

Plant classification using Deep Learning

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Deep Learning

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1 INTRODUCTION

For this year's Computer Vision and Deep Learning course I am going to implement a plant classifier. The reason why I chose this problem is because I am passionate about growing plants at home and find the problem interesting and challenging enough.

2 LITERATURE REVIEW

In the first [1] paper mentioned in the references section the author describes the process of building and training a model to classify plants based on the ResNet50 convolutional neural network architecture. The performance was evaluated on the observations of iNaturalist and they were able to classify almost half of the observations, who were above a 30% predictive cutoff, with a top1 (the most highly like class) accuracy of 59% and a top5 accuracy of 74%. For training, they used the dataset provided by PlantNet, consisting of over 250000 images belonging to over 6000 classes.

The second [2] paper describes the authors' approach to the ExpertLifeCLEF 2018 Challenge. The main goal was to compare the performance of human experts and machines. The dataset they used consists of 2 parts. One is only trusted images from the Encyclopedia of Life, while the other was built using search engines without any further validation. They tested 3 network architectures: Inception v3, ResNet50 and DenseNet201. The DenseNet architecture showed the best performance with a Top1 accuracy of 71.8%. They concluded that machine plant classification is within reach of human-like performance and expect that the gap will close in the next few years.

The authors of the third [3] paper trained a ResNet26 model on the BJFU100 dataset, containing 10000 images of 100 plant species located at the Beijing Forestry University campus. By using stochastic gradient descent with categorical cross-entropy loss function during training, they were able to achieve an accuracy of 91.78. They are planning to expand the BJFU100 database by more plant species at different phases of life cycle.

REFERENCES

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