Special Session Title: Intelligent Vehicle Systems

Special session objectives and topics

The research and development of intelligent vehicles are rapidly growing worldwide. With the decreasing sensor costs and computer chips and increasing computer processing speed and memory, it has become practical to provide a host of intelligent devices in cars that can be used in airbag control, unwelcome intrusion detection, collision warning and avoidance, power management and navigation, driver alertness monitoring etc. Computational intelligence plays a vital role in building different types and levels of intelligence in vehicle systems, which in turn, offer the potential for significant enhancements in driving safety, operational efficiency and autonomy.

This special session seeks to present and highlight the latest developments and emerging research in computational intelligence technologies with applications to developing all aspects of intelligent vehicle systems.

Submissions to the Special Session should be centered on theoretical results or innovative applications of computational intelligence to intelligent vehicle systems. Specific topics for the special session include, but are not limited to:

- Collision detection and avoidance
- Computational intelligence in vehicle communications and connectivity
- Driver state detection and monitoring
- Driver assistance and automation systems
- Fault diagnostics and health monitoring
- Human and vehicle interface
- Intelligent battery management
- In-vehicle automation systems
- Learning and adaptive Control
- Learning/adaption in recognition and perception
- Robotic vehicles and driverless cars
- Route guidance systems
- Smart sensors and virtual sensors
- Traffic sign detection and recognition
- Trip modeling and driver speed prediction
- Vehicle energy management and optimization in hybrid vehicles

Organizers:

Session Chair: Yi Lu Murphey, Professor and Chair, Department of Electrical and Computer Engineering, University of Michigan-Dearborn, Dearborn, Michigan 48128, USA, yilu@umich.edu

Dr. Murphey's Short CV: Yi Lu Murphey received a M.S. degree in computer science from Wayne State University, Detroit, Michigan, in 1983, and a PhD degree with a major in Computer Engineering and a minor in Control Engineering from the University of Michigan, Ann Arbor, Michigan, in 1989. Currently she is a professor and the Chair of the Electrical and Computer Engineering Department at the University of Michigan-Dearborn. Her current research interests are in the areas of machine learning, text mining and intelligent systems with applications to engineering diagnostics and prognostics, optimal vehicle power management and intelligent transportation systems. She is an editor for the Journal of Pattern Recognition. She has served on technical committees and session chairs for many conferences and organized special sessions for various conferences sponsored by the Computational Intelligence Society. She is currently the Vice Chair of IEEE SEM section and also the chair of the conference committee. More detail of her research can be found at http://www-personal.engin.umd.umich.edu/~yilu/.

Session Co-Chair: Dr. Mahmoud Abou-Nasr, Technical Expert, Neural Networks & Intelligent Systems, Research & Advanced Engineering, Ford Motor Company, USA, mabounas@ford.com

Dr. Abou-Nasr's Short CV: Dr. Abou-Nasr is a Senior Member of the IEEE and Vice Chair Technical Activities Computational Intelligence & Systems Man and Cybernetics SEM Chapter. He has received the B.Sc. degree in Electrical Engineering in 1977 from the University of Alexandria, Egypt, the M.S. and the Ph.D. degrees in 1984 and 1994 respectively from the University of Windsor, Ontario, Canada, both in Electrical Engineering. Currently he is a Technical Expert with Ford Motor Company, Research and Advanced Engineering, Modern Control Methods and Computational Intelligence Group, where he leads research & development of neural network and advanced computational intelligence techniques for automotive applications. His research interests are in the areas of neural networks, machine learning, pattern recognition, forecasting, data mining, optimization and control. He is an adjunct faculty member of the computer science department, Wayne State University, Detroit, Michigan and was an adjunct faculty member of the operations research department, University of Michigan Dearborn. Prior to joining Ford, he held electronics and software engineering positions with the aerospace and robotics industries in the areas of real-time control and embedded communications protocols. He is a guest editor of a special issue on "Real World Data Mining Applications," Annals of Information Systems, Springer and associate editor of the DMIN'09-DMIN'11 proceedings. He is a member of the program and technical committees of IJCNN, WCCI, ISVC and ECAI. He is also a reviewer for IJCNN, MSC, CDC, Neural Networks and IEEE Transactions on Neural Networks & Learning Systems. Dr. Abou-Nasr has organized and chaired special sessions in data mining and IJCNN conferences as well as international classification competitions in WCCI 2008 in Hong Kong and IJCNN2011 in San Jose CA.

