2010 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications

(MESA 2010)

QingDao, China
15-17 July 2010
Contents

MESA10-01
Autonomous Systems and Ambient Intelligence

Distributed Context Assessment: A Case Study with Robots in Intelligent Environments, pp.1-6
Fulvio Mastrogiovanni; Antonello Scalmano; Antonio Sgorbissa; Renato Zaccaria

Real Time Control Design for Mobile Robot Fault Tolerant Control. Introducing the ARTEMIC Powered Mobile Robot, pp.7-13
Cristian Axenie; Razvan Solea

Neural Networks Modeling of Autonomous Underwater Vehicle, pp.14-19
Reza Amin; Amir A. Khayyat; Kambiz Ghaemi Osgouie

Optimal Autopilot of an Unicycle, pp.20-25
Ping-Ho Chen; Wei-Hsiu Hsu; Ding-Shinan Fong; Ru-Fong Liou

Consensus of Nonlinear System using Feedback Linearization, pp.26-31
TaeKyung Lee; Hye-Sung Ahn

Poster session A
SUAVTA + Education + Autonomous + Autonomic

An intelligent control strategy based on ANFIS techniques in order to improve the performance of a low-cost unmanned aerial vehicle vision system, pp.32-37
G. N. Marichal; A. Hernandez; L. Acosta; M. Olivares-Mendez; P. Campoy

Hu Sheng; Haiyang Chao; Calvin Coopmans; Jinlu Han; YangQuan Chen; Mac MaKee

A Multifunctional HIL Testbed for Multicopter VTOL UAV Actuator, pp.44-48
Corentin Cheron; Aaron Dennis; Vardan Semenjyan; YangQuan Chen

Anchor-based Programming Teaching Embedded with C# Platform, pp.49-52
Li Liu; Zhaqing Wang; Xusheng Jiang

Development of a Remote Practice System for Embedded System Education, pp.53-58
Takeyuki Kodama; Yudai Suzuki; Shinji Chiba

A Case Study of Course Design for Software Development on Mobile Phone, pp.59-64
Tianzhou CHEN; Qingsong SHI; Xueqing LOU; Wei HU

A Global Curriculum Design Framework For Embedded System Education, pp.65-69
Yu Zhang; Zhaqing Wang; Licheng Xu

A First Course in Computer Programming for Mechanical Engineers, pp.70-75
Burford Furman; Eric Wertz

Key Technologies of Pre-processing and Post-processing methods for Embedded Automatic Speech Recognition Systems, pp.76-80
Dongzhi He; Yibin Hou; Yuanyuan Li; Zhihao Ding

A Survey on Multi-Agent Reinforcement Learning: Coordination Problems, pp.81-86
Youngcheol Choi; Hye-Sung Ahn

Sensorless Torque Estimation using Adaptive Kalman Filter and Disturbance Estimator, pp.87-92
Sang-Chul Lee; Hye-Sung Ahn

MESA10-02
Autonomic and Distributed Mechatronic and Embedded Systems

Embedded Sensor Networks for Process Monitoring and Mechatronic Applications, pp.93-98
Somashekhar S Hiremath; Gokul Balakrishnan

GPRS-Based Fault Monitoring for Electric Distribution Grid, pp.99-102
Zhixin Tie; Zhaqing Wang

A New Schoenflies Motion Parallel Manipulator, pp.103-108
Chao Chen

MODULAR EMBEDDED SYSTEM DESIGN FOR MECHATRONIC EDUCATION, pp.109-112
Ali Özgü Nursal

An Autonomic Mobile Agent-Based System for Distributed Job Shop Scheduling, pp.113-118
Yu-Cheng Chou; Harry H. Cheng

MESA10-13
Small Unmanned Aerial Vehicle Technologies and Applications (SUAVTA)

Dead Reckoning and Kalman Filter Design for Trajectory Tracking of a Quadrotor UAV, pp.119-124
Qing-Li Zhou; Youmin Zhang; Yao-Hong Qu; Camille-Alain Rabbath

