2011 2nd International Conference on Instrumentation Control and Automation

(ICA 2011)

Bandung, Indonesia
15 – 17 November 2011
TABLE OF CONTENTS

WELCOME SPEECH i
CONFERENCE ORGANIZATION ii
LIST OF REVIEWERS iii
TABLE OF CONTENTS iv

PLENARY SESSION
Practical and Advanced Image Processing for Security and Recognition by Thermal Distributed Image Features
Osamu Ono
(Meiji University, Japan) 1

Tropical Wood Species Recognition System based on Multi-Feature Extractors and Classifiers
Marzuki Khalid, Rubiyah Yusof, Anis Salwa Mohd Khairuddin
(Universiti Teknologi Malaysia, Malaysia) 6

Current Technology on Minimally Invasive Surgery and Interventional Techniques
Jenny Dankelman, John J. van den Dobbelsteen, Paul Breedveld
(TU Delft, The Netherlands) 12

Networked Control Systems: Time Delays and Robust Control Design Issues
Endra Joelianto
(Bandung Institute of Technology, Indonesia) 16

PARALLEL SESSIONS
H1-1-A Emerging Actuator Technology
Active Damping of Smart Piezoelectric Plates Using Variational Approach
Ibrahim Sadek, Ismail Kucuk
26

Disturbance Reduction on the Small Satellite Actuator
Dong-Ik Cheon, Daegyun Choi, Eunjeong Jang, Hwa-Suk Oh
31

Integrated Rate and Inertial Dependent Prandtl-Ishlinskii Model for Piezoelectric Actuator
V. Hassani, T. Tjahjowidodo 35

H1-1-B Feedback and Reference Control
Transient Response Improvement of PID Controller using ANFIS – Hybrid Reference Control
Endra Joelianto, Deddy Candra Anura 41

Model Reference Adaptive Control of Cavity Pressure in Injection Molding during Filling and Packing Phases
Gunawan Dewantoro, Feriyonika 47
H1-1-C Fuzzy Control Systems
Design of a Novel Fuzzy Adaptive PI Controller for Monitor Hydraulic AGC System of Cold Rolling Mill
Shirin Khosravi, Ahmad Afshar, Farshad Barazandeh 53
Fuzzy Controller for Beam Stabilization in a Heavy-Ion Synchrotron
Jochen Grieser, Harald Klingbeil, Jürgen Adamy 59
An Adaptive Neuro-fuzzy Controller for Cement Kiln
Mehrad G. Sharabiany, Alireza Fatehi, Babak N. Araabi 65

H1-1-D Bio-engineering Analysis and Instrumentation
Observation of Acupuncture Stimulation on Human Stamina Improvement using EMG
Farida I. Muchtadi, Suprijanto, Gunawan Ismail, H. Susanti, Maria E. Prasetyo 71
Wavelet Denoising to Analyze Electroencephalogram Signal of Perfect Pitch and Non Perfect Pitch Subjects
Suprijanto, Renata Amelia, A. Sabdono Sudarsono, Joko Sarwono 77

H1-2-A Instrumentation and Image Processing Techniques
Batik-Inspired Wax Patterning for Cloth-based Microfluidic Devices
Azadeh Nilghaz, Dedy H.B. Wicaksono, F. Adibah Abdul Majid 82
Compact Computer Vision for Black Tea Quality Evaluation Based on the Black Tea Particles
Suprijanto, Amalia Rakhmawati, Endang Yuliastuti 87
Haar Wavelet Based Reduced Reference Quality Assessment Technique for JPEG/JPEG2000 Images
Antony Halim, Irwan Prasetya Gunawan 92
Estimation of Rice Milling Degree using Image Processing and Adaptive Network Based Fuzzy Inference System (ANFIS)
Deden M. F. Shiddiq, Yul Y. Nazaruddin, Farida I. Muchtadi, Sapta Raharja 98

