NYC Food Desert Predictor

by Justin Morgan Williams

What are food deserts?

Food deserts are areas that have **limited access** to **fresh, healthy** and **affordable foods**.

Can lead to:

- Increased disease rates
- Food insecurity

Food Retail Expansion to Support Health (FRESH)

FRESH program created to improve food access by bringing healthy and affordable food options to communities by **offering tax** and **zoning incentives** towards **supermarket expansion**.

- 2009
- 18 projects completed
- 1,000 jobs

Business Questions

What aspects contribute most to food deserts?

Do current FRESH boundaries correlate with census tracts identified as food deserts?
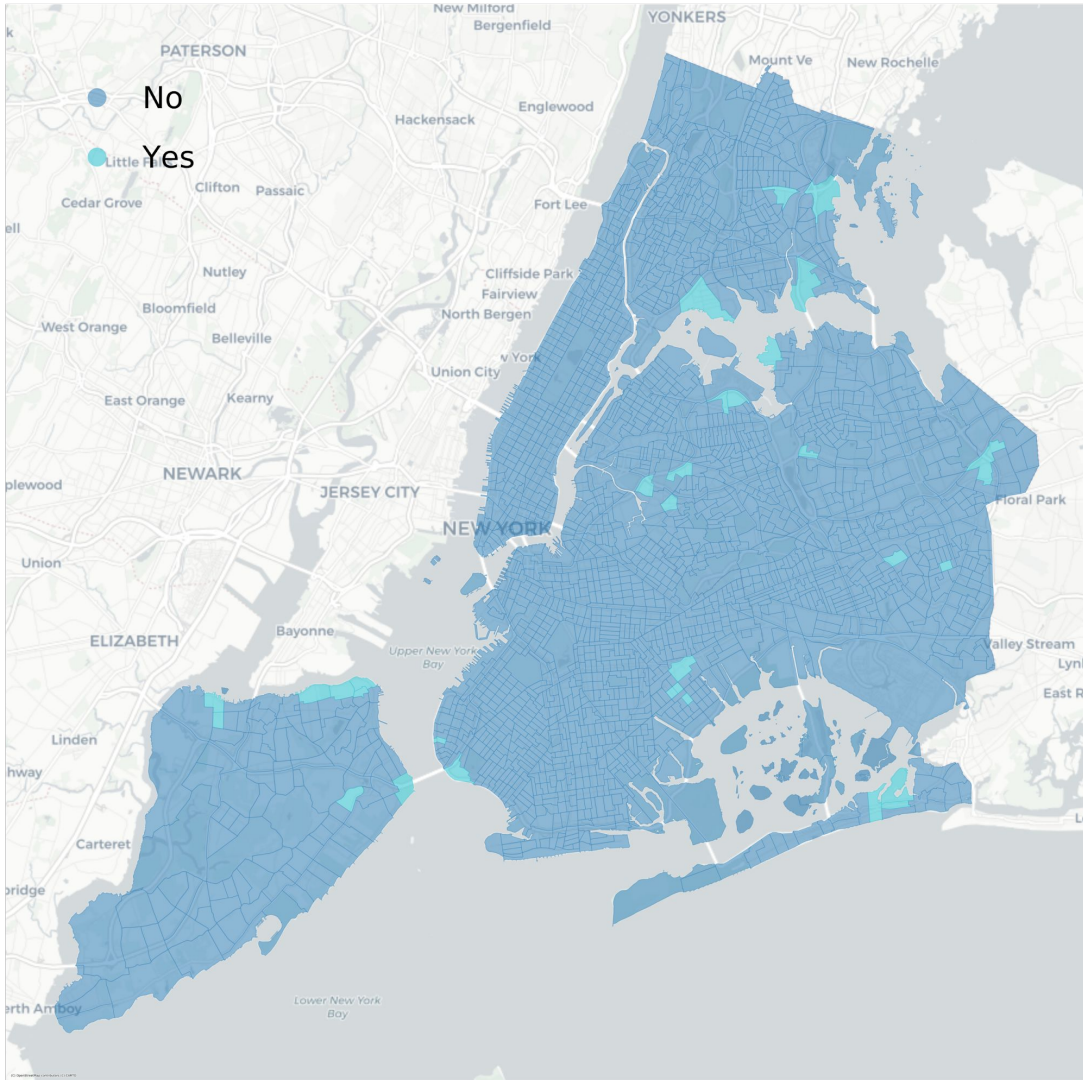
Data

