

Sensor and Systems in Smart Farming

Conference:

CCECE 2019: <http://www.ccece2019.ieee.ca/>

Topic of Interest:

Sensor and Systems in Smart Farming and Agriculture

Objectives and scope

There has been an increasing interest to use engineering techniques and sensor systems in plant imaging and root phenotyping. The heart of plant biology is about understanding the link between genetic differences in plants and phenotypes or plant traits. While genotyping plants are now relatively low-cost and high-throughput, phenotyping is still labor-intensive and restrictive to plant biology studies and crop improvement research. To address the challenge, in-field autonomous sensor systems and efficient data processing algorithms are highly desired. The special session will focus on such digital systems including both hardware and software in the areas of Electrical Engineering, Mechanical Engineering, Computer Science and Plant Science.

More information about can be found here: <https://p2irc.usask.ca/>

About GIFS and P2IRC:

The Plant Phenotyping and Imaging Research Centre (P2IRC) is an agricultural research centre managed by the Global Institute for Food Security (GIFS) and located at the University of Saskatchewan. P2IRC was established thanks to funding awarded to the University of Saskatchewan by the Canada First Research Excellence Fund award, Designing Crops for Global Food Security. P2IRC's seven-year transdisciplinary program will transform crop breeding through research in phenometrics, image acquisition technologies, computational informatics of crop phenotype data, and societal and developing world impact (<http://p2irc.usask.ca>).

Some suggested topics include:

1. Sensor and engineering systems
 - a. Optical sensors, LIDAR, digital camera, hyperspectral camera, ultrasonic, etc.
 - b. High-throughput data acquisition system
 - c. Various sensors for plant traits and environment: humidity, soil moisture, water stress, leaf wetness, soil nutrition, mineral content, etc.
 - d. Data and image compression system
 - e. Wireless transmission of in-field digital data
 - f. Wireless sensor network
 - g. Internet of things (IoT) and smart sensor
2. Image processing tools and algorithms for plant modeling
 - a. Image analysis, segmentation and feature extraction
 - b. Deep learning techniques
 - c. Machine learning algorithms
 - d. Quality assessment of plant images
 - e. Software to measure digital plant phenotypes
3. Robotics system and tools
 - a. Navigation and tracking algorithm
 - b. Statistics analysis
 - c. Embedded systems

Special Session Chairs:

Khan A. Wahid, PhD, P.Eng
Professor
Dept. of Electrical and Computer Engineering
University of Saskatchewan
Email: khan.wahid@usask.ca

Anh V. Dinh, PhD, P.Eng
Associate Professor
Dept. of Electrical and Computer Engineering
University of Saskatchewan
Email: anh.dinh@usask.ca