

Advancing Sustainable Food Production through User-Centric AI-Based Phenotyping

Abstract

The integration of artificial intelligence (AI) into sustainable agriculture has revolutionized phenotyping, the process of measuring and analyzing plants and their surrounding ecosystems. User-centric AI-based phenotyping focuses on developing tools and systems tailored to the needs of farmers, breeders, agronomists, researchers, and agricultural stakeholders. These AI systems leverage machine learning algorithms and advanced image-sensing techniques to provide accurate, real-time data on crop health, growth patterns, and environmental interactions. This presentation will introduce the current research activities of the Laboratory of Field Phenomics at the University of Tokyo.

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RESEARCH AREAS AND EXPERTISE

- General area: Agricultural Informatics
- Specific area: Plant Phenomics, Machine learning and Image processing

SELECTED AWARDS AND RECOGNITION

- Senior Editor, Plant Phenomics, 2023-
- Board Member, Councilor of Japanese Society of Agricultural Informatics.
- Board Member, Japanese Plant Phenotyping Network.
- JSAI Shinnourin International Award, by Japanese Society of Agricultural Informatics. To: Guo, W. 2022.05.
- Young Researcher's Award, by Japanese Society of Agricultural Informatics. To: Guo, W. 2020.05.
- Best presentation award, at 136th Meeting of the Japanese Society of Breeding. To: Guo, et al., 2019.09.
- Director Award, at 2018 AIP Challenge Program by AIP Network Laboratory, JST (Japan Science and Technology Agency). To: Guo, W. 2019.04.

Wei Guo, Ph.D., is an Associate Professor and PI at the Laboratory of Field Phenomics, Graduate School of Agricultural and Life Sciences, the University of Tokyo, Japan. Trained as an engineer in computer science/informatics in China and Japan, he received his Ph.D. in agriculture, majoring in agro-informatics at the University of Tokyo in 2014. He established the "Laboratory of Field Phenomics," Japan's first plant phenomics laboratory, as a core member in 2017. His research focuses on field-based phenotyping using advanced sensing platforms and technologies such as drones and ground robots, image processing, and machine learning approaches. In 2020, Guo received the Young Researcher's Award from the Japanese Society of Agricultural Informatics. He has published over sixty journal papers in the field of plant phenomics. His synergistic activities include being a Board member of "Japanese Society of Agricultural Informatics(JSAI)"; International Commission of Agricultural Engineering (CIGR) "Technical Section VII (IT)" and "WG12 - Artificial Intelligence and Data Science"; "Japanese Plant Phenotyping Network". He is also the Senior editor of the journal "Plant Phenomics".