H1-2-B Systems Modeling, Simulation and Control
Modeling and Simulation of a DC Motor Control System with Digital PID Controller and Encoder in FPGA Using Xilinx System Generator
Behzad Behnam, Masoud Mansouryan 104
A Receding Horizon Control of a Cooperative Multi Target Tracking System
Ehsan Moradi Pari, Mohammad Haeri 109
Just-in-Time Control Method for a Free-joint Manipulator
Yuji Usui, Sumiko Majima 113
Hardware in the Loop Simulation of Railway Traffic Re-scheduling by Means of MILP Algorithm
Endra Joelianto, Aan Setiawan, Diah Chaerani 119
H1-2-C Sliding Mode Control Designs
Synchronizing Two Different Fractional Order Hyperchaotic Systems Using Generalized Fractional Order Sliding Mode Control
Ali Abooee, Mohammad Haeri 125
Controller Design for Inverted Pendulum System using Discrete Sliding Mode Control
R. Ngadengon, Y. M. Sam, J. H. S. Osman, R. Ghazali 130
Fuzzy Sliding Mode Control of Injection Velocity in Injection Molding during Filling Phase
Feriyonika, Gunawan Dewantoro 134
Stabilization a class of fractional-order polytopic differential inclusion systems and variable structure control
Saeed Balochian 140

H1-2-D UAV, Helicopter and Rocket
Determination of Flight Attitude using Kalman Filter for an Agricultural Unmanned Helicopter
H. J. Park, Y. M. Koo, H. B. Park 146
Robust Switched Linear Controller for Multimode Helicopter Models
Salmah, Solikhatun, Noorma Yulia Megawati, Endra Joelianto, Agus Budiyono 152
Dynamic UAV Path Planning for Moving Target Intercept in 3D
H. H. Triharminto, T. B. Adji, N. A. Setiawan 157
Surface Control Design of Rocket using MIMO PID Robust Integral Backstepping
Beni Kusuma Atmaja, Endra Joelianto 162

H2-1-A Model Predictive Control
Hybrid Modeling and Discrete Controller Design of Three-Tank Benchmark System
Cyril Joseph, V. I. George, P. R. Venkateswaran 170
Bake Plate Control using A Robust Multiplexed Model Predictive Control (RMMPC)
Endra Joelianto, Iqbal Ginanjar Prasetia 175

