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 proveable 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 normalisation