NGI EXPLORERS

CHALLENGE #31
SCU-WIFI-01

Wireless WiFi Sensor Networks for Mission Critical Applications

Meet the expectations of this US Node through the technology challenge described below

GOALS

The next industrial revolution, referred to as Industry 4.0, heavily relies on the adoption of wireless networks. Despite a large body of literature and standards on the wireless sensor networks proposed for mission-critical applications, the existing works do not address the demands of high-rate applications where the amount of data collected from nodes is in the order of few hundreds of megabits per second or gigabytes per second. This mandates the need for developing wireless sensor networks that provide high sampling rate, high communication data rate, and real-time delivery. In this regard, there exist challenges pertaining to reducing the overhead of packet processing, minimizing the effect of multi-tasking on sampling rate, establishing accurate time synchronization among nodes, increasing networking scalability via using multiple wireless infrastructures, etc.

DETAILS

(1) develop a toolkit for the fast, low-overhead collection of statistical data from WiFi access points , and develop techniques for generating traffic traces representing real-world WiFi traffic; (2) understanding the effect of various low-overhead protocol stacks on processing delay and overhead; (3) develop predictive scheduling methods, which benefit from resource allocation in the fog system to enable IoT devices to dynamically adjust their wake-up/sleep schedules; and (4) develop scheduling methods above the MAC layer to provide context-aware adjustment of packet priorities.

SKILLS REQUIRED

Wireless communication, real-time communication, RTOS, LwIP, NetX, Linux

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