PaanDiDe: A Deep Learning-based Robot for Plant Disease Detection

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Careful monitoring of plant conditions and their diagnosis is necessary, but a human cannot control a large area of land where the crop grows. Early diagnosis and accurate detection of plant leaf diseases can prevent the spread of the disease. An automatic image classification system can be a possible solution to this problem. We trained large, deep convolutional neural networks (CNN's) to classify more than 80,000 varied-condition plant leaf images (diseased and healthy) using the PlantVillage dataset into 38 different classes. We demonstrate near-human performance on the cross-validation set with our best model, which yields 96% accuracy. We explore techniques such as dropout and data-augmentation to reduce overfitting. Moreover, we designed a robot, which can travel around the field and diagnose plants autonomously. The base of the robot is Raspberry Pi 4B, with 4GB of RAM and 2x 12V motors. Images are processed directly in the robot: it doesn't need an Internet connection and available to use in remote areas. The system can be used in greenhouses and medium-sized fields.

Awards Won: