

# **2010 Sixth International Conference on Intelligent Sensors, Sensor Networks and Information Processing**

**(ISSNIP 2010)**

**Brisbane, Australia  
7-10 December 2010**



**IEEE Catalog Number: CFP10842-PRT  
ISBN: 978-1-4244-7174-4**

---

**Sensor Networks**

---

- 1        **Exploration of Adaptive Filters for Target Tracking in the Presence of Model Uncertainty**  
*Tracy Q.S. Truong, DSTO, Australia*
- 7        **Comparative Study of RPL-Enabled Optimized Broadcast in Wireless Sensor Networks**  
*Thomas Clausen, Ulrich Herberg, LIX, France*
- 13       **Developing Low-Cost Intelligent Wireless Sensor Networks for Aquatic Environments**  
*Jarrod Trevathan<sup>1</sup>, Ian Atkinson<sup>1</sup>, Wayne Read<sup>1</sup>, Nigel Bajema<sup>1</sup>, Yong Jin Lee<sup>1</sup>, Adam Scarr<sup>1</sup>, Ron Johnstone<sup>2</sup>*  
*<sup>1</sup>James Cook University, Australia; <sup>2</sup>University of Queensland, Australia*
- 19       **Low Cost Prototyping System for Sensor Networks**  
*Neil W. Bergmann<sup>1</sup>, Matthew Wallace<sup>1</sup>, Edoardo Calia<sup>2</sup>*  
*<sup>1</sup>University of Queensland, Australia; <sup>2</sup>Istituto Superiore Mario Boella, Italy*
- 25       **RHA: A Robust Hybrid Architecture for Information Processing in Wireless Sensor Networks**  
*Thanh Dang<sup>1</sup>, Nirupama Bulusu<sup>1</sup>, Wu-chi Feng<sup>1</sup>, Wen Hu<sup>2</sup>*  
*<sup>1</sup>Portland State University, USA; <sup>2</sup>CSIRO, Australia*
- 31       **A Reactive Geographic Routing Protocol for Wireless Sensor Networks**  
*Rong Ding, Lei Yang, Beihang University, China*
- 37       **Minimizing the Operational Cost of Chemical Sensor Networks**  
*Shanika Karunasekera<sup>1</sup>, Alex Skvortsov<sup>2</sup>, Ajith Gunatilaka<sup>2</sup>*  
*<sup>1</sup>University of Melbourne, Australia; <sup>2</sup>DSTO, Australia*

- 
- 43      **Multifunction Array Lidar Network for Intruder Detection, Tracking, and Identification**  
*J.A. Krill, M.J. O'Driscoll, M.C. Gross, S.J. Papadakis, G.F. Ricciardi, J.S. Peri, I.N. Bankman, Johns Hopkins University, USA*
- 49      **Induction Motor Condition Monitoring Using Industrial Wireless Sensor Networks**  
*Liqun Hou, Neil W. Bergmann, University of Queensland, Australia*
- 55      **Performance Analysis of IEEE 802.15.4 MAC Protocol for WSNs with ACK Frame Transmission Under Unsaturated Traffic Conditions**  
*Sumudu Wijetunge, Upul Gunawardana, Ranjith Liyanapathirana, University of Western Sydney, Australia*
- 61      **Resolving RFID Data Stream Collisions Using Set-Based Approach**  
*Prapassara Pupuniwat, Bela Stantic, Griffith University, Australia*
- 67      **A Distributed Protocol for Object Tracking in Wireless Multimedia Sensor Networks**  
*Junbin Liu<sup>1</sup>, Damien O'Rourke<sup>1</sup>, Tim Wark<sup>1</sup>, Simon Denman<sup>2</sup>, Sridha Sridharan<sup>2</sup>*  
*<sup>1</sup>CSIRO, Australia; <sup>2</sup>Queensland University of Technology, Australia*
- 73      **Performance Evaluation of a Converge-Cast Protocol for IEEE 802.15.4 Tree-Based Networks**  
*X. Liu<sup>1</sup>, Christopher Leckie<sup>1</sup>, S.K. Saleem<sup>2</sup>*  
*<sup>1</sup>University of Melbourne, Australia; <sup>2</sup>NICTA, Australia*
- 79      **Segment-Based Packet Combining in a Cluster: To Combine or Not to Combine?**  
*Andreas Willig<sup>1</sup>, Danil Kipnis<sup>2</sup>, Holger Karl<sup>3</sup>*  
*<sup>1</sup>University of Canterbury, New Zealand; <sup>2</sup>Technical University of Berlin, Germany; <sup>3</sup>University of Paderborn, Germany*

