Agriculture Satellite Image Classifier

Studying Crop Land From Space

Problem Statement

Pattern recognition in aerial imagery is challenging

Agtech products must be frictionless to deploy for the farmer

ROI has to be provable immediately

Data

- 21,1061 aerial images containing 6 features
  - Cloud_shadow
  - Double_planter
  - planter_skip
  - Standing_water
  - Waterway
  - Weed_cluster

Model Selection

Resnet, vgg16 and multiple layers of CNN were tested

The best results came from a 20 layer cnn with an adam optimizer

Results

- 76% accuracy overall

	precision	recall	f1-score	support
cloud_shadow	0.62	0.70	0.66	209
double_planter	0.70	0.57	0.63	440
planter_skip	0.00	0.00	0.00	23
standing_water	0.70	0.43	0.53	289
waterway	0.56	0.35	0.43	511
weed_cluster	0.80	0.90	0.85	2959
accuracy			0.76	4431
macro avg	0.56	0.49	0.52	4431
weighted avg	0.74	0.76	0.74	4431

Conclusion

Need to better identify planter_skip as this feature was not picked up in any models

Critical categories of cloud shadow which impacts all imaging was identified as was weed clusters

Next Steps & Improvements

Train models on a single data point and add more features as it works

Work on better weight balancing to reduce initial loss function

Look at individual layers

Experiment with data normalization