Center for Intelligent Maintenance Systems

IMS Researcher Profiles

IMS Researcher Profile

Institution: UMST

Name:	Ahmet Soylemezoglu
Contact Info:	Email: soylemez@mst.edu Phone: (573) 341-6565

Current Research Activities:	Discrete event systems, flexible manufacturing systems, shop floor control, computer integrated manufacturing, preventive maintenance and shop floor prognostics
Dissertation/Thesis Topics:	
Master's Thesis:	Tool management in Flexible Manufacturing Systems
Dissertation (In progress):	Performance based manufacturing system control using system –level prognostics
Project 1:	Embedded agent for integrated product lifecycle and asset management
Project 2:	Bearing prognostics
Previous Experience:	Maintenance Engineer, Pirelli S.p.A, Izmit, Turkey

Publications:

JOURNAL PAPERS:

1. **SOYLEMEZOGLU**, A., ZAWODNIOK, M.J., CHA, K., HALL, D., BIRT, J., SAYGIN, C., and SARANGAPANI, J., "A Testbed Architecture for Auto-ID Technologies," ***Assembly Automation***, Vol.26, No.2, pp.127-136, 2006.
2. MILLS-HARRIS, M.D., **SOYLEMEZOGLU**, A., and SAYGIN, C., "Adaptive Inventory Management Using RFID Data," ***International Journal of Advanced Manufacturing Technology*** (accepted in 2005, in-print for 2006).
3. MEYYAPAN, L., **SOYLEMEZOGLU**, A., and SAYGIN, C., "A Wasp-Based Control Model for Real-Time Routing of Parts in a Flexible Manufacturing System", ***International Journal of Computer Integrated Manufacturing*** (accepted –in print).
4. **SOYLEMEZOGLU**, A., BUYURGAN, N, and SAYGIN, C., "Tool Management in Flexible Manufacturing Systems," ***IJAMT*** (under review).

CONFERENCE PAPERS:

1. **SOYLEMEZOGLU**, A., BIRT, J.T., SAYGIN, C., SARANGAPANI, J., TRIMBLE, D., and ROUSE, C., "Auto-ID Technologies and Solutions for Aerospace Manufacturing," ***AEROMAT'05***, Orlando, Florida, June 6-9, 2005.
2. MILLS-HARRIS, M.D., **SOYLEMEZOGLU**, A., and SAYGIN, C., "RFID Data-based Inventory Management of Time-Sensitive Materials," ***The 31st Annual Conference of the IEEE Industrial Electronics Society (IECON'05)***, Special Session: Integrated Manufacturing and Service Systems, Raleigh, North Carolina, Nov 6-10, 2005.
3. CHA, K., **SOYLEMEZOGLU**, A., BIRT, J., ZAWODNIOK, M.J., FONDA, J., TAQIEDDIN, E.S., MILLSHARRIS,M.D., SAYGIN, C., SARANGAPANI, J., TRIMBLE, D., and SIEGEL, T., "A Testbed for Validation and Benchmarking of Auto-ID Solutions," ***AEROMAT'05***, Orlando, Florida, June 6-9, 2005.
4. MILLS-HARRIS, M.D., **SOYLEMEZOGLU**, A., SAYGIN, C., ETZKORN, K.M., and FREEMAN, P., "Adaptive Inventory Management for Cost Reduction in Network-Centric Manufacturing Environments," ***AEROMAT'05***, Orlando, Florida, June 6-9, 2005.

IMS Researcher Profile

Institution: Missouri S&T

Name: Reghu Anguswamy

Contact Info: radk7@mst.edu

Expertise: Diagnostic and prognostic schemes for multi-input multi-output systems (e.g. pneumatic systems), embedded systems, wireless networks

Current Research Activities: Wireless networks

Thesis Topics: In-process Diagnostics and Wireless Sensor Network Routing protocol for Network Enabled Environments

Project 1: Multivariable Prognostics Schemes

- MTS (Mahalanobis-Taguchi Strategy) for multi-actuator based pneumatic systems

Skills: C, C++, Visual Basic, Visual C++ , Ns-2, OPNET, MATLAB, Microsoft Certified Professional (MCP) in C#.NET, Windows programming, 2005, hardware-software co-design for embedded systems

Previous Background:

- Graduate Research Assistant – University of Missouri – Rolla, *Jan'06 - Current*
- Software Engineer - Infosys Technologies Ltd. Aug '04 – Dec '05

Publications:

- **In-Process Quality Monitoring of Fastening Operations,** *R. Anguswamy*, J. Birt, Drs. Jagannathan Sarangapani,and C. Saygin, International Journal for Manufacturing Research, Special Issue, 2008 (Under review)
- **In-Process Quality Monitoring of Fastening Operations Using Embedded Mobile Wireless Sensor Network-based Pull-type Tools,** *R. Anguswamy*, J. Birt, Drs. Jagannathan Sarangapani and C. Saygin, 2007 ASME International Mechanical Engineering Congress and Exposition, Seattle, Washington, November 10-16, 2007
- **Pull-Type Tool Health Monitoring and Product Quality Verification using Wireless Sensor Networks,** J.W. Fonda, *R. Anguswamy,* M. Zawodniok, J.Birt, Jagannathan Sarangapani,and C. Saygin, ISHM'06, Cincinnati, August 2006

