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Bio-inspired Motor Control Strategies for Redundant and Flexible Manipulator with Application to Tooling Tasks

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Preface

In recent years, robots have been successfully applied to automate repetitive, structured, and non-contact tasks such as painting and welding. However, when it comes to contact tasks such as fine finishing tasks, these still cannot be performed by robots and often require the intervention of skilled human operators. Control strategies currently adopted for industrial robots are based on position/force control and do not capture the skills experienced human operators develop. This book proposes a design and fabrication of the robot, the kinematic analysis, and the plotter's design at the end-effector.

Moreover, this book also presents developed tools and algorithms that capture human motor skills for optimal robotic rehabilitation and then a technique for capturing vibration employed in the clinical motion process to determine the micro- and macro-motions of stroked persons is discussed. The optical motion tracker device is a powerful technology for measuring human motion, especially in biomechanical, industrial, and clinical applications where high accuracy is required. The field of rehabilitation robots has lately developed, and robotic therapy is anticipated to become increasingly common in clinical settings in the coming years. Because developing general-purpose rehabilitation devices would be extremely difficult, most robots are built to do specific jobs. The major motivations to use robots in stroke rehabilitation are to expand therapy without adding more therapists and to give better therapy than conventional therapy. The main objective is to develop tools and algorithms that capture human motor skills for optimal robotic rehabilitation. The presented approaches allow for the resolution of classic system problems, and their combination gives trustworthy information regarding location, velocity, acceleration, and orientation.

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Contents

Bio-inspired Motor Control Strategies for Redundant Manipulators 1
1 Introduction 1
2 Cable-Driven Manipulator and A–A Actuator 6
2.1 Cable-Driven Manipulator—Literature Review 6
2.2 Redundant Cable-Driven Manipulators 8
2.3 Agonist—Antagonist Actuator 10
2.4 Position and Impedance Control 11
2.5 Variable Stiffness Devices 15
3 Conclusion and Discussion 16
References 17

Bio-inspired Motor Control Strategies: Cable-Driven Manipulator Using Agonist–Antagonist Actuation 21
1 Agonist–Antagonist Mechatronics and Cable-Driven Systems 21
1.1 Passive Impedance Setup Description 21
1.2 Passive Impedance Added Rotor Setup Description 23
1.3 Active Impedance Setup Description 23
2 Passive and Active Agonist–Antagonist Actuator Experiment 29
2.1 Measuring Impedance of Passive Agonist–antagonist Setup 29
2.2 Measuring Impedance of Passive Agonist–Antagonist Setup Incorporating Rotor Weight 34
2.3 Active Agonist–Antagonist Experiment 37
2.4 The Z-Width of Active Impedance 41
3 Conclusion and Discussion 42
References 43

Design and Control of 2D-Plotter Planar Parallel Robot 45
1 Introduction 45
2 Kinematic Formulas for 3RRR Planar Parallel Robot 48

3 Design 2D-Plotter Planar Parallel Robot 50
3.1 Mechanical Design 50
3.2 The Circuit Design for the DC Motor Driver and the Actuator Driver 52
3.3 The Principle of the 2D-Plotter Planar Parallel Robot 52
4 Conclusion and Discussion 53
References 54

Combining 3D Motion Tracker with IMU Sensor Signals of Muscles to Discover Macro- and Microvibration for Stroke Rehabilitation 57
1 Introduction 57
2 Motion Capturing Using Multimodal Sensor Fusion 60
3 Complementary Filter 62
4 Experiment Verification of Complementary Filter Algorithm 64
5 Conclusion and Discussion 67
References 67

A Pneumatic Actuator-Powered Robotic Glove for Hand Rehabilitation 69
1 Introduction 69
1.1 Design a Soft Robotic Glove Actuator 70
1.2 Design a Mold 70
2 Design of Electro-Pneumatic Board 74
3 Soft Wearable Robotic Glove Actuator Performance 75
4 Conclusion 76
References 77

Artificial Intelligence in Rehabilitation Evaluation-Based Robotic Exoskeletons: A Review 79
1 Introduction 79
2 Artificial Intelligence (AI) Technology is Used for Evaluation 80
3 sEMG Signal Properties Were Used to Make an Assessment 80
4 The Evaluation is Dependent on the Characteristics of Motion Trajectory Error 82
5 Joint Motion Angle Characteristics are Used to Make an Assessment 82
6 Based on the Angular Velocity Properties of the Joints, an Assessment is Made 83
7 The Social Robot as an Evolution of the Collaborative Robot 84
7.1 Definition of Collaborative Robots 84
7.2 Definition of Social Robots 84
8 Social Robotics Research Directions 85
8.1 Possible Classification 85
8.2 Personal Issues to Consider 86
9 Conclusions and Discussions 86
References 88

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