Session Co-Chair: Ishwar K Sethi, Professor**,** School of Engineering and Computer Science, Oakland University, Rochester, MI 48098, USA

isethi@oakland.edu

Dr. Sethi's Short CV: Ishwar K. Sethi is currently a professor in the Department of Computer Science and Engineering at Oakland University in Rochester, Michigan, where he served as the chair of the department from 1999 to 2010. From 1982 to 1999, he was with the Department of Computer Science at Wayne State University, Detroit, Michigan. Before that, he was a faculty member at Indian Institute of Technology, Kharagpur, India, where he received his Ph.D. degree in 1978. His current research interests are in computer vision, data mining, machine learning and pattern classification, and multimedia information indexing and retrieval. He has graduated over 20 doctoral students and has authored or coauthored over 150 journal and conference articles. He has served on the editorial boards of several prominent journals including IEEE Trans. Pattern Analysis and Machine Intelligence, IEEE Multimedia, Pattern Recognition, and Machine Vision and Applications. He is currently a co-editor of "Modeling and Optimization in Science and Technologies (MOST) published by Springer. He was elected IEEE Fellow in 2001 for his contributions in artificial neural networks and statistical pattern recognition.

Session Co-Chair: Robert Karlsen, PhD, Research Scientist**,** U.S. Army Tank Automotive Research, Development, and Engineering Center (TARDEC)**,** robert.e.karlsen.civ@mail.mil

Dr. Karlsen's Short CV: Dr. Karlsen received a B.S. in Physics from the University of Washington, Seattle, WA, in 1986 and a Ph.D. in Physics from the University of Arizona, Tucson, AZ, in 1993. He has worked at TARDEC since 1994, first in the Survivability Technology Area and currently in Ground Vehicle Robotics. He is presently the Research Lead in Robotics and manages projects in autonomy, vision-based navigation, incremental learning, and human robot interactions. His research interests include robotics, image processing, human vision modeling, and machine learning. He is a member of SPIE and IEEE. He is a conference chair for the Unmanned Systems Technology conference, part of the SPIE Defense, Security and Sensing symposium. He is a reviewer for IEEE IJCNN, ITS, IVS, SSCI and Trans. Neural Networks and Learning Systems.

Session Co-Chair: Chaomin Luo, PhD, Assistant Professor**,** Department of Electrical and Computer Engineering**,** University of Detroit Mercy, Michigan, USA
luoch@udmercy.edu

Dr. Luo's Short CV: Dr. Chaomin Luo received his Ph.D. degree in Department of Electrical and Computer Engineering at the University of Waterloo, Ontario, Canada in 2008, his M.Sc. degree in Engineering Systems and Computing at the University of Guelph, Ontario, Canada, and his B.Eng. degree in Electrical Engineering from the Southeast University, Nanjing, China. He was a Research Associate in the Department of Electrical and Computer Engineering, at McMaster University in 2003. His extensive industry experience contains working as an Electronics Engineer, Hardware Designer and a Director of the Embedded Systems and Intelligent Instrument Lab in Canada, Singapore and China. After he received his Ph.D, he was an Assistant

Professor in the Graduate Institute of Electrical Engineering, College of Electrical Engineering and Computer Science, the National Taipei University, from August to December 2008. He joined the Department of Electrical and Computer Engineering, at the University of Detroit Mercy, as an Assistant Professor in Jan 2009. His research interests lie in two areas. The one is in Intelligent System, Computational Intelligence, Robotics and Automation and Mechatronics. The other is in Electronic Design Automation of VLSI/FPGA Circuits, Embedded Systems and Optimization in Electronic Design Automation. He is the Publicity Chair in the 2011 IEEE International Conference on Automation and Logistics. He is on the Conference Committee in the 2012 International Conference on Information and Automation and International Symposium on Biomedical Engineering and also the Publicity Chair in the 2012 IEEE International Conference on Automation and Logistics. Also, he was Chair of IEEE SEM - Computational Intelligence Chapter and is currently a Vice Chair of IEEE SEM - Computational Intelligence Chapter. Dr. Luo serves as the Editorial Board Member (Associated Editor) of International Journal of Sensing, Computing & Control.

Possible contributors:

Ryan Eustice, Associate Professor, University of Michigan, Ann Arbor, MI 48109, eustice@umich.edu

William Grosky, Professor and Chair, Department of Computer and Information Science, University of Michigan-Dearborn, wgrosky@umich.edu

Dev Kocchar, Research Scientist, Ford Motor Company, dkochhar@ford.com

Hafiz Malik, Assistant Professor, Department of Electrical and Computer Engineering, University of Michigan-Dearborn, Dearborn, Michigan 48128, USA, hafiz@umd.umich.edu

Abul Masrur, Research Scientist, US Army TARDEC, Warren, Michigan, m.a.masrur.civ@mail.mil

Ryan McGee, Technical Specialist, Ford Motor Company, rmcgee3@ford.com

Steven E. Muldoon, Senior Systems Engineer, Robert Bosch LLC, USA, Steven.Muldoon@us.bosch.com

Edwin Olsen, Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Mi 48109, ebolson@umich.edu

Shiqi Qiu: Research Engineer, Ford Motor Company, sqiu2@ford.com

Harpreet Singh, Professor, Department of Electrical and Computer Engineering, Wayne State University, hsingh@eng.wayne.edu