

# Predicting Food Insecurity with Machine Learning

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# Introduction

- Inspiration for project:
  - The Bok Choy local project
  - 13.7 million households experienced food insecurity in 2019 (usda.gov 2020)
  - \$161 billion worth of food thrown out each year (rts.com 2020)
- Data:
  - CPS Food Insecurity 2019 Data
- Question to answer:
  - Can we predict whether someone will experience food insecurity or not.

# Diving Deeper into the Data

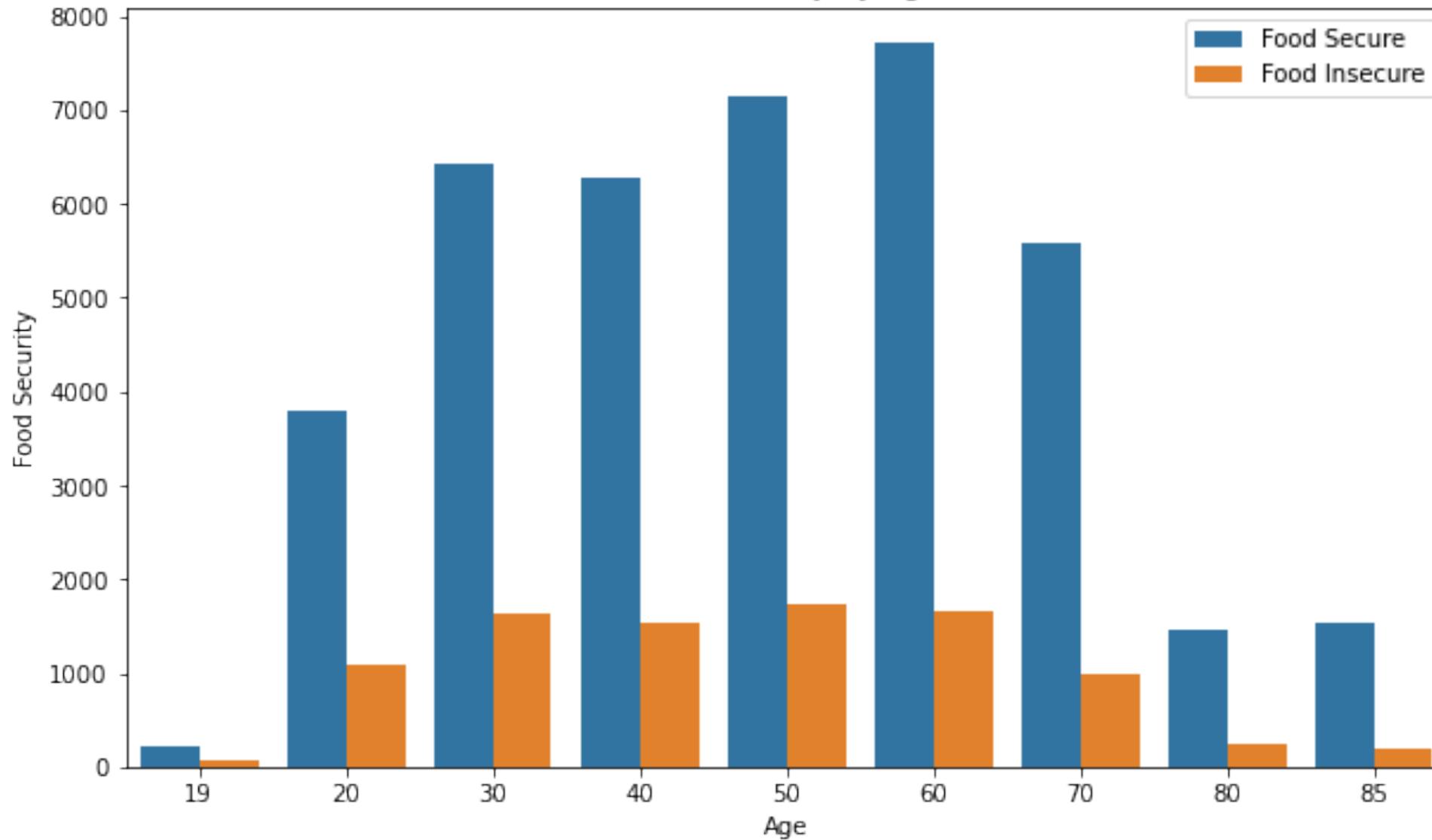
- Data and data dictionary gathered from Census.gov under their food security data sets page
- Original data set contained over 500 columns and 138,000 rows
  - GCFIP → state
  - Changed numerical values back to actual categorical values

