Henry Medeiros

Marquette University
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EDUCATION

Ph.D. Electrical and Computer Engineering 2010
Purdue University, West Lafayette, Indiana
Thesis: Object Tracking using Wireless Camera Networks
Advisor: Avinash Kak

Master of Sciences in Electrical Engineering 2005
Federal University of Technology of Paraná, Brazil

Bachelor Degree in Electrical Engineering 2003
Federal University of Technology of Paraná, Brazil

PROFESSIONAL AFFILIATIONS

2014-present **Assistant Professor**
Department of Electrical and Computer Engineering, Marquette University

2012-2014 **Research Scientist**
School of Electrical and Computer Engineering, Purdue University

2010-2014 **Chief Technology Officer**
Spensa Technologies Inc., West Lafayette, Indiana

2011-2012 **Assistant Professor of Electrical Engineering**
Federal University of Technology of Paraná, Brazil

RESEARCH GRANTS

2013 United States Department of Agriculture Small Business Innovation Research (SBIR) Grant, "Electronic Trap for Automated Monitoring of Insect Populations", Spensa Technologies Inc.

2013 National Science Foundation Small Business Innovation Research (SBIR) Grant, "A Multimodal Sensor Platform for Automated Detection and Classification of Pest Insects", Spensa Technologies Inc.

2011 Brazilian Council for Scientific and Technological Development (CNPq), "Efficient Data Collection on Wireless Sensor Networks", Federal University of Technology of Paraná

AWARDS AND FELLOWSHIPS

2012 Brazilian Council for Scientific and Technological Development (CNPq) Research Productivity fellowship

2008 Second International Conference on Distributed Smart Cameras Service Award

2005 Fulbright commission fellowship for Ph.D. studies in the United States of America

2003	Agency of the Brazilian Ministry of Education (CAPES) fellowship for graduate studies
2003	Best student of the 2003 class of electrical engineering at the Federal University of Technology of Paraná
2000-2002	Brazilian Council for Scientific and Technological Development (CNPq) fellowships for undergraduate research

RESEARCH EXPERIENCE

2010-2014	**Chief Technology Officer**, Spensa Technologies Inc. Manage a research and development team in a startup company setting with focus on wireless sensor networks, embedded systems design, and signal analysis and event detection.
2012-2014	**Research Scientist**, Purdue University. Manage a group of students to carry out research on robotics and robotic vision to develop novel autonomous systems for pruning apple trees using laser scanners and other vision modalities.
2011-2012	**Assistant Professor of Electrical Engineering**, Federal University of Technology of Paraná. Advised students performing research on data compression and aggregation in wireless sensor networks.
2006-2010	**Graduate Research Assistant**, Purdue University. Designed distributed algorithms for collaborative processing and object tracking in ultra-low-power wireless smart cameras.
Summer 2008	**Graduate Research Intern**, NXP Semiconductors. Designed and implemented algorithms for tracking objects in image sequences based on particle filters on the IC3D/Xetal SIMD embedded parallel processor.
2003-2005	**Graduate Research Assistant**, Federal University of Technology of Paraná. Designed a digital smart camera based on the Texas Instruments C6416 digital signal processor and other systems based on low power microcontrollers and DSPs.
2000-2003	**Undergraduate Research Assistant**, Federal University of Technology of Paraná. Implemented an embedded system to count colonies of bacteria in milk samples in petri dishes on a Texas Instruments C5416 DSP using image processing techniques.
1997-2000	**Electronics Technician**, Topdata Automation Systems, Brazil. Designed and implemented embedded systems based on the 8051 family of microcontrollers.

