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3D Printing Soft Robots -- Adaptive Fault Tolerant Controller for Nonlinear Active Suspension -- Ultraviolet Curable Materials for 3D Printing Soft Robots: From Hydrogels to Elastomers and Shape Memory Polymers -- Design and Grasping Experiments of a Three-Branch Dexterous Soft Gripper -- Modelling Analysis of a Soft Robotic Arm Based on Pneumatic-Network Structure -- Integrated DLP and DIW 3D Printer for Flexible Electronics -- Bi-Directional Deformation, Stiffness-Tunable, and Electrically Controlled Soft Actuators Based on LCEs 4D Printing -- Multi-Material Integrated Printing of Reprogrammable Magnetically Actuated Soft Structures -- A Lightweight Jumping Robot with Untethered Actuation -- Dielectric Elastomer Actuators for Soft Robotics Landing Trajectory and Control Optimization for Helicopter in Tail Rotor Pitch Lockup -- A Dual-Mode Micro Flapping Wing Robot with Water Gliding and Taking-Off Motion -- A Self-Loading Suction Cup Driven by Resonant-Impact Dielectric Elastomer Artificial Muscles -- Model-Free Adaptive Control of Dielectric Elastomer Actuator -- Modeling and Design Optimization of a Pre-Stretched Rolled Dielectric Elastomer Actuator -- Structural Dynamics Modeling with Modal Parameters and Excitation Decoupling Method Based on Energy Distribution -- Force Sensor-Based Linear Actuator Stiffness Rendering Control -- Design, Modeling and Control of a Dielectric Elastomer Actuated Micro-Positioning Stage -- Tension Distribution Algorithm of Flexible Cable Redundant Traction for Stable Motion of Air-Bearing Platform -- Research on High-Frequency Motion Control of Voice Coil Motors Based on Fuzzy PID -- Feedback Linearization with Improved ESO For Quadrotor Attitude Control -- Design and Analysis of a Flexible Joint Actuator Based on Peano-Hasler with Performance Enhancement Characteristics -- Human-like Locomotion and Manipulation -- Walking Stability Analysis of Biped Robot Based on Actuator Response Characteristics -- Design of an Actuator for Biped Robots Based on the Axial Flux Motor -- Omnidirectional Walking Realization of A Biped Robot -- Control of the Wheeled Bipedal Robot on Roads with Large and Unknown Inclination -- Nonsmooth Dynamic Modeling of a Humanoid Robot with Parallel Mechanisms -- Human-Like Dexterous Manipulation for Anthropomorphic Hand-Arm Robotic System via Teleoperation -- Design of a Compact Anthropomorphic Robotic Hand with Hybrid Linkage and Direct Actuation -- Application of Compliant Control in Position-Based Humanoid Robot -- Fast Walking of Position-Controlled Biped Robot Based on Whole-Body Compliance Control -- Whole Body Balance Control for Bipedal Robots Based on Virtual Model Control -- Design and Implementation of Lightweight Thigh Structures for Biped Robots Based on Spatial Lattice Structure and Additive Manufacturing Technology -- Design of a Humanoid Robot Foot with a Lattice Structure for Absorbing Ground Impact Forces -- An Action Evaluation and Scaling Algorithm for Robot Motion Planning -- Design and Control of the Biped Robot HTY -- SPSOC: Staged Pseudo-Spectral Optimal Control Optimization Model For Robotic Chinese Calligraphy -- Obstacle Avoidance Path Planning Method Based on DQN-HER -- Realizing Human-like Walking and Running with Feedforward Enhanced Reinforcement Learning -- Research on Target Trajectory Planning Method of Humanoid Manipulators Based on Reinforcement Learning -- Study on the Impact Performance of the Joint Cycloid Reducer for Legged Robots -- An Optimal Configuration Solution of 8-DOF Redundant Manipulator for Flying Ball -- Smooth Composite-space RRT: An Improved Motion Planner for Manipulators under Incomplete Orientation Constraint -- Cooperative Control of Dual-Arm Robot of Adaptive Impedance Controller Based on RBF Neural Network -- Trajectory Tracking Control

for Robot Manipulator under Dynamic Environment -- Pattern Recognition and Machine Learning for Smart Robots -- A High-Temperature Resistant Robot for Fixed-Point Firefighting -- Multiscale Dual-Channel Attention Network for Point Cloud Analysis -- Study on Quantitative Precipitation Estimation and Model's Transfer Performance by Incorporating Dual Polarization Radar Variables -- Research on Object Detection Methods in Low-light Conditions -- Image Recovery and Object Detection Integrated Algorithms for Robots in Harsh Battlefield Environments -- A Fuzzy-Based Improved Dynamic Window Approach for Path Planning of Mobile Robot -- Is the Encoder Necessary in DETR-Type Models? - Analysis of Encoder Redundancy -- Image Enhancement Algorithm Based on Multi-Scale Convolution Neural Network.

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## Sommario/riassunto

The 9-volume set LNAI 14267-14275 constitutes the proceedings of the 16th International Conference on Intelligent Robotics and Applications, ICIRA 2023, which took place in Hangzhou, China, during July 5–7, 2023. The 413 papers included in these proceedings were carefully reviewed and selected from 630 submissions. They were organized in topical sections as follows: Part I: Human-Centric Technologies for Seamless Human-Robot Collaboration; Multimodal Collaborative Perception and Fusion; Intelligent Robot Perception in Unknown Environments; Vision-Based Human Robot Interaction and Application. Part II: Vision-Based Human Robot Interaction and Application; Reliable AI on Machine Human Reactions; Wearable Sensors and Robots; Wearable Robots for Assistance, Augmentation and Rehabilitation of Human Movements; Perception and Manipulation of Dexterous Hand for Humanoid Robot. Part III: Perception and Manipulation of Dexterous Hand for Humanoid Robot; Medical Imaging for Biomedical Robotics; Advanced Underwater Robot Technologies; Innovative Design and Performance Evaluation of Robot Mechanisms; Evaluation of Wearable Robots for Assistance and Rehabilitation; 3D Printing Soft Robots. Part IV: 3D Printing Soft Robots; Dielectric Elastomer Actuators for Soft Robotics; Human-like Locomotion and Manipulation; Pattern Recognition and Machine Learning for Smart Robots. Part V: Pattern Recognition and Machine Learning for Smart Robots; Robotic Tactile Sensation, Perception, and Applications; Advanced Sensing and Control Technology for Human-Robot Interaction; Knowledge-Based Robot Decision-Making and Manipulation; Design and Control of Legged Robots. Part VI: Design and Control of Legged Robots; Robots in Tunnelling and Underground Space; Robotic Machining of Complex Components; Clinically Oriented Design in Robotic Surgery and Rehabilitation; Visual and Visual-Tactile Perception for Robotics. Part VII: Visual and Visual-Tactile Perception for Robotics; Perception, Interaction, and Control of Wearable Robots; Marine Robotics and Applications; Multi-Robot Systems for Real World Applications; Physical and Neurological Human-Robot Interaction. Part VIII: Physical and Neurological Human-Robot Interaction; Advanced Motion Control Technologies for Mobile Robots; Intelligent Inspection Robotics; Robotics in Sustainable Manufacturing for Carbon Neutrality; Innovative Design and Performance Evaluation of Robot Mechanisms. Part IX: Innovative Design and Performance Evaluation of Robot Mechanisms; Cutting-Edge Research in Robotics.

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