Robotics -- 2.3 Some General Terms -- 2.4 Requirements of AI and IoT for Robotic Automation -- 2.5 Role of AI and IoT in Robotics -- 2.6 Diagrammatic Representations of Some Robotic Systems -- 2.7 Algorithms Used in Robotics -- 2.8 Application of Robotics -- 2.9 Case Studies -- 2.9.1 Sophia -- 2.9.2 ASIMO -- 2.9.3 Cheetah Robot -- 2.9.4 IBM Watson -- 2.10 Conclusion -- References -- 3 Robotics, AI and IoT in the Defense Sector -- 3.1 Introduction -- 3.2 How Robotics Plays an Important Role in the

Defense Sector -- 3.3 Review of the World's Current Robotics Capabilities in the Defense Sector -- 3.3.1 China -- 3.3.2 United State of America -- 3.3.3 Russia -- 3.3.4 India -- 3.4 Application Areas of Robotics in Warfare -- 3.4.1 Autonomous Drones -- 3.4.2 Autonomous Tanks and Vehicles -- 3.4.3 Autonomous Ships and Submarines -- 3.4.4 Humanoid Robot Soldiers -- 3.4.5 Armed Soldier Exoskeletons -- 3.5 Conclusion -- 3.6 Future Work -- References -- 4 Robotics, AI and IoT in Medical and Healthcare Applications -- 4.1 Introduction -- 4.1.1 Basics of AI -- 4.1.1.1 AI in Healthcare -- 4.1.1.2 Current Trends of AI in Healthcare -- 4.1.1.3 Limits of AI in Healthcare -- 4.1.2 Basics of Robotics -- 4.1.2.1 Robotics for Healthcare -- 4.1.3 Basics of IoT -- 4.1.3.1 IoT Scenarios in Healthcare -- 4.1.3.2 Requirements of Security -- 4.2 AI, Robotics and IoT: A Logical Combination.
4.2.1 Artificial Intelligence and IoT in Healthcare -- 4.2.2 AI and Robotics -- 4.2.2.1 Limitation of Robotics in Medical Healthcare -- 4.2.3 IoT with Robotics -- 4.2.3.1 Overview of IoMRT -- 4.2.3.2 Challenges of IoT Deployment -- 4.3 Essence of AI, IoT, and Robotics in Healthcare -- 4.4 Future Applications of Robotics, AI, and IoT -- 4.5 Conclusion -- References -- 5 Towards Analyzing Skill Transfer to Robots Based on Semantically Represented Activities of Humans -- 5.1 Introduction -- 5.2 Related Work -- 5.3 Overview of Proposed System -- 5.3.1 Visual Data Retrieval -- 5.3.2 Data Processing to Attain User Objective -- 5.3.3 Knowledge Base -- 5.3.4 Robot Attaining User Goal -- 5.4 Results and Discussion -- 5.5 Conclusion -- References -- 6 Healthcare Robots Enabled with IoT and Artificial Intelligence for Elderly Patients -- 6.1 Introduction -- 6.1.1 Past, Present, and Future -- 6.1.2 Internet of Things -- 6.1.3 Artificial Intelligence -- 6.1.4 Using Robotics to Enhance Healthcare Services -- 6.2 Existing Robots in Healthcare -- 6.3 Challenges in Implementation and Providing Potential Solutions -- 6.4 Robotic Solutions for Problems Facing the Elderly in Society -- 6.4.1 Solutions for Physical and Functional Challenges -- 6.4.2 Solutions for Cognitive Challenges -- 6.5 Healthcare Management -- 6.5.1 Internet of Things for Data Acquisition -- 6.5.2 Robotics for Healthcare Assistance and Medication Management -- 6.5.3 Robotics for Psychological Issues -- 6.6 Conclusion and Future Directions -- References -- 7 Robotics, AI, and the IoT in Defense Systems -- 7.1 AI in Defense -- 7.1.1 AI Terminology and Background -- 7.1.2 Systematic Sensing Applications -- 7.1.3 Overview of AI in Defense Systems -- 7.2 Overview of IoT in Defense Systems -- 7.2.1 Role of IoT in Defense -- 7.2.2 Ministry of Defense Initiatives -- 7.2.3 IoT Defense Policy Challenges.
7.3 Robotics in Defense -- 7.3.1 Technical Challenges of Defense Robots -- 7.4 AI, Robotics, and IoT in Defense: A Logical Mix in Context -- 7.4.1 Combination of Robotics and IoT in Defense -- 7.4.2 Combination of Robotics and AI in Defense -- 7.5 Conclusion -- References -- 8 Techniques of Robotics for Automation Using AI and the IoT -- 8.1 Introduction -- 8.2 Internet of Robotic Things Concept -- 8.3 Definitions of Commonly Used Terms -- 8.4 Procedures Used in Making a Robot -- 8.4.1 Analyzing Tasks -- 8.4.2 Designing Robots -- 8.4.3 Computerized Reasoning -- 8.4.4 Combining Ideas to Make a Robot -- 8.4.5 Making a Robot -- 8.4.6 Designing Interfaces with Different Frameworks or Robots -- 8.5 IoRT Technologies -- 8.6 Sensors and Actuators -- 8.7 Component Selection and Designing Parts -- 8.7.1 Robot and Controller Structure -- 8.8 Process Automation -- 8.8.1 Benefits of Process Automation -- 8.8.2 Incorporating AI in Process Automation -- 8.9 Robots and Robotic Automation -- 8.10 Architecture of the Internet of Robotic Things -- 8.10.1 Concepts of Open Architecture Platforms -- 8.11 Basic Abilities -- 8.11.1

