2010 IEEE Conference on Robotics Automation and Mechatronics

(RAM 2010)

Singapore
28 – 30 June 2010

IEEE Catalog Number: CFP10834-PRT
ISBN: 978-1-4244-6503-3

TABLE OF CONTENTS

A Low Cost Wearable Wireless Sensing System for Upper Limb Home Rehabilitation 1
Chee Kian Lim, I-Ming Chen, Zhiqiang Luo, Song Huat Yeo

An Interactive Therapy System for Arm and Hand Rehabilitation 9
Zhiqiang Luo, Chee Kian Lim, Weiting Yang, Ke Yen Tee, Kang Li, Chao Gu, Kim Doang Nguyen, I-Ming Chen, Song Huat Yeo

Enhancement of Spatial Orientation and Haptic Perception for Master-Slave Robotic Natural Orifice Transluminal Endoscopic Surgery (NOTES) 15
K. Yang, Z. L. Sun, A. P. Kencana, V. A. Huynh, M. Rasouli, S. J. Phee, D. Lomanto, K. Y. Ho

Seeking Perceptual-based Metrics to Assess the Visuo-motor Loop in Mobile Robot Teleoperation 19
Luca Brayda, Jesus Ortiz, Ryad Chellali, Nicolas Mollet, Jean-Guy Fontaine

Can Observers Perceive Depth in Virtual Environments Within Extrapersonal Space? 26
Abdeldjallil Naceri, Ryad Chellali

Identification and Control of Quantum Systems 32
Zhengui Xue, Hai Lin, Tong Heng Lee

EMG-Driven Computer Game for Post-Stroke Rehabilitation 38
Xing Shusong, Zhang Xia

Automated Fabrication of Three Dimensional Porous Microfiber Scaffolds for Tissue Engineering 43
J. An, C. K. Chua, K. F. Leong

Structural Analysis of 600Kgf Heavy Duty Handling Robot 46
Gwang-Jo Chung, Doo-Hyung Kim, Hyuk Shin

GA-based Dynamic Manipulability Optimization of a 2-DOF Planar Parallel Manipulator 52
Hao Qi, Guan Liwen, Wang Jinsong, Wang Liping

A New Compensation Strategy for an AC Contactor under Voltage-Sag Events 58
Chih-Yu Hung, Chieh-Tsung Chi

BLDC Motor Driven Robot Finger Design Using the Sliding Actuation Principle 64
Young June Shin, Kyung-Soo Kim, Soohyun Kim

Non-radiological Colonoscope Tracking 68
Lee Yik Ching, Knut Moller, Jackrit Suthakorn

Wireless Capsule Endoscopes for Enhanced Diagnostic Inspection of Gastrointestinal Tract 74
Mahdi Rasouli, Andy Prima Kencana, Van An Huynh, Eng Kiat Ting, Joshua Chong Yue Lai, Louis Soo Jay Phee

Optimal Design and Control of a Hand Exoskeleton 78
M. F. Orlando, H. Akolkar, A. Dutta, A. Saxena, L. Behera

Design of a Robotic Transcranial Magnetic Stimulation System 84
Xiang Yi, Robert Bicker

Model-based Design Analysis for Programmable Remote Center of Motion in Minimally Invasive Surgery 90
L. Yang, C. B. Chng, C. K. Chui, D. P. C. Lau

ReachMAN to Help Sub-acute Patients Training Reaching and Manipulation 96
Che Fai Yeong, Karen Baker, Alejandro Melendez-Calderon, Etienne Burdet, E. Diane Playford

Low Power Ultra-wideband Wireless Telemetry System for Capsule Endoscopy Application 102
Yuan Gao, Shengxi Diao, Chyuen-Wei Ang, Yuanjin Zheng, Xiaojun Yuan

A Systematic Graph-based Method for the Kinematic Synthesis of Non-anthropomorphic Wearable Robots 106
Fabrizio Sergi, Dino Accoto, Nevio Luigi Tagliamonte, Giorgio Carpino, Lakshmi Pathiyil, Eugenio Guglielmelli

Sensorless Drive of Permanent Magnet Brushless DC Motor with 180 Degree Commutation 112
Boyang Hu, Swamidoss Sathiakumar

On the Dynamics of the Flexible Robot Arm in a Real Deployment Profile 118
P. Bagheri Ghaleh, S. M. Malaek

