Food Access Data Analysis

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Food Access Research

- Motivation to identify and analyze communities with limited access to healthy food.
- Urban neighborhoods and rural towns without access to fresh, affordable food are known as food deserts.
    - About 23.5 million Americans live in food deserts.
    - Urban population more than 1 mile from nearest supermarket
    - Rural Population more than 10 miles from nearest supermarket

Inequities Associated with Food Deserts

- Dominated by fast food providers and corner stores with lack of fresh produce

- These populations are thus prone to health issues:
  - Obesity, cardiovascular diseases, diabetes.
  - Covid-19 Pandemic exacerbated these issues.

- Poor nutrition in children can put them at an educational disadvantage[1]

Research Questions

- What socioeconomic factors are associated with communities with limited food access?
- Does race share a correlation with food access?
- Motivation: Understand and analyze underserved communities.

Dataset Description

- Source: United States Department of Agriculture Food Access Research Atlas 2019
  - Contains census tract information for every county in United States
  - Census Tract: a subdivision of the county level
    - 3143 counties, over 73,000 census tracts
  - Key Variables: demographic data, median family income, population, poverty rate, low access 1 and 10.

Exploratory Data Analysis

- Originally looked at racial data:

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Logistic Regression: 0.974
Scaled Logistic Regression: 0.981
Undersampled Logistic Regression: 0.982
SVM Accuracy: 0.982
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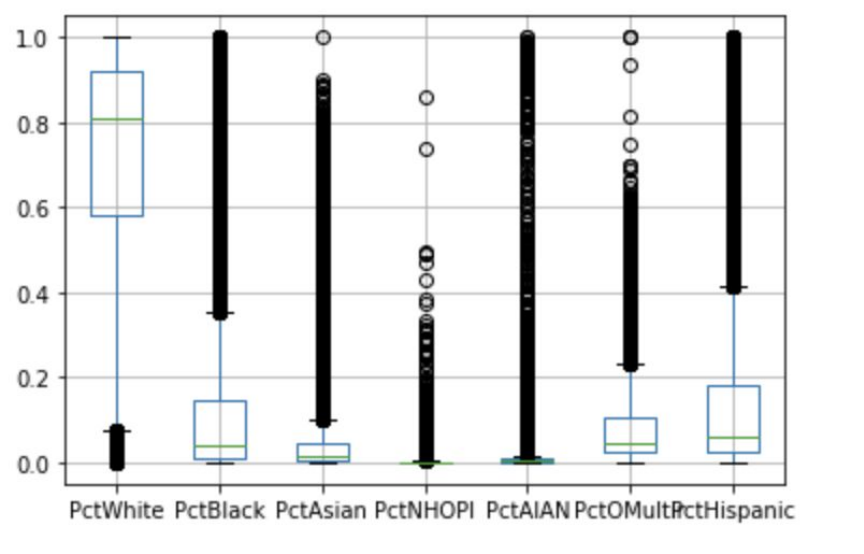
- Great accuracy, however, PCA indicated one variable had too much weight
- Thus, we looked further at the income data.

