Manitoba Crop Clustering

The Dangers of under-rotation and clustering 2004-2023

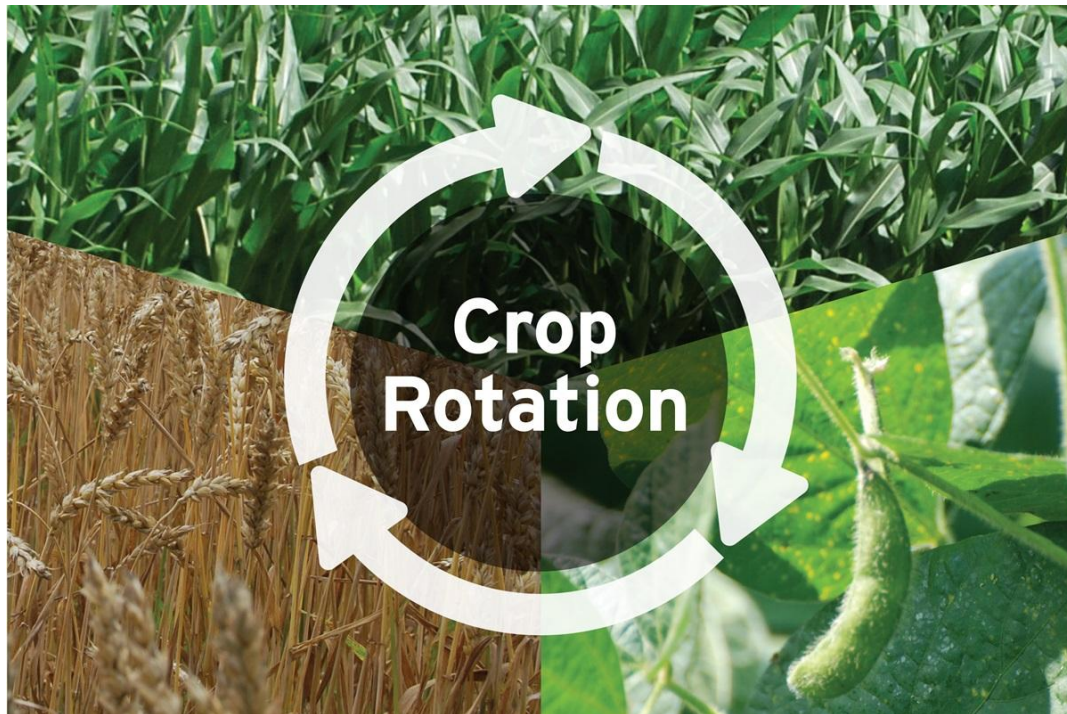Trevor Rowland

Problem Identification

Discover trends in given data:

Huge Datasets.

Data Consistency.

Accurate Predictions.

Target Audience

"Crop rotation helps return nutrients to the soil without synthetic inputs, interrupting pest, weed and disease cycles, improving soil health" - Rodale Institute

- Crop Insurance Companies
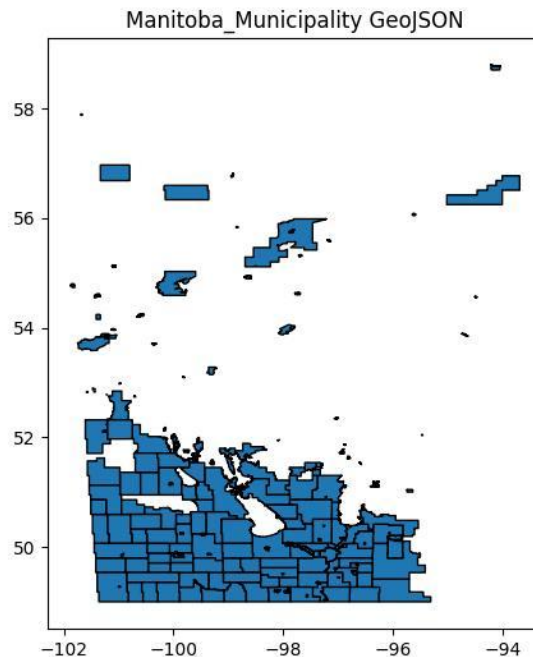- Grain Buyers
- Individual Farmers