# Exploratory Data Analysis

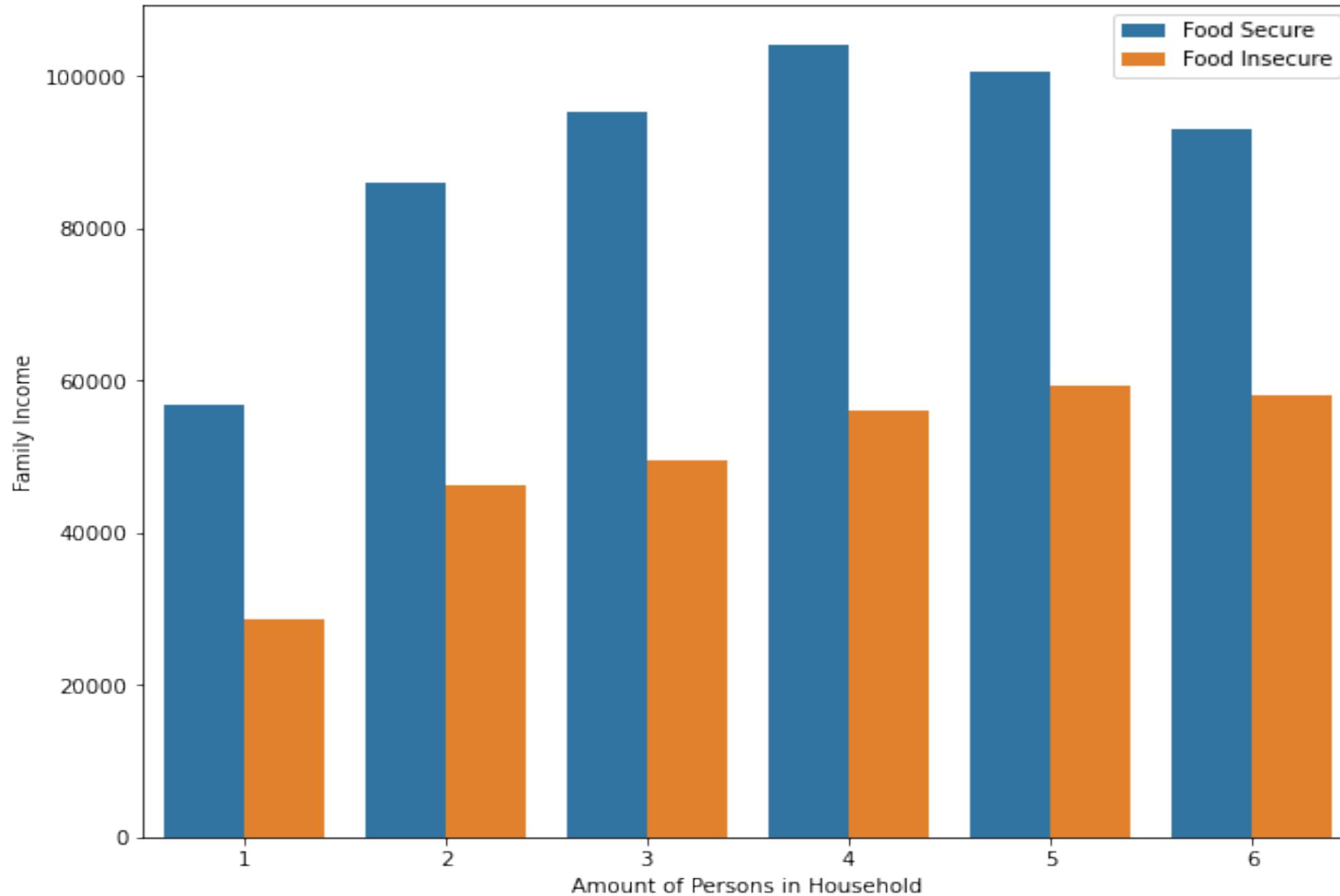
Census Variables	New Variables
-1 (not in universe/not applicable)	Changed to 0
-2 (don't know)	Changed to 'Unknown'
-9 (no response)	Changed to 'Unknown'
-4 (hours varied)	Changed to 40 hrs/week
1 (yes)	Changed to yes
2 (no)	Changed to no
1-16 (income)	\$5,000-\$150,000
2-85 (years)	Changed to 20s, 30s, 40s, etc
1-14 (household numbers)	Changed to 1-6+