Autonomous Safe Landing of a Vision Guided Helicopter, pp.125-130
Andrea Cesetti; Emanuele Frontoni; Adriano Mancini; Primo Zingaretti

Fault-tolerant Localization for Multi-UAV Cooperative Flight, pp.131-136
Yaohong Qu; Youmin Zhang
A Two-Stage Calibration Method for Low-cost UAV Attitude Estimation Using Infrared Sensors, pp.137-142
Di Long; Haiyang Chao; YangQuan Chen

autopilot of electrical helicopter, pp.143-148
Dmitry Romaev; Andrey Barabanov

MESA10-03
Bio-Mechatronics and Bio-sensors

A Surface Micromachined Capacitive Pressure Sensor for Intraocular Pressure Measurement, pp.149-154
Kalyan Katuri; Melur Ramasubramanian; Sajay Asrani

Contactless Power Couplers for Respiratory Devices, pp.155-160
Hao Zheng; KaiSui Tnay; Nordin Alami; Aiguo Patrick Hu

Biologically-inspired postural and reaching control of a multi-segment humanoid robot, pp.161-167
Karim Tabboub

Intra-luminal Injection of Ferro-fluid for Magnetic Bowel Retraction in Minimal Access Surgery, pp.168-173
Zhigang Wang; Andrew Brown; Stuart Brown; Lijun Wang; Alfred Cuschieri; Pascal Andre; Gordon J Florence

MESA10-10
Sensors and MEMS

Infrastructure for ICs and MEMS manufacturing, pp.174-179
Bernard Courtois

A contribution to the classical scalar Preisach hysteresis model for magneto-elastic materials, pp.180-185
Klaus Oppermann; Bernd R. Armeaning; Bernhard G. Zagar

IDC based Battery-Free Wireless Pressure Sensor, pp.186-191
Jose Villalobos; Zhen Xu; Yi Jia

Implementation of Force Sensor with Multi Strain Gauges for Enhancing Accuracy and Precision, pp.192-195
YooChang Kim; YongSeok Ihn; HyoukRyeol Choi; SangMu Lee; JaChoon Koo

Poster session B
Sensors etc.

Reconfiguration Plan Analysis of Quadruped/Biped Walking Robot with Parallel Leg Mechanism, pp.196-201
Hongbo Wang; Zhengyan Qi; Guiling Xu; Xing Hu

Discrete Data-Based State Feedback Model of Human Operator, pp.202-207
Karlev Tervo

An Integrated Micro Immunosensor for Hemoglobin-A1c Level Detection, pp.208-212
Qiannan Xue; Chao Bian; Hong Zhang; Shanfong Xia

The Instant Core Loss Prediction for High-speed Mechatronics, pp.213-216
Kuofeng Chen

Nam Ho; Anh-Vu DINH-DUC

Study on the Actuating Performance of NiTi/Si Composite Film, pp.224-228
Shuanghuang SUN; XiaoHui LIU

Simple Cable-Driven Manipulator System as Laboratory Assistant, pp.229-232
Janusz Baczynski; Michal Baczynski

MESA10-05
Development, Verification, Debug Tools for Mechatronic and Embedded Systems

Performance Guided High Level Algorithm Partitioning, pp.233-238
Florian Schupfer; Jiong Ou; Peter Brunmayr; Christoph Grimm

Bringing TCP/IP networking to resource limited embedded systems, pp.239-244
Roman Glistvain; Mokhtar Aboelaze

A SysML-based Integration Framework for the Engineering of Mechatronic Systems, pp.245-250
Mohammad Chami; Holger Seemüller; Holger Voos

Method of Droplet Routing in Digital Microfluidic Biochip, pp.251-256
Kamalesh Singh; Tuhina Samanta; Hafizur Rahaman; Parthasarathi Dasgupta

