Identifying Irrigated Agriculture Land Using Remote Sensing and Machine Learning

Data & Methods

Terra (EOS AM-1)\textsuperscript{1}
We use the Moderate Resolution Imaging Spectroradiometer (MODIS) of MODIS’s many products, the Enhanced Vegetation Index (EVI) is our prime interest. Healthy crops (presumably irrigated crops) will have a higher EVI. To the left, we have the EVI of Houston County. Green is high; red is low.

Machine Learning

Random Forest
This model classifies data by organizing the data into several decision trees (left) with each node performing a data sort in Our model generates false positive rate (FPR) and true positive rate (TPR) values for 128 different thresholds.

Logistic Regression
The binomial logistic regression model classifies data by computing the log-odds that can be later used by the Sigmoid Curve to convert to probabilities. The data on one side of the curve falls in one category and vice versa. The model identifies the input dependency of the odds of an output.

Key Findings & Future Work

Key Findings
The overall goal was to define a workflow and have preliminary results to define a viable methodology for finding irrigated land. We now have a process for determining the accuracy of the machine learning results.

Future Work
The remainder of this project will be fine-tuning the models to better interpret the variations across the state. The results from this summer were found by training the models on Limestone county, and then testing it on Houston county. We believed that we can improve the accuracy by accounting for other major crops neglected in the initial testing. Furthermore, we plan to experiment with other vegetation indexes and other satellite products.

Acknowledgements & References

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