USDA 2017 Study

2010 Census Tract Shapefile

FRESH Food Store Zoning Boundaries

- 2165 Census Tracts in NYC (rows)

- ~70 features (columns)

- Race

- Income/Poverty

- SNAP (Supplemental Nutrition Assistance Program)

- Kids

- Seniors

- Vehicle Access

Low-income and low-access at .5 mile

31 of 2165 Census Tracts

1.43%

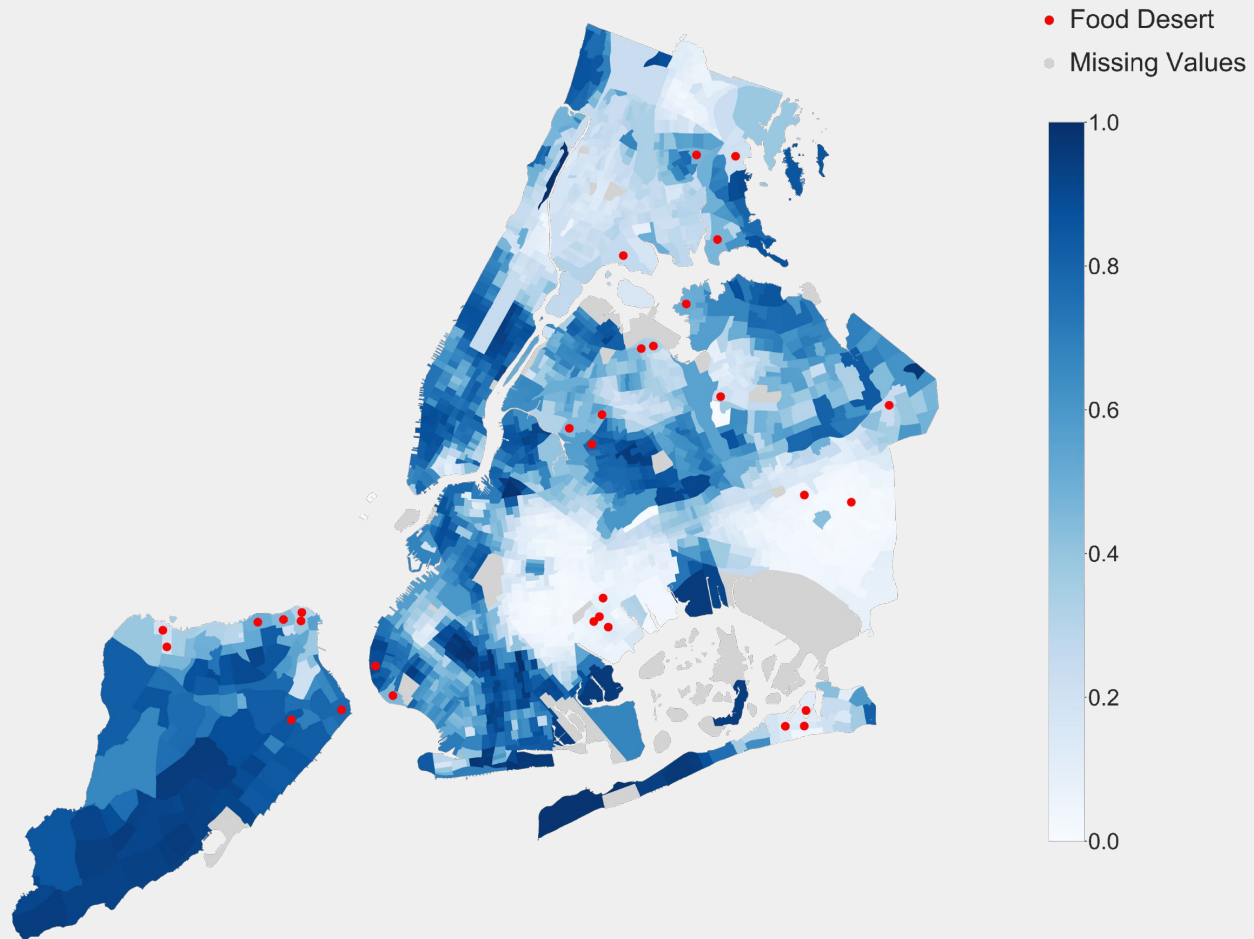were classified as food deserts

Methodology

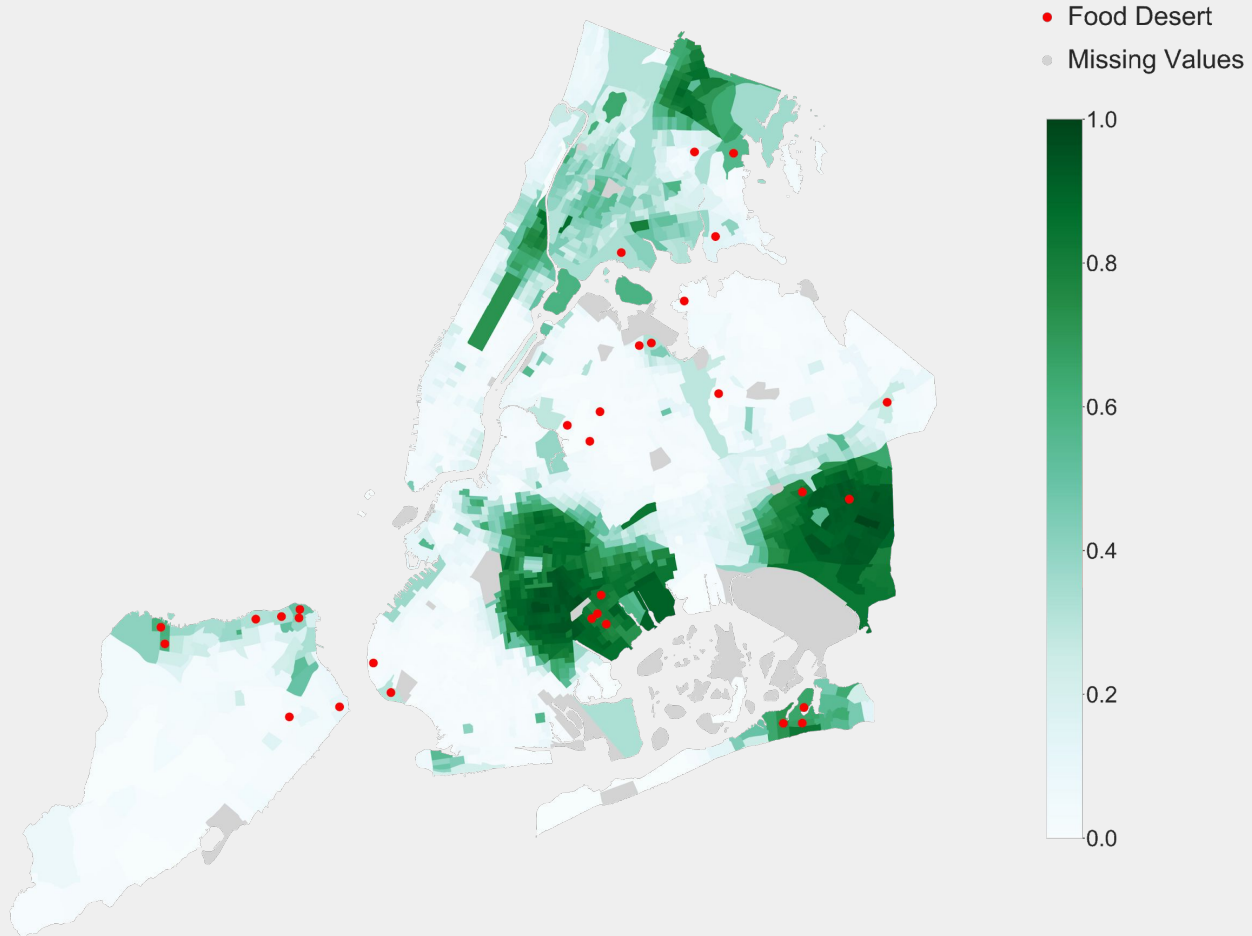Exploratory data analysis focused on the following

