Crops Classification

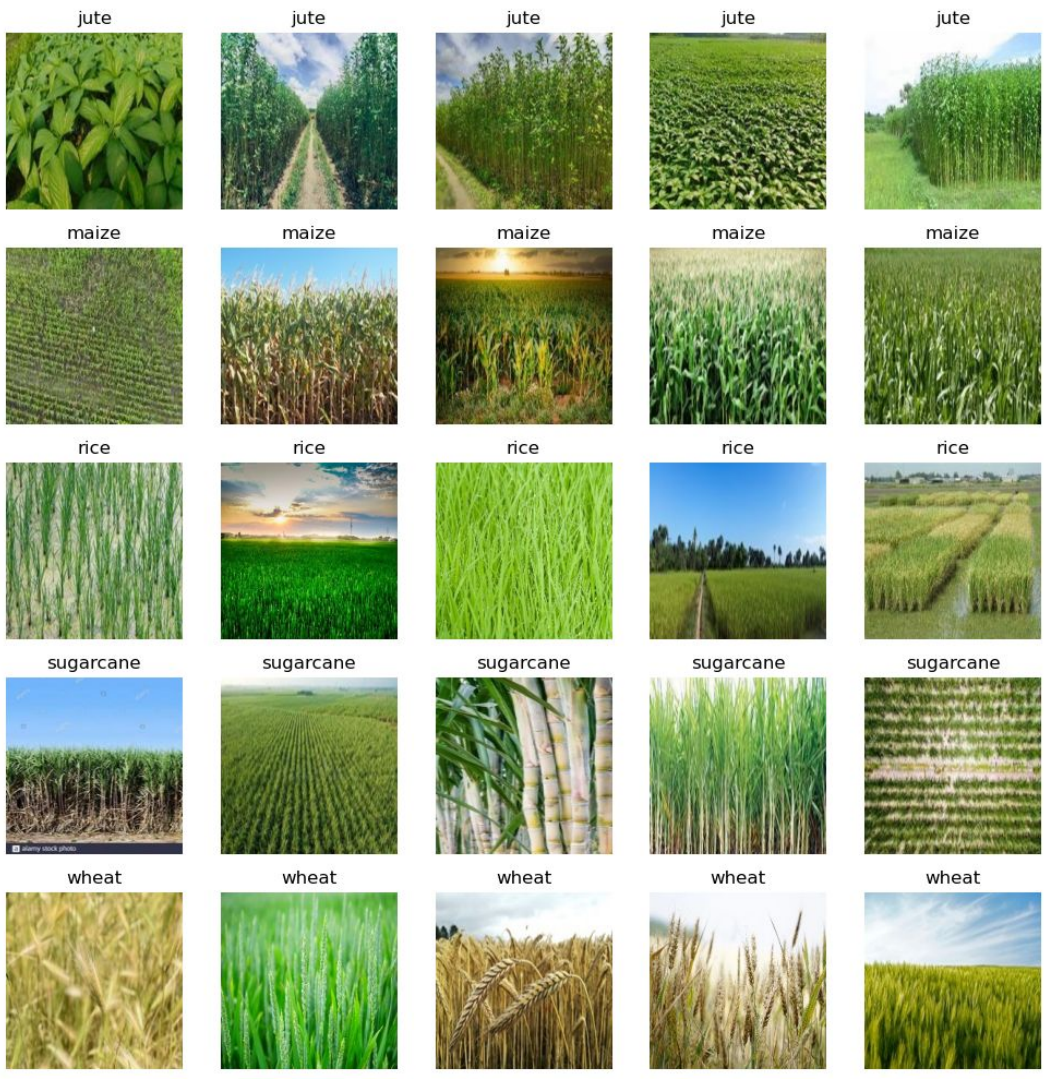
Using Neural Networks

Problem

Advances in technology have led to improvements in agricultural techniques that help increase the yield and quality of crops. Image classification can help with counting the number of crops, detecting misplaced crops, and detecting crop damage.