H2-1-B Imaging & Medical Instrumentation
Imaging Tools for the Analysis of Microvessel and Angiogenesis Development in A Tridimensional Cell Culture System
Irza Sukmana 181
Comparison of Two Sagittal Pelvic Tilt Measurement Protocols using Newly Calibrated Novel Pelvic Sensor
Isniza Ismail, Aqilah Leela T. Narayanan, Dedy H.B. Wicaksono 184
Prototype Design of Low Cost Four Channels Digital Electroencephalograph for Sleep Monitoring
Muhammad Salehuddin, Suprijanto, Farida I. Muchtadi 188
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2-1-C Natural Phenomenon Prediction and Monitoring</td>
<td>M. Amir Abas, A. Khusa'ry Azim, M. Hilmi Fadzil, M. Dahlui</td>
<td>194</td>
</tr>
<tr>
<td>Monitoring the Quality of Ozone towards the Prevention of Further Global Warming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design of Horizontal Seismic Sensor with Spherical Inverted Pendulum and Magnetic Levitation</td>
<td>Mohammad Rohmanuddin, Eko Mursito Budi, Rakhmadian Purnama</td>
<td>200</td>
</tr>
<tr>
<td>Maritime Weather Prediction Using Fuzzy Logic in Java Sea</td>
<td>Aulia Siti Aisjah, Syamsul Arifin</td>
<td>205</td>
</tr>
<tr>
<td>Design of Horizontal Seismic Sensor with Spherical Inverted Pendulum and Magnetic Levitation</td>
<td>Mohammad Rohmanuddin, Eko Mursito Budi, Rakhmadian Purnama</td>
<td>200</td>
</tr>
<tr>
<td>H2-1-D Embedded Systems, Design and Implementation</td>
<td>Mohammad Rohmanuddin, Eko Mursito Budi, Rakhmadian Purnama</td>
<td>200</td>
</tr>
<tr>
<td>Implementation of 4 Axes Digital Read Out (DRO) as an Embedded System for Machine Tools</td>
<td>Muzie Hikmah, Arko Djajadi, Maralo Sinaga</td>
<td>209</td>
</tr>
<tr>
<td>The Design of Recorder Radius Tools to Play Four Wheel Vehicle Based on Microcontroller</td>
<td>Dandy Oktodify, Hilda Rizky Aulia, Tiara Nurul Anggraeni</td>
<td>214</td>
</tr>
<tr>
<td>Algorithm Payload for Test Load Rocket Lapan 2009 using ATMEGA 128</td>
<td>Ageng Maulana, Yahan Nuryadi, Naniek Anidani</td>
<td>220</td>
</tr>
<tr>
<td>H2-2-A Mathematical Control Theory</td>
<td>Anthony J. Kearsley</td>
<td>224</td>
</tr>
<tr>
<td>Optimality Conditions for a Hierarchical Control Problem Governed by a PDE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Analysis of Linear System with SOS for Complex Eigenvalues</td>
<td>Noorma Y. Megawati, Salmah, Indah E. Wijayanti, Endra Joelianoto</td>
<td>231</td>
</tr>
<tr>
<td>Discrete Time Riccati Equations in Open Loop Nash Games for Descriptor Systems</td>
<td>Salmah</td>
<td>236</td>
</tr>
<tr>
<td>The Open-Loop Zero-Sum Linear Quadratic Differential Game for Index One Descriptor Systems</td>
<td>Muhammad W. Musthofa, Jacob Engwerda, Salmah, Ari Suparwanto</td>
<td>240</td>
</tr>
<tr>
<td>H2-2-B Network Management and Automation Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Evaluation of Soft Handover Parameters in WCDMA System</td>
<td>Ruhani Ab Rahman, Muhammad Ibrahim, Wan Nazirah Wan Md Adnan, Murizah Kassim, Mat Ikram Yusof</td>
<td>246</td>
</tr>
<tr>
<td>Simple SNMP Based Optical Power Meter</td>
<td>Karel Slavicek</td>
<td>252</td>
</tr>
<tr>
<td>Implementation of Sensor Network for Automation of Bottle-Capping Assembly Station using IEEE 802.15.4</td>
<td>Kunal Uttekar, Rahul Gosavi, Sarthak Lad, Jagruti Kamat</td>
<td>258</td>
</tr>
</tbody>
</table>
H2-2-C Measurement System Analysis
Density Measurement System using Magnetically Operated Reed Switch
Simultaneous Multiple Assays on Microfluidic Cloth-Based Analytical Devices
Azadeh Nilghaz, Dedy H.B. Wicaksono, Eko Supriyanto 266
Summation Convolution Filtered Back Projection (SCFBP) and Algebraic Reconstruction Technique (ART) in Ring Array Ultrasound Tomography Based on Time of Flight
Khusnul Ain, Deddy Kurniadi, Amoranto Trisnobudi, O. Santoso 269
Source Separation using Independent Component Analysis Techniques for Machine Fault Detection in the presence of Background Noise
Dhany Arifianto 274

H2-2-D Automation System Design
Accuracy Evaluation of Delivered Measurements to HMI in a Real SCADA Automation System
H. Khazaeei Targhi, H. Sheisi, H. Moradmand 279
Integration of Real-time Decision-Making in Time-triggered Software Architectures for Certifiable Autonomous Unmanned Systems
Jens Halbig, André Windisch, Patrick Kingsbury, Norbert Oswald, Wolfram Hardt 284
Design of Automatic Change over Unit ATIS PAE time as well as maintaining the presence of E 5000 M and T6T Airport-Jakarta
Sumardi, Munnik Haryanti, Yohannes Dewanto 290
Design of Proximity Warning System Simulator for Train Driver
Sang Aji Jaya Suseno, Yohannes Dewanto 295

H2-3-A Robotics Control and Autonomous Systems
LQR Controller of One Wheel Robot stabilized by Reaction Wheel Principle
Kadam Shishirkumar Namdev, Seth B. 299
Implementation of Guidance System in Modeled Autonomous Mobile for Obstacle Avoidance Behavior
Yin Mon Myint 304
Developing a Quadrupedal Robot with Speech Recognition Movement Control
Andreas, Erikson F. Soonggalon, Ketut Tejawibawa 310
Motion Simulation for Propeller-Driven USM Underwater Glider with Controllable Wings and Rudder
Khalid Isa, Mohd Rizal Arshad 316