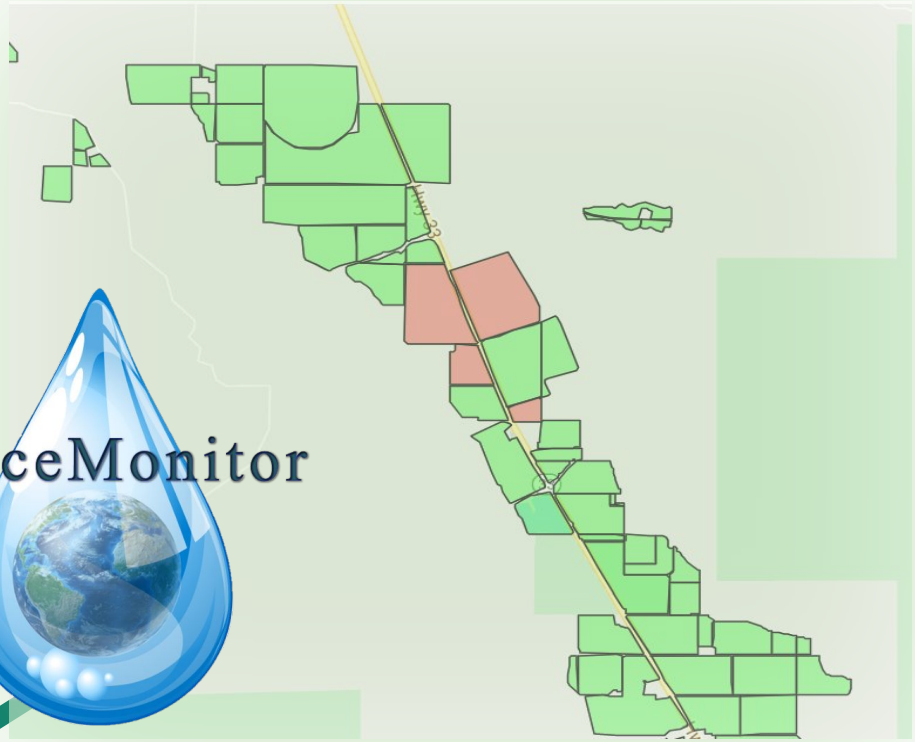
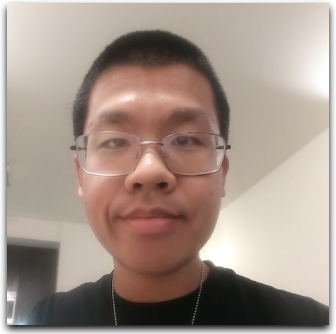
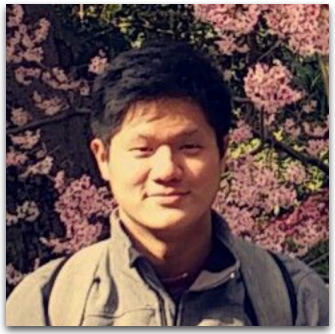

SpaceMonitor

Team 2B || !2B

SpaceMonitor



Daniel Shu



Bryan Wu

Richard Rodriguez

Meredith Xu

Anna Ivannikova

PowWow

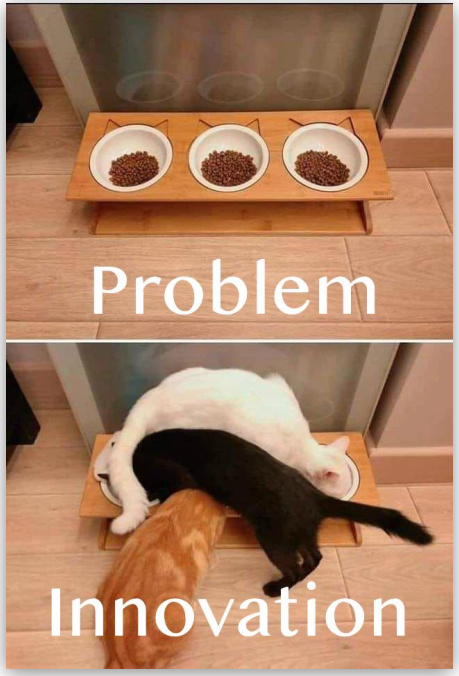
The Problem and Innovation

Problem

- Inefficient use of water in farms can lead to high cost and climate change
- Farmers and groups like Resource Conservation Districts are interested in efficiently applying water
- Drones are expensive and manual evaluation of fields is slow

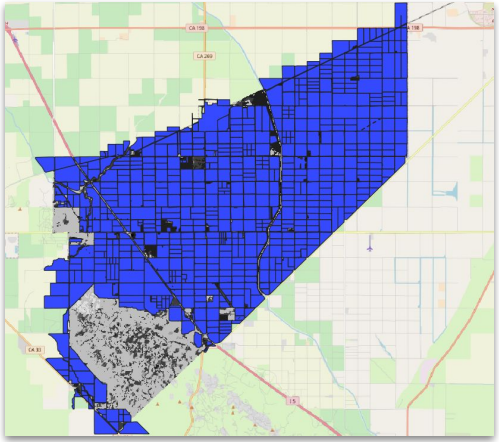
Cost-effective solution to quickly and easily evaluate efficiency on field

- Use satellite data (readily available and inexpensive) to find inefficient fields
- Consolidate multiple data layers (ETa, elevation, water depth) into one source