IMS Researcher Profile

Institution: Missouri S&T

Name: Mohammed Rana Basheer

Contact Info: mrbxcf@mst.edu

Expertise: Stochastic Processes, Wireless Networks, Ad Hoc Networks,

Current Research Activities: Real time location service (RTLS) systems

Dissertation/Thesis Topics: Real Time Location Service Using Received Signal Strength Indicator

Project 1: Location-aware Smart Services

- Development of signal processing for improved localization
- Asset tracking using RTLS system
- Wireless sensor application

Skills: Electronic Hardware Development, Embedded programming, C/C++, ARM Assembly language programming

Previous Background:

- MS (2003) in Computer Engineering, University of Missouri-Rolla,
- 3.5 yrs as at Garmin International,
- 2 yrs at Hughes Software Systems
- 1 yr at Tata Consultancy Service

Awards

- Elevator Pitch Competition, MST, 2007
- Distinctive Excellence at Atmel AVR Design Contest - 2006

IMS Researcher Profile

Institution: Missouri S&T

Name: James W. Fonda

Contact Info: fonda@mst.edu

Expertise: Controls, Sensor Networks, and Hardware

Current Research Activities:

Dissertation/Thesis Topics:

Project 1:

- Wireless Monitoring
- Fault Detection and Prognostics of Large Scale Systems

Skills: Embedded system design, C/C++ programming, Matlab

Previous Background:

BSEE University of Missouri-Rolla (2001)

MSEE University of Missouri-Rolla (2004)

Ph.D. EE University of Missouri-Rolla (2008)

Publications:

- J.W. Fonda, M.J. Zawodniok, J.T. Birt, S. Jagannathan, UMR Mote-based Demonstration of Wireless Sensor Networking Protocols using Pneumatic Testbed, 6th International Symposium on Information Processing in Sensor Networks, IPSN 2007, pp. 569–570, April 2007.

- J. W. Fonda, M. J. Zawodniok, S. Jagannathan, S. E. Watkins*, "*Development and Implementation of Optimized Energy-Delay Sub-network Routing Protocol for Wireless Sensor Networks," *Proc. of the IEEE Int. Symp. on Intelligent Control*, Munich, Germany, pp. 119-124, 2006.

- J. W. Fonda, M. J. Zawodniok, J. Sarangapani, and S. E. Watkins, "Adaptive Distributed Fair Scheduling and Its Implementation in Wireless Sensor Networks," *Proc. of the IEEE Conf. on Systems, Man and Cybernetics*, Taipei, Taiwan, pp. 3382-3387, 2006.

- J. W. Fonda, Watkins, S. E., "Health Monitoring of a Truss Bridge using Adaptive Identification," *Proc of the IEEE Conf. on Intelligent Transportation Systems Conf. (ITSC)*, pp.944-949, 2007.

- K. Mitchell, S. E. Watkins, J. W. Fonda, and J. Sarangapani, "Embeddable Modular Hardware for Multi-Functional Sensor Networks," *Smart Mater. Struct*., vol. 16, no. 5, pp. N27-N34, 2007.

IMS Researcher Profile

Institution: Missouri S&T

Name: Shahab Mehraeen

Contact Info: sm347@mst.edu

Expertise: Missouri University of Science and Technology

Current Research Activities: Nonlinear Control, NN Control, Power System Control, Motor Drive Prognostics

Dissertation/Thesis Topics: Decentralized Control of Power Systems

Project 1: Power System and Energy Harvesting

- Energy harvesting from vibrations for wireless motes
- Development of harvesting circuitry and PZT beam to maximize transfer of energy
- Control of distributed power systems

Project 2: Electronics Prognostics

- Multi-pole motor drive diagnostics and prognostics
- Electronic prognostics

Skills: Nonlinear Control Systems, Power Electronics, Matlab, Simulink

Previous Background:

- Robust Linear Control Systems (M.S. Research Topic),
- Power Plants Control Systems (Working for industry for 4 years)

Publications:

- S Mehraeen, S. Jagannathan, K Corzine, "Energy Harvesting Using Piezoelectric Materials and High Voltage Scavenging Circuitry", IEEE International Conferance on Industrial Technology, 2008, China.
- Invention disclosure "Energy Harvesting Using Piezoelectric Materials and High Voltage Scavenging Circuitry“ – patent application in progress

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IMS Researcher Profile

Institution: MS&T

Name: Balaje T. Thumati

Contact Info: bttr74@mst.edu

Expertise: Fault diagnosis and prognosis, neural networks, and adaptive control

Current Research Activities: Fault detection, Isolation and prognostics

Dissertation/Thesis Topics: Fault diagnosis for nonlinear discrete-time systems with applications to pumps

Project 1: Integrated watchdog agent with online learning methodology for effective diagnosis

- To develop an integrated watchdog agent approach with applications to hydraulic systems, vehicles and engines.
- The diagnostic/prognostic agents will be in the form of a embedded software modules which can be selected by the service personnel by using a portable service tool through wireless/wired network.

