

IMS Researcher Profile

Institution: MS&T

Name: Balaje T. Thumati

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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 47th 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.