

Open Invited Track/Session

Title:

Sensing, control, automation and robotics for agriculture

Organizers:

Manoj Karkee - Washington State University, USA

Jay Katupitiya - University of New South Wales, Australia

Noboru Noguchi - Hokkaido University

Hiroshi Shimizu - Kyoto University, Japan

Arto Visala - Aalto University, Finland

IFAC Technical Committee 8.1: Control in Agriculture

Abstract:

World is facing increasingly critical challenges in producing sufficient, quality food, feed, fiber and fuel with depleting farming resources such as water, chemicals and labor. To address these challenges, scientists and engineers around the world have, in recent years, been exploring opportunities in utilizing new innovations in Artificial Intelligence, Internet of Things, Big Data Analytics, and Robotics. Widespread research and development in this area is expected to lead the farming industry towards Ag 4.0 supported by smart, automated/autonomous machines and agricultural systems that will increase consistency and reliability of farming decisions and operations, reduce inputs (including labor), and optimize crop yield and quality. Proposed session on 'Sensing, Control, Automation and Robotics for Agriculture' is expected to bring together a trans-disciplinary group of researchers working in both fundamental and applied research and development projects in this area to share their accomplishments, knowledge and experiences to the global audience. The session will also facilitate discussion on future direction for research and development, and help foster collaborative efforts across the continents to realize the vision of Smart Agriculture or Ag 4.0.

Description:

Commonly accepted population growth models predict that there will be more than nine billion people by 2050. Increasing population, along with growing affluence around the world, will significantly increase the demand for food, feed, fiber, and fuel, which need to be met with static or decreasing agricultural resources, including water, and nutrients. Decreasing availability and increasing cost of labor is another limitation the world is facing today for sustainable agriculture.

Sensing, control, automation and robotics technologies have been an important means for increasing agricultural productivity, improving worker health and safety, optimizing resource utilization, and reducing labor requirements. In this context, it is crucial to bring together some of the pioneering researchers from different parts of the world together into a forum where the progresses made could be shared and a collective vision can be spearheaded for

the future direction of this important area of research and development. In this context, IFAC Technical Committee 8.1, Control in Agriculture is proud to announce this special workshop at IFAC 2020 World Congress. We would like to invite all of you to submit your papers (or extended abstracts) to this special session where prominent researchers will be sharing their latest results and thought provoking ideas and direction in the development and application of tools and technologies such as AI, Big Data, IoT, UAVs and Robotics to make farming smarter. The session is also expected to provide a venue for leveraging the advances in other lateral technologies for enhancing the productivity in agriculture.

Some of the areas of interest for this session include, but not limited to:

▪Crop Monitoring ▪Soil, Plant and Environment Sensing ▪ Pest and Disease Detection Management ▪ Crop Yield Estimation/Monitoring/Mapping ▪ Sensing and Automation with UAVs ▪ Internet of Things ▪ Wireless Sensor Network ▪ Big Data and Cloud Computing ▪ Decision Support Systems ▪ Sensing and Automation for Precision Irrigation ▪ Precision Agriculture and Variable Rate Technologies ▪ Machine Vision and Robotics for Crop Harvesting ▪ Machine Vision and Robotics for Weed Control ▪ Automation and Robotics in Agriculture ▪ Design and Control of Agricultural Implements ▪ Traction, Transmission and Slip Control Systems ▪ Agricultural Machinery Guidance and Control ▪ Robust Control Systems for Agriculture ▪ Sensing, Automation and Robotics in Plant Factory, Protected Cultivation and Greenhouses ▪ Sensing and Automation in Animal Farming ▪ Sensing, Automation and Robotics for PostHarvest/Processing ▪ Nanotechnology for Precision and Automated Agriculture ▪ Crop Systems/Canopy Architectures, Breeding and Genetics for Precision and Automated Agriculture