Record Nr. UNISA996466246903316 Intelligent Robotics and Applications: 4th International Conference, **Titolo** ICIRA 2011, Aachen, Germany, December 6-8, 2011, Proceedings, Part I // edited by Sabina Jeschke, Honghai Liu, Daniel Schilberg Berlin, Heidelberg:,: Springer Berlin Heidelberg:,: Imprint: Springer, Pubbl/distr/stampa 2011 **ISBN** 3-642-25486-1 Edizione [1st ed. 2011.] Descrizione fisica 1 online resource (XXIV, 643 p.) Lecture Notes in Artificial Intelligence;; 7101 Collana 629.892 Disciplina Soggetti Artificial intelligence Optical data processing Pattern recognition Computer graphics Application software Computer communication systems Artificial Intelligence Image Processing and Computer Vision Pattern Recognition Computer Graphics Information Systems Applications (incl. Internet) Computer Communication Networks Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Bibliographic Level Mode of Issuance: Monograph Nota di contenuto Intro -- Title -- Preface -- Organization -- Table of Contents --Progress in Indoor UAV -- On the Way to a Real-Time On-Board Orthogonal SLAM for an Indoor UAV -- Introduction -- Introductive System Description -- SLAM Algorithm -- Indoor Navigation --Experimental SLAM Results -- Conclusion -- References --Quadrocopter Localization Using RTK-GPS and Vision-Based Trajectory Tracking -- Introduction -- Characteristics of the Flight Platform --Sensors and Hardware Equipment -- Software -- Differential GPS --

Real Time Kinematic GPS -- Measurements -- Position Control and

Trajectory Tracking -- Position Controller -- Trajectory Controller --Conclusions and Future Research -- References -- Five-Axis Milling Simulation Based on B-rep Model -- Introduction -- Geometric Description of Ball-End Tool -- Tool Swept Volume Generation --Swept Profiles of Cylinder Surface -- Swept Profiles of Hemisphere Surface -- Realization of Five-Axis Milling Simulation -- Determining and Solving Self-intersection -- Conclusions -- References -- Robotics Intelligence -- Exploration Strategies for Building Compact Maps in Unbounded Environments -- Introduction -- Related Work -- Greedy Exploration -- Compact Exploration Strategies -- Spiral Exploration --Distance-Penalized Exploration -- Evaluation -- Experiment 1: Low Obstacle Density -- Experiment 2: High Obstacle Density --Experiment 3: Elongated Obstacles -- Conclusions -- References --The Basic Component of Computational Intelligence for KUKA KR C3 Robot -- Introduction -- Kinematics -- Workspace -- Example of Calculations -- Conclusions -- References -- An Experimental Comparison of Model-Free Control Methods in a Nonlinear Manipulator -- Introduction -- System Description -- Model-Free Control Strategies -- Proportional-Integral-Derivative -- Robust Tracking with Control Vector Constraints. Active Disturbance Rejection Control -- The Experiment -- Study Preparation -- Experimental Results -- Conclusions and Future Work -- References -- Industrial Robots -- Research on Modular Design of Perpendicular Jointed Industrial Robots -- Introduction -- Modular Division and Conceptual Design -- Subdivision and Detailed Design of Execute Module -- Conclusions -- References -- Online Path Planning for Industrial Robots in Varying Environments Using the Curve Shortening Flow Method -- Introduction -- Problem -- State of the Art -- Curve Shortening Flow Method -- Basic Principle -- Equation --Numerical Solution -- Extension to Three Dimensions -- Results --Summary and Outlook -- References -- Parallel-Populations Genetic Algorithm for the Optimization of Cubic Polynomial Joint Trajectories for Industrial Robots -- Introduction -- Formulation of Cubic Polynomial Joint Trajectory -- PGA1 Formulation -- PGA2 Formulation -- Optimization Technique Using GA -- Application Examples --Example 1: Comparison with lin83 and tse98 -- Example 2: With Dynamic Constraints -- Conclusions -- References -- Robotics Assembly Applications -- Integrative Path Planning and Motion Control for Handling Large Components -- Introduction -- Motivation -- Path Planning and Motion Control for Robots -- Integrative Path Planning and Control Concept -- Implementation -- Application -- Summary and Outlook -- References -- Automatic Configuration of Robot Systems - Upward and Downward Integration -- Introduction -- Scope of the Paper -- Existing Approaches -- Conceptual Design -- Paradigm Shift -- Characteristics of Modules -- Function Modelling --Experimental Setup -- Conclusions and Outlook -- References --Process and Human Safety in Human-Robot-Interaction - A Hybrid Assistance System for Welding Applications -- Introduction. State of the Art in Human-Robot-Interaction (HRI) and Legal Requirements for Industrial Application -- Human Safety and Ergonomics -- Workspace Monitoring -- Ergonomics -- Process Safety -- Conclusion -- References -- Operation Simulation of a Robot for Space Applications -- Introduction -- A Space Service Robot -- Adams Model -- Simulation Results -- Conclusion -- References -- Regrasping: Improving Capability for Multi-Arm-Robot-System by Dynamic Reconfiguration -- Introduction -- Handling Concept --Robot Architecture -- Reconfiguration -- Re-grasp Planning --Conclusion -- References -- A Parallel Kinematic Concept Targeting at

