SENSORCOMM 2015

The Ninth International Conference on Sensor Technologies and Applications

ISBN: 978-1-61208-425-1

August 23 - 28, 2015

Venice, Italy

SENSORCOMM 2015 Editors

Sergey Yurish, IFSA, Spain

Jaime Lloret Mauri, Polytechnic University of Valencia, Spain

SENSORCOMM 2015

Foreword

The Ninth International Conference on Sensor Technologies and Applications (SENSORCOMM 2015), held between August 23-28, 2015 in Venice, Italy, continued a series of events covering related topics on theory and practice on wired and wireless sensors and sensor networks.

Sensors and sensor networks have become a highly active research area because of their potential of providing diverse services to broad range of applications, not only on science and engineering, but equally importantly on issues related to critical infrastructure protection and security, health care, the environment, energy, food safety, and the potential impact on the quality of all areas of life.

Sensor networks and sensor-based systems support many applications today on the ground. Underwater operations and applications are quite limited by comparison. Most applications refer to remotely controlled submersibles and wide-area data collection systems at a coarse granularity.

Underwater sensor networks have many potential applications such a seismic imaging of undersea oilfields as a representative application. Oceanographic research is also based on the advances in underwater data collection systems.

There are specific technical aspects to realize underwater applications which cannot be borrowed from the ground-based sensors net research. Radio is not suitable for underwater systems because of extremely limited propagation. Acoustic telemetry could be used in underwater communication; however off-the-shelf acoustic modems are not recommended for underwater sensor networks with hundreds of nodes because they were designed for long-range and expensive. As the speed of light (radio) is five orders of magnitude higher than the speed of sound, there are fundamental implications of time synchronization and propagation delays for localization. Additionally, existing communication protocols are not designed to deal with long sleep times and they can't shut down and quickly restart.

In wireless sensor and micro-sensor networks, energy consumption is a key factor for the sensor lifetime and accuracy of information. Protocols and mechanisms have been proposed for energy optimization considering various communication factors and types of applications. Conserving energy and optimizing energy consumption are challenges in wireless sensor networks, requiring energy-adaptive protocols, self-organization, and balanced forwarding mechanisms.

We take here the opportunity to warmly thank all the members of the SENSORCOMM 2015 Technical Program Committee, as well as the numerous reviewers. The creation of such a high quality conference program would not have been possible without their involvement. We also kindly thank all the authors who dedicated much of their time and efforts to contribute to SENSORCOMM 2015. We truly believe that, thanks to all these efforts, the final conference program consisted of top quality contributions.

Also, this event could not have been a reality without the support of many individuals, organizations, and sponsors. We are grateful to the members of the SENSORCOMM 2015

organizing committee for their help in handling the logistics and for their work to make this professional meeting a success.

We hope that SENSORCOMM 2015 was a successful international forum for the exchange of ideas and results between academia and industry and for the promotion of progress in the area of sensor technologies and applications.

We are convinced that the participants found the event useful and communications very open. We hope Venice provided a pleasant environment during the conference and everyone saved some time for exploring this beautiful city.

SENSORCOMM 2015 Chairs:

SENSORCOMM Advisory Chairs
Jean Philippe Vasseur, Cisco Systems, Inc., France
Jaime Lloret Mauri, Polytechnic University of Valencia, Spain
Jens Martin Hovem, Norwegian University of Science and Technology, Norway
Pascal Lorenz, University of Haute Alsace, France
Sergey Yurish, IFSA, Spain

SENSORCOMM 2015 Industry Liaison Chairs
Sarfraz Khokhar, Cisco Systems, Inc., USA
Michael Niedermayer, Siemens AG, Germany
Harkirat Singh, Samsung Electronics Co., Kore**a**

