

Plant Phenotyping Technologies Using Low Cost Devices

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Abstract

Agricultural production depends on climate, weather, soil properties, plant type, and so on. Thus, farmers have tried to continuously modified cultivation strategy and techniques for a long time so as to fit the ambient environmental and plant conditions. Additionally, consumers' demands have also shifted to fresh, high-quality, and high-security fruits and vegetables. In response to these issues, various researches and developments have been investigated to establish next generation of agriculture up to now. The core technology will be Information and Communication Technologies (ICT). Currently, there are a lot of ICT applications in agriculture (smart farming) including a spatio temporal data collection and a facility automation including environmental monitoring and control in a greenhouse.

On the other hand, plant growth behavior and quality status is strongly influenced by not only gene property but also the environmental conditions and nutritional status in general. Various methods have been developed to measure the plant growth behavior. Among them, image processing and analysis methods and technologies are expected in order to extract biological, physiological, and ecological features of plants. Due to the rapid developments and expansion of recent ICT (Information and Communication Technology), they are significantly contributed to achieve high throughput plant phenotyping, which is focused on the comprehensive assessment of complex plant features such as growth, physical property, and yield (Roberto, Aluizio, 2015). These researches have been actually utilized to solve problems related to food and biomass production under drastic climate change, global warming, and increase in the global population. However, typical plant phenotyping system is very expensive and thus affordable system development is required to improve the researches in this field. I believe that it is a key technology to realize smart agriculture, too. Figure 1 shows a developing the spatio-temporal data sensing and visualization platform for plant phenotyping (Ito et al, 2021).

I would introduce several technologies for plant phenotyping utilizing affordable devices and open software.

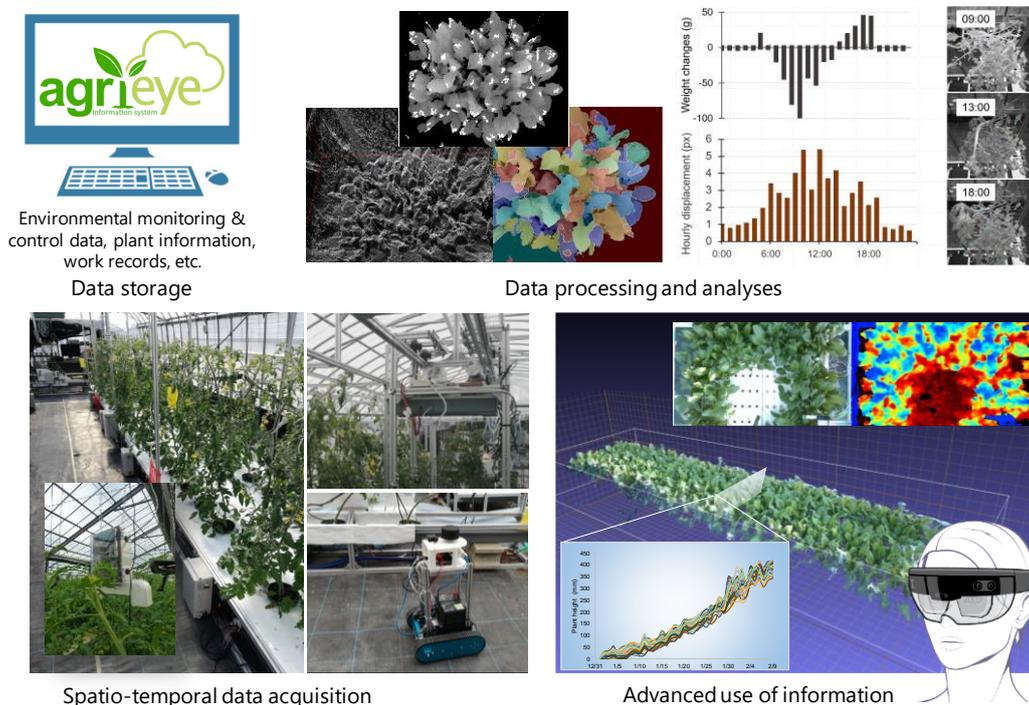


Fig. 1 Spatio-temporal data sensing and visualization platform for plant phenotyping.

References

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