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IEEE Winnipeg Section

Carrier Wave

UA Researchers Create Self-Healing Computer Systems for Spacecraft

Special points of interest:

- Next IEEE Winnipeg Section Meeting on May 6, 2008

Failure of control systems on spacecraft can be especially maddening for engineers because, normally, they would be able to fix it in minutes if they could only get their hands on it. But what if these same systems could fix themselves?

Ali Akoglu and his students at the University of Arizona are using Field Programmable Gate Arrays (FPGAs) to do just that. FPGAs combine software and hardware to produce flexible systems that can be reconfigured at the chip level. Because some of the hardware functions are carried out at the chip level, the software can be set up to mimic hardware. In this way, the FPGA "firmware" can be reconfigured to emulate different kinds of hardware.

Currently, they are testing five hardware units which are wirelessly linked together. They then create test malfunctions which the network attempts to repair. First, unit that reported the failure attempts to heal itself at the node level by reprogramming the problem circuits. If that fails, the second step is for the unit to attempt a recovery by employing redundant circuitry. If the unit's onboard resources cannot fix the problem, the network-level intelligence is alerted and another unit reconfigures itself to carry out it's own tasks as well as the critical tasks of the failed unit.

Akoglu is an assistant professor in electrical and computer engineering and the project began as part of his graduate class in 2006. His students presented a paper on the system which sparked the interest of NASA, which eventually provided an $85,000 grant to pursue the work.

Kevin Carr adjusts the transmitter module that is used to wirelessly link five units being tested in a self-healing computer system.

Story and photo courtesy of University of Arizona new siteANews: http://uanews.org/node/19382

New Chair of Women In Engineering

IEEE Winnipeg Section would like to welcome Lesley McFarlane as the new chair of Women In Engineering (WIE).

Lesley graduated from Mount Allison university in 1984 with a Bachelor of Science degree and later obtained her B.Sc. in Electrical Engineering from the University of New Brunswick and MBA from the University of Manitoba.

In the past, she worked with the Canadian Armed Forces as a telecommunications officer and later with MTS Allstream in their Wireless Planning and Engineering group as well as their New Product Introduction Project. For the past 18 months she has led the Business Planning and Operational Performance groups, responsible for implementing and maintaining operational effectiveness programs.

Thanks very much to Lesley for volunteering and we look forward to working with her in the future.

Inside this issue:

Technical Papers Sought for IEEE Wireless Hive Network Conference

Organizers of the IEEE Wireless Hive Network Conference (IEEE WHNC 2008) are seeking technical papers from authors presenting the latest research, innovations and implementations related to the theory and practice of wireless sensor network systems, printed electronic device technologies, cognitive radio and related information system support.

IEEE WHNC 2008 (http://www.ieee-whnc.org/index.html) will be held at the Courtyard by Marriott in Austin, Texas, on 7-8 August. It will feature keynote addresses and panel discussions by leading experts, as well as innovative technology presentations.

Dr. Deborah Estrin, a UCLA professor of computer science with a joint appointment in electrical engineering, will deliver the 7 August keynote. She is founding director of the National Science Foundation-funded Center for Embedded Networked Sensing at UCLA. Jon Adams, director of Radio Technology and Strategy for Freescale Semiconductor, is the 8 August keynote speaker. Adams is an expert in wireless systems and communications, focusing on ZigBee, Wi-Fi, WiMAX and cellular 3G technologies. He is on the IEEE Industry Standards and Technology Organization board of directors.

Wireless hive networks (WHN) are local communities of wireless devices associated with such items as warehouse shelves, biomedical sensing and border motion detectors. IEEE WHNC 2008 will draw researchers, engineers and other practitioners to address WHN protocols, power generation, semiconductor processes and other WHN production and efficiency issues.

Authors are invited to submit three- to six-page papers in IEEE conference format. All submissions must describe original work not previously published or currently under review for publication in another conference or journal. Topic areas include, but are not limited to: device technology; system architecture and implementation; applications; security; legislative environment and regulatory policy; and cognitive radio.

The submission deadline is 15 May 2008. See http://www.ieee-whnc.org/whnc2008cfp.pdf for more information.

Presented papers will be published in the IEEE conference proceedings and in IEEE Xplore. The “Best Paper Award” will be given to the author judged to have the best technical paper presented at the conference.

Meet our 2008 Section Executive

Our IEEE Winnipeg Section Vice Chair, Rasit Eskicioglu

M. Rasit Eskicioglu, 2008 IEEE Winnipeg Section Chair

M. Rasit Eskicioglu received his B.Eng. in Chemical Engineering from Istanbul Technical University, Turkey, M.Sc. in Computer Engineering from Middle East Technical University, Turkey, and PhD in Computing Science from University of Alberta, Canada.

He has been teaching, and doing research and development mainly in systems area for more than 25 years. His research interests include operating systems, cluster and grid computing, high-speed network interconnects, mobile and sensor networks. He has also investigated ways to make software DSM systems more efficient and scalable using high-speed, programmable interconnects. Most recently, he is looking at issues that relate to networking technologies for future homes.

Dr. Eskicioglu is an associate professor in the Computer Science Department at the University of Manitoba, Canada. He is a member of ACM (since 1979), and Senior member of IEEE (since 1989) and USENIX (since 1992).