SENSORCOMM 2015 Research/Industry Chairs
Hristo Djidjev, Los Alamos National Laboratory, USA Teng Rui, National Institute of Information and Communication Technology, Japan
S. Biju Kumar, Philips Research - Eindhoven, The Netherlands
Ivan Ndip, Fraunhofer-Institut fuer Zuverlaessigkeit und Mikrointegration / Technische Universitaet (TU) Berlin, Germany

SENSORCOMM 2015 Special Area Chairs
Embedded systems
Joshua Ellul, University of Malta, Malta
Security
Yenumula Reddy, Grambling State University, USA
Body networks
Alessandro Pozzebo, Università degli Studi di Siena, Italy
Underwater systems
Mylène Toulgoat, Communications Research Centre - Ottawa, Canada
Applications
Elena Gaura, Coventry University, UK
Social sensing
Abdulrahman Alarifi, King Abdulaziz City for Science and Technology (KACST), Kingdom of Saudi Arabia

Atmospheric Icing and Sensing

Muhammad Shakeel Virk, Narvik University College, Norway

SENSORCOMM 2015

Committee

SENSORCOMM Advisory Chairs

Jean Philippe Vasseur, Cisco Systems, Inc., France
Jaime Lloret Mauri, Polytechnic University of Valencia, Spain
Jens Martin Hovem, Norwegian University of Science and Technology, Norway
Pascal Lorenz, University of Haute Alsace, France
Sergey Yurish, IFSA, Spain

SENSORCOMM 2015 Industry Liaison Chairs

Sarfraz Khokhar, Cisco Systems, Inc., USA
Michael Niedermayer, Siemens AG, Germany
Harkirat Singh, Samsung Electronics Co., Korea

SENSORCOMM 2015 Research/Industry Chairs

Hristo Djidjev, Los Alamos National Laboratory, USA Teng Rui, National Institute of Information and Communication Technology, Japan
S. Biju Kumar, Philips Research - Eindhoven, The Netherlands
Ivan Ndip, Fraunhofer-Institut fuer Zuverlaessigkeit und Mikrointegration / Technische Universitaet (TU) Berlin, Germany

SENSORCOMM 2015 Special Area Chairs

Embedded systems
Joshua Ellul, University of Malta, Malta

Security
Yenumula Reddy, Grambling State University, USA

Body networks
Alessandro Pozzebo, Università degli Studi di Siena, Italy

Underwater systems
Mylène Toulgoat, Communications Research Centre - Ottawa, Canada

Applications
Elena Gaura, Coventry University, UK

Social sensing
Abdulrahman Alarifi, King Abdulaziz City for Science and Technology (KACST), Kingdom of Saudi Arabia

Atmospheric Icing and Sensing
Muhammad Shakeel Virk, Narvik University College, Norway

