日本生物環境工学会
オンライン次世代研究発表会

2021年11月2日(火)

講演要旨
Abstract

大会ホームページ:
https://sites.google.com/view/jsabees-online-congress2021/

B3-1

Parameter optimization towards the development of a novel deep-network architecture for automatic detection of tomato leaf disease

○Md Parvez Islam (Ehime University), Kenji Hato (Ehime University)

キーワード: Convolution neural network, MobileNet v2, accuracy, parameter optimization, classification

はじめに

Pests and diseases have a devastating effect on food security as it caused 20 to 40% loss of global food production (Food and Agriculture organization of the United Nation, International plant protection convention, 2017). A timely and accurately diagnosis-based monitoring system could effectively reduce the loss by preventing disease from spreading (Barbedo, 2018). Now a days, the convolution neural network based deep learning technique has made breakthrough in image classification and achieved extraordinary accuracy to predict plant diseases. In this study, we will demonstrate the effectiveness of a google developed deep network architecture MobileNetv2 with parameter adjustment and optimization in classifying 13 types of tomato leaf diseases.

材料および方法

In this experiment we used public data of the 12 different classes of tomato leaf diseases and a healthy class from PlantVillage (Kaggle). A pretrained MobileNetv2 was downloaded and modified using MATLAB R2021a for classifying 13 class (12 disease + 1 healthy). The network was trained on a computer equipped with 2xGeForce RTX 3060 (12GB) and 128 CPU memory.

結果および考察

We observed that differences between training and validation accuracy ranges from -0.98% to 13.58% (Fig.1) occur under different training data and parameter. None of them reached to 0 under any condition.
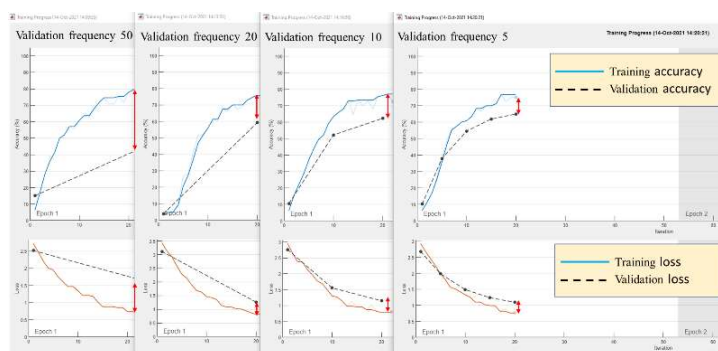

Fig. 1 クロロフィル蛍光画像計測装置

引用文献

Barbedo, J.G. 2018. Factors influencing the use of deep learning for plant disease recognition, Biosystem Engineering, 171, 84-91.

Food and Agriculture organization of the United Nation, International plant protection convention. 2017. Plant health and food security, Pamphlet 17829EN/1/09.17 (accessed October 10, 2021).