- High **interpretability**

- **Geospatial** analysis

- Modeling focused on **F1** (harmonic mean) with a secondary metric of **Recall** (actual positives)
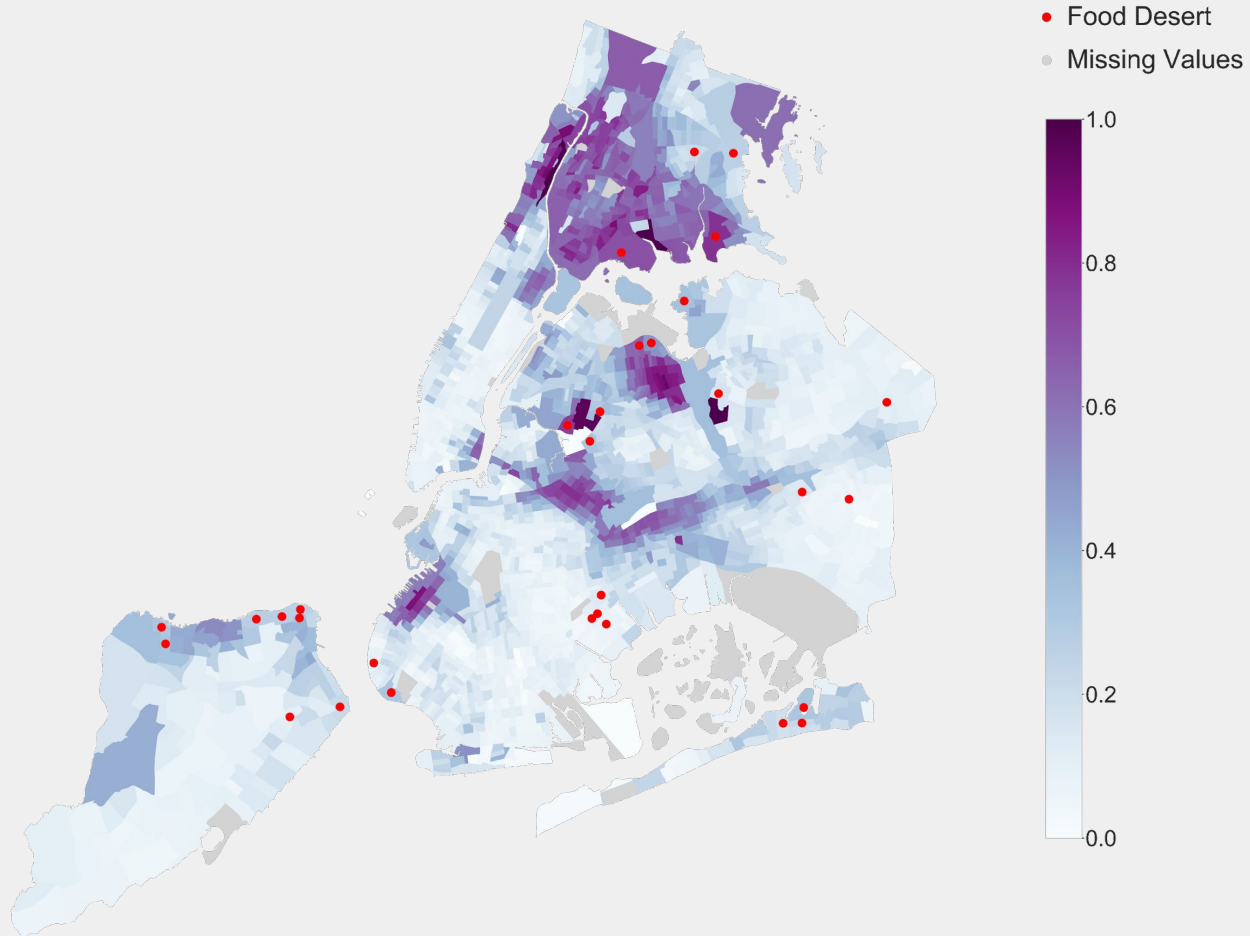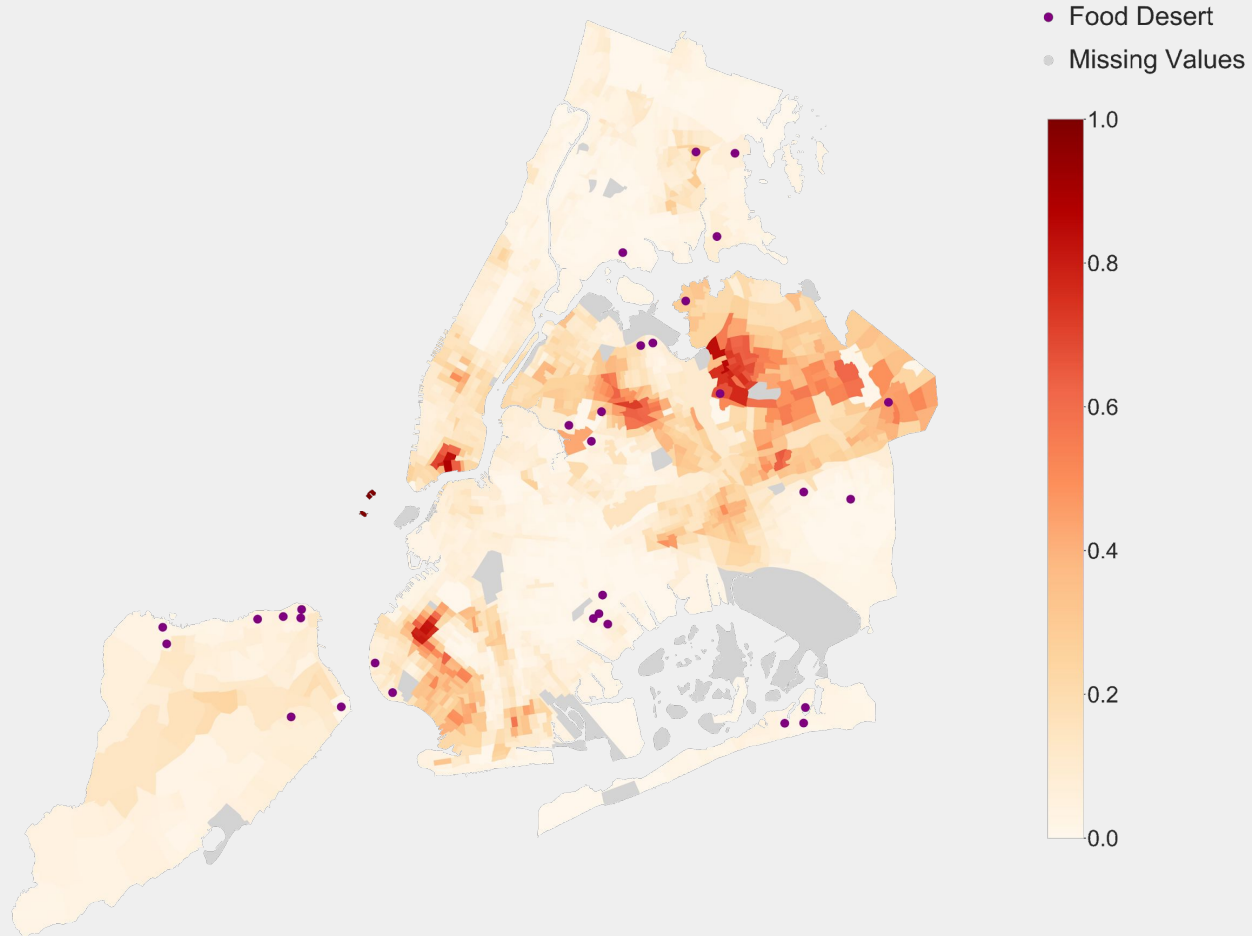
White per Census Tract & Food Deserts

