Crop Pest and Pathogen Detection with Computer Vision

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Connacher Murphy

1. Introduction

We develop a crop pest and pathogen diagnostic model. We train a neural network on the Mensah et al. (2023) CCMT dataset.

Our diagnostic model powers the `CroPP` tool at saxifrage.

2. Data

We use the Mensah et al. (2023) CCMT dataset. We assign the images into training and test sets with probabilities 80% and 20%, respectively.

The data include labelled images of corn, cassava, maize, and tomatoes. We use only the maize data at present.

3. Architecture

We begin with a pre-trained instance of `resnet18`. We then conduct further training for each crop. We adopt a cross entropy loss function.

4. Cross-Validation Exercises

We consider the selection of hyperparameters through cross-validation. We provide summary statistics in `validation_summary.pdf`.

5. Deployment Training

The live version of `CroPP` is trained with

- 30 epochs,
- a 1×10^{-4} learning rate,
- and a batch size of 128.

You can view a demonstration of the detection model on the saxifrage website.