ZPETC Path-Tracking Gain-Scheduling Design and Real-Time Multi-Task Flight Simulation for the Automatic Transition of Tilt-Rotor Aircraft 124
Chih-Cheng Peng, Thong-Shing Hwang, Shiaw-Wu Chen, Ching-Yi Chang, Yi-Ciao Lin, Yao-Ting Wu, Yi-Jing Lin, Wei-Ren Lai

A Technical Approach to H_2 and $H\infty$ Control of a Flexible Transmission System 130
Mahdi Sojoodi, Vahid Johari Majd

Dynamic Identification of Robot with a Load-Dependent Joint Friction Model 135
P. Haman, M. Gautier, P. Garrec, A. Janot

Trajectory Analyses for Five-Axis Machine Tools 142
Rong-Shine Lin, Tsong-Han Lin
Using a Dual Compass Configuration with Shaft Encoders for Self-Localization of an Autonomous Maneuverable Nonholonomic Mobile Robot 148
Evangelos Georgiou, Jian Dai
Modular Re-Configurable Robot Drives 156
Michael Hofbaur, Mathias Brandstotter, Simon Jantscher, Christoph Schorghuber
Performance Enhancement of a Statically Unstable Two Wheeled Mobile Robot Traversing on an Uneven Surface 162
Zareena Kausar, Karl Stol, Nitish Patel
Posture Stabilization of Skid Steer Wheeled Mobile Robots 169
E. Mohammadpour, M. Naraghi, M. Gudarzi
Model Predictive Control Based Optimal Crusing Control of Two-wheeled Mobile Robots 176
Shinya Akiba, Tadanao Zanma, Muneaki Ishida
A Compact Design of Zero-Radius Steering Autonomous Amphibious Vehicle with Direct Differential Directional Drive – UTAR-AAV 182
Yuhon Yee, Yongchai Tan, Boonyew Yeoh, Engbeng Tan, Zhenyang Wong
Shared Control for Obstacle Avoidance in Intelligent Wheelchairs 188
Marcelo R. Petry, Antonio Paulo Mareira, Rodrigo A. M. Braga, Luis Paulo Reis
Implementation of Asymmetric Multiprocessing Framework in Humanoid Robot 194
Wei Kin Wong, Tze Ming Neoh, Chu Kiong Loo, Ying Wei Liew, Eng Kean Lee
Design and Simulation of Flexure-based Planar Force/torque Sensor 200
Pham Huy Hoang, Vo Doan Tat Thang
Time of Flight based Two Way Ranging for Real Time Locating Systems 205
Danwei Wang, Ramprashanth Kannan, Liu Wei, Bertrand Tay
Simultaneous Periodic Output Feedback Control of a Smart Cantilever Beam with Data Fusion 212
J. Arunshankar, M. Umapathy
Robot Path Planning in a Social Context 218
Stephen Sehestedt, Sarath Kodagoda, Gamini Dissanayake
Self-aggregation in Multi-Agent Shape Control 224
Reza Haghighi, Chien Chern Cheah
HMM with Explicit State Duration for Prognostics in Face Milling 230
Wu Yue, G. S. Hong, Y. S. Wong
False Alarm Metrics: Evaluating Safety in Human Robot Interactions 236
Mohan Rajesh, Elara, Carlos A. Acosta Calderon, Changjiu Zhou, Wijerupage Sardha Wijesoma
Optimal Energy Gait Planning for Humanoid Robot Using Geodesics 243
Liandong Zhang, Changjiu Zhou, Peijie Zhang, Zhiwei Song, Yue Pik Kong, Xinyu Han
Visual Perception System for a Social Robot 249
J. P. Bandera, R. Marfil, A. J. Palomino, A. Bandera, R. Vazquez-Martin
Recipes for Designing High-performance and Robust Software for Robots 256
Jesus Martinez, Adrian Romero-Garces, Ricardo Vazquez-Martin, Antonio Bandera
Teaching new tricks to a Robot Learning to Solve a Task by Imitation 262
Carlos A. Acosta Calderon, Rajesh E. Mohan, Changjiu Zhou
Performance Evaluation of Active Vibration Control Schemes for Flexible Robot Manipulator 269
M. A. Ahmad, R. M. T. Raja Ismail, M. S. Ramli, N. Hambali
Task Completion with Partially-Failed Manipulators 275
Hamid Abdi, Saeid Nahavandi
Preliminary Design of Vertical Take-Off and Landing (VTOL) UAV with Steerable Vertical Thrust Effect 281
Julian Tan Kok Ping, Saukeong Ban, Chingseong Tan, Thomas Ting Shee Peng, Ng Chin Soon
A Generic Model for a Robotic Agent System using GAIA Methodology: Two Distinct Implementations 286
Daniel Castro Silva, Rodrigo A. M. Braga, Luis Paulo Reis, Eugenio Oliveira
Open-loop and Closed-loop Recursive Identification of an Electro-hydraulic Actuator System 292
Ghazali Rozaimi, Sam Yahaya
Automatic Detection and Recognition of Traffic Signs 298
M. Sajjad Hossain, M. Mahmudal Hassan, M. Ameer Ali, Humayun Kabir, A. B. M. Shawkat Ali
Design and Simulation of Micro-Linear Actuator 304
Pham Huy Hoang
Real-time Simulation of a 3-leg 6-DOF Parallel Manipulator Based on RT-Linux Operation System 309
Chih-Cheng Peng, Thong-Shing Hwang, Ching-Yi Chang, Yao-Ting Wu, Sang-Hugh Wu