Black per Census Tract & Food Deserts

Latinx per Census Tract & Food Deserts
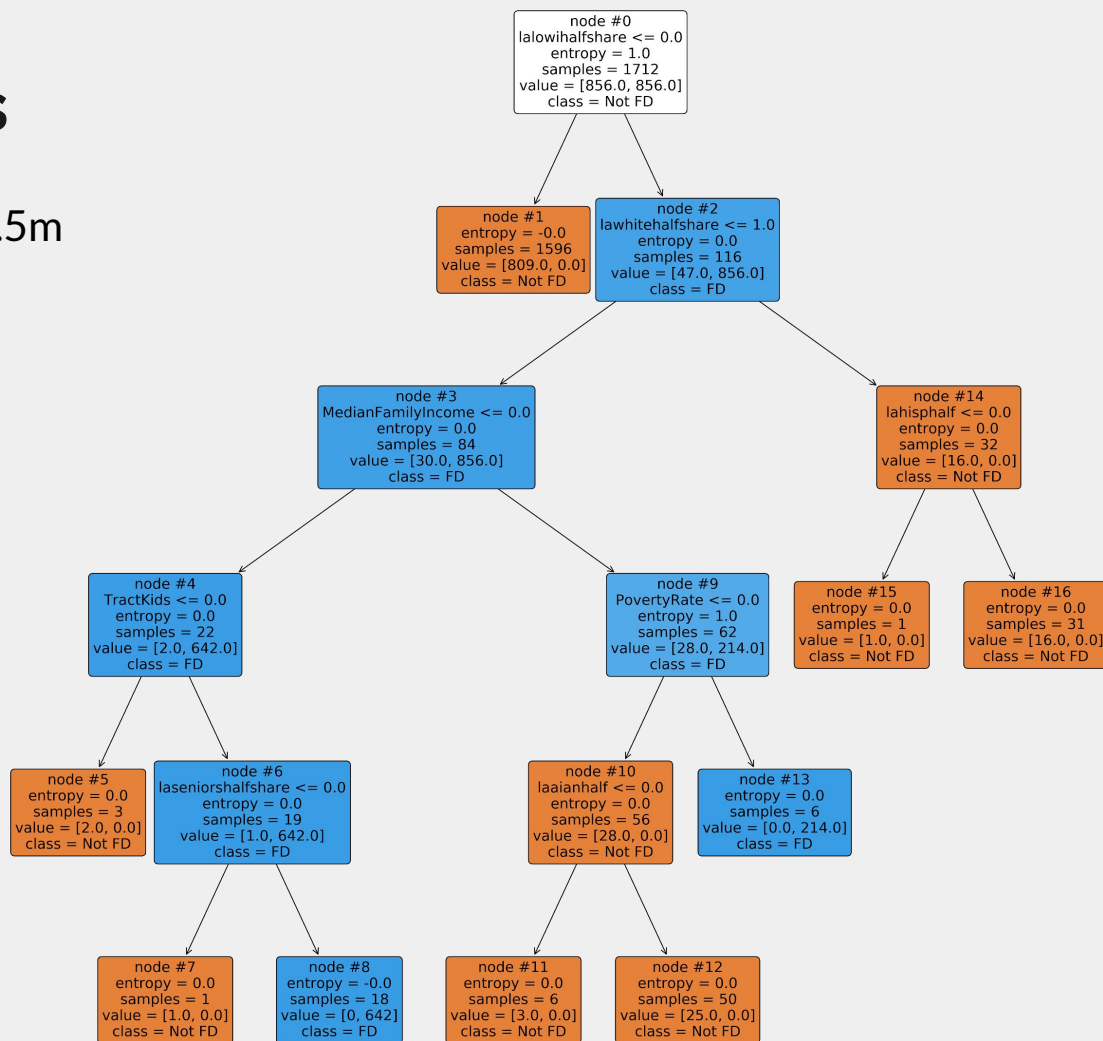
Asian per Census Tract & Food Deserts

