1   TheLR531v1-A Deep-Learning Architecture for the Automatic Segmentation of

2   horticultural crops

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4   キーワード: automatic segmentation, deep learning, classification, image

5   processing

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7   Separating plants or plant leaves from the background in images (Thermal RGB & RGB) is a

8   challenging task. We propose a TheLR531v1 network (thermal leaf RGB network with 531 layers

9   version 1) to recover plants or plant leaf canopy (horticultural crops) from their backgrounds

10   in real-time more accurately than other networks (Figure 1). The proposed network has an average

11   boundary F1 score or BF score of 92.51% to distinguish plants or plant canopy pixels from

12   background pixels. We evaluated the network performance by using over 55,992 augmented images

13   (tomato, cabbage, lettuce) and obtained 94.55% training and 95.89% validation accuracy without

14   overfitting issues. The total parameters of TheLR531v1 are only 4.5 M, which is

15   significantly lower than other state-of-the-art models. This research aimed to develop

16   a deep learning technique for the automatic segmentation of both thermal RGB & RGB images to

17   continuously monitor the various morphological character or surface temperature of the

18   horticultural crops both grow inside a plant factory or in the open field.
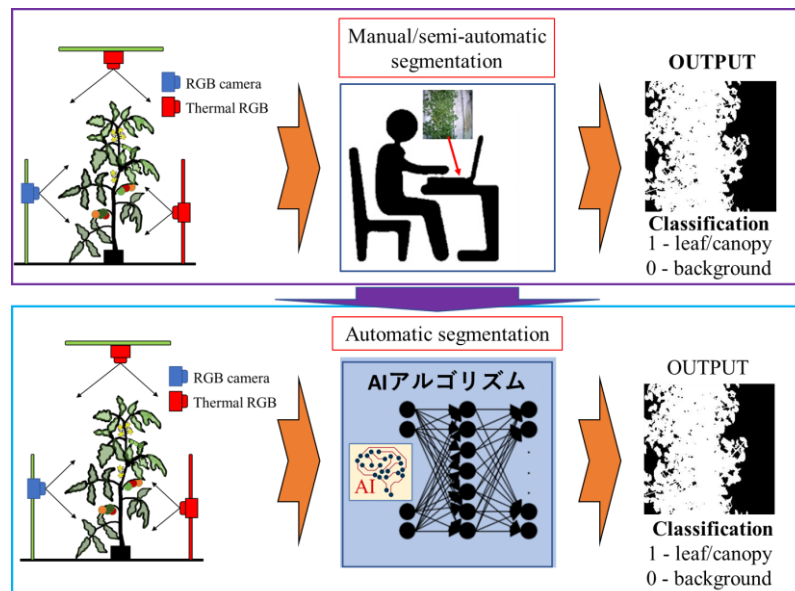

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20   Figure 1. Automatic segmentation using TheLR531v1 network.

21   Reference

22   Islam, M.P., Hatou K. 2022. TheLR531v1 - A deep learning multi-branch CNN architecture for

23   day-night automatic segmentation of horticultural crops. Computer and Electronics in

24   Agriculture, Elsevier (under review).