Organized Session 6

CIGR-WG 12 (Artificial Intelligence and Data Science)

Machine Learning Innovations in Biosystems Engineering

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**Concept of Organized Session**

Transversal fields of knowledge like data science, machine learning, and artificial intelligence are currently transforming how we conduct research and build new technologies. Particularly Statistical and Machine Learning represent a way to cope with complexity and uncertainty. Due to their significant complexity and inherent variability, biological and environmental systems do in fact pose a problem for engineers, necessitating the use of suitable mathematical tools.

The current session by Working Group 12 "Artificial Intelligence and Data Science" seeks to give participants a comprehensive overview of these methods used in several areas of Biosystems Engineering. Invited talks include topics such as applications in horticulture and open field agriculture, automation and robotics in fruit tree management, insect detection and tracking, forest modelling, and the adoption of smart technologies in agriculture.

The main goal of the presentations is to open up a discussion regarding technical aspects of machine learning and to connect professionals from various fields who are working on related issues. Particular methods, like certain deep learning model architectures or random forest classifiers, find use in a variety of quite different fields from precision agriculture and soil science to ocean science and forestry. The same happens with development activities like robot navigation, analisys of RGB and multispectral images and 3D geometric simulations. Therefore, a networking event with the opportunity to network complements the speakers in this session.

**Keywords:** Artificial Intelligence, Data Science, algorithms, deep learning, statistics, computational modelling.