Πανεπιστήμιο Κύπρου
University of Cyprus

School of Engineering
Department of Electrical and Computer Engineering

IEEE
Advancing Technology for Humanity

Department of Electrical and Computer Engineering

Title: «Navigation, Coordination and Fault Detection in Mobile Service Robots: Algorithms and Embedded Devices Implementation»

Demetris Stavrou
PhD student in the Department of Electrical and Computer Engineering, University of Cyprus

Wednesday 6th May 2015, 17:00 – 18:00
Room KENTP. A019, Old Campus – University of Cyprus

Abstract:
The number of service robots deployed in the world is growing fast and their dependability is important for the wide acceptance of the public. The attributes that distinguish a dependable robot are safety, reliability, confidentiality. Safety is in particular focus when robots are operating close to people, and a fault may potentially cause harm. A fault in any of the multiple interconnected subsystems the robot is comprised of, could cause unwanted, unsafe behavior. If such faults are detected on time, the robot will be able to stop or adapt its operation and remain safe. Fault detection can improve the dependability of a robot but when robots operate as a group, other factors need to be taken into consideration. Even if a robot operates correctly individually, a team of robots in the same environment requires coordination to ensure that no collisions or other unwanted events occur. The presentation includes the following subjects: a) Coordinating a team of robots in a warehouse environment; b) Localizing a highly constrained robot; c) Fault detection and path correction using either internal or external sensors. The algorithms developed for this work, were designed in order to work on a relatively low-resource embedded system, similar to what is found in the currently sold service robots. To validate this experimentally, embedded devices were designed and built which were used to implement some of the algorithms of this work. This ensures, that the results of this work are directly applicable in practice.

Biography:
Demetris Stavrou received Master of Engineering in Electrical and Electronic Engineering and Master of Science in Modern Digital Communication Systems from the University of Sussex, England in 2004 and 2005, respectively. He joined the Department of Electrical and Computer Engineering, University of Cyprus in September 2008 as a research assistant working in the area of mobile sensor networks and mobile robots. He is currently a Graduate Research Assistant at KIOS Research Center for Intelligent Systems and Networks and PhD candidate at the University of Cyprus. His research interests are Control, Perception, Coordination and Fault Diagnosis all in the context of mobile robots. He is a student member of IEEE and IEEE Robotics and Automation Society.