Exploratory Data Analysis



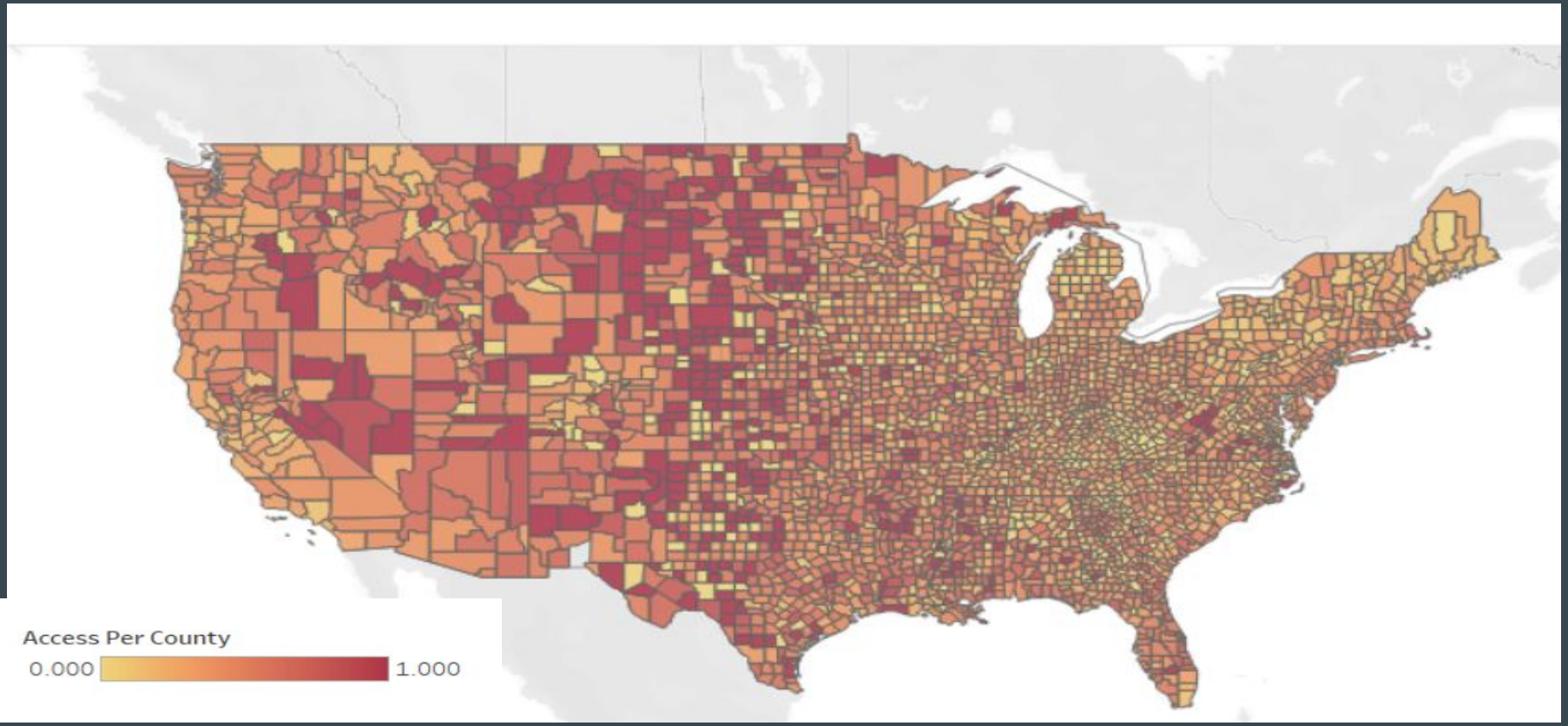
	Importance
Urban	0.065373
Pop2010	0.205181
OHU2010	0.194710
PovertyRate	0.165930
MedianFamilyIncome	0.182706
PctLowI	0.186100

Machine Learning Analysis

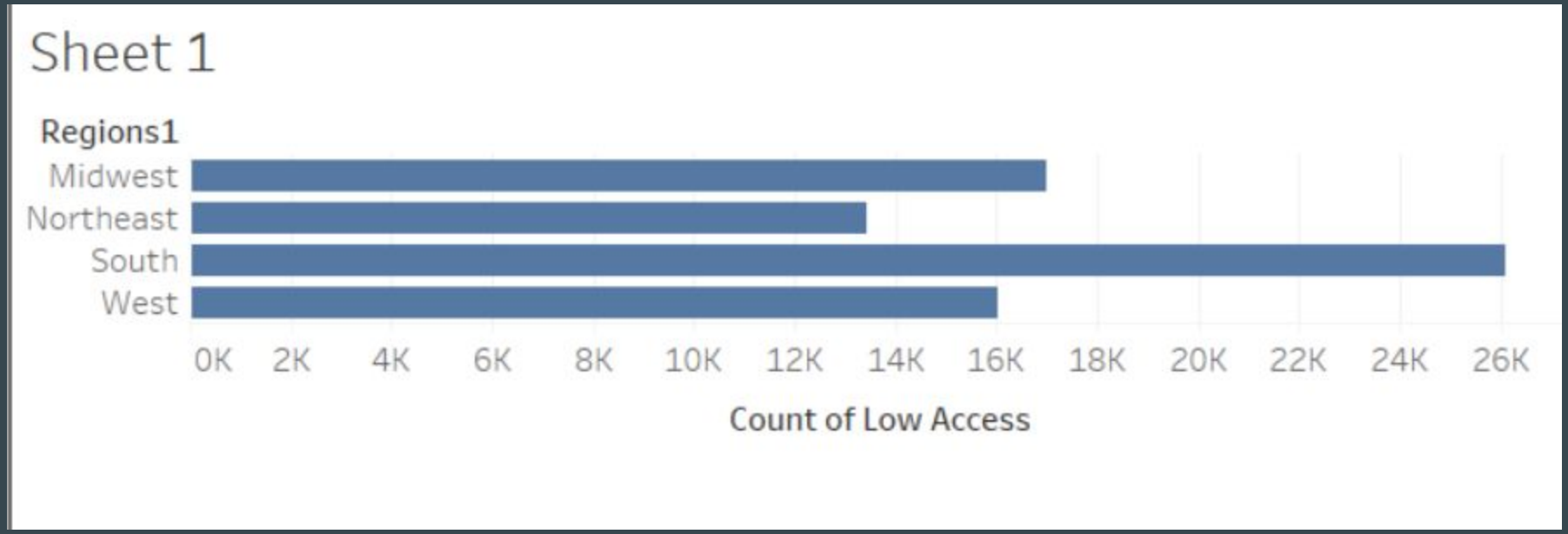
- Overall Accuracy: 69.72%
- Predicted food deserts with 72% accuracy
- Predicted non food deserts with 64% accuracy
- Used Supervised Machine Learning Model with low access 1 to 10 as target variable.