TEACHING EXPERIENCE

MARQUETTE UNIVERSITY

Digital Image Processing: Graduate course on principles and techniques of digital image processing (2014)

FEDERAL UNIVERSITY OF TECHNOLOGY OF PARANÁ, BRAZIL

Introduction to Control: Undergraduate course on principles of signals and linear time-invariant systems and notions of control theory (2011-2012)

Basic Electronics: Undergraduate course on principles of non-linear electronic circuits and systems, from diodes to operational amplifiers (2011-2012)

Circuit Analysis: Undergraduate course on fundamentals of linear circuit analysis, from Kirchhoff laws to transient and steady-state circuit responses (2011)

PROFESSIONAL SERVICES

TECHNICAL PROGRAM COMMITTEE MEMBER

2009 Publications Chair: 3rd International Conference on Distributed Smart Cameras

EXTERNAL REVIEWER

2014 Brazilian Council for Scientific and Technological Development (CNPq)

2014 Information Fusion

2014 International Journal of Distributed Sensor Networks

2014 IEEE Transactions on Networking

2014, 2013 2009 IEEE Transactions on Signal Processing

2014, 2013 EURASIP Journal on Wireless Communications and Networking

2012 IEEE Transactions on Image Processing

2012 ACM Transactions on Sensor Networks

2012 Telemedicine and e-Health

2012 Texas Instruments University Stellaris ARM Cortex-M Microcontroller (MCU) Teaching Tools

2011 Neurocomputing

2010, 2009 Computer Vision and Image Understanding

2008 Book Multi-Camera Networks: Concepts and Applications

2004 Texas Instruments "DSP Implementation using the TMS320C6711, C6713 & C6416" teaching materials

UNIVERSITY SERVICES

2014 Committee member: Marquette University Department of Electrical and Computer Engineering undergraduate committee

2012 Committee member: Federal University of Technology of Paraná faculty search committee for an Assistant Professor of Electrical Engineering in the area of digital systems

2011-2012 Committee member: Federal University of Technology of Paraná inter-campus committee for undergraduate research fellowships

2011-2012 Committee chair: Federal University of Technology of Paraná graduate program in electrical engineering committee for English language proficiency evaluation

STUDENTS MENTORED

Ph.D.

2013 Shivani G. Rao, Purdue University

2013 Kihyun Hong, Purdue University

2013 Joshua J. Zapf, Purdue University
2011 Marcos V. Rambo, Federal University of Technology of Paraná, Brazil

MASTER

2012 Marcos C. Maciel, Federal University of Technology of Paraná, Brazil

PROFESSIONAL AFFILIATIONS

IEEE Member
ASEE Member

PATENTS

ISSUED PATENTS

MEDEIROS, H; PARK, J; KAK, A; IWAKI, H. "Calibration of Large Cameras Networks," U.S. Patent No. 8,760,521, Issued on June 24, 2014.

PARK, J.; HOLGUIN, G; MEDEIROS, H. "Automatic Monitoring of Insect Populations." South African Patent No. 2013/3528, Issued on January 29, 2014.

PATENT APPLICATIONS

PARK, J.; HOLGUIN, G; MEDEIROS, H. "Automatic Monitoring of Insect Populations." U.S. Patent Application No. 13/879,685, Mexican Patent Application No. MX/a/2013/004066, Chinese Patent Application No. 201180063662.8, Indian Patent Application No. 4224/DELNP/2013, European Patent Application No. 11834936.4, Colombian Patent Application No. 13098053, Canadian Patent Application No. 2,814,940, South African Patent Application No. 2013/3528, Chilean Patent Application No. 2013-1050, Brazilian Patent Application No. BR11 2013 009401 0, Australian Patent Application No. 2013/203436, New Zealand Patent Application No. 608703.

MEDEIROS, H; PARK, J; KAK, A; IWAKI, H. "Calibration of Large Cameras Networks," Japanese Patent Application No. 2012-526995, Patent Cooperation Treaty Application PCT/US2010/034937, Filed May, 2010, Published December 2011, Pub. No. 2011/0310255A1.

MEDEIROS, H; PARK, J; KAK, A; IWAKI, H. "Clustering Protocol for Directional Sensor Networks," U.S. Patent Application 12/236,238. Filed September, 2008, Published March, 2010, Pub. No. 2010/0073686A1.