More Accurate Assembly of Aircraft Sections -- Introduction -- Related Work -- Scenario and Concepts -- Kinematic Modelling -- Tripod --Hexapod -- Jacobian Matrices -- Criteria for the Benchmark of Kinematics -- Optimization Algorithm -- Numerical Results, Benchmark and Discussion -- Conclusion -- References --Dimensional Synthesis of Parallel Manipulators Based on Direction-Dependent Jacobian Indices -- Introduction -- Typical Design Requirements -- Workspace and Kinetostatic Performance Evaluation -- Position and Jacobian Analysis of the Manipulator: -- Direction-Dependent Kinetostatic Performance Indices: -- Geometric Interpretation of the Derived Performance Indices: -- Dimensional Synthesis -- Conclusion -- References -- Rehabilitation Robotics --EMG Classification for Application in Hierarchical FES System for Lower Limb Movement Control -- Introduction -- System Structure -- EMG Signal Processing -- EMG Acquisition -- Algorithms -- Results of Intention Recognition -- Preliminary FES Experiments -- Conclusion and Future Work -- References -- Situated Learning of Visual Robot Behaviors -- Introduction -- Related Work -- Behavior Representative Features -- Modeling Situatedness -- Scenario Classification. Scenario Modeling -- Experimental Results -- Conclusions --References -- Humanoid Motion Planning in the Goal Reaching Movement of Anthropomorphic Upper Limb -- Introduction -- Method -- Twists and Wrenches -- Second Order Kinematic Model --Numerical Simulation -- Discussion and Conclusion -- References --Human Sitting Posture Exposed to Horizontal Perturbation and Implications to Robotic Wheelchairs -- Introduction -- Biomechanics and Motor Control of Sitting Posture -- Vibrational Analysis of Sitting Posture -- Biomechanics and Control Model -- Implications to Robotic Wheelchairs -- Conclusions -- References -- Automatic Circumference Measurement for Aiding in the Estimation of Maximum Voluntary Contraction (MVC) in EMG Systems -- Introduction -- Background --Design of Automatic Circumference Armband -- Experimental Results and Analysis -- Discussion -- Conclusion and Future Work --References -- Classification of the Action Surface EMG Signals Based on the Dirichlet Process Mixtures Method -- Introduction -- Methods -- Dirichlet Process Mixture Model -- Feature Extraction -- Materials -- Analysis and Results -- Conclusions -- References -- Displacement Estimation for Foot Rotation Axis Using a Stewart-Platform-Type Assist Device -- Introduction -- Stewart-Platform-Type Ankle-Foot Assist Device -- Control the Posture (Inverse Kinematics) -- Measure the Posture (Forward Kinematics) -- Rotation Axis Estimation of Ankle Joint -- Ankle Joint -- Rotation Axis Estimation -- Experiment and Result --Conclusions -- References -- Mechanisms and their Applications --Inverse Kinematics Solution of a Class of Hybrid Manipulators --Introduction -- Overview of Kinematic Configuration and Modeling --Inverse Kinematics Solution -- A Numerical Example -- Discussion and Conclusion -- References -- Stiffness Analysis of Clavel's DELTA Robot. Introduction -- Inverse Kinematics -- Static Force Transmission --Stiffness Model -- Relevant Structural Stiffness Effects -- Results --References -- Optimum Kinematic Design of a 3-DOF Parallel Kinematic Manipulator with Actuation Redundancy -- Introduction --Mechanism Description and Inverse Kinematics -- Optimum Kinematic Design -- Indices Definition -- Normalization of the Geometric Parameters -- Optimum Kinematic Design -- Performance Comparison between Redundant and Non-redundant Manipulators -- Conclusions -- References -- Integrated Structure and Control Design for a Flexible Planar Manipulator -- Introduction -- Dynamic Modeling of a Flexible Five-Bar Linkage -- Kinetic and Potential Energy of a Five-Bar Linkage

-- Boundary and Constraint Conditions -- Dynamic Equation Using Lagrangian Formulation -- Integrated Design Problem Formulation --Controller, Performance Indices and Design Variables -- Problem Formulation -- Simulation and Discussion -- Conclusion -- References -- Effects of Clearance on Dynamics of Parallel Indexing Cam Mechanism -- Introduction -- Modelling Indexing Cam Mechanism --Profile of Parallel Indexing Cam Based on Exponential Product Formula -- Unilateral Contact Model and Clearance Model -- Simulation of Parallel Indexing Cam Mechanism with Clearance -- Dynamics Response -- Effects of Change of Clearance on Responses of Turret and Rotary Table -- Conclusion -- References -- Design and Compliance Experiment Study of the Forging Simulator -- Introduction -- Design of the Forging Simulator -- Kinematic Analysis --Performance Analysis -- Optimal Work Space -- Building of Forging Simulator Platform -- Compliance Experiment Study of the Forging Simulator -- Calibration of the Overflow Valve's Value -- Reproducing of Forging Process -- Conclusion of Experiments -- Conclusion --References.

Design of Compliant Bistable Mechanism for Rear Trunk Lid of Cars.

## Sommario/riassunto

The two volume set LNAI 7101 and LNAI 7102 constitutes the refereed proceedings of the 4th International Conference on Intelligent Robotics and Applications, ICIRA 2011, held in Aachen, Germany, in November 2011. The 122 revised full papers presented were thoroughly reviewed and selected from numerous submissions. They are organized in topical sections on progress in indoor UAV, robotics intelligence, industrial robots, rehabilitation robotics, mechanisms and their applications, multi robot systems, robot mechanism and design, parallel kinematics, parallel kinematics machines and parallel robotics, handling and manipulation, tangibility in human-machine interaction, navigation and localization of mobile robot, a body for the brain: embodied intelligence in bio-inspired robotics, intelligent visual systems, self-optimising production systems, computational intelligence, robot control systems, human-robot interaction, manipulators and applications, stability, dynamics and interpolation, evolutionary robotics, bio-inspired robotics, and image-processing applications.