- Decoding census values even further
- Trends and key analysis explored
- Not a very diverse data set

## Food Security By Age

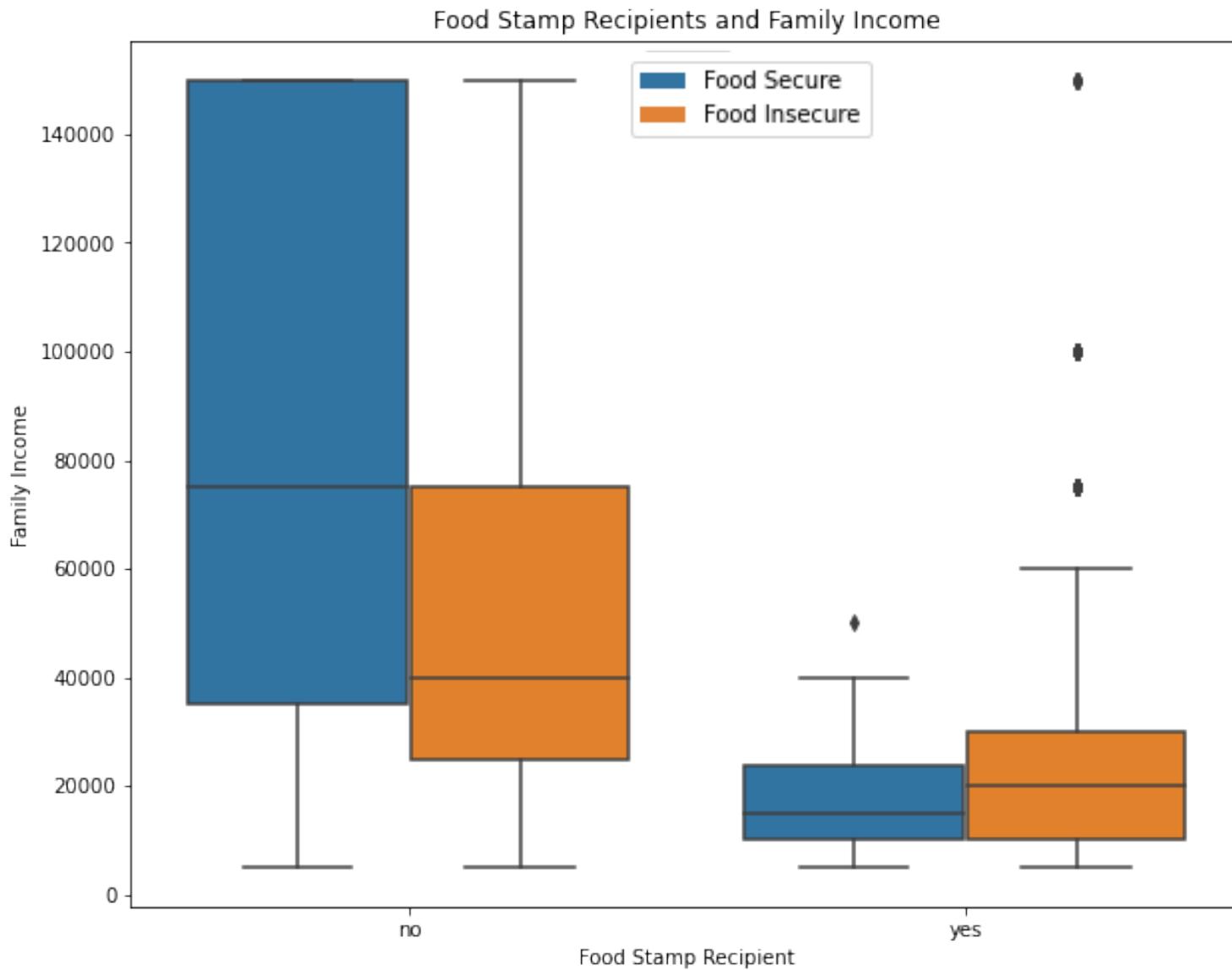


### Food Security Based on Household Quantity and Family Income



# Other Areas Explored

- Number of jobs and Food security
- Gender and Income based food security
  - Outliers found here
- Food pantry location unknown