PUBLICATIONS

JOURNAL PAPERS

HONG, K.; MEDEIROS, H.; SHIN, P.; PARK, J. "Resource-Aware Distributed Particle Filtering for Cluster-Based Object Tracking in Wireless Camera Networks," *International Journal of Sensor Networks*, Accepted for publication, 2014.

MEDEIROS, H.; MACIEL, M.C.; SOUZA, R.D.; PELLENZ, M.E. "Lightweight Data Compression in Wireless Sensor Networks using Huffman Coding," *International Journal of Distributed Sensor Networks*, vol. 2014, Article ID 672921, 11 pages, 2014.

DE SCHATZ, C.V.; MEDEIROS, H.; SCHNEIDER, F.; ABATTI, P.J. "Wireless Medical Sensor Networks: Design Requirements and Enabling Technologies," *Telemedicine and e-Health*, vol. 18, no. 5, 2012.

YODER, J.; MEDEIROS, H.; PARK, J.; KAK, A. "Cluster-Based Distributed Face Tracking in Camera Networks," *IEEE Transactions on Image Processing*, vol. 19, no. 10, 2010.

MEDEIROS, H.; HOLGUIN, G.; SHIN, P.J.; PARK, J. "Parallel Histogram-based Particle Filter for Object Tracking on SIMD-based Smart Cameras," *Computer Vision and Image Understanding*, vol. 114, no. 11 2010.

MEDEIROS, H.; PARK, J.; KAK, A. "Distributed Object Tracking Using a Cluster-Based Kalman Filter in Wireless Camera Networks," *IEEE Journal of Selected Topics in Signal Processing*, vol. 2, no. 4, 2008.

BOOK CHAPTERS

MEDEIROS, H.; PARK, J. "Cluster-Based Object Tracking by Wireless Camera Networks," Book Chapter In: *Multi-Camera Networks: Concepts and Applications*, Elsevier, 2009.

PEER-REVIEWED CONFERENCE PAPERS

RAO, S.; MEDEIROS, H.; KAK, A. "Comparing Incremental Latent Semantic Analysis Algorithms for Efficient Retrieval from Software Libraries for Bug Localization," In *Second International Workshop on Software Mining*, 2013.

RAO, S.; MEDEIROS, H.; KAK, A. "An Incremental Update Framework for Efficient Retrieval from Software Libraries for Bug Localization," In *20th Working Conference on Reverse Engineering*, 2013.

SHIN, P.J.; MEDEIROS, H.; PARK, J.; KAK, A.C. "Predictive Duty Cycle Adaptation for Wireless Camera Networks," In *Fifth ACM/IEEE International Conference on Distributed Smart Cameras*, 2011.

DE SCHATZ, C.V.; MEDEIROS, H.; SCHNEIDER, F.K.; ABATTI, P.J. "Wireless Protocols for Ad-Hoc Medical Sensor Networks," In *IASTED Symposium on Imaging and Signal Processing in Healthcare and Technology*, 2011.

MEDEIROS, H.; GAO, X.; PARK, J.; KLEIHORST, R.; KAK, A. "A Parallel Implementation of the Color-Based Particle Filter for Object Tracking," In *ACM Sensys Workshop on Applications, Systems, and Algorithms for Image Sensing*, 2008.

MEDEIROS, H.; IWAKI, H.; PARK , J. "Online Distributed Calibration of a Large Network of Wireless Cameras Using Dynamic Clustering," In *Second ACM/IEEE International Conference on Distributed Smart Cameras*, 2008.

MEDEIROS, H.; PARK, J.; KAK, A., "A Parallel Color-based Particle Filter For Object Tracking," *Computer Vision and Pattern Recognition Workshops*, 2008.

MEDEIROS, H.; PARK, J.; KAK, A. "A Light-weight Event-driven Protocol for Sensor Clustering in Wireless Camera Networks," In *ACM/IEEE International Conference on Distributed Smart Cameras*, 2007.