Mr. Haider Al-Saidi, 2008 IEEE Winnipeg Section Vice-Chair

Haider has been a member of the IEEE for 11 years. He was previously the IEEE student branch councillor for Assiniboine Community College where he was very involved in building the membership of the branch.

He received his B.Sc in Electrical and Nuclear Engineering from the University of Baghdad and M.Sc. From Rensselaer Polytechnic Institute.

Haider's previous experience in industry and education include research for ICUCOM Corporation, Senior Engineer at Applied Wave Research and Instructor of Wireless Engineering Technology at Assiniboine Community College.

His goals as vice-chair are to improve IEEE membership and increase awareness of IEEE services within the scientific, industrial and educational communities.

Julian Nedohin-Macek, 2007 IEEE Winnipeg Section Secretary

After attending High school in Ontario, Julian graduated from the University of Manitoba's Electrical Engineering program in 2003.

Julian helped out at the McNaughton Center for 5 years as a volunteer-at-large and continued working with the IEEE GOLD Affinity Group as webmaster and the Winnipeg Section as Secretary. Julian has been happily employed with Standard Aero since 2005 as a Project Specialist. When asked why Julian volunteers with the Winnipeg Section, he replied "The IEEE is a great way to keep in touch with colleagues near and far, and keep up with technical activities in industry. The Winnipeg Section provides a face for the IEEE and volunteering returns much more than the hours spent doing so. The Section's strong local leadership has provided me many opportunities to advance my career and be a better engineer for myself and my employer."

Our IEEE Winnipeg Section Secretary, Julian Nedohin-Macek

George Pasieka, 2008 IEEE Winnipeg Treasurer

George Pasieka is a professional with over thirty years of knowledge and experience in IT technology, Process and Project Management, System Analyst, Business Analysis and Information Systems Operational support. He has completed assignments for private and public organizations in Canada and the United States and is presently employed in the entertainment industry as a Business Analyst / Project Manager.

His accomplishments include an Associate Computing Professional (ACP) designation, an International Project Management Association (IMPA) level C Certified Project Manager, a certified Project Management Professional (PMP) and a certified Organizational Project Maturity Model (OPM3)® assessor and consultant from the Project Management Institute and a Masters Certificate in Project Management from the Schulich School of business at York University in Toronto. Currently, he working on his Master of Business Administration (MBA).

A member of IEEE for 27 years, a member of the Association for Computing Machinery (ACM), Association for the Advancement of Cost Engineering (ACCE), International Institute of Business Analysts (IIBA), Project Management Institute (PMI), a member of the American Society for the Advancement of Project Management (ASAPM) and a founding member of the Project Management Association of Canada.

He is presently on two Winnipeg non-profit boards. He is a member of the Canadian Mental Health Association (CMHA) Winnipeg board and is board chair of Self-Starting Creative Opportunities For People in Employment (SSCOPE).

Questions or comments regarding the newsletter? Contact Jason Kuyp.
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The Institute of Electrical and Electronics Engineers, Inc. is a non-profit organization involved in the advancement of technology. Comprising nearly 365,000 members worldwide, it is a valuable source of technical and professional information, resources and services.

The Winnipeg Section of IEEE strives to meet the needs of its members in the province of Manitoba by providing continuing education, conferences, and special meetings in the areas of electrical, electronics, and computing, to its members in Winnipeg and the surrounding area.

For information on IEEE and how to join, please visit our website at www.ieee.com.

"The best computer is a man, and it's the only one that can be mass-produced by unskilled labor."

Werner Magnus Maximillian von Braun

We're on the web!!
http://winnipeg.ieee.org/index.html

Computerized Combat Glove

Some U.S. soldiers in Iraq are already equipped with wearable computer systems. But the lack of efficient input devices restricts their use to safer environments, such as the interior of a Humvee or a base station, where the soldier can set down his weapon and use the keyboard or mouse tethered to his body. Now RallyPoint, a startup based in Cambridge, MA, has developed a sensor-embedded glove that allows the soldier to easily view and navigate digital maps, activate radio communications, and send commands without having to take his hand off his weapon.

For soldiers carrying a plethora of equipment, finding and using electronic controls on their bodies can be awkward, says Forrest Liau, the president and cofounder of RallyPoint. "We wanted to make a device that would have all the necessary components in a combat-ready way," he says. The Natick Soldier Systems Center in Natick, MA, has a contract with RallyPoint and is currently testing a prototype of the glove, called a Handwear Computer Input Device (HCID), for use with its electronic systems.

A typical wearable computer system consists of a helmet-mounted display and hardware the soldier wears around his waist. RallyPoint's engineers have designed their glove so that soldiers can grip other objects, such as their weapons or a steering wheel, and still be able to use their electronic systems. The glove has four custom-built push-button sensors sewn into the fingers near the tips. Sensors on the lower portion of the index finger and the tip of the fourth activate radio communications, a different channel for each finger. Another sensor on the tip of the index finger changes modes, from "map mode" to "mouse mode." In map mode, the fourth sensor, located on the pinky finger, is used to zoom in on and out of the map; in mouse mode, it serves as a mouse-click button.

For the full story, please see http://www.technologyreview.com/Infotech/20680/page1/