Harnessing Satellite Observations and Deep Learning to Identify Irrigated Fields

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Introduction
Irrigation, or controlling the flow of water to objects such as crops or landscapes, is growing at an increased rate in our state. As irrigated acreage rises, having accurate irrigation data is critical to make efficient work of the water we that we use. Managing this increased water demand is likely to be one of the largest and most important challenges facing water resource management in the state.

Impact
Irrigation is essential to the profitability and efficiency of farms, making irrigation a major user of ground and surface waters. In the United States, agriculture accounts for approximately 80 percent of the Nation’s consumptive water use1. The outcome of this project will be to enhance Alabama’s irrigation survey, helping the state manage the water demand in the agriculture system and in turn improve farmland production.

Results and Conclusion
Below is the plotted accuracies of each training iteration versus the accuracies of those trees when ran on the validation set. The best tree depth is found by the highest validation set accuracy. Then, that trained decision tree is used to predict the outcomes of the test set’s accuracy.

The results look very promising and after running the experiment over multiple counties across the state, some of the statistics include:

- Accuracies averaging around 85-89%.
- Precision, Recall, and F1 Scores of 0.87 ±0.01.

Overall, this was a very successful project that has huge amounts of real-world applications if taken further to run across the whole state, or more, the whole nation.

References

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