

Plant pathology detection with convolutional neural networks

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Abstract—

Index Terms—Deep Learning, CNN, Plant Pathology

I. INTRODUCTION

Apple industry in U.S. has \$15 billion annual market size [1]. Various kinds of plant diseases cause significant economic losses. The manual diagnosis of apple plant diseases are laborious and expensive. Hence, computer vision-based methods have been developed to detect diseases from the images of leaves. The variations in imaging conditions such as backgrounds, lighting, and the large variety of visual symptoms are the main challenging aspects for these methods.

In this paper, we investigate the performance of convolutional neural networks on detecting plant diseases from the images of apple leaves.

A. Dataset

We use [Plant Pathology 2021-FGVC8 dataset](#) for training the models. The dataset consist of over 18,632 RGB images, varying between 2592×1728 to 5184×3456 in size, and their labels. Each sample is labelled by experts with one or more disease types due to the fact that a plant may have multiple diseases.

There are 5 kinds of plant disease existing in the dataset:

- 1) *frog_eye_leaf_spot*
- 2) *powdery_mildew*
- 3) *rust*
- 4) *scab*

A sample is labelled as *healthy* when no disease is spotted, and labelled as *complex* when many diseases are spotted.

As it can be seen from Fig. 2., there is imbalance among labels in the dataset.

B. Literature Search

II. METHODS

A. Data quality

B. Model training and evaluation

III. CONCLUSION

REFERENCES

- [1] R. Thapa, K. Zhang, N. Snavely, S. Belongie, and A. Khan, “The plant pathology challenge 2020 data set to classify foliar disease of apples,” *Applications in Plant Sciences*, vol. 8, no. 9, p. e11390, 2020. [Online]. Available: <https://bsapubs.onlinelibrary.wiley.com/doi/abs/10.1002/aps3.11390>



Fig. 1. Sample images and labels from the dataset

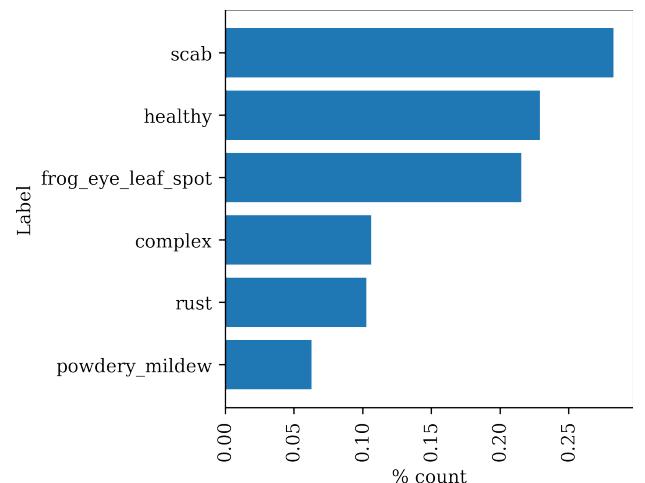


Fig. 2. Label distribution in the dataset