SENSORCOMM 2015 Technical Program Committee

Abdulrahman Alarifi, Computer Research Institute - King Abdulaziz City for Science and Technology, Saudi Arabia
Carlo Alberto Boano, Graz University of Technology, Austria
Mothanna Alkubeily, Université de Technologie de Compiègne, France
Boushra Alkubily, Université de Technologie de Compiègne, France
Maykel Alonso Arce, CEIT and Tecnun (University of Navarra), Spain
Mansour Alsaleh, King Abdulaziz City for Science and Technology (KACST), Saudi Arabia
Tariq Alsboui, Manchester Metropolitan University, UK
Adil Al-Yasiri, University of Salford, UK
Isabelle Augé-Blum, INSA Lyon - Laboratoire CITI -Villeurbanne, France
Reza Azarderakhsh, The University of Western Ontario, Canada
Sebastian Bader, Mid Sweden University, Sweden
Dominique Barthel, Orange Labs Division R&D - Meylan, France
Novella Bartolini, "Sapienza" University of Rome, Italy
Majid Bayanil Abbasy, Universidad Nacional de Costa Rica, Costa Rica
Rezaul K Begg, Victoria University, Australia
Paolo Bellavista, University of Bologna, Italy
Stephan Benecke, Technische Universitaet Berlin | Fraunhofer Institut Zuverlässigkeit und Mikrointegration, Germany
Ali Berrached, University of Houston-Downtown, USA
Karabi Biswas, Indian Institute of Technology - Kharagpur, India
Alessandro Bogliolo, University of Urbino, Italy
David Boyle, Imperial College London, UK
Lina Brito, Madeira Interactive Technologies Institute (M-ITI) - University of Madeira, Portugal
Ioannis Broustis, AT&T Labs Research, U.S.A
Tiziana Calamoneri, “La Sapienza” Università di Roma, Italy
Maria-Dolores Cano Baños, Technical University of Cartagena, Spain
Juan Vicente Capella Hernández, Universidad Politécnica de Valencia, Spain
Alexandru Caracas, IBM Research - Zurich, Switzerland
Berta Carballido Villaverde, United Technologies Research Centre, Ireland
Matteo Ceriotti, University of Duisburg-Essen, Germany
Amitava Chatterjee, Jadavpur University, India
Harsha Chenji, University of Texas at Dallas, USA
Sang H. Choi, NASA Langley Research Center, USA
Hugo Coll Ferri, Polytechnic University of Valencia, Spain
Daniel Curiac, "Politehnica" University of Timisoara, Romania
David Cuartielles, Malmö University, Sweden
Juarez Bento da Silva, Universidade Federal de Santa Catarina, Brazil
Debabrata Das, International Institute of Information Technology - Bangalore, India
Danco Davcev, University for Information Science & Technology "St. Paul the Apostle" - Ohrid, Republic of Macedonia
Eli De Poorter, Ghent University - iMinds, Belgium
Jerker Delsing, Lulea University of Technology, Sweden

Behnam Dezfouli, University of Iowa, USA
Akshaye Dhawan, Ursinus College, USA
Vincenzo Di Lecce, Politecnico di Bari, Italy
Mari Carmen Domingo, Barcelona Tech University, Spain
Wan Du, Nanyang Technological University (NTU), Singapore
Sylvain Durand, LIRMM/Université Montpellier II, France
Imad H. Elhajj, American University of Beirut, Lebanon
Joshua Ellul, University of Malta, Malta
Vincent Emeakaroha, University College Cork, Ireland
Xiang Fei, Coventry University, UK
Paulo Felisberto, Institut for Systems and Robotics-Lisbon / Universidade do Algarve, Portugal
Gianluigi Ferrari, University of Parma, Italy
Armando Ferro Vázquez, Universidad del País Vasco - Bilbao, Spain
Paul Fortier, University of Massachusetts Dartmouth, USA
Leonardo Franco, Universidad de Malaga, Spain
Pedro Furtado, University of Coimbra, Portugal
Miguel Garcia Pineda, Polytechnic University of Valencia, Spain
Elena Gaura, Coventry University, UK
Hamid Gharavi, National Institute of Standards and. Technology (NIST) - Gaithersburg, USA
Chris Gniady, University of Arizona, USA
Stephane Grumbach, INRIA, France
Jayavardhana Gubbi, University of Melbourne, Australia
Jianlin Guo, Mitsubishi Electric Research Laboratories - Cambridge, USA
Malka N. Halgamuge, The University of Melbourne, Australia
Mohammad Hammoudeh, Manchester Metropolitan University, UK
Vincent Huang, Ericsson Research - Stockholm, Sweden
Muhammad Ali Imran, University of Surrey, U.K.
Abhaya Induruwa, Canterbury Christ Church University, UK
Vasanth Iyer, International Institute of Information Technology, India
Shaghayegh Jaberi, Islamic Azad University - Tehran, Iran
Imad Jawhar, United Arab Emirates University - Al Ain, UAE
Zhen Jiang, West Chester University, USA
Miao Jin, University of Louisiana at Lafayette, U.S.A.
Adrian Kacso, University of Siegen, Germany
Kyoung-Don Kang, Binghamton University, USA
Reinhardt Karnapke, Brandenburg University of Technology Cottbus – Senftenberg, Germany
Dimitrios A. Karras, Chalkis Institute of Technology, Hellas
Fotis Kerasiotis, University of Patras / Rio-Patras, Greece
Yaser Khamayseh, Jordan University of Science and Technology, Jordan
Abdelmajid Khelil, Huawei European Research Center, Germany
Sarfraz Khokhar, Cisco Systems Inc., USA
Kwangsoo Kim, Electronics and Telecommunications Research Institute (ETRI), Korea
Boris Kovalerchuk, Central Washington University, USA
Thorsten Kramp, IBM Research Zurich, Switzerland
Dilip Krishnaswamy, Qualcomm Research - San Diego, U.S.A.
Danny Krizanc, Wesleyan University - Middletown, USA
Sisil Kumarawadu, University of Moratuwa, Sri Lanka
Erlend Larsen, The Norwegian Defence Research Establishment (FFI) - Kjeller, Norway