Method

- Python / Jupyter notebook
- Pandas
- GeoDataframe.
- Group by Municipality
- Group by Crop Type
- Group by Year

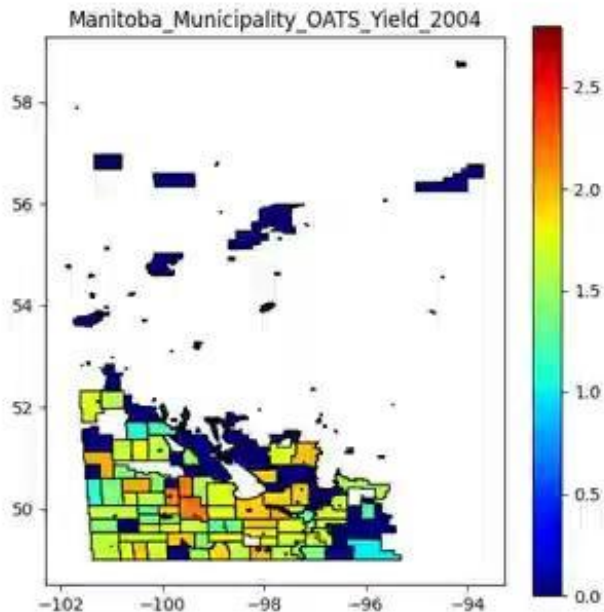Produces geographical crop heatmap image

Images saved to heatmap video.
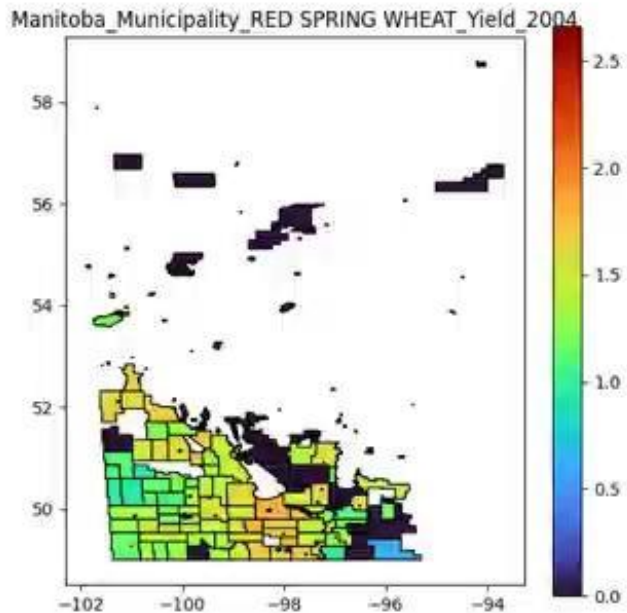
Hotspots located, and final graph created.