Discernment Capacity -- 8.11.2 Motion Capacity -- 8.11.3 Manipulation Capacity -- 8.12 More Elevated Level Capacities -- 8.12.1 Decisional Self-Sufficiency -- 8.12.2 Interaction Capacity -- 8.12.3 Cognitive Capacity -- 8.13 Conclusion -- References -- 9 An Artificial Intelligence-Based Smart Task Responder: Android Robot for Human Instruction Using LSTM Technique -- 9.1 Introduction -- 9.2 Literature Review -- 9.3 Proposed System -- 9.4 Results and Discussion -- 9.5 Conclusion -- References -- 10 AI, IoT and Robotics in the Medical and Healthcare Field -- 10.1 Introduction -- 10.2 A Survey of Robots and AI Used in the Health Sector -- 10.2.1 Surgical Robots -- 10.2.2 Exoskeletons -- 10.2.3 Prosthetics -- 10.2.4 Artificial Organs. 10.2.5 Pharmacy and Hospital Automation Robots -- 10.2.6 Social Robots -- 10.2.7 Big Data Analytics -- 10.3 Sociotechnical Considerations -- 10.3.1 Sociotechnical Influence -- 10.3.2 Social Valence -- 10.3.3 The Paradox of Evidence-Based Reasoning -- 10.4 Legal Considerations -- 10.4.1 Liability for Robotics, AI and IoT -- 10.4.2 Liability for Physicians Using Robotics, AI and IoT -- 10.4.3 Liability for Institutions Using Robotics, AI and IoT -- 10.5 Regulating Robotics, AI and IoT as Medical Devices -- 10.6 Conclusion -- References -- 11 Real-Time Mild and Moderate COVID-19 Human Body Temperature Detection Using Artificial Intelligence -- 11.1 Introduction -- 11.2 Contactless Temperature -- 11.2.1 Bolometers (IR-Based) -- 11.2.2 Thermopile Radiation Sensors (IR-Based) -- 11.2.3 Fiber-Optic Pyrometers -- 11.2.4 RGB Photocell -- 11.2.5 3D Sensor -- 11.3 Fever Detection Camera -- 11.3.1 Facial Recognition -- 11.3.2 Geometric Approach -- 11.3.3 Holistic Approach -- 11.3.4 Model-Based -- 11.3.5 Vascular Network -- 11.4 Simulation and Analysis -- 11.5 Conclusion -- References -- 12 Drones in Smart Cities -- 12.1 Introduction -- 12.1.1 Overview of the Literature -- 12.2 Utilization of UAVs for Wireless Network -- 12.2.1 Use Cases for WN Using UAVs -- 12.2.2 Classifications and Types of UAVs -- 12.2.3 Deployment of UAVS Using IoT Networks -- 12.2.4 IoT and 5G Sensor Technologies for UAVs -- 12.3 Introduced Framework -- 12.3.1 Architecture of UAV IoT -- 12.3.2 Ground Control Station -- 12.3.3 Data Links -- 12.4 UAV IoT Applications -- 12.4.1 UAV Traffic Management -- 12.4.2 Situation Awareness -- 12.4.3 Public Safety/Saving Lives -- 12.5 Conclusion -- References -- 13 UAVs in Agriculture -- 13.1 Introduction -- 13.2 UAVs in Smart Farming and Take-Off Panel -- 13.2.1 Overview of Systems -- 13.3 Introduction to UGV Systems and Planning. 13.4 UAV-Hyperspectral for Agriculture -- 13.5 UAV-Based Multisensors for Precision Agriculture -- 13.6 Automation in Agriculture -- 13.7 Conclusion -- References -- 14 Semi-Automated Parking System Using DSDV and RFID -- 14.1 Introduction -- 14.2 Ad Hoc Network -- 14.2.1 Destination-Sequenced Distance Vector (DSDV) Routing Protocol -- 14.3 Radio Frequency Identification (RFID) -- 14.4 Problem Identification -- 14.5 Survey of the Literature -- 14.6 PANet Architecture -- 14.6.1 Approach for Semi-Automated System Using DSDV -- 14.6.2 Tables for Parking Available/Occupied -- 14.6.3 Algorithm for Detecting the Empty Slots -- 14.6.4 Pseudo Code -- 14.7 Conclusion -- References -- 15 Survey of Various Technologies Involved in Vehicle-to-Vehicle Communication -- 15.1 Introduction -- 15.2 Survey of the Literature -- 15.3 Brief Description of the Techniques -- 15.3.1 ARM and Zigbee Technology -- 15.3.2 VANET-Based Prototype -- 15.3.2.1 Calculating Distance by Considering Parameters -- 15.3.2.2 Calculating Speed by Considering Parameters -- 15.3.3 Wi-Fi-Based Technology -- 15.3.4 Li-Fi-Based Technique -- 15.3.5 Real-Time Wireless System -- 15.4 Various Technologies Involved in V2V Communication -- 15.5 Results and Analysis -- 15.6