Seongsoo Lee, Soongsil University - Seoul, Korea
Pierre Leone, University of Geneva, Switzerland
Jacek Lewandowski, Coventry University, UK
Xiuqi Li, University of North Carolina at Pembroke, U.S.A
Chiu-Kuo Liang, Chung Hua University - Hsinchu, Taiwan
Qilian Liang, University of Texas at Arlington, USA
Weifa Liang, Australian National University - Canberra, Australia
Chun-Lung Lin, Industrial Technology Research Institute (ITRI) Hsinchu, Taiwan
Thomas Lindh, STH/KTH - Stockholm, Sweden
André Luiz Lins de Aquino, Federal University of Ouro Preto, Brazil
Aihua Liu, Qingdao Institute of Bioenergy & Bioprocess Technology - Chinese Academy of Sciences, China
Hai Liu, Hong Kong Baptist University, Hong Kong
Jaime Lloret Mauri, Polytechnic University of Valencia, Spain
Elsa María Macías López, University of Las Palmas de Gran Canaria, Spain
Abdallah Makhoul, Université de Besancon - Belfort, France
Gianfranco Manes, University of Florence, Italy
Vladimir Marbukh, NIST, USA
Andrew Markham, University of Oxford, UK
José Ramiro Martínez de Dios, University of Seville, Spain
Francisco Martins, University of Lisbon, Portugal
Kovatsch Matthias, ETH Zurich, Switzerland
Natarajan Meghanathan, Jackson State University, USA
Fabien Mieyeville, Ecole Centrale Lyon - INL (Institute of Nanotechnology of Lyon), France
Nader Faisal Jaafar Mohamed, UAEU, UAE
Jose M. Moya, Universidad Politécnica de Madrid, Spain
Mohammad Mozumdar, California State University, Long Beach, USA
Abderrahmen Mtibaa, Texas A&M University, U.S.A.
Umair N. Mughal, Narvik University College, Norway
Mohamad Y. Mustafa, Narvik University College, Norway
Leonid Naimark, BAE Systems, USA
Deok Hee Nam, Wilberforce University, USA
Mahmuda Naznin, Bangladesh University of Engineering and Technology - Dhaka, Bangladesh
Ivan Ndip, Fraunhofer-Institut fuer Zuverlaessigkeit und Mikrointegration / Technische Universitaet (TU) Berlin, Germany
Sarmistha Neogy, Jadavpur University, India
Edith C.-H. Ngai, Uppsala University, Sweden
Michael Niedermayer, Siemens AG, Germany
Gregory O'Hare, University College Dublin (UCD), Ireland
Brendan O'Flynn, Tyndall National Institute/University College Cork, Ireland
Cyril Onwubiko, Research Series Ltd., UK
Knut Øvsthus, Bergen University College, Norway
Carlos Enrique Palau Salvador, Universidad Politecnica de Valencia, Spain
Sung-Joon Park, Gangneung-Wonju National University, South Korea
Lorena Parra Boronat, Universitat Politécnica de Valencia (UPV), Spain
Eros Pasero, Politecnico di Torino, Italy
Animesh Pathak, Inria Paris-Rocquencourt, France
Leonidas Perlepes, University of Thessaly, Greece
Dirk Pesch, Cork institute of Technology, Ireland