Task Planning for Service Robots with Optimal Supervisory Control 315
Hyun-Wook Jo, Jae-Ho Ahn, Jun-Sang Park, Jun-Han Oh, Jong-Tae Lim
Accurate Mathematical Model for Describing Electrohydraulic Loading System of Helicopter Pitch Adjusting Hydromechanical Servos 321
Guojian Liu, Yunhua Li, Liman Yang
Feed Rate Servo Control for Spindle-Less Veneer Lathe 327
Yihong Guo, Yunhua Li, Zhongwei Guo, Liman Yang
Multi-layer Flight Control Synthesis and Analysis of a Small-scale UAV Helicopter 333
Ali Karimoddini, Guowei Cai, Ben M. Chen, Hai Lin, Tong H. Lee
Structural Controllability of High Order Dynamic Multi-agent Systems 339
Alireza Partovi, Lin Hai, Ji Zhijian
Robot Path Simulation: A Low Cost Solution Based on CAD 345
Pedro Neto, J. Norberto Pires, A. Paulo Moreira
Co-ordination in RoboCup's 2D Simulation League: Setplays as flexible, Multi-Robot plans 351
Luis Mota, Nuno Lau, Luis Paulo Reis
Synchronized Task Decomposition for Two Cooperative Agents 357
Mohammad Karimadini, Hai Lin
Recognition of Occluded Objects by Feature Interactions 363
Wu Jiayun, Lim Kah Bin, Chen Xiao
Contour Feature Detection Based on Gestalt Rule and Maximum Entropy of Neighborhood 369
Li Kunpeng, Wang Sunan, Chen Naijian, Di Hongyu
A Vision-Based Strategy for Autonomous Lift Operation 374
Han Wang, Ying Ying, Jian Xu
Visual Self-Localization for Nonholonomic Mobile Robots using a Hybrid Skip-List Inspired Search Algorithm with a Gradient Policy 379
Evangelos Georgiou, Jian Dai
Measurement of the Effective Focal Length by the Centerline Detection of light stripes 387
Zhenjiu Zhang, Hong Hu
Preliminary Study on Visual Guidance for Autonomous Vehicle in Rain Forest Terrain 392
Chee Way Teoh, Chinseong Tan, Yong Chai Tan, Xin Wang
The Design of Jump Shot Decision-Making System for a Billiard Robot 398
Jr-Syu Yang, You-Mu Chen
Using MTF for Automated Gated Imaging System in Turbid Medium 403
Yekhong Chua, Chingseong Tan, Xin Wang, Cheeway Teoh, Gerald Seet, Andrzej Sluzek
On the Development of an Unmanned Underwater Robotic Crawler for Operation on Subsea Flexible Risers 408
P. Chatzakos, V. Papadmitriou, D. Psarros, Ian Nicholson, Tat-Hean Gan
A Novel Fly Optimization Algorithm for Swarming Application 414
Zulkifli Zainal Abidin, Umi Kalthum Ngah, Rizal Arshad, Ong Boon Ping
Design Considerations for Micro-Autonomous Underwater Vehicles (μAUVs) 418
Simon A. Watson, Peter N. Green
Propulsion Systems for Micro-Autonomous Underwater Vehicles (μAUVs) 424
Simon A. Watson, Peter N. Green
Semi-autonomous Flying Robot for Physical Interaction with Environment 430
Albert Albers, Simon Trautmann, Thomas Howard, Trong Anh Nguyen, Markus Frietsch, Christian Sauter
Formation Control for Multiple Mobile Robots Based on the Spiking Neural Network 436
Xu Wang, Zhi-Qiang Cao, Wen-Wen Zhang, Min Tan, Zeng-Guang Hou, Xiu-Qing Wang
Parking Control of a Center-Articulated Mobile Robot in Presence of Measurement Noise 442
Mehdi Delbrobaei, Kenneth A. McIsaac
Modified Trajectory Shaping Guidance for Autonomous Parallel Parking 447
Muhammad Usman Rafique, Kunwar Faraz
Operating Management of Intelligent & Autonomous MIMO Vehicles 453
Wissam Khalil, Rochdi Merzouki, Belkacem Ould-Bouamama
A New Hybrid Time-Based / Event-Based Simulation Method for Transport Systems Considering Physical Effects 459
Roland Wischnewski, Jurgen Robman
Robot Path Planning Based On Four Point-EGSOR Iterative Method 465
Azali Saudi, Jumat Sulaiman
Automated Food Ordering System with Interactive User Interface Approach 471
Yongchai Tan, Kienloong Lee, Zhichao Khor, Kaevin Goh, Khimleng Tan, Bentfei Lew
A New Control Algorithm for A Passive Type Dance Partner Robot 475
Zhao Liu, Chenglong Fu, Ken Chen, Yoshinori Koike, Yasuhisa Hirata, Kazuhiro Kosuge

