

A large, abstract circular graphic on the left side of the slide features a marbled pattern with swirling colors of orange, brown, teal, and white, resembling the surface of Jupiter.

# **Eliminating poverty through farming and soil analysis**

By: Billy Adams

# Problem Statement

- Classifying good quality soil from multispectral measurements
- Predicting the right crop for the right environment

# Business Impact

- Improve food security
- Eliminate poverty, terrorism, and crime
- Promote economic growth
- Promote environmentally friendly farming practices
- Reverse the affects of climate change



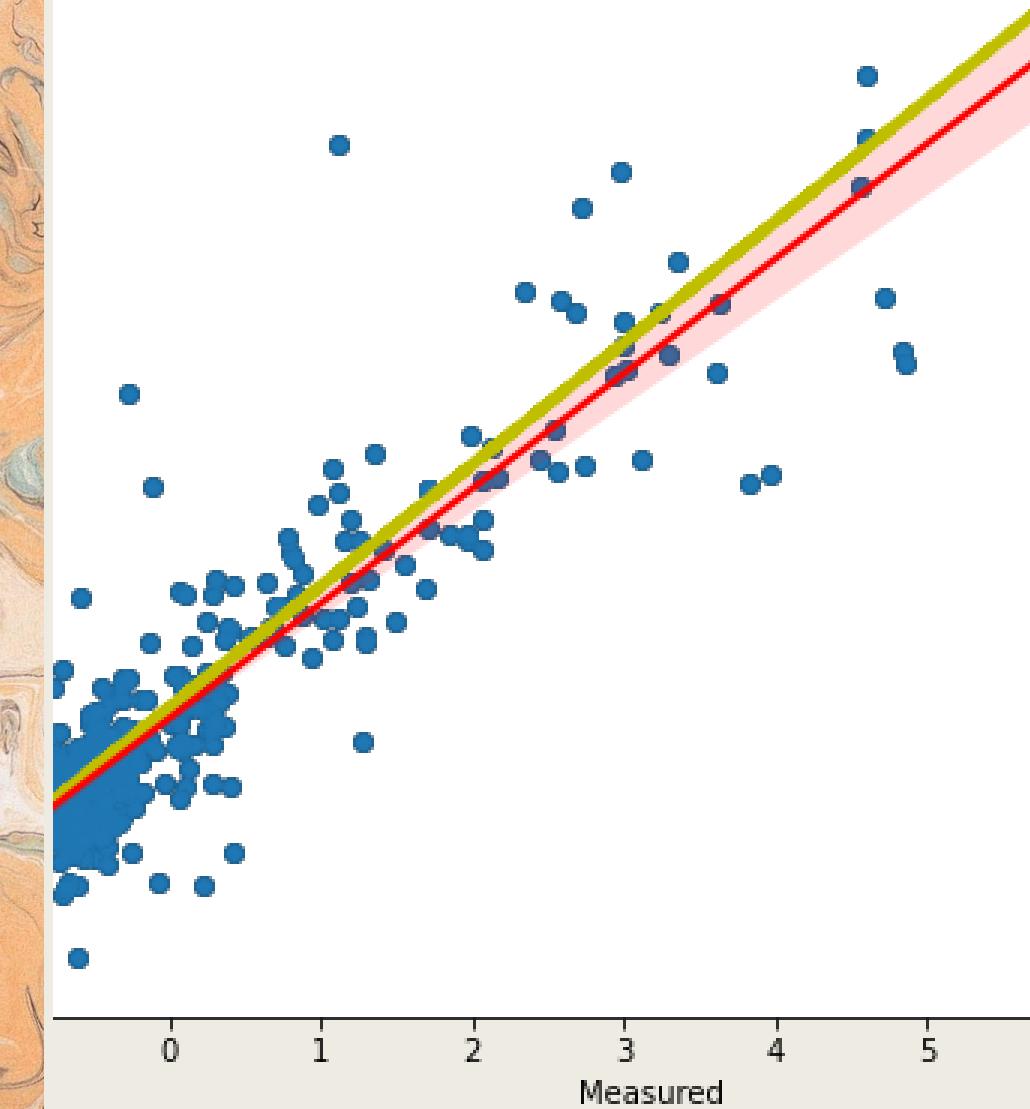
# Methodology

- EDA of African Soil Property data
- Feature Selection with Linear Regression and DecisionTreeRegressor
- Soil Classification with Neural Network
- EDA of African Household Farming survey
- Logistic Regression
- KNN