Patrick Pons, CNRS-LAAS, France
Miodrag Potkonjak, University of California - Los Angeles, USA
Shrisha Rao, International Institute of Information Technology - Bangalore, India
Shahid Raza, Swedish Institute of Computer Science (SICS) – Stockholm, Sweden
Yenumula Reddy, Grambling State University, USA
Mark Reed, Yale School of Engineering & Applied Science, USA
Juan Reig Pascual, Polytechnic University of Valencia, Spain
Càndid Reig, University of Valencia, Spain
Tor Arne Reinen, SINTEF ICT, Norway
Biljana Risteska Stojkoska, University "Ss. Cyril and Methodius", Macedonia
Joel Rodrigues, University of Beira Interior, Portugal
Laura Margarita Rodríguez Peralta, Universidad Popular Autónoma del Estado de Puebla - UPAEP, Puebla, México
Lorenzo Rubio-Arjona, Universidad Politécnica de Valencia, Spain
Ulrich Rückert, Bielefeld University, Germany
Teng Rui, National Institute of Information and Communication Technology, Japan
Jorge Sá Silva, University of Coimbra, Portugal
Tapio Saarelainen, Army Academy, Finland
Sicari Sabrina, University of Insubria, Italy
Husnain Saeed, National University of Sciences & Technology (NUST), Pakistan
Addisson Salazar, Polytechnic University of Valencia, Spain
Ioakeim Samaras, Industrial Systems Institute / Intracom-Telecom - Software Development Center, Thessaloniki, Greece
Francisco Javier Sánchez Bolumar, ADIF, Spain
Olga Saukh, ETH Zurich, Switzerland
Kamran Sayrafian, National Institute of Standards & Technology, USA
Elad Michael Schiller, Chalmers University of Technology, Sweden
Leo Selavo, University of Latvia, Latvia
Sandra Sendra Compte, Polytechnic University of Valencia, Spain
Kuei-Ping Shih, Tamkang University - Taipei, Taiwan
Simone Silvestri, Sapienza University of Rome, Italy
Francesco Simeone, University "Sapienza" of Roma / INFN-Roma, Italy
Jasvinder Singh, Cork Institute of Technology, Ireland
Andrzej Skowron, University of Warsaw, Poland
K M Sunjiv Soyjaudah, University of Mauritius, Mauritius
Arvind K. Srivastava, NanoSonix Inc. - Skokie, USA
Grigore Stamatescu, University Politehnica of Bucharest, Romania
Yannis Stamatiou, University of Patras, Greece
Razvan Stanica, National Polytechnic Institute of Toulouse, France
Jack Stankovic, University of Virginia, USA
Kris Steenhaut, Vrije Universiteit Brussel, Belgium
Julinda Stefa, Sapienza University of Rome, Italy
David Stork, Rambus Labs, USA
David Sundaram, University of Auckland, New Zealand
Ewa Szynkiewicz, Warsaw University of Technology, Poland
Muhammad Tariq, Waseda University - Tokyo, Japan
Kerry Taylor, CSIRO Canberra, Australia
Rolf Thomasius, Technische Universität Berlin, Germany