MESA10-11
Sensor Networks and Networked Embedded Systems

Energy-Aware Distribution of Monitoring Agents Using Genetic Algorithms, pp.257-262
Wenjia Liu; Bo Chen

A Novel Hybrid Routing Model for Wireless Grain Depot Surveillance System, pp.263-268
An-ding ZHU

Automatic Estimation the Number of Clusters in Hierarchical Data Clustering, pp.269-274
Chuanzi Zang; Bo Chen

Simple video technique for initial positioning of cable-driven manipulators, pp.275-278
### MESA10-06
**Embedded System Infrastructure and Theory & Renewable Energy Systems**

- *Intelligent Water Dispenser System Based on Embedded Systems*, pp.279-282
  Jinhuang Huang; Jun Xie

- *Digital Platform design for magnetically suspended bearings equipped for wind turbine based on DSP28335+FPGA*, pp.283-287
  Hongen Wu; Linjing Xiao; Baoren Wang; Guili Li; Peng Li

- *A Method for Adjusting the Periods of Periodic Processes To Reduce the Least Common Multiple of the Period Lengths in Real-Time Embedded Systems*, pp.288-294
  Jia Xu

  Linwei Niu

### MESA10-16
**Embedded Computer Vision**

- *Disparity Map Computation on Scalable Computing*, pp.301-306
  Jesus Ortiz; Humberto Calderon; Jean-Guy Fontaine

- *High Parallel Disparity Map Computing on FPGA*, pp.307-312
  Humberto Calderon; Jesus Ortiz; Jean-Guy Fontaine

- *An Embedded High Performance Data Acquisition and Pre-Processing Interface for Asynchronous Event-Based Silicon Retina Data*, pp.313-318
  Christoph Sulzbachner; Jurgen Kogler; Willfried Kubinger

- *A framework based on vision sensors for the automatic management of exchange parking areas*, pp.319-324
  Ludovico Catani; Emanuele Frontoni; Primo Zingaretti

### Poster session C
**Mechatronic and Embedded System Applications, Diagnosis and Monitoring**

- *Structural Health Monitoring of Buried Pipelines under Static Dislocation and Vibration*, pp.325-329
  Siavash Dezfouli; Abolghasem Zabihollah

- *Quick Crack Detection of the Large Vibrating Screen Lower Beam Based on Combined Technical Method of MMT and ET*, pp.330-335
  Guanghui XUE; Guorui ZHAO; Shigang ZHU; Hui LIU; Miao WU

- *A Monitoring and Controlling System Based on Distributed Industrial Ring Ethernet in Coal Mine*, pp.336-340
  Liu Zhi-hai; Zeng Qing-liang; Li Gu; Wang Liang

- *A Fault Detection Approach using both Control and Output Error Signals in Frequency Domain*, pp.341-344
  Chih-Ping Yeh; Han Long Yang; Wen Chen

  Jirong Wu; Jianqun Liu; Dong Xu; Jian Cao

- *Research on Totally Electrical Screw-rotated Injection Equipment and Method*, pp.351-354
  Dong-mei Jiao; Bai-yuan Lv

- *Design and Implementation of Communication Platform in CNC System*, pp.355-360
  Tianrong Gao; Dong Yu; Dongfeng Yue; Yi Hu

- *The study of mediator-less microbial fuel cell based on Saccharomyces cerevisiae*, pp.361-363
  Yisheng Liu; Wei Li; Xudong Hu; Yun Yin

  Luning Xu; Li Han; Zuo Min Dong

- *Study of Minimum Quantity Coolant (MQC) on Surface Roughness during Turning Operation on Aluminum*, pp.370-374
  Yaser Hadi

### MESA10-07
**Diagnosis and Monitoring in Mechatronic Systems**

- *DUKF-based GTM UAV Fault Detection and Diagnosis with Nonlinear and LPV Models*, pp.375-380
  Ling Ma; Youmin Zhang

- *Fault detection for descriptor systems with Markov jump parameters and time-varying delays*, pp.381-386
  Zhiwei Gao; Nan Xiao