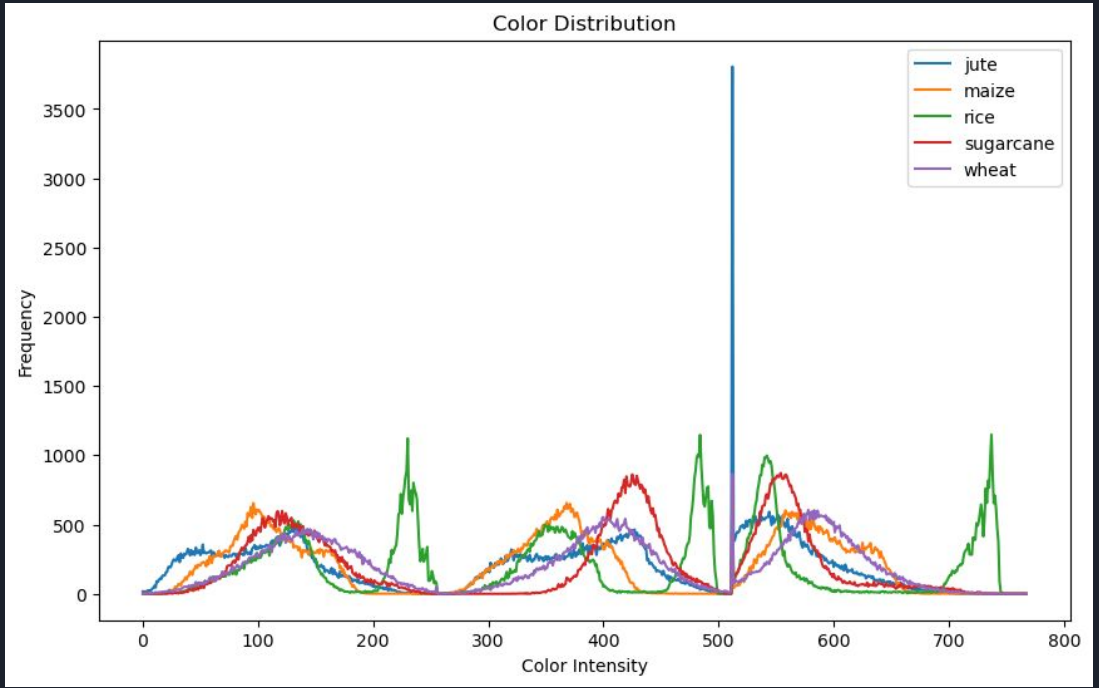
Data

The 201 test crop images come from a kaggle dataset. They contain images for 5 different classes which are maize, sugarcane, jute, wheat, and rice

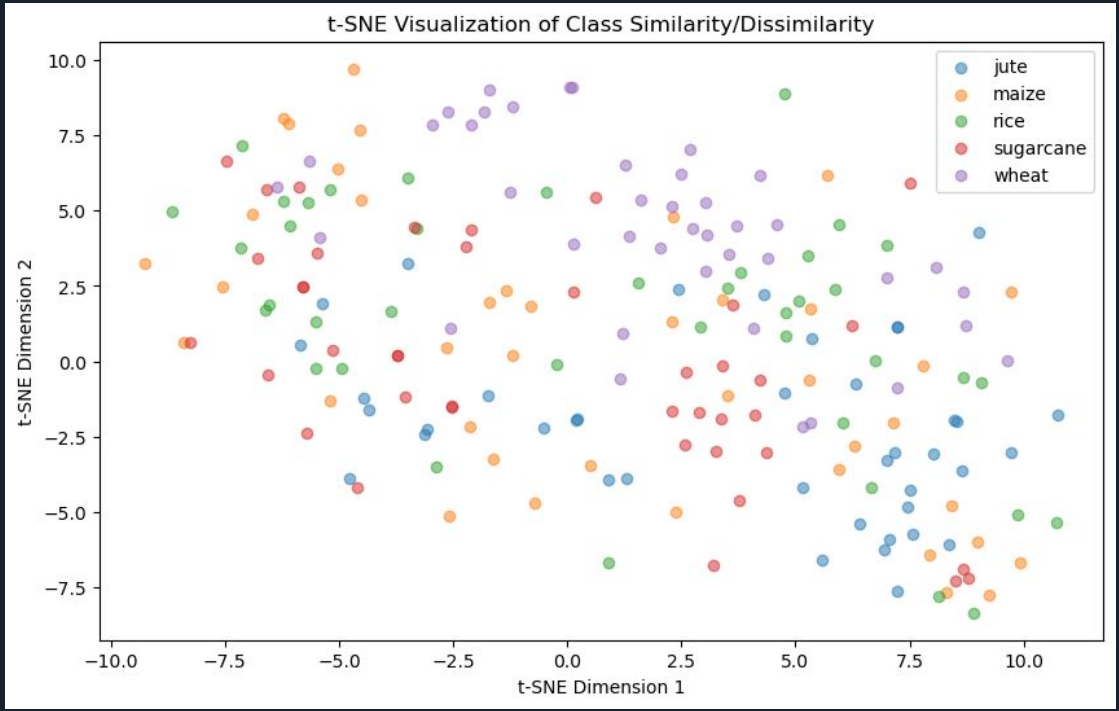


EDA

A color distribution of 3 photos for each of the crop types. Green is the predominant color with some having more shadows depending on the photo.



A t-SNE reveals that there isn't too much of a difference between the groups. This could because of the relatively small amount of training data and wide variety of angles the pictures were taken at.



Modeling

Transfer learning was used for this project using the Xception model architecture, and the weights for the model came from Imagenet weights which were trained on millions of labeled images of different categories.

Without any fine tuning the model performed 53.3% on the test data and 80% on validation set. After unfreezing the layers it performed a 60% on the test set and 90% on the validation set which suggests there might be some slight overfitting.

Future Improvements

- More test/training images since the sample was fairly small
- Use images of crops with different diseases/damages to be able to detect the types of damaged crops
- Try different pretrained models with different weights to see if they perform better on the test set
- Try different learning rates to find lower levels of loss for gradient descent