	Predicted 0	Predicted 1
Actual 0	9391	1756
Actual 1	3678	3121

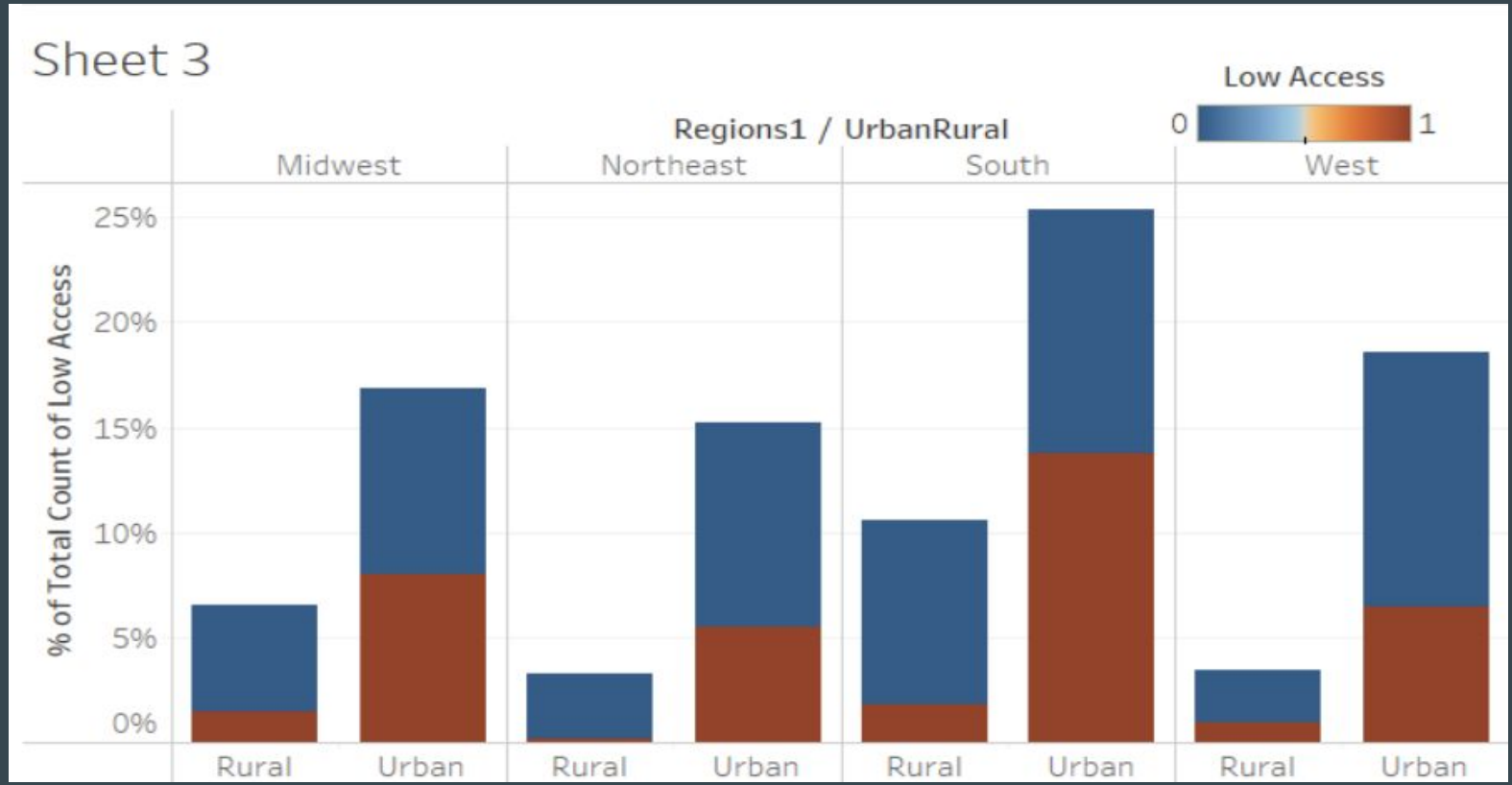
Dashboard



Dashboard


Sheet 1
Regions1
Midwest
Northeast
South
West
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
24K
26K
Count of Low Access

Dashboard


Sheet 3
Low Access
0
1
Regions1 / UrbanRural
Midwest
Northeast
South
West
% of Total Count of Low Access
25%
20%
15%
10%
5%
0%
Rural
Urban
Rural
Urban
Rural
Urban
Rural
Urban

Conclusion

- Racial data is likely significant.
- Median Income does not define food access for all populations.
  - This indicates other factors at play.
    - Regional cost of living not taken into account.
    - Number of people supported by income unknown.
- Geographically, noticeable trends of low food access from dashboard:
  - Mississippi Delta, West Virginia, Native American Reservations
  - Large population centers tend to have less low food access compared to rural (Wyoming)
- Pinpoint communities in need of more food infrastructure

Questions