Conclusion -- References -- 16 Smart Wheelchair -- 16.1 Background -- 16.2 System Overview -- 16.3 Health-Monitoring System Using IoT -- 16.4 Driver Circuit of Wheelchair Interfaced with Amazon Alexa -- 16.5 MATLAB Simulations -- 16.5.1 Obstacle Detection -- 16.5.2 Implementing Path Planning Algorithms -- 16.5.3 Differential Drive Robot for Path Following -- 16.6 Conclusion -- 16.7 Future Work -- Acknowledgment -- References -- 17 Defaulter List Using Facial Recognition -- 17.1 Introduction -- 17.2 System Analysis -- 17.2.1 Problem Description -- 17.2.2 Existing System -- 17.2.3 Proposed System -- 17.3 Implementation.
17.3.1 Image Pre-Processing.

Sommario/riassunto

"Artificial Intelligence (AI) is one of the trending technologies in the recent era. The emergence of the robotics and application of AI in it brings out a significant change in the domain. Various algorithms that emerge in AI and the computational efficiency of the systems has made it possible to address a number of applications through robotics. The Internet of Things (IoT) is the important domain that plays a major role in robotics. With the aid of IoT and AI, robotics is an exponential development in providing solutions to complex technical problems. The 24 chapters in this book provides a deep overview of robotics and the application of AI and IoT in robotics. It contains the exploration of AI and IoT based intelligent automation in robotics. The various algorithms and frameworks for robotics based on AI and IoT are presented, analyzed, and discussed. This book also provides insights on application of robotics in education, healthcare, defense and many other fields which utilize IoT and AI. It also introduces the idea of smart cities using robotics"--