Identifying Counties for a Food Access Program

Using Public Data on Health Outcomes, Socioeconomic and Sociodemographic Statuses, and Access to Healthy Food

Introduction

N1 Health's client, a national Medicare Advantage plan, is seeking to understand how best to use its resources to address food access challenges in its membership.

1. Where should we deploy a food access program?

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2. Which segment of the population might benefit the most from the program?

3. What do we know about the potential impact of the food program on medical costs or utilization?

Data Wrangling

Pivoting raw tables

Preliminary feature selection using df_fda_vars

- Using Excel
- Why use this?
- Why those variables?

Data Slicing

- Using col_feat to create df_fda_full

Exploratory Data Analysis

Feature Engineering

- Working only with percent change instead of PCT_POP
  - Dim Reduction
  - Consistent data types
  - Reflects momentum in the data
- Creation of Need Ranking
- Transformation

Variables in the Need Ranking

1. PERPOV10
2. CHILDPOVRATE15
3. PERCHLDPOV10
4. PCT_BIPOC_10
5. PCH_FOODINSEC_12_17
6. PCT_LACCESS_BIPOC15

Model Training/Deployment

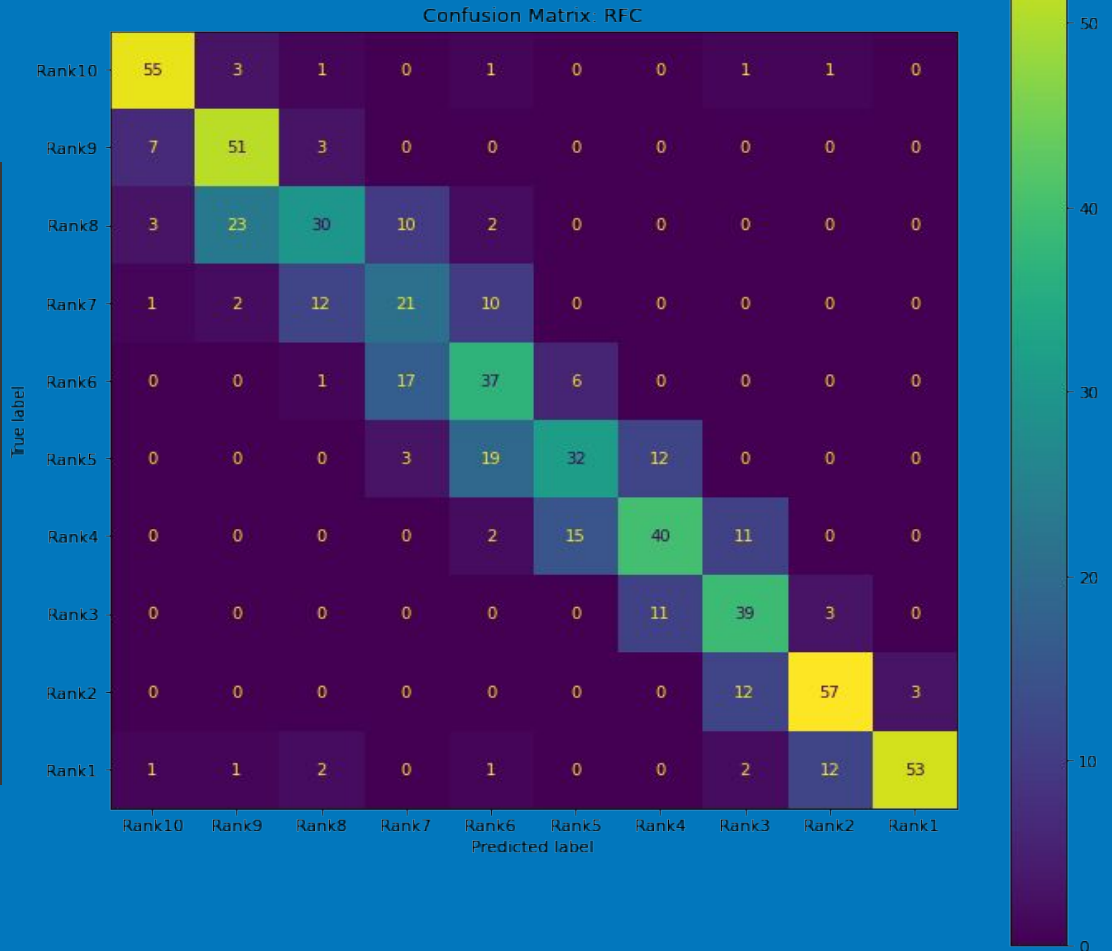
RFC

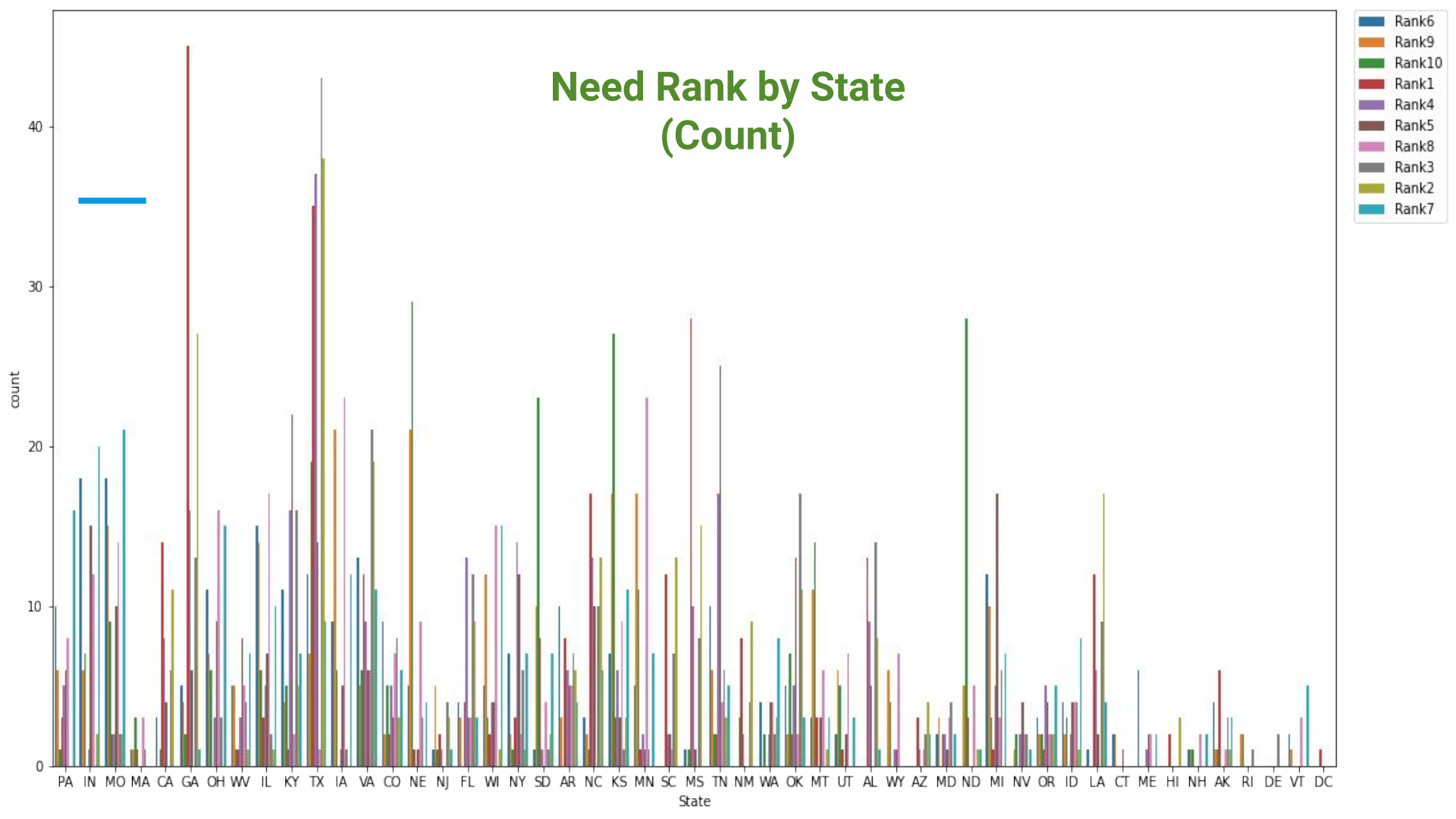
Randomized Search with Cross Validation

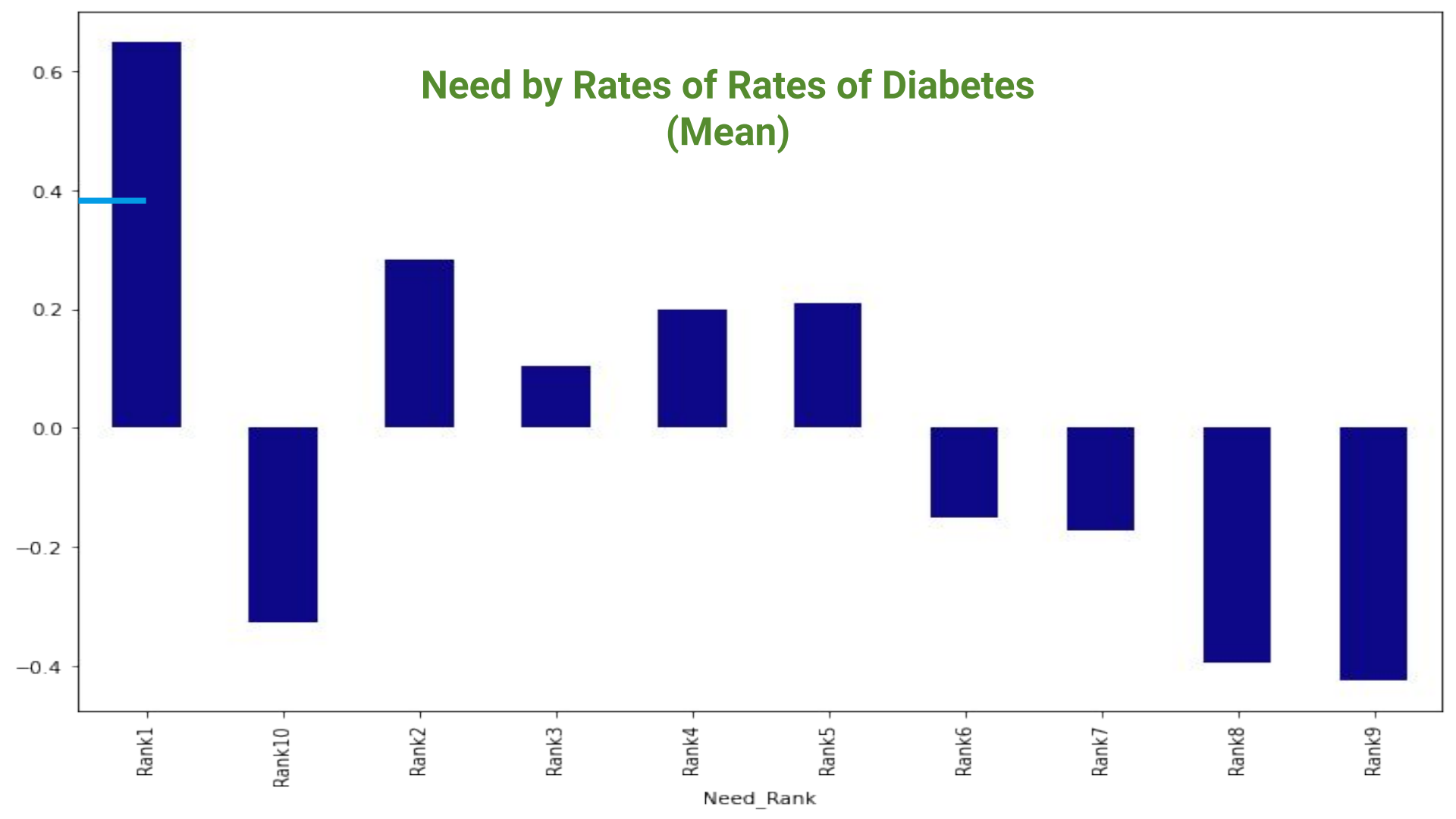
Exploring the Results

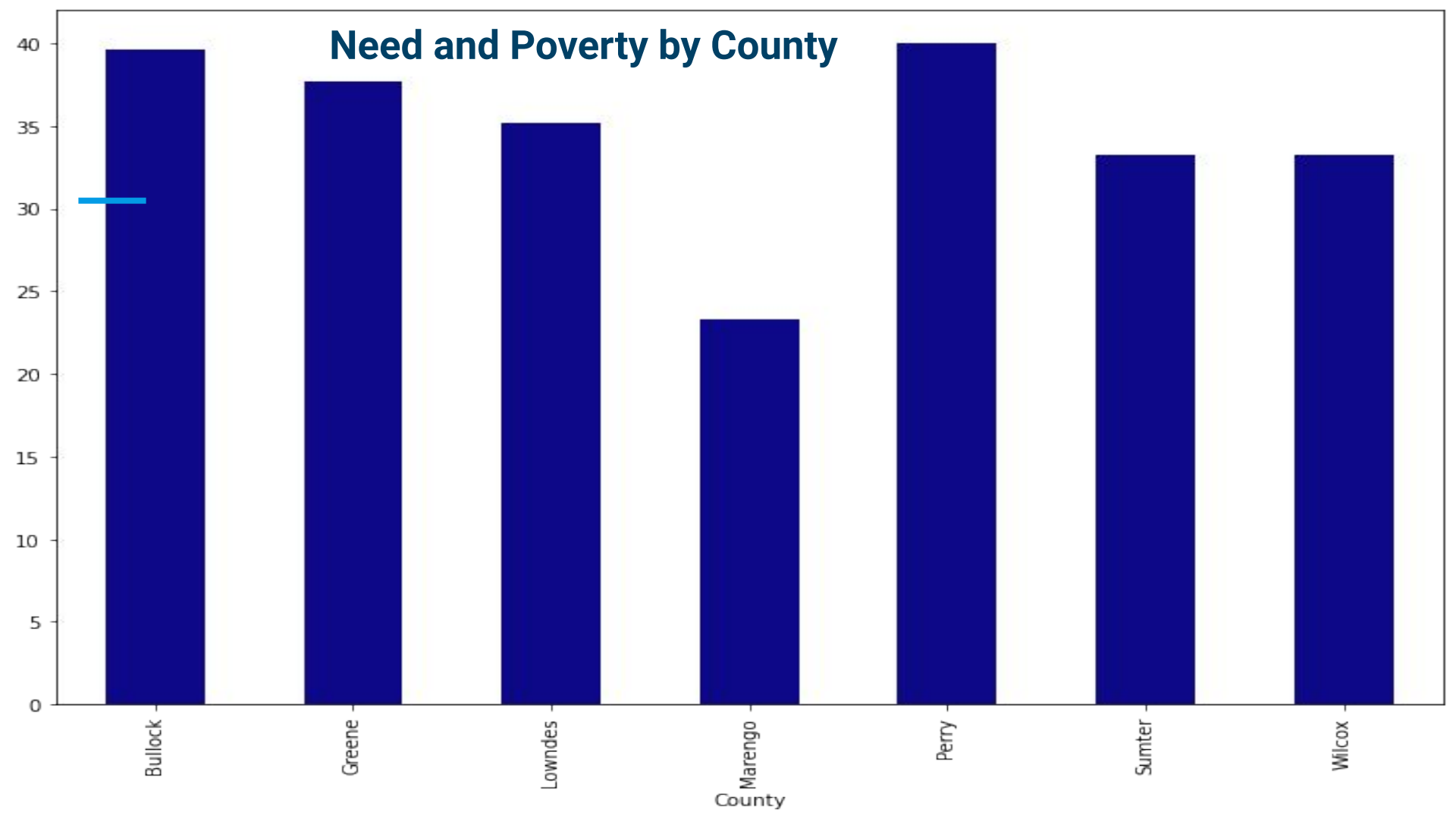
Random Forest Classifier

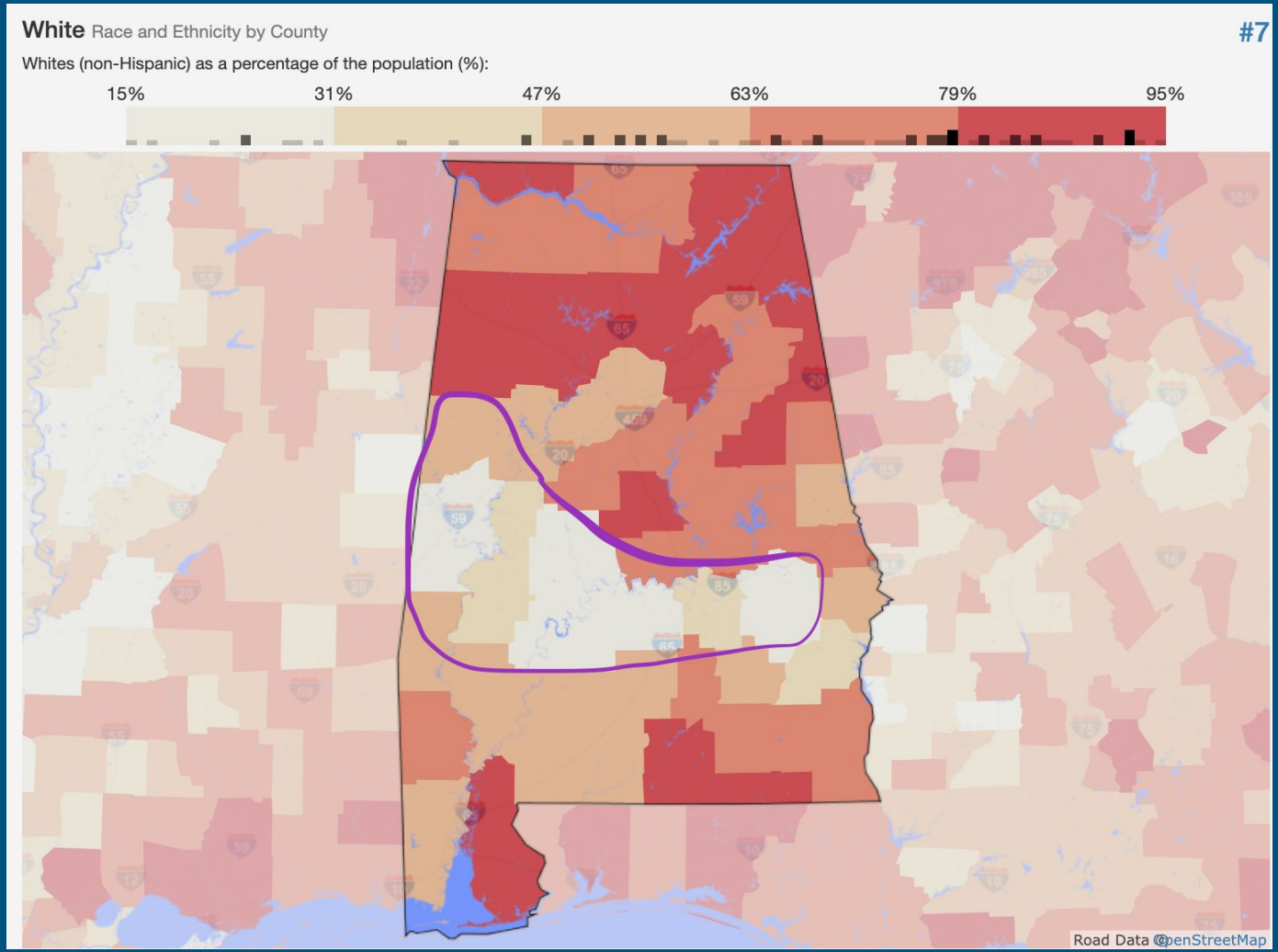
	precision	recall	f1-score	support
Rank10	0.95	0.74	0.83	72
Rank9	0.82	0.89	0.85	62
Rank8	0.78	0.79	0.79	72
Rank7	0.60	0.74	0.66	53
Rank6	0.63	0.59	0.61	68
Rank5	0.60	0.48	0.54	66
Rank4	0.51	0.61	0.56	61
Rank3	0.41	0.46	0.43	46
