CSC 8260: Embedded Networking for Cyber-Physical Systems and Internet of Things

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Class ref number: 27876
Class timings: MW 3:00pm-4:20pm
Class webpage: http://www.cs.wayne.edu/~hzhang/courses/8260/8260.html

Overview

Seamlessly integrating sensing, networking, and computation with the control of physical devices and processes, cyber-physical systems (CPS) and Internet of Things (IoT) are expected to transform how we interact with and manipulate the physical world. Accordingly, CPS/IoT will have far-reaching impact on science and engineering and are critical to a wide range of applications such as smart transportation, Industrial 4.0, and smart energy grid. One basic enabler of CPS/IoT is embedded networking of sensors, controllers, and actuators. In supporting mission-critical, real-time, and closed-loop sensing and control, embedded CPS/IoT networks represent a significant departure from traditional wired and wireless networks, and it is critical to ensure controllable, predictable communication quality in CPS/IoT.

This course is designed for students who are interested in CPS/IoT in general and CPS/IoT embedded networking in particular. We will examine a wide range of topics including CPS/IoT applications (e.g., smart transportation, industrial automation, smart energy grid, and smart health), field area and control networks (e.g., HART, Modbus, PROFIBUS, PROFINET), industrial Ethernet, time-triggered communication, safety and security of industrial networks, fundamentals of wireless communication (e.g., wireless channel, signal propagation, modulation, link models), wireless industrial networks, as well as embedded networking in aerospace, automotive, rail, and building automation. This course is expected to prepare students for innovative development and research in CPS and IoT.

Prerequisites

Basic knowledge of computer networks (e.g., materials covered in CSC6290 or equivalent). Or consent of instructor.

For more information, please visit the class webpage or contact Dr. Hongwei Zhang (hongwei AT wayne.edu).