- *Real Time Monitoring of Input Force for High Speed Power Chucks Used in CNC Lathes*, pp.387-391
  Cheng Zhou; Huayong Yang; Likui Yang

- *Characterization of partial discharge signals*, pp.392-397
  Z.W. Zhong

### MESA10-15
**Mechatronic and Embedded System Applications**

- *Development of an Embedded Monitoring Device for a Manufacturing Plant*, pp.398-402
  Peter Niklas; Martin Zauner; Martin Horauer

- *Design Analysis of a Pneumatic Muscle Driven Wearable Parallel Robot for Ankle joint Rehabilitation*, pp.403-408
### MESA10-12

**Robotics and Mobile Machines**

- Prashant Jamwal; Shengquan Xie; Kean Aw
  - *A Fault-Tolerant Safety Communication Model Based on Dual Ring Bus*, pp.409-414
- Dongfeng Yue; Dong Yu; Tianrong Gao; Zhenyu Yin; Yi Hu; Jinghua Bai
- Andrea Ascani; Emanuele Frontoni; Adriano Mancini; Primo Zingaretti
- Deval Yagnik; Jing Ren; Ramiro Liscano
  - *Robot localization in urban environments using omnidirectional vision sensors and partial heterogeneous apriori knowledge*, pp.428-433
- Emanuele Frontoni; Andrea Ascani; Adriano Mancini; Primo Zingaretti
  - *Design, Dynamic Modeling and Simulation of a Spherical Mobile Robot with a Novel Motion Mechanism*, pp.434-439
- Ahmad Ghanbari; Saber Mahboubi; Mir Masoud Seyyed Fakhrabadi
- Matteo Zoppi; Rezia Molifino; Pietro Cer Veri
  - *Forward displacement analysis of a 2-DOF RR-RRR-RRR spherical parallel manipulator*, pp.446-451

**Abstracts**

- P. Jamwal, S. Xie, K. Aw
  - *A Fault-Tolerant Safety Communication Model Based on Dual Ring Bus*, pp.409-414
- D. Yue, D. Yu, T. Gao, Z. Yin, Y. Hu, J. Bai
- A. Ascani, E. Frontoni, A. Mancini, P. Zingaretti
- D. Yagnik, J. Ren, R. Liscano
  - *Robot localization in urban environments using omnidirectional vision sensors and partial heterogeneous apriori knowledge*, pp.428-433
- E. Frontoni, A. Ascani, A. Mancini, P. Zingaretti
  - *Design, Dynamic Modeling and Simulation of a Spherical Mobile Robot with a Novel Motion Mechanism*, pp.434-439
- A. Ghanbari, S. Mahboubi, M. Seyyed Fakhrabadi
- M. Zoppi, R. Molifino, P. Cerveri
  - *Forward displacement analysis of a 2-DOF RR-RRR-RRR spherical parallel manipulator*, pp.446-451

### MESA10-17

**Fractional Order Dynamic Systems and Controls**

- Qiuping Li; Shurong Sun; Zhenlai Han; Yige Zhao
  - *On the existence and uniqueness of solutions for initial value problem of nonlinear fractional differential equations*, pp.452-457
- Changpin Li; Zhengang Zhao
- Li; Xue Dingyu
  - *Design of controllers using damping contours defined from closed loop systems based on fractional complex order integrators*, pp.464-469
- P. Lanusse, J. Sabatier, A. Oustaloup
  - *Numerical study on a layered fractional model of drug release*, pp.470-473
- Xicheng Li; Wen Chen
  - *A Variable Order Fractional Operator Based Synthesis Method for Multifractional Gaussian Noise*, pp.474-479
- H. Sheng; H. Sun; Y. Chen; T. Qiu
  - *An Approximation Algorithm of Fractional Order Pole Models Based on an Optimization Process*, pp.486-491