Modeling

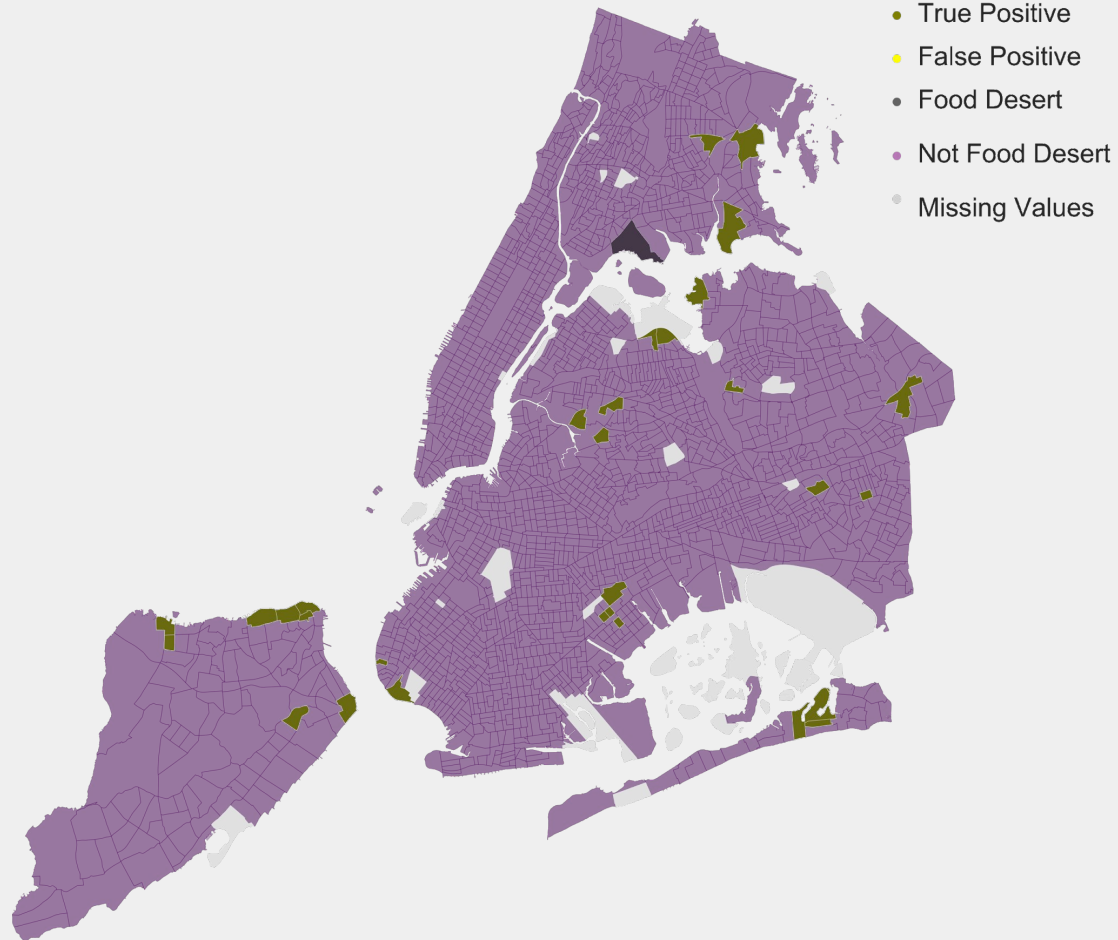**Decision Tree Classifier**

Metrics

- F1 = .92 (harmonic mean)
- Recall = .85 (actual positives)
- 1 False Negative
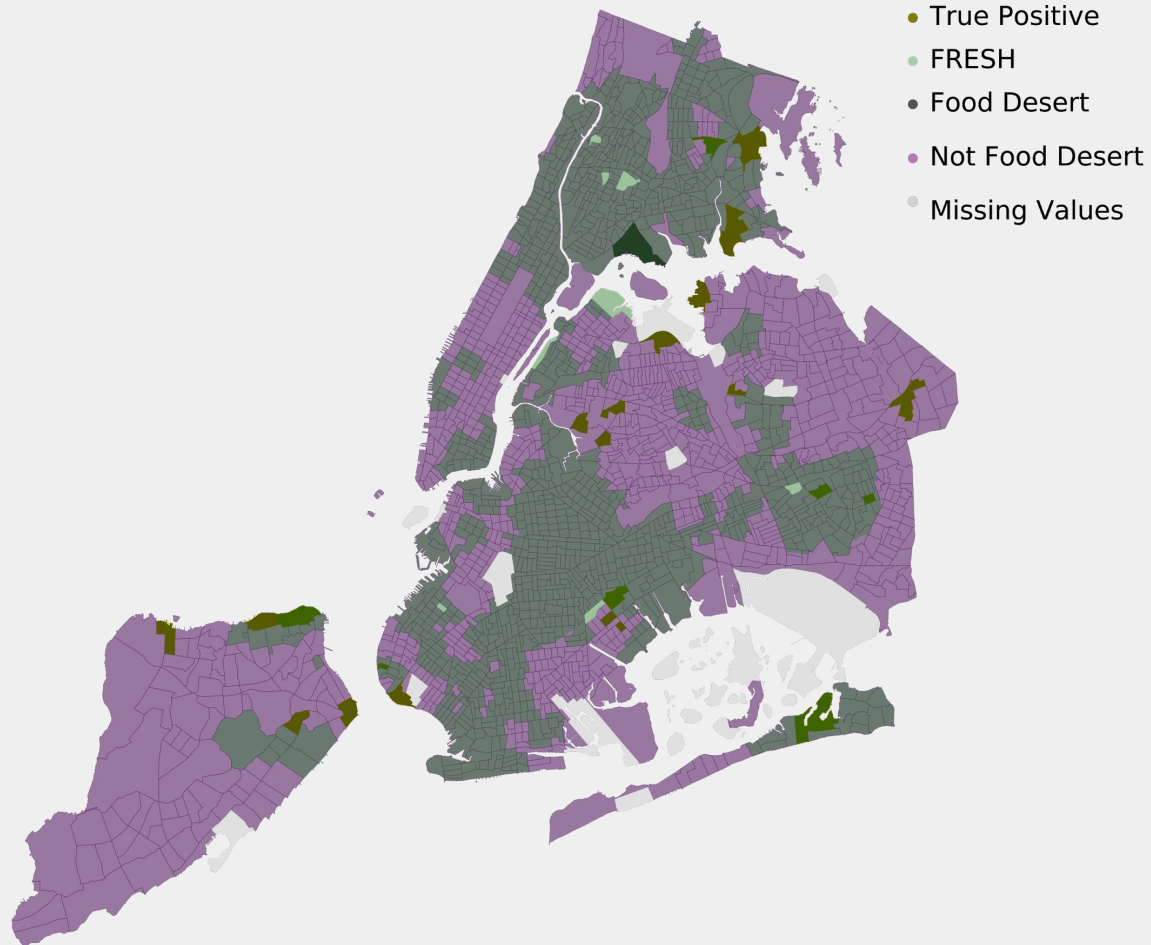- 0 False Positive

8 Feature Splits

- ○ Low-access/Low-income .5m

- ○ Low-access white .5m

- ○ Median Family Income

- ○ Low-access Latinx .5m

- ○ Kids per Tract

- ○ Poverty Rate

- ○ Low-access Senior .5m

- ○ Low-access AIAN

DTC Final Model Predictions

- True Positive
- False Positive
- Food Desert
- Not Food Desert
- Missing Values

DTC Final Model Predictions with FRESH

- True Positive
- FRESH
- Food Desert
- Not Food Desert
- Missing Values

Findings

- **Low-access/low-income** are greatest indicators of food deserts

- Secondarily share of **white demographic** has direct correlation to food deserts

- **Median income** and **poverty rate** as well as share of non-earners **Kids** and **seniors** should also be considered.

Recommendations/Next Steps

Recommendations

- Adjust **FRESH** boundaries to offer incentives for supermarket expansion within food desert tracts.

Next Steps:

- Perform analysis on newer data
- Explore opportunities for local community **urban agriculture** by conducting a suitability analysis of city owned sites in close proximity of food desert tracts.

Thank you!

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