2011 First International Conference on Robot, Vision and Signal Processing

(RVSP 2011)

Kaohsiung City, Taiwan
21 – 23 November 2011
Table of Contents

Preface.........................................................................................................................................................xii
Organization Committee ...........................................................................................................................xiii
Program Committee ...................................................................................................................................xv
Reviewers..................................................................................................................................................xvii

Micro Robots and Micro-manipulation

Design and Fabrication of an Auto-Reconfiguring Modular Micro Mobile Robot ........................................1
Jonathan Hodgins and Dan Zhang

Analysis of a Novel Design of a Three-Degree of Freedom Hip Exoskeleton
Based on Biomimetic Parallel Structure .......................................................................................................6
Min Pan and Dan Zhang

Simulation Driven Design of a Novel Compliant Parallel Mechanism for Medical Micromanipulation ..................10
Dan Zhang and Zhen Gao

Design of a Three DOFs MEMS-based Precision Manipulator ....................................................................14
Zhongzhe Chi, Min Pan, and Dan Zhang

Hongchun Li, Xiaoguang Zhao, and Min Tan

Real-Time Multiple-Vehicle Detection and Tracking System in Complex Environment with Automatic Lane Detection and Reducing Shadow Effects .................................................................23
Bing-Fei Wu and Jhy-Hong Juang

Cycloid Reducers Study Applied on Orientation Mechanism ......................................................................27
Lucia Pascale and Paul Ciprian Patic

Application of Learning from Demonstration to a Mining Tunnel Inspection Robot ....................................32
Fenglu Ge, Wayne Moore, Michael Antolovich, and Junbin Gao
Multimedia Innovative Technology

Block Polarity and AC Correlation-Based Robust Video Watermarking for H.264/AVC .................................................................36
   Wu-Chih Hu, Ching-Yu Yang, Deng-Yuan Huang, and Seung-Yuan Liao

A Feature-Based Gender Recognition Method Based on Color Information .................................................................40
   Guo-Shiang Lin and Yi-Jie Zhao

Automatic Colon Segmentation Using Isolated-Connected Threshold ............................................................................44
   Ku-Yaw Chang, Hao-Han Zhang, Shao-Jer Chen, Lih-Shyang Chen, and Jia-Hong Chen

Adapted Mean Variable Distance to Fuzzy-Cmeans for Effective Image Clustering ..........................................................48
   S. Ramathilaga, James Jiunn-Yin Leu, and Yueh-Min Huang

Bloodstain Segmentation in Color Images .............................................................................................................52
   Ying-Wei Wang, Deng-Yuan Huang, Wu-Chih Hu, and Chun-Ying Ho

Fuzzy Recognition Based on the Total Matching Degree of Multi-features .................................................................56
   Lei Jingtao and Zhu Jianmin

Intelligent Radio Based Positioning and Fuzzy Based Navigation for Robotic Wheelchair with Wireless Local Area Networks .........................................................61
   Bing-Fei Wu, Cheng-Lung Jen, and Tzu-Wei Huang

4-Axis Robot Design and Simulation Based on SimulationX .....................................................................................65
   Luyan Bi and Lisheng Liu

Psychology, Robot and Signal Processing

A Programming Method Combining Static Display with Dynamic Robots .................................................................69
   Chien-Ho Ko, Hsiang-Tse Tsai, and Tai-Wei Chang

Time-Frequency Analysis of EEGs Recorded during Meditation .............................................................................73
   Shih-Feng Wang, Yu-Hao Lee, Yung-Jong Shiah, and Ming-Shing Young

Car-Like Mobile Robot Reverse Parking: Using Fuzzy Logic Control Approach ....................................................77
   Zhenzhang Liu, Yijun Wang, and Tien-Fu Lu

Underwater Feature Based Visual Odometry - Experiment and Analysis .............................................................81
   Peiliang Gong and Donglai Zhang

Research and Application on Robot & Vision

Based on Fuzzy Color Detection and Field Calibration for Robot Soccer ..........................................................86
   Shun-Hung Tsai, Chun-Hung Su, Chih-Hsiang Chang, Chorng-Tyan Lin, Chih-Chin Wen, and Jeng-Han Li

Design of Sliding Mode Controller for Two-Link Robot Manipulator ..........................................................90
   Chorng-Tyan Lin, Kuan-Chih Liu, Chien-Wen Chung, and Yaote Chang
The Introduction of Precision Positioning and Compensation Technology in Gantry-Type Platform .................................................................94
  Cheng-Yen Chen, Yung-Chen Wu, Chun-Wei Huang, and Po-Wen Hsueh

The Integration and Application of Machine Vision by Using Ultra-low Alignment Stage .................................................................98
  Chih-Chin Wen, Hui-Hung Lin, Shi-Wei Lin, Chorng-Tyan Lin, Chun-Ming Yang, and Jwu-Jiun Yang

A Development and Construction of Parallel Robot with Embedded System .........................................................102
  Hui-Hung Lin, Chih-Chin Wen, Shi-Wei Lin, Cheng-Chung Chang, Kuan-Chih Liu, and Chorng-Tyan Lin