**Abstracts**

- Qiuping Li, Shurong Sun, Zhenlai Han, Yige Zhao
  - *On the existence and uniqueness of solutions for initial value problem of nonlinear fractional differential equations*, pp.452-457
- Changpin Li, Zhengang Zhao
- Li, Xue Dingyu
  - *Design of controllers using damping contours defined from closed loop systems based on fractional complex order integrators*, pp.464-469
- P. Lanusse, J. Sabatier, A. Oustaloup
  - *Numerical study on a layered fractional model of drug release*, pp.470-473
- Xicheng Li, Wen Chen
  - *A Variable Order Fractional Operator Based Synthesis Method for Multifractional Gaussian Noise*, pp.474-479

### Poster session D

**Control, robotics and dynamic systems**

- Yige Zhao; Shurong Sun; Zhenlai Han; Meng Zhang
- Meng Li; Xue Dingyu
  - *An Approximation Algorithm of Fractional Order Pole Models Based on an Optimization Process*, pp.486-491
- Mathieu PELLET; Pierre MELCHIOR; Julien PETIT; Jean-Marie CABELGUEN; Alain OUSTALOUP
- Dongfeng Wang; Xiaoyan Wang
  - *A fractional-order synchronization of two networked motion control systems*, pp.504-510
- Yongshun Jin; YangQuan Chen
  - *The Finite Element Method for the Generalized Space Fractional Fokker-Planck Equation*, pp.511-516
- Zhengang Zhao; Changpin Li
  - *A speculative study of anomalous relaxation modeling for the distribution of prime numbers*, pp.517-521
- Wang; Shuai Hu; HongGuang Sun
  - *Linear Quadratic Regulator and Fuzzy controller Application in Full-car Model of Suspension System with Magnetorheological Shock Absorber*, pp.522-528
- Ali Fellah Jahromi; Abolghasem Zabihollah
  - *Using Expert PID Control in Hydraulic-based AMT System to Reduce Shift Vibration*, pp.529-532
- Sheng-bo Qi; Cheng-rui Zhang; Hong-lin Xie
  - *Navigation Technology of Autonomous Mobile Robots in Unknown Environments*, pp.533-538
- Tuanjie Li; Gaowei Yuan; Qingjuan Duan
  - *A new 6-DOF 3-legged parallel mechanism for force-feedback interface*, pp.539-544
- Chao Chen; William John Heyne; Daniel Jackson
  - *Modeling of Variable Length Cable Driven Parallel Robot*, pp.545-548
- DUAN QJ; Duan BY; Li TJ; Tang AF
  - *Path planning of a mobile robot using solid modeling techniques on potential fields*, pp.549-553
- Aris Synodinos; Nikos Aspragathos
  - *Aris Synodinos; Nikos Aspragathos*
Cyber-Physical Systems and Cooperative Systems

Automated Social Coordination of Cyber-Physical Systems with Mobile Actuator and Sensor Networks, pp.554-559
Johnathan Nielsen; Levi Rock; Brad Rogers; Andrew Dalia; Joshua Adams; YangQuan Chen

Context system using Pervasive Controller Area Network bus system to improve driving safety, pp.560-565
Shichao Cai; Mohamed Becherif; Maxime Wack

Global stabilization over the network with continuous loss of states, pp.566-570
Chunjian Qian; Shouhuai Xu; Weisong Tian

Stephen Nestinger; Harry Cheng

MESA10-08
Mechatronic Control and Electrical Vehicular Systems

Acceleration-to-torque Ratio based Anti-skid Control for Electric Vehicles, pp.577-581
Zhiyang Cai; Chengbin Ma; Qunfei Zhao

A new 2D systems approach applied to iterative learning control of spatio-temporal dynamics, pp.582-587
Blazej Cichy; Krzysztof Galkowski

On Distributed Order Low-Pass Filter, pp.588-592
Yan Li; Hu Sheng; YangQuan Chen

Optimal Control of Permanent Magnet Synchronous Motor Using Predictive Functional Control, pp.593-598
Huixian Liu; Shihua Li

Author Index