- 
- 85      **Packet Forwarding in Overlay Wireless Sensor Networks Using NashQ Reinforcement Learning**  
*Sajee Singsanga<sup>1</sup>, Wipawee Hattagam<sup>1</sup>, Ewe Hong Tat<sup>2</sup>*  
*<sup>1</sup>Suranaree University of Technology, Thailand; <sup>2</sup>Universiti Tunku Abdul Rahman, Malaysia*
- 91      **Distributed Semantic Algorithm for Power Constrained Publish/Subscribe Routing**  
*Muhammad Ikram Ashraf, Leonardo Goratti, Jussi Haapola, Carlos Pomalaza-Ráez,*  
*University of Oulu, Finland*
- 97      **A Fault-Tolerant Data Dissemination Based on Honeycomb Architecture for Mobile Multi-Sink Wireless Sensor Networks**  
*Ayşegül Tüysüz Erman, Arta Dilo, Paul J.M. Havinga, University of Twente, The Netherlands*
- 103     **The Effect of Correlation of Chemical Tracers on Chemical Sensor Network Performance**  
*Champake Mendis<sup>1</sup>, Ajith Gunatilaka<sup>2</sup>, Alex Skvortsov<sup>2</sup>, Shanika Karunasekera<sup>1</sup>*  
*<sup>1</sup>University of Melbourne, Australia; <sup>2</sup>DSTO, Australia*
- 109     **Using Adaptive Sensor Ranking to Reduce the Overhead of the Coverage Configuration Protocol**  
*Silvia Santini, ETH Zürich, Switzerland*
- 115     **A Practical Localization Solution for Wireless Sensor Networks Deployed in Linear Topography**  
*Kui Zhang<sup>1</sup>, Peng Guo<sup>2</sup>, Nirvana Meratnia<sup>1</sup>, Paul J.M. Havinga<sup>1</sup>*  
*<sup>1</sup>University of Twente, The Netherlands; <sup>2</sup>Huazhong University of Science & Technology, China*

- 
- 121      **Low Power Wake-Up Receiver for Wireless Sensor Nodes**  
*Gerd Ulrich Gamm, Matthias Sippel, Milos Kostic, Leonhard M. Reindl,*  
*Albert-Ludwigs-Universität Freiburg, Germany*
- 127      **SensorFeed: An Architecture for Model-Based Sensor Network Data Enrichment**  
*Ali Salehi, Mukaddim Pathan, Doug Palmer, Michael Compton, CSIRO, Australia*
- 133      **Reducing the Data Transmission in Wireless Sensor Networks Using the Principal Component Analysis**  
*Amirmohammad Rooshenas, Hamid R. Rabiee, Ali Movaghar, M. Yousof Naderi, Sharif University of Technology, Iran*
- 139      **Distributed Sensing, Communications, and Power in Optical Fibre Smart Sensor Networks for Structural Health Monitoring**  
*Graham Wild, Gary Allwood, Steven Hinckley, Edith Cowan University, Australia*
- 145      **Reward and Punishment Based Cooperative Adaptive Sampling in Wireless Sensor Networks**  
*Alireza Masoum, Nirvana Meratnia, Zahra Taghikhaki, Paul J.M. Havinga, University of Twente, The Netherlands*
- 151      **Towards a Scalable and Interoperable Global Environmental Sensor Network Using Service Oriented Architecture**  
*Rakhi Motwani, Mukesh Motwani, Frederick Harris Jr., Sergiu Dascalu, University of Nevada at Reno, USA*
- 157      **COM-LOC++: A Distributed Range-Free Localization Algorithm in Wireless Networks**  
*B.J. Dil, Paul J.M. Havinga, University of Twente, The Netherlands*