Hardware-Accelerated Vehicle License Plate Detection at High-Definition Image ...............................................................106
  Sheng-Yan Yang, Yan-Chen Lu, Li-Yen Chen, and Der-Chun Cherng

Model-Following Control of Single-Phase Inverters Using Time-Varying Sliding Surface .............................................................110
  En-Chih Chang, Rong-Ching Wu, and Chieh-Hsu Kuo

A Safety Preservation Type Vision System Based on Probabilistic Measures .............................................................114
  Takafumi Yamamoto, Yoji Yamada, Masaki Onishi, and Yoshihiro Nakabo

Robot Sensing and Control

Minimum-Jerk Robot Joint Trajectory Using Particle Swarm Optimization .................................................................118
  Hsien-I Lin and Yu-Cheng Liu

Optimal Configuration of a Parallel Kinematic Manipulator for the Maximum Dynamic Load-Carrying Capacity .........................................................122
  Chun-Ta Chen and Shi-Chang Zeng

Development of Wireless Torque Sensing Using Embedded Microchip .................................................................126
  Chih-Jer Lin and Guo-Xing Liu

A Regressor Free Adaptive Backstepping Design of Flexible Joint Robot Based on Function Approximation Technique .........................................................130
  Yin-Chieh Chang and Jinsiang Shaw

Image/Video Coding and Optimization Algorithm I

An Improved Distributed Compressive Video Sensing Based on Adaptive Sparse Basis .........................................................137
  Lei Liu, Anhong Wang, Zhihong Li, and Kongfen Zhu

NN-SMC MPPT Method for PV Generating System .........................................................141
  Zhao Yong, Li Hong, and Liu Liqun
A Hybrid Vector Artificial Physics Optimization for Constrained Optimization
Problems ...................................................................................................................................................145
   Liping Xie and Jianchao Zeng

PSO with Constraint-Preserving Mechanism for Mixed-Variable Optimization
Problems ...................................................................................................................................................149
   Chaoli Sun, Jianchao Zeng, Jengshyang Pan, and Yunqiang Zhang

The Research of Soft Component Library Based on Cloud Computing ..............................................154
   Hongyan Zhao, Yingjun Zhang, and Jiangfeng Liu

Damage Detection Based on Self-Organizing Map Neural Network ......................................................158
   Liping Zhao, Feng Zhang, and Xiaoyan Xiong

Target Following Using a Vector Field Approach .................................................................................162
   Tommie Liddy, Tien-Fu Lu, and David Harvey

Video-Based Traffic Analysis System Using a Hierarchical Feature Point Grouping Approach ..........166
   Chung-Hsien Huang

Image/Video Coding and Optimization Algorithm II

A High Precision Pressure Data Acquisition System Based on MSC1210 ...........................................170
   Yang Tiemei

A Computation Method of Concept Semantic Similarity in Heterogeneous Ontologies .........................174
   Yingjun Zhang, Yanxia Zhang, Lihu Pan, and Lichao Chen

VQ Codebook Design Algorithm Based on Copula Estimation of Distribution Algorithm .........................178
   Xiadong Guo, Lifang Wang, Jianchao Zeng, and Xueliang Zhang

Design the Controller of Switched Reluctance Motor Based on DSP .................................................182
   Yang Jin-Ling, Han Ru-Cheng, and Zhang Ying-Jun

GPC Control Method and Stability Analysis of Networked Control Systems .....................................186
   Sun Zhiyi, Sun Qianlai, and Wang Anhong

Safety Design and Control Algorithm for Robotic Spinal Surgical System .........................................190
   Haiyang Jin, Ying Hu, Feng Li, and Jianwei Zhang

Microcomputer Implementation of a Finite Error Convergence Time Controller for Voltage Source Inverters .................................................................195
   En-Chih Chang, Lung-Sheng Yang, and Chieh-Hsu Kuo

Mirror Based IMU-camera and Internal Camera Calibration ...............................................................199
   Ghazaleh Panahandeh, Dave Zachariah, and Magnus Jansson
Network and Information Security

Design and Implementation of an Improved Overlapped Cell Image Segmentation Method .................................................................204
   Shu Li, Lei Wu, and Yang Sun

Survey of Energy-Saving Protocols in Wireless Sensor Networks .................................................................208
   Xiu-Shuang Yi, Pei-Jun Jiang, Xing-Wei Wang, and Shao-Cheng Zhang

Core Functions Analysis and Example Deployment of Virtual Honeynet .................................................................212
   Liu Tian-Hua, Yi Xiu-Shuang, and Ma Shi-Wei

A Morphological License Plate Locating Method in Complex Background ..........................................................216
   Yang Sun

Research of Multi-robot Parallel Assembly Optimization Base on PSO-SS .................................................................220
   Ping Yan and Minghai Jiao

Background Subtraction Based Segmentation Using Object Motion Feedback ..................................................224
   Yan-Chen Lu, Sheng-Yan Yang, and Der-Chun Cherng