- Family size and marital status in relation to food security
- Job type and food security levels



# Modeling Process

Question being asked → Classification modeling to answer

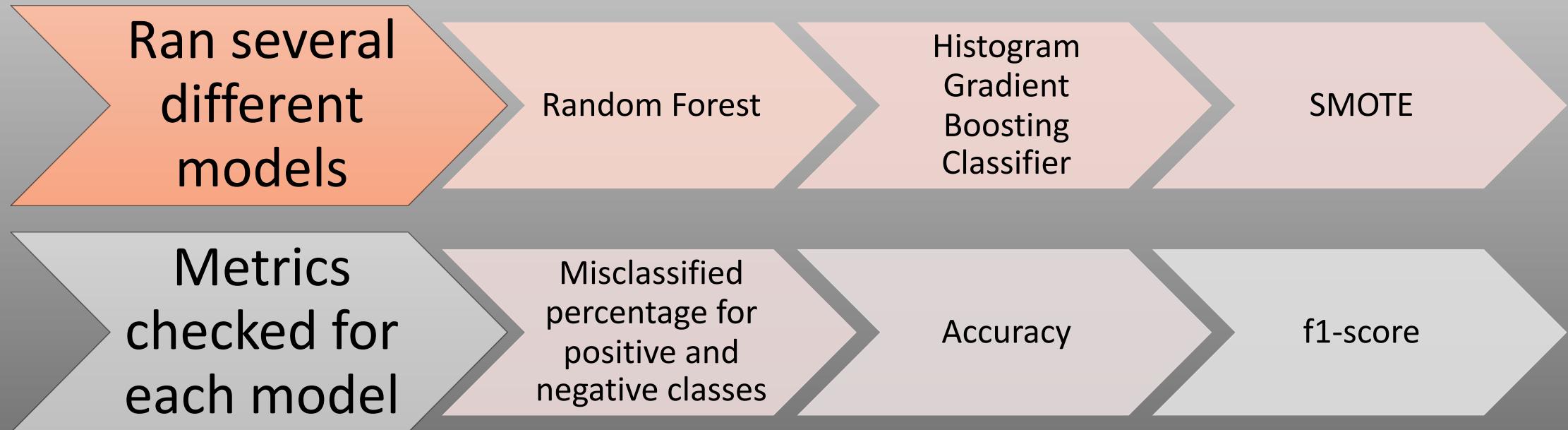
Final data cleaning steps

Pre-processing steps

Baseline score found

Wanted to minimize as many false negatives as I could

# Modeling Process Cont.