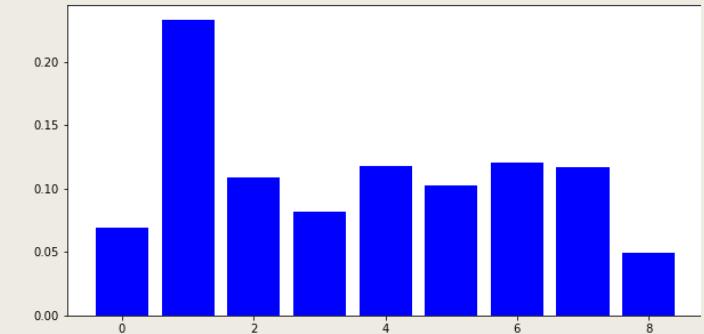
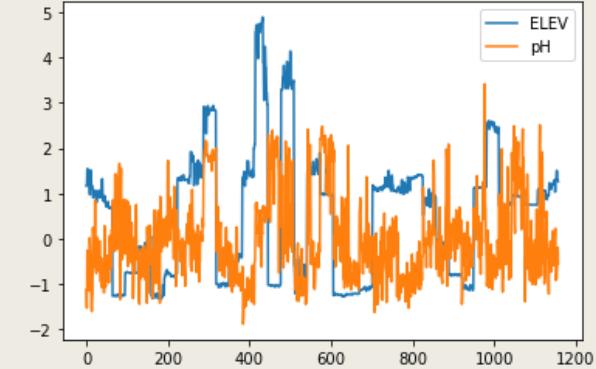
# Feature Selection

- All Mid-Infrared Absorbance measurement correlate strongly with the soil content



# Feature Selection

- Elevation is the most important out of all the non-infrared features when it comes to predicting soil quality



# Classification

- Neural Network - achieved 72% accuracy predicting soil quality

# African Farming Survey

- Predicting the right crop for the right environment

# Logistic Regression

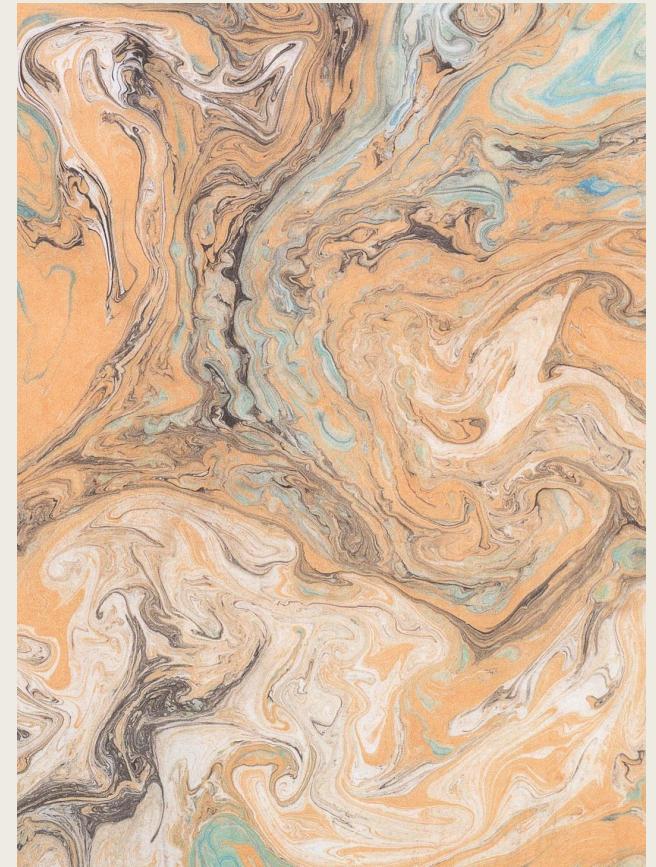
	precision	recall	f1-score	support
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1	0.87	1.00	0.93	334
2	0.95	0.67	0.79	267
3	0.63	0.94	0.76	309
4	1.00	0.90	0.95	265
5	0.85	0.73	0.79	283
6	0.79	0.96	0.87	313
7	0.84	0.25	0.39	128
8	0.70	0.97	0.81	298
9	0.98	0.81	0.88	253
10	0.94	1.00	0.97	230
28	0.77	0.32	0.45	200

accuracy

0.82

burkinafaso	0.113265
senegal	0.112327
zambia	0.105033
ethiopia	0.103991
niger	0.093779
egypt	0.093779
ghana	0.093154
kenya	0.085027
cameroon	0.083359
zimbabwe	0.072939
south africa	0.043347



