노지 배추 생체중 추정을 위한 인공지능 모델 개발

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Development of a Neural Network Model to Estimate the Biomass of Chinese Cabbages

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In-situ biomass estimation provides information for crop management such as crop growth status and expected yield. Non-destructive tecnologhies have been developed for accurate and fast assessment of crop biomass. RGB images have been used to estimate crop biomass, which would be cost-effective and accurate, compared with sophisticated devices, e.g., lidar and spectrometer. The objectives of this study were to develop an approach to estimate in-situ biomass from ordinary photos, which can be taken using handheld devices, e.g., smartphones. In the present study, a neural network was used to perform training a large number of RGB images of which cabbage freish weight was obtained. It was found that the neural network was useful to estimate biomass of cabbage at multiple growth stages although the error tended to increase at the laster growth stage. For example, the determination coefficient was about 0.53 and 0.42 for cabbages grown for 25 days and 60 days, respectively. Our results suggests that the use of RGB images would have potential to estimate biomass of cabbages, which merits further development of the neural network with different architectures such as variation of color channels and depth of the neural network.

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