Rank2	0.61	0.44	0.51	68
Rank1	0.64	0.84	0.72	61
accuracy			0.66	629
macro avg	0.66	0.66	0.65	629
weighted avg	0.67	0.66	0.66	629




Need Rank by State
(Count)
Rank6
Rank9
Rank10
Rank1
Rank4
Rank5
Rank8
Rank3
Rank2
Rank7
count
0
10
20
30
40
PA IN MO MA CA GA OH WV IL KY TX IA VA CO NE NJ FL WI NY SD AR NC KS MN SC MS TN NM WA OK MT UT AL WY AZ MD ND MI NV OR ID LA CT ME HI NH AK RI DE VT DC
State


Need by Rates of Rates of Diabetes
(Mean)
0.6
0.4
0.2
0.0
−0.2
−0.4
Rank1
Rank10
Rank2
Rank3
Rank4
Rank5
Rank6
Rank7
Rank8
Rank9
Need_Rank


Need and Poverty by County
40
35
30
25
20
15
10
5
0
Bullock
Greene
Lowndes
Marengo
Perry
Sumter
Wilcox
County


White Race and Ethnicity by County
#7
Whites (non-Hispanic) as a percentage of the population (%):
15%
31%
47%
63%
79%
95%
Road Data © OpenStreetMap

Limitations/ Future Work

- Health outcome data (CDC)
- Ranking System
- Machine Learning to Predict Food Insecurity by County
- Integration with CMS data
  - ML to predict expenditures
- What Sort of Program?
  - New or Existing Program?
- Communities Impacted:
  - BIPOC
  - Experiencing Poverty
  - Highest Rates of Metabolic Syndromes