Vassilis Triantafillou, Technological Educational Institution of Messolonghi, Greece
Neeta Trivedi, Aeronautical Development Establishment- Bangalore, India
Wilfried Uhring, University of Strasbourg, France
Fabrice Valois, INRIA SWING / CITI, INSA-Lyon, France
Jean Philippe Vasseur, Cisco Systems, Inc., France
Roberto Verdone, Università di Bologna, Italy
Manuela Vieira, UNINOVA/ISEL, Portugal
Muhammad Shakeel Virk, Narvik University College, Norway
Michael Walsh, Tyndall National Institute, Ireland
Wenwu Wang, University of Surrey, UK
You-Chiun Wang, National Sun Yat-sen University, Taiwan
Zhibo Wang, Wuhan University, China
Chih-Yu Wen, National Chung Hsing University - Taichung, Taiwan
Andreas Wombacher, University of Twente, Netherlands
Fang-Jing Wu, Institute for Infocomm Research (I2R), Singapore
Hui Wu, University of New South Wales, Australia
Yizhong Xu, Narvik University College, Norway
Dongfang Yang, National Research Council Canada - London, Canada
Chih-Wei Yi, National Chiao Tung University, Taiwan
Nicolas H. Younan, Mississippi State University, USA
Sergey Y. Yurish, IFSA - Barcelona, Spain
Yifeng Zhou, Communications Research Centre, Canada
Tanveer Zia, Charles Sturt University, Australia

Copyright Information

For your reference, this is the text governing the copyright release for material published by IARIA.

The copyright release is a transfer of publication rights, which allows IARIA and its partners to drive the dissemination of the published material. This allows IARIA to give articles increased visibility via distribution, inclusion in libraries, and arrangements for submission to indexes.

I, the undersigned, declare that the article is original, and that I represent the authors of this article in the copyright release matters. If this work has been done as work-for-hire, I have obtained all necessary clearances to execute a copyright release. I hereby irrevocably transfer exclusive copyright for this material to IARIA. I give IARIA permission or reproduce the work in any media format such as, but not limited to, print, digital, or electronic. I give IARIA permission to distribute the materials without restriction to any institutions or individuals. I give IARIA permission to submit the work for inclusion in article repositories as IARIA sees fit.

I, the undersigned, declare that to the best of my knowledge, the article is does not contain libelous or otherwise unlawful contents or invading the right of privacy or infringing on a proprietary right.

Following the copyright release, any circulated version of the article must bear the copyright notice and any header and footer information that IARIA applies to the published article.

IARIA grants royalty-free permission to the authors to disseminate the work, under the above provisions, for any academic, commercial, or industrial use. IARIA grants royalty-free permission to any individuals or institutions to make the article available electronically, online, or in print.

IARIA acknowledges that rights to any algorithm, process, procedure, apparatus, or articles of manufacture remain with the authors and their employers.

I, the undersigned, understand that IARIA will not be liable, in contract, tort (including, without limitation, negligence), pre-contract or other representations (other than fraudulent misrepresentations) or otherwise in connection with the publication of my work.

Exception to the above is made for work-for-hire performed while employed by the government. In that case, copyright to the material remains with the said government. The rightful owners (authors and government entity) grant unlimited and unrestricted permission to IARIA, IARIA's contractors, and IARIA's partners to further distribute the work.

Table of Contents

A Real-Time Bridge Scouring Monitoring System Based on Accelerometer Sensors 1
Chih-Chyau Yang, Yi-Jie Hsieh, Ssu-Ying Chen, Wen-Ching Chen, Chih-Ting Kuo, Chen-Chia Chen, Chien-Ming Wu, and Chun-Ming Huang

Using Energy Budgets to Reach Lifetime Goals while Compensating Dynamic Effects 7
Andre Sieber, Jorg Nolte, and Reinhardt Karnapke

An Optimized Temperature Sensing Period for Battery Lifetime in Wireless Sensor Network 14
Seongman Jang, Keonhee Cho, Tacklim Lee, Byeongkwan Kang, and Sehyun Park

Design and Implementation of Indoor Position Estimation System using Drone for Industrial Security 19
Sanghoon Lee, Seonki Jeon, Myeong-in Choi, Byeongkwan Kang, and Sehyun Park