Manitoba_Municipality GeoJSON

Results

Manitoba Oats Heat Map 2004-2023

CropClustering
CROP HISTORY VISUALIZATION

Manitoba_Municipality_OATS_Yield_2004

Results

Manitoba Spring Wheat Heat Map 2004-2023

Results

Manitoba Canola Heat Map 2004-2023

CropClustering
CROP HISTORY VISUALIZATION
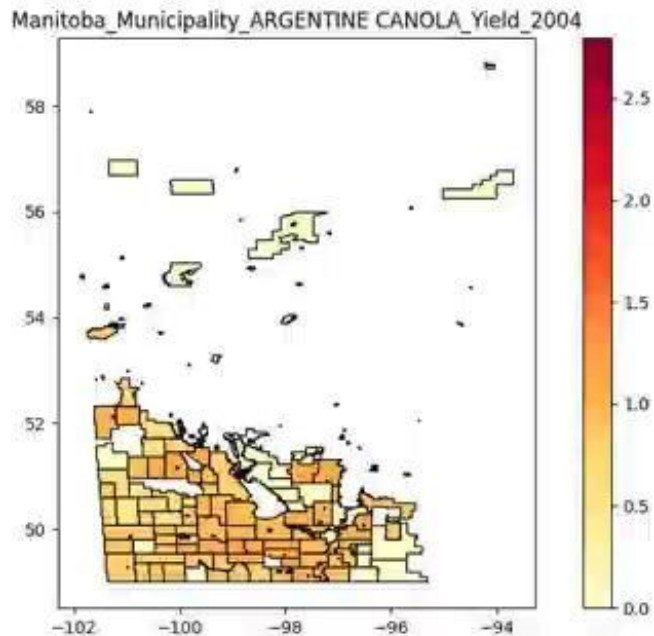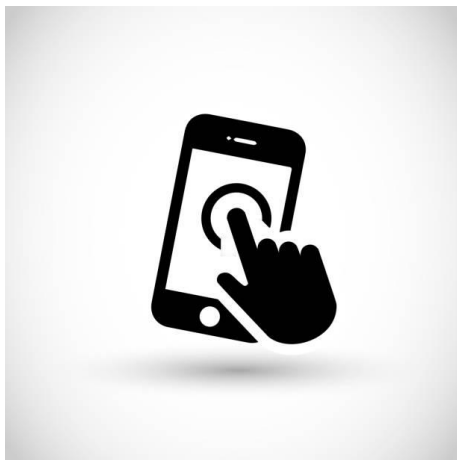
Conclusion
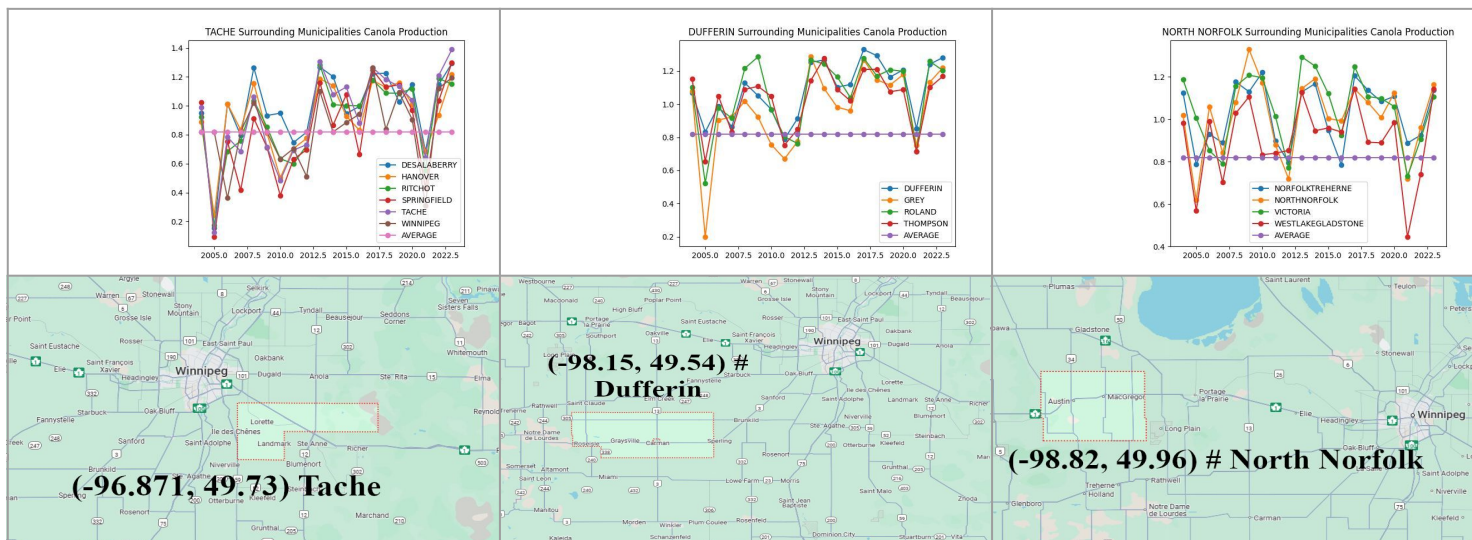
Next Steps

- Make into an app, click on municipality, show second graph
- Dynamically load data
- Machine learning predict next years' yield

Appendix

Crop Rotation:

https://rodaleinstitute.org/why-organic/organic-farming-practices/crop-rotations/#:~:text=Crop%20rotation%20helps%20return%20nutrients,increase%20biodiversity%20on%20the%20farm.

Cluster Farming Study:

https://cabiagbio.biomedcentral.com/articles/10.1186/s43170-024-00220-7

Field seeding

https://open.alberta.ca/dataset/3decfc22-edbc-4c04-8cd4-39240500eaf2/resource/148f9e8a-40c9-4b6d-9136-405f460e8135/download/2008-519-28.pdf\