Long Term Trajectory Prediction of Moving Objects Using Gaussian Process ................................................228
   Elnaz Jahani Heravi and Sohrab Khanmohammadi

Leader-Follower Formation Control Based on Hybrid Formation Control Framework and Waypoint in Cone Method .................................................................233
   Yanyan Dai and Suk Gyu Lee

Communication Systems

The Subchannel Inversion for Power Allocation in Multicarrier OFDM Systems .................................................................237
   Chia-Hsin Cheng, Yung-Fa Huang, and Yung-Pei Cheng

Integration Interval Determination Algorithms for DLC Receivers .................................................................241
   Chuan-Wang Chang and Hsi-Chou Hsu

Blind Adaptive Multiuser Detection Algorithm for Time-Hopping Impulse Radio Ultra Wide Band Systems in Multipath Channel .................................................................244
   Chien-Erh Weng and Ho-Lung Hung

TransSQL: A Translation and Validation-Based Solution for SQL-injection Attacks .................................................................248
   Kai-Xiang Zhang, Chia-Jun Lin, Shih-Jen Chen, Yanling Hwang, Hao-Lun Huang, and Fu-Hau Hsu

Fuzzy Variable Structure Control for Autonomous Orientation of Hovercraft Systems .................................................................252
   Chun-Chieh Wang

Based on PSoC Electric Angle Meter .................................................................256
   Y.C. Chin, F.H. Chu, S.C. Huang, and H.Y. Yang
Improved Robust Stabilization of Time-Delay Systems via Fuzzy Discretized Approach ...............................................................260
   Yan Zhao and Bing Li

Implementation of Intelligent Motor Speed Control Using Rotary Encoder .................................................................264
   Min Chao, Kunta Hsieh, Chin-Yu Wang, and Hsinchiu Chang

Cross-Discipline Techniques
The Active/Passive Forces Analyzing of a 4PUS/1RPU Parallel Manipulator .................................................................268
   Xiaojun Yang, Xiaoke Song, and Bing Li

Analysis of Modified Single-Phase PFC AC-DC Buck-Boost Converter ........................................................................272
   Lung-Sheng Yang and En-Chih Chang

New Sorting Technique on Partial Distortion Search Using Two Bit-Transform for Fast Optimal Motion Estimation ....................................................276
   Hung-Ming Chen, Po-Hung Chen, and Jian-Hong Ciou

Design, Fabrication and Control of a Three-Finger Robotic Gripper ....................................................................................280
   Farzad Cheraghpour Samavati, Amir Feizollahi, Pouya Sabetian, and S. Ali. A. Moosavian

Deducting Fingerprint Singular Points Using Orientation Field Reliability ........................................................................284
   Mohammed S. Khalil

Vision-Aided Inertial Navigation Using Planar Terrain Features .................................................................................................287
   Ghazaleh Panahandeh and Magnus Jansson

Advanced Intelligent Trajectory Tracking Design for Vehicle Systems under the Effects of Uncertain Disturbances ............................................................292
   Nai Ren Guo, Yung-Yue Chen, and Tzong Jiy Tsai

Approximated Nonlinear Predictive Control for Trajectory Tracking of a Wheeled Mobile Robot ..............................................296
   R. Hedjar, M. Alsulaiman, and K. Almutib

Oily Residuals Security Threat on Smart Phones ..................................................................................................................300
   Khalid Airowaily and Majed Alruabaian

Indoor Water-Dispensing Robot with Two-Stage Localization .................................................................................................303
   Li Juan, Tien-Szu Pan, Kuo-Kun Tseng, Jeng-Shyang Pan, and Jialong Zhang

A Parallel Hybrid Evolutionary Particle Filter for Nonlinear State Estimation ........................................................................308
   Jialong Zhang, Tien-Szu Pan, and Jeng-Shyang Pan

An Injection Molding Pantograph Mechanism for Use of the Miniature Surface Mount System ................................................313
   Mikio Horie
Multimedia Technology

Performance Evaluation of the Unified Pulse-Replacement (UPR) Algorithm for 3GPP-AMR 12.2k Speech Coder ...............................................................320
   Fu-Kun Chen, Guan-Ming Chen, and Yue-Dar Jou

Efficient Pre-selection Method for Fast MP-MLQ Search in G.723.1 ......................................................324
   R.S. Lin, Y.C. Li, and J.Y. Wang

Visual Fire Detection Based on Data Mining Technique ........................................................................328
   Yu-Chiang Li and Wei-Cheng Wu

A Parallel Computing Algorithm for H.264/AVC Decoder ...........................................................................332
   Yung-Chiang Wei, Rong-Xian Zhang, and Rong-San Lin

   Hsin-Chuan Chen

Design and Implementation of the Multi-touch Tables ..............................................................................340
   Chao-Hsuing Tseng and Yung-Chiang Wei

Grasp Planning for Rehabilitation Robot in Manipulate Book ..................................................................344
   Tianyu Wang

A Study to Support Haptic Collaboration with Real Time Force Feedback over Wireless Networks ................348
   Kian Meng Yap and Tsung-Han Lee

Author Index ............................................................................................................................................352