Edge-Based Technique for Ultra-Fast Gating of Large Array Imagers 24
Octavian Maciu, Wilfried Uhring, Jean-Pierre Le Normand, Jean-Baptiste Kammerer, and Foudil Dadouche

Design Methodology of TDC on Low Cost FPGA Targets 30
Foudil Dadouche, Thimothe Turko, Wilfried Uhring, Imane Malass, Jeremy Bartringer, and Jean-Pierre Le Normand

Temperature Sensor for Hydro Generator Bearings using Thermally Regenerated Fiber Bragg Gratings 36
Erlon Vagner da Silva, Uilian Jose Dreyer, Kleiton de Moraes Souza, Cicero Martelli, Valmir de Oliveira, Hypolito Kalinowski, and Jean Carlos Cardozo da Silva

A Novel Elliptically-Slotted Patch Antenna-based Biosensor Design 42
Sunday Ekpo, Vijayalakshmi Velusamy, and Rupak Kharel

Integrated Smart Glove for Hand Motion Monitoring 46
Brendan O'Flynn, Javier Torres Sanchez, James Connolly, Joan Condell, Kevin Curran, Philip Gardiner, and Barry Downes

Ultra-miniature, Computationally Efficient Diffractive Visual-bar-position Sensor 52
Mehjabin Monjur, Leonidas Spinoulas, Patrick R. Gill, and David G. Stork

A Distributed Scheduling Algorithm to Improve Lifetime in Wireless Sensor Network based on Geometric Placement of Sensors with Coverage and Connectivity Constraints 58
Diery Ngom, Pascal Lorenz, and Bamba Gueye

An Algorithm to Evaluate and Build Schedules for a Distributed Sensor System with Respect to Clock Synchronization 65
Andreas Puhm, Michael Kramer, and Martin Horauer

Self-Stabilizing Structures for Data Gathering in Wireless Sensor Networks 72
Sandra Beyer, Stefan Lohs, Jorg Nolte, Reinhardt Karnapke, and Gerry Siegemund

Wireless Sensor Networks in Structural Health Monitoring: a Modular Approach 78
Fabio Angeletti, Mario Paoli, Ugo Maria Colesanti, and Andrea Vitaletti

Building the O-Life Franco-Lebanese Environmental Observatory Using Sensor Web Enablement Framework: Challenges and First Approach 82
Hicham Hajj Hassan, Anne Laurent, Nicolas Arnaud, Olivier Lobry, Laurent Drapeau, and Carla Khater

A Virtual Force Movement Scheme for Sensor Deployment in Directional Sensor Networks 86
Chiu-Kuo Liang and Yu-Shu Lo

Classification of Human Interactions with Tools Using a Tool-mounted Wireless Sensor Node to Support Sustainable Manufacturing 92
Andreas Tilhein, The Duy Nguyen, Stephan Benecke, Eduard Wagner, Jorg Kruger, and Klaus Dieter Lang

Evidential Network for Multi-Sensor Fusion in an Uncertain Environment 98
Eric Villeneuve, Francois Peres, Cedrik Beler, and Vicente Gonzalez-Prida

Near Real-Time Oceanographic Data Management through Sensor Web Enablement (SWE) Standards 104
Elena Partescano, Alessandra Giorgetti, and Alberto Brosich

Feature Selection and Interpretation of GSR and ECG Sensor Data in Biofeedback Stress Monitoring 106
Tom Gedeon, Xuanying Zhu, Leana Copeland, and Nandita Sharma

Using Mutual Charge Scheme to Measure Salinity of Ice 112
Umair Najeeb Mughal and Bhushan Nikumbh

Infrared Thermal Signature Evaluation of a Pure Ice Block 117
Taimur Rashid, Hassan A. Khawaja, Kare Edvarsen, and Umair N. Mughal