---

## Advances in Optimization for Distributed Control, Information Fusion and Sensor Network Applications

---

- 163      **Real Time Data Streaming in Sensor Networks: Integrating SAL with the RBNB Data Turbine**  
*Yong Jin Lee<sup>1</sup>, Jarrod Trevathan<sup>1</sup>, Ian Atkinson<sup>1</sup>, Wayne Read<sup>1</sup>, Nigel Bajema<sup>1</sup>, Adam Scarr<sup>1</sup>, Jochen Braun<sup>1</sup>, Andreas Knisch<sup>1</sup>, Andreas Seemann<sup>1</sup>, Ron Johnstone<sup>2</sup>*  
<sup>1</sup>James Cook University, Australia; <sup>2</sup>University of Queensland, Australia
- 169      **Trajectory Control of Autonomous Fixed-Wing Aircraft Performing Multiple Target Passive Detection and Tracking**  
*Peter W. Sarunic<sup>1</sup>, Robin J. Evans<sup>2</sup>*  
<sup>1</sup>DSTO, Australia; <sup>2</sup>University of Melbourne, Australia
- 175      **Convergence of Loopy Belief Propagation for Data Association**  
*Jason L. Williams<sup>1</sup>, Roslyn A. Lau<sup>2</sup>*  
<sup>1</sup>DSTO, Australia; <sup>2</sup>NICTA, Australia
- 181      **DeftRFID: A Lightweight and Distributed RFID Middleware**  
*Yingliang Lu<sup>1</sup>, Weifeng Zhang<sup>2</sup>, Zengchang Qin<sup>2</sup>, Yao Meng<sup>1</sup>, Hao Yu<sup>1</sup>*  
<sup>1</sup>Fujitsu R&D Center Co. Ltd., China; <sup>2</sup>BUAA, China
- 187      **Optimal Sensor Separation for AoA Based Localization via Linear Sensor Array**  
*Sanvidha C.K. Herath, Pubudu N. Pathirana, Deakin University, Australia*
- 193      **Maximum Likelihood Approach for Tracking Multiple Mobile Agents with a Moving Doppler Radar System**  
*Sanvidha C.K. Herath, Pubudu N. Pathirana, Deakin University, Australia*

- 
- 199      **Remarks on the Cramer-Rao Inequality for Doppler-Based Target Parameter Estimation**  
*Adrian N. Bishop<sup>1</sup>, Matthew Smith<sup>2</sup>*  
<sup>1</sup>NICTA, Australia; <sup>2</sup>CEA Technologies, Australia
- 205      **Cohesive Motion Control of Autonomous Formations in Three Dimensions**  
*Ismail Bayezit<sup>1</sup>, Mehdi M. Amini<sup>2</sup>, Barış Fidan<sup>1</sup>, Iman Shames<sup>2</sup>*  
<sup>1</sup>University of Waterloo, Canada; <sup>2</sup>NICTA, Australia
- 211      **Distributed Training of Multiclass Conic-Segmentation Support Vector Machines on Communication Constrained Networks**  
*Sutharshan Rajasegarar, Alistair Shilton, Christopher Leckie, Ramamohanarao Kotagiri, Marimuthu Palaniswami, University of Melbourne, Australia*
- 217      **A Model for Optimal and Robust Control with Time-Varying Computing Constraints**  
*Adrian N. Bishop, Iman Shames, NICTA, Australia*
- 223      **Reducing Sensors' Movement Using Simple Iterative Virtual Movement**  
*Hosna Omidvar Mohammadi<sup>1</sup>, Mahmood Fathy<sup>2</sup>, Hossein Ghaffarian<sup>2</sup>*  
<sup>1</sup>Arak Islamic Azad University, Iran; <sup>2</sup>Iran University of Science & Technology, Iran
- 227      **An Efficient Distributed Cluster-Head Election Technique for Load Balancing in Wireless Sensor Networks**  
*Sepideh Afkhami Goli, Hamed Yousefi, Ali Movaghar, Sharif University of Technology, Iran*
- 233      **Establishing a Link Between Multiple-Sensor Outputs and Non-Deterministic Decision-Making**  
*Edwin El-Mahassni, DSTO, Australia*
- 239      **A Novel Flocking Inspired Algorithm for Self-Organization and Control in Heterogeneous Wireless Networks**  
*Haijun Zhang<sup>1</sup>, Jaime Llorca<sup>2</sup>, Christopher C. Davis<sup>2</sup>, Stuart D. Milner<sup>2</sup>*  
<sup>1</sup>City University of Hong Kong, China; <sup>2</sup>University of Maryland at College Park, USA