Project 2: Integrated Watchdog Agent with Online Fault Isolation Methodology

- To develop an integrated watchdog agent with an effective fault isolation methodology. The scheme will be able to isolate the fault occurring in the system. It will be available in the form of an embedded software module.

Skills:

Software

Technical package: Matlab, Simulink, Labview

Programming: C, C++

Operating systems: Windows XP, Vista

Previous Background:

I have earned a bachelors degree in Instrumentation and control engineering and a master's degree in measurement and control engineering. Earlier research worked involved with developing models of human ear cells behavior. Major interest was in modeling specific cell dynamics of the outer and inner cell of human ear by using neural networks, and fuzzy logic. This research was submitted as a thesis during my master's degree program.

As part of the senior year group project, we developed an automatic human health monitoring system, which was submitted towards my bachelor's degree requirement.

Publications:

[1] B. T. Thumati and S. Jagannathan, "A Model Based Fault Detection and Prognostic Scheme for Uncertain Nonlinear Discrete-Time Systems", Submitted to 47h IEEE Conference on Decision and Control (CDC), Cancun, Mexico, 2008.

[2] B. T. Thumati and S. Jagannathan, "A Model Based Fault Detection Scheme for Nonlinear Multivariable Discrete-time Systems", Submitted to Systems, Man and Cybernetics conference (SMC) 2008, Singapore, 2008.

[3] B. T. Thumati and S. Jagannathan, "An online approximator-based fault detection framework for nonlinear discrete-time systems", Proc. Of the 46th IEEE Conference on Decision and Control (CDC), pp. 2608-2613, New Orleans, LA, USA, 2007.

[4] B. T. Thumati, J. Brit, N. Bassi, and Jag Sarangapani," A neural network model based approach to detect seal and impeller failures in centrifugal pump", Proc. of IMECE 07, 2007 ASME International Mechanical Engineering Congress and Exposition, Seattle, WA, USA, 2007.

IMS Researcher Profile

Institution: Missouri S&T

Name: Qinmin Yang

Contact Info: qinminyang@gmail.com, (309)-310-9416

Expertise: control design, nano-manipulation, fault accommodation

Dissertation/Thesis Topics:

Project 1: Fault Accommodation Strategies

- Development of a reconfigurable control methodology
- Application of fault accommodation technique to pump system

Skills: C/C++, Matlab, Simulink

Previous Background:

- PhD (2007) in electrical Engineering, University of Missouri-Rolla

Publications:

- Q. Yang, J. Vance and S. Jagannathan, “Neural network control of nonaffine nonlinear discrete-time systems”, IEEE Transactions on Systems, Man and Cybernetics: Part B, accepted for publication, to appear in August 2008.
- Q. Yang, S. Jagannathan and E. Bohanan,”Automatic drift compensation using phase-correlation method for nanomanipulation”, IEEE Transactions on Nanotechnology, vol. 7, 2008.

IMS Researcher Profile

Institution: Missouri S&T

Name: Maciej Zawodniok

Contact Info: mjzx9c@mst.edu, (573)-202-0378

Expertise: wireless sensor and ad hoc networks, embedded systems, RF-based systems including RFID technology

Current Research Activities: development of product lifecycle and asset tracking system, development of wireless communication agents

Dissertation/Thesis Topics:

Project 1: Wireless Monitoring

- Sensor data processing
- Monitoring, diagnostics and prognostics agents for embedded systems

Project 2: Interoperability

- Coexistence of wireless communication devices and networks
- Automatic RF spectrum resource allocation

Skills: embedded system design, C/C++ programming, Matlab, Java,

Previous Background:

- MS (1999) in Computer Science, Politechnika Slaska w Gliwicach (Poland)
- PhD (2006) in computer Engineering, Univeristy of Missouri-Rolla

Publications:

- M. Zawodniok and S. Jagannathan, Predictive Congestion Control MAC Protocol for Wireless Sensor Networks, IEEE Transactions on Wireless Communications, Vol. 6, No. 11, pp. 3955–3963, November 2007.
- M. Zawodniok and S. Jagannathan, Energy-Efficient Rate Adaptation MAC Protocol for Wireless Ad Hoc Networks, International Journal of Wireless Information Networks (IJWI), Vol. 14, No 4, pp. 251-263, November 2007.
- K.C. Emani, K. Kam, M. Zawodniok, Y.R. Zheng, J. Sarangapani, Improvement of CAN BUS Performance by Using Error-Correction Codes, Proc. Of IEEE Region 5 Technical Conference 2007, pp. 205-210, April 2007.
- J.W. Fonda, M.J. Zawodniok, J.T. Birt, S. Jagannathan, UMR Mote-based Demonstration of Wireless Sensor Networking Protocols using Pneumatic Testbed, 6th International Symposium on Information Processing in Sensor Networks, IPSN 2007, pp. 569–570, April 2007.