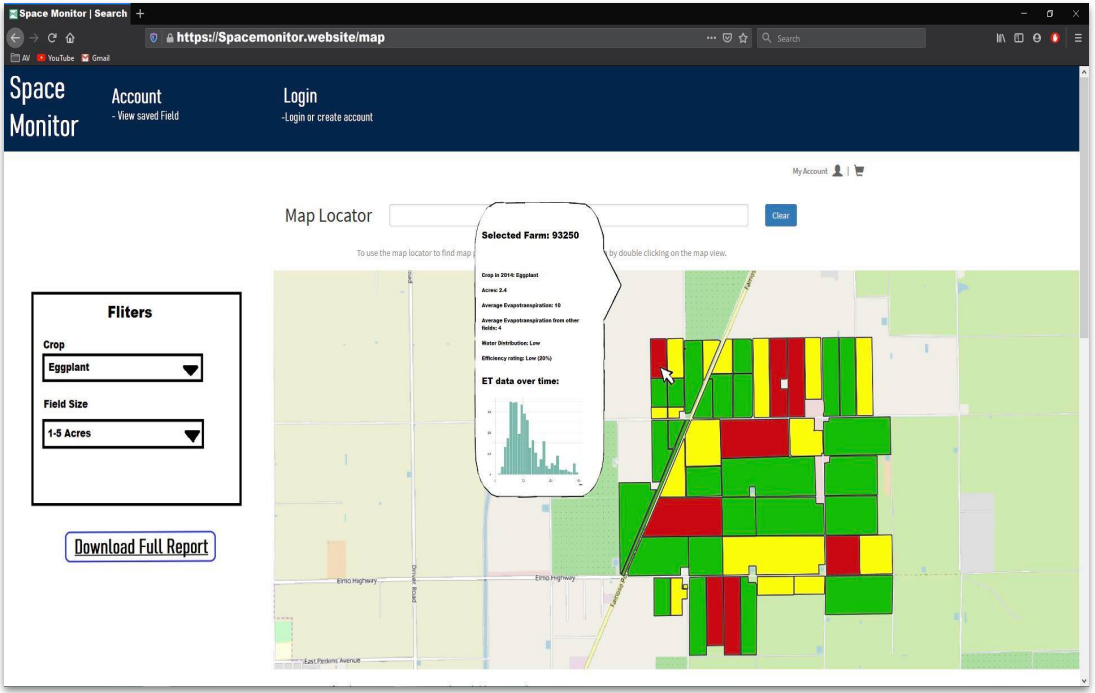
Technical Details

- Using QGIS, Raster and Vector data
  - Use algorithms to combine ETa and crop census data
  - Export vector polygons to draw on Google Maps
- Applying Machine Learning
  - Unsupervised machine learning algorithm: k-means clustering based on locations
  - Use standard deviation to evaluate efficiency
- Website/UI
  - Frontend: React, Google Map API
  - Backend: Flask, PostgreSQL




LIVE DEMO

Final Design Plans (Main Page)



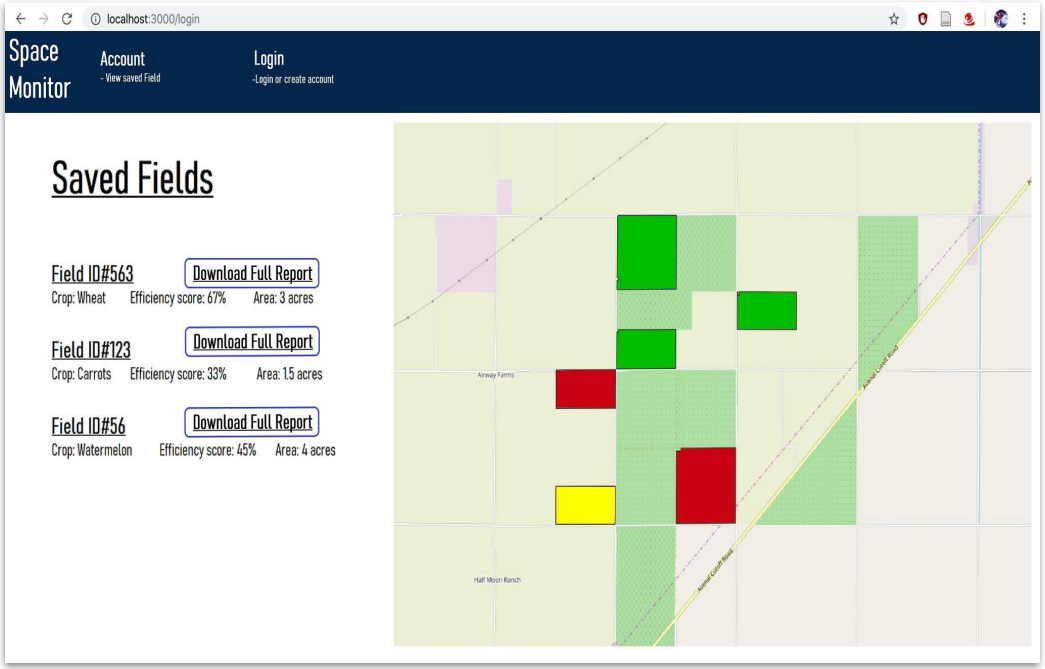
- Color the fields based on their efficiency

- Include informative information in a pop up and in full report
  - We'll need to find out this information from farmers

- Map locator for faster search

- Create a personal cabinet

Final Design Plans (Personal Cabinet)



- Save the defined view(s) (with all filterings)

- Save all reports

- What else?
  - We'll need to find out this information from farmers

Challenges

1. Set up evaluations for clustering algorithm
2. Determine the number of clusters for each crop
3. Learning new technology
4. Speed up the webpage loading
    - Making the API calls for field data more efficient

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Next Steps

- Implement a more sophisticated algorithm to calculate efficiency
- Cache algorithm results
- Add more data layers
- Option to set threshold value for efficient water usage
- Google Maps API -> MapBox