---

**Sensor Network Security**

---

- 245      **An Efficient Location-Dependent Key Management Scheme for Wireless Sensor Networks**  
*In-Tai Kim, Yi-Ying Zhang, Myong-Soon Park, Korea University, Korea*
- 251      **Anubis: An Attestation Protocol for Distributed Context-Aware Applications**  
*Senaka Buthpitiya, Feng-Tso Sun, Heng-Tze Cheng, Patrick Tague, Martin Griss, Anind K. Dey, Carnegie Mellon University, USA*
- 257      **Detecting Intrusions Within RFID Systems Through Non-Monotonic Reasoning Cleaning**  
*Peter Darcy<sup>1</sup>, Bela Stantic<sup>1</sup>, Aikaterini Mitrokotsa<sup>2</sup>, Abdul Sattar<sup>1</sup>*  
*<sup>1</sup>Griffith University, Australia; <sup>2</sup>EPFL, Switzerland*
- 263      **All Proxy Scheme for Event Source Anonymity in Wireless Sensor Networks**  
*Yihua Zhang<sup>1</sup>, Matthew Price<sup>2</sup>, Lukasz Opyrchal<sup>2</sup>, Keith Frikken<sup>2</sup>*  
*<sup>1</sup>University of Notre Dame, USA; <sup>2</sup>Miami University, USA*
- 269      **Labelled Data Collection for Anomaly Detection in Wireless Sensor Networks**  
*Shan Suthaharan<sup>1</sup>, Mohammed Alzahrani<sup>1</sup>, Sutharshan Rajasegarar<sup>2</sup>, Christopher Leckie<sup>2</sup>, Marimuthu Palaniswami<sup>2</sup>*  
*<sup>1</sup>University of North Carolina at Greensboro, USA; <sup>2</sup>University of Melbourne, Australia*

---

**Sensor Networks for Healthcare**

---

- 275      **CommonSens: Personalisation of Complex Event Processing in Automated Homecare**  
*Jarle Søberg, Vera Goebel, Thomas Plagemann, University of Oslo, Norway*
- 281      **Availability Measure Model for Assistive Care Loop Framework Using Wireless Sensor Networks**  
*Venki Balasubramanian, Doan B. Hoang, University of Technology Sydney, Australia*
- 287      **Accelerometers: An Underutilized Resource in Sports Monitoring**  
*Jonathon Neville, Andrew Wixted, David Rowlands, Daniel James, Griffith University, Australia*
- 291      **Using Smart Phones and Body Sensors to Deliver Pervasive Mobile Personal Healthcare**  
*Patrick Crilly, Vallipuram Muthukkumarasamy, Griffith University, Australia*
- 297      **Exploring Novel Features and Decision Rules to Identify Cardiovascular Autonomic Neuropathy Using a Hybrid of Wrapper-Filter Based Feature Selection**  
*Shamsul Huda<sup>1</sup>, Herbert Jelinek<sup>2</sup>, Biplob Ray<sup>1</sup>, Andrew Stranieri<sup>1</sup>, John Yearwood<sup>1</sup>*  
*<sup>1</sup>University of Ballarat, Australia; <sup>2</sup>Charles Sturt University, Australia*
- 303      **Intelligent Health Care — A Motion Analysis System for Health Practitioners**  
*Zenon Chaczko, Anup Kale, Christopher Chiu, University of Technology Sydney, Australia*
- 309      **Unravelling Unique Qualitative and Quantitative Characteristics of the Surface Submental EMG in OSA Polysomnograms**  
*Mak Daulatzai<sup>1</sup>, Chandan Karmakar<sup>1</sup>, Neela Khan<sup>2</sup>, Ahsan Khandoker<sup>1</sup>, Marimuthu Palaniswami<sup>1</sup>*  
*<sup>1</sup>University of Melbourne, Australia; <sup>2</sup>Swinburne University, Australia*

- 
- 315      **Correlations Between End Point Foot Trajectories and Inertial Sensor Data**  
*Braveena K. Santhiranayagam<sup>1</sup>, Daniel T.H. Lai<sup>1</sup>, Rezaul K. Begg<sup>1</sup>,  
Marimuthu Palaniswami<sup>2</sup>*  
<sup>1</sup>Victoria University, Australia; <sup>2</sup>University of Melbourne, Australia
- 321      **Nonlinear Active Noise Control with Virtual Sensing Technique**  
*Debi Prasad Das, Danielle J. Moreau, Ben Cazzolato, University of Adelaide, Australia*

Author Index