Special Issue

Simulation Environments and Image Synthesis for Precision Agriculture: Advancing Data Quality, Accessibility, and Agricultural Innovation

Message from the Guest Editors

Precision agriculture faces issues with data scarcity, quality, and diversity, and the reliance on real-world agricultural data has been limited by high costs and time-consuming collection processes. One potential solution is synthetic data generation, which uses generative models and simulation environments. These technologies enable the production of diverse, high-quality datasets, which are essential for developing reliable machine learning models. The goal of this Special Issue is to investigate novel approaches for the creation of synthetic data, with a focus on the application of simulation environments and generative models such as GANs and VAEs. The scope of this Special Issue includes applications in various aspects of precision agriculture, such as crop and weed management, as well as soil and water management. This Special Issue will highlight innovative studies on the creation of synthetic data, such as methods for combining actual and synthetic data, producing realistic agricultural datasets, and assessing the effects of synthetic data-driven activities on the environment and the economy.

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