Objectives of the Session

There is a great potential for machines to learn to solve many problems relating to interactions with natural environment by using artificial intelligence and machine learning. Agriculture offers a vast application area for all kinds of AI core technologies: Mobile, autonomous agents operating in uncontrolled environments, stand-alone or in collaborative settings, to investigate, test and exploit technologies from robotics, computer vision, sensing and environment interactions. Integrating multiple partners and their heterogeneous information sources leads to application of semantic technologies. The complexity of the agricultural production asks for progress in modeling capabilities, handling of uncertainty, and in the algorithmic and usability aspects of location- and context-specific decision support. The growing interest in reliable predictions as a basis for planning and control of agricultural activities requires the interdisciplinary cooperation with domain experts e.g. from agricultural research. Modern agricultural machines could use self-configuring components and be able to collaborate and exhibit aspects of self-organization and swarm intelligence.

The principle of artificial intelligence is one where a machine can perceive its environment, and through a certain capacity of flexible rationality, take action to address a specified goal related to that environment. Machine learning is when this same machine, according to a specified set of protocols, improves in its ability to address problems and goals related to the environment as the statistical nature of the data it receives increases. The system receives an increasing amount of similar sets of data that can be categorized into specified protocols, its ability to rationalize increases, allowing it to better "predict" on a range of outcomes.

All technical papers in this Special Session will give a first view on this challenging interplay between AI, machine learning and Agriculture. Taking profit from state-of-the-art sensing and actuator technologies the contribution on data mining, spatio-temporal constraint planning and pattern recognition in agriculture addresses challenges and potentials of appropriate methods in Agriculture.

The collection of articles will show that Agriculture is a promising application field for AI and Machine technology, and in turn AI and Machine Learning has a rich variety of important contributions to offer to cope with the pressing challenges faced by Agriculture.

Scope

The special session on AI and Machine Learning technologies for Rural and Agricultural Systems encourages the following topics (but not limited to)

- Agricultural Engineering and Mechanization
- Agriculture and Public Health
- Agricultural Value Chain
- Agriculture Advancement and Development
- Agricultural Education and Capacity Building
- Agricultural Research and Extension
- Data Mining in Agriculture
- Urban Agriculture
- Social Interactions of Agriculture
- Cloud Computing in Agriculture
- IoT for Agriculture
- Climate Smart Agriculture
- Big Data Analytics in Agriculture
- Drone technology in Agriculture
- Geospatial technology in Agriculture
- Digital Pathways in Agriculture
- Technology Transfer to Communities & Farmers
- Research Trends in Precision Farming
- Sustainable Agriculture and Natural Resources (Soil, Water, Environment etc.)
- Farming Systems Management
- Integrated Pest Management, Plant Health and Nutrition
- Agricultural Policies and Safety
- Community, Regional and International Development of Agriculture
- Environmental and Social Standards of Agriculture
- The Future Smart Farming and Open Source Farming
- Spatial variability in agricultural systems
- ICT for agricultural development
- Agricultural Nanotechnologies
- Management and mitigation of agricultural data

Contribution to the main conference

This special session will complement the main conference program at South Asian University, Delhi, India in that it will examine the area or artificial intelligence and machine learning

techniques related to agricultural and other rural systems and the issues related to such data sets and systems.

Expected Outcome from the Special Session

The session will be used to facilitate the establishment of a collaborative group of researchers interested in this area. Papers and presentations delivered for the session will be collated for a special journal issue (to be advised). All papers submitted to special session will be reviewed using the same process as of the conference.

Special Session Chairs

Dr. Leisa Armstrong, School of Science, Edith Cowan University, Australia
Professor Amiya Tripathy Don Bosco Institute of Technology, Mumbai, India
Dr. Rajni Jain, National Centre for Agricultural Economics and Policy Research, New Delhi, India

Special Session Committee

Professor D. A. Diepeveen, Curtin University, Australia
Professor P. Krishna Reddy, IIIT Hyderabad, Hyderabad, India
Professor J. Adinarayana, CSRE, IIT Bombay, Mumbai, India
Dr. Ritaban Dutta, CSIRO, Tasmania
Dr. Sreedhar Nallan, Edith Cowan University, Australia
Dr. Niketa Gandhi, Machine Intelligence Research Labs (MIR Labs), USA