# K-Nearest Neighbor

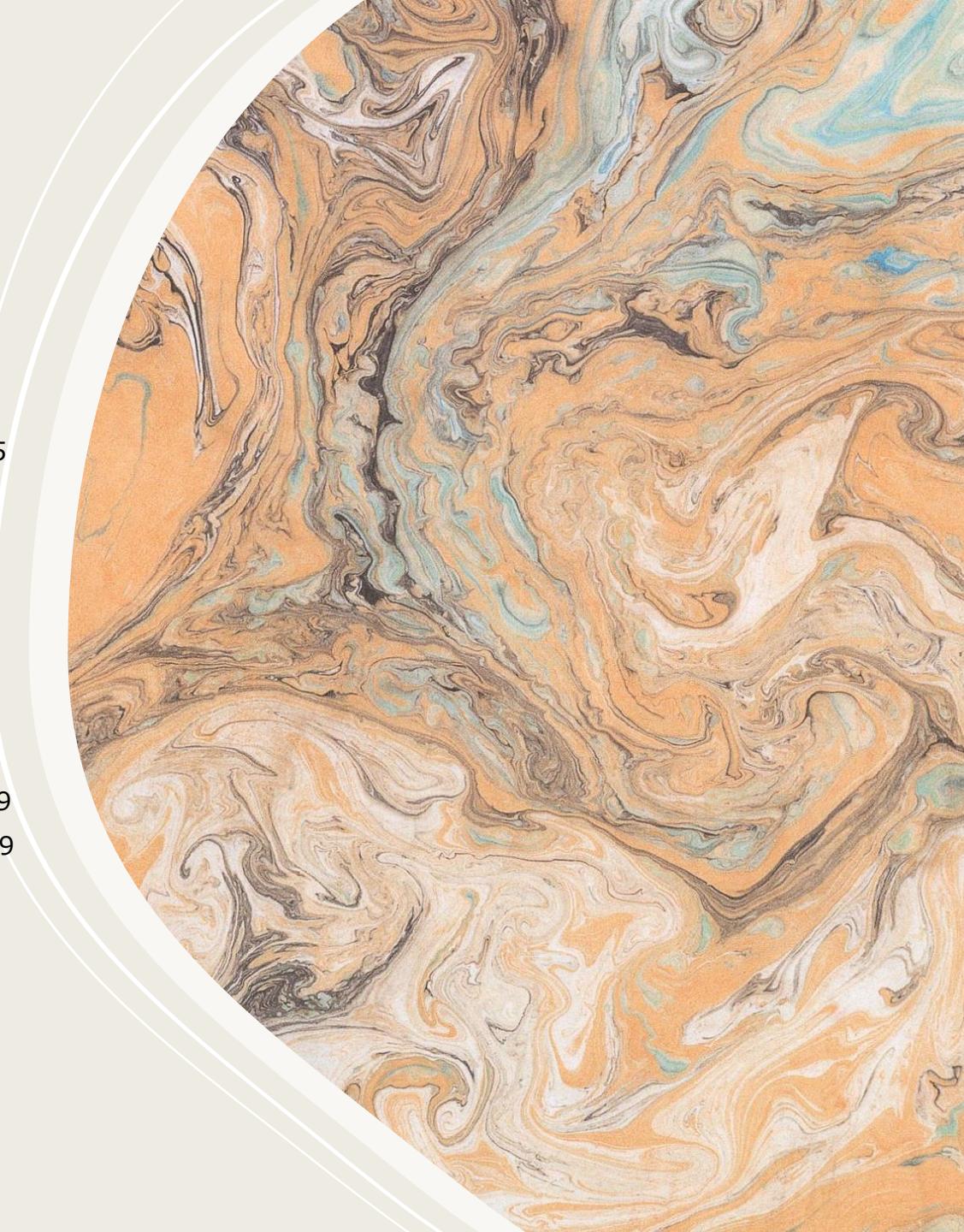
	precision	recall	f1-score	support
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1	0.96	0.97	0.97	334
2	0.97	0.96	0.97	267
3	0.96	0.94	0.95	309
4	0.90	0.91	0.91	265
5	0.99	0.97	0.98	283
6	0.93	0.98	0.95	313
7	0.93	0.92	0.93	128
8	0.94	0.94	0.94	298
9	0.80	0.77	0.78	253
10	0.79	0.79	0.79	230
28	0.91	0.92	0.91	200

accuracy

0.92

burkinafaso	0.113265
senegal	0.112327
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ethiopia	0.103991
niger	0.093779
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# Recommendations

- Use drones for Precision Agriculture
- Educate on better farm practices and soil & water conservation
- Community Engagement

# Future Work

- Take additional surveys from regions all over the globe
- Forecast weather data
- Analyze terrorism
- Forecast and determine the biggest driver of poverty



Thank you