Sensors and Machine Learning in Energy and Embedded IoT Applications

Andreas Spanias, SenSIP Center Director
Arizona State University

Abstract

In our poster, we provide a description of ongoing sensor and machine learning research projects at the NSF SenSIP center. The ASU Sensor Signal and Information Processing (SenSIP) center research activities include signal processing and machine learning algorithm development for extracting information from sensors and IoT systems. More specifically center activities are focused on developing signal processing and machine learning methods for various applications including AI-enabled sensing for automotive and other applications, IoT solar energy system monitoring, surveillance systems, health monitoring, and sound systems. We will provide an overview of our NSF and industry research with specific focus on two efforts: a) machine learning for extracting data analytics for real-time embedded sensor systems and b) machine learning and sensors for monitoring and control renewable energy systems. Algorithms and quantitative results will be described for both applications.   We address Tiny ML Summit objectives by describing results in these two IoT application domains that show: a) examples of compact ML algorithms in embedded sensor systems that can be trained in real time to classify events and signals and b) how our machine learning methods improve energy efficiency in IoT solar systems. A demonstration will also be part of the poster presentation.

Biography

Andreas Spanias is Professor in the School of Electrical, Computer, and Energy Engineering at Arizona State University (ASU). He is also the director of the Sensor Signal and Information Processing (SenSIP) center and the founder of the SenSIP industry consortium (now an NSF I/UCRC site). Member companies of the NSF SenSIP center and industry consortium on sensor information processing include: Intel, National Instruments, LG, NXP, Raytheon, Sprint and several SBIR type companies. He is an IEEE Fellow and he recently received the IEEE Phoenix Section Award for Patents and Innovation. He also received the IEEE Region 6 section award (across 12 states) for his contributions education and research in signal processing.
  He is author of more than 300 papers,15 patents, two text books and several lecture monographs. He served as Distinguished lecturer for the IEEE Signal processing society in 2004. More info at: http://spanias.faculty.asu.edu/