Joint Velocity Redistribution for Fault Tolerant Manipulators 481
Hamid Abdi, Saeid Nahavandi
Entrainment Property Analysis of Van Der Pol Oscillator Driving a Spring-mass System for Large Force Generation by Averaging Method 487
Jun Kobayashi
Motion Planning Algorithm for a Mobile Robot Suspended by Seven Cables 493
A. Capua, A. Shapiro, S. Shoval
A New Bionically Inspired Approach to Increase Positioning Accuracy of Robotic Systems 499
Albert Albers, Simon Horter, Markus Frietsch
CAD-Based Off-Line Robot Programming 505
Pedro Neto, J. Norberto Pires, A. Paulo Moreira
Self-Localization of Humanoid Robots with Fish-eye Lens in a Soccer Field 511
Bo Tian, Chuen-Leong Ng, Chee-Meng Chew
A Novel Approach for Real Time Eye State Detection in Fatigue Awareness System 517
H. Wang, L. B. Zhou, Y. Ying
Robust Pose Estimation and Tracking System for a Mobile Robot Using a Panoramic Camera 522
Om K. Gupta, Raymond A. Jarvis
Scene Retrieval with Color Moment Invariant 529
Xiao Chen, Jianxun Li, Jiayun Wu
Optical Flow Based System Design for Mobile Robots 534
Mehmet Serdar Guzel, Robert Bicker
Development of Intelligent Massage Manipulator and Reconstruction of Massage Process Path using Image Processing Technique 540
Chih-Cheng Peng, Thong-Shing Hwang, Chih-Jui Lin, Yao-Ting Wu, Ching-Yi Chang, Jian-Bin Huang
Autonomous Infrared (IR) Thermography Based Inspection of Glass Reinforced Plastic (GRP) Wind Turbine Blades (WTBs) 546
P. Chatzakos, N. Avdelidis, K. Hrissagis, Tat-Hean Gan
A PSO Algorithm for Biped Gait Planning Using Spline Approximation 552
Zhang Qizhi Zhou Yali, Ge Xinsheng
Humanoid Robot Push Recovery through Walking Phase Modification 558
Albertus Hendrawan Adiwahono, Chee-Meng Chew, Weiwei Huang, Van Huan Dau
Planning Bipedal Walking Gait Using Augmented Linear Inverted Pendulum Model 564
Van-Huan Dau, Chee-Meng Chew, Aun-Neow Poo
Moving Control of Quadruped Hopping Robot Using Adaptive CPG Networks 570
Anuar Bin Mohamed Kassim, Takashi Yasuno
Design of an SMA-Actuated Jumping Robot 578
Thanhtam Ho, Sangyoon Lee
Author Index