

Crop Pest and Pathogen Detection with Computer Vision

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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 5-fold cross-validation.

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.