



Mentored by the
Visual Analytics Group

Gil Shohet

Junior, Aerospace Engineering

Project Objective

Produce analytics using data collected on John Deere combines during the harvest season.

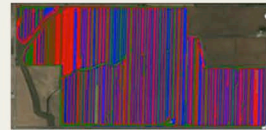
Develop scalable methods to organize, visualize, and interpret a large dataset consisting of millions of data points spanning over 100 sensors on multiple machines, with the goal of providing tools for modern farmers to analyze their performance and improve operations.

Approach

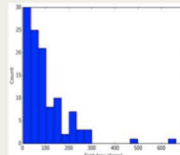
- Collaborate with experts in agronomy in order to understand the context behind the data.
- Compile the data, which consists of many files spanning three combines, into a consolidated and accessible format.
- Explore trends in the data and visualize them in a useful, human-readable form, focusing on the geospatial information provided by GPS data.

Status

- Began analysis on data from 2012, dealing with many machines, but poor data coverage.
- Switched to 2013 data, focusing on only three combines, but much more complete.
- Data, which spanned hundreds of csv files, is now in time-series form and stored in a database.
- Weather data provides another dimension
- Have methods to visualize spatial data from GPS on a satellite imagery overlay.
- Used image processing techniques to identify irregular regions and visualize the effects of region shape and size on productivity.



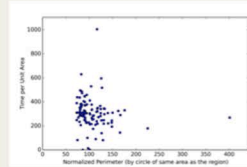
Very large field. Multiple Combines



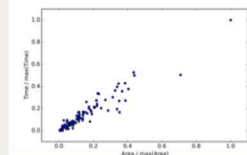
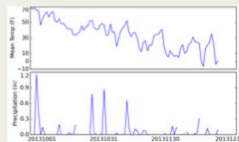
Binary image produced from GPS data.



Small Field. Single Combine



Major regions segmented. GPS data overlaid.



Questions

- What other sources of data could provide further insight into the operation?
- What factors determine how valuable or productive a given field is to the farmer?
- The analysis comparing differently shaped regions is incomplete and neglects factors such as time spent in transport and yield of a given field. Would the results change if we took these factors into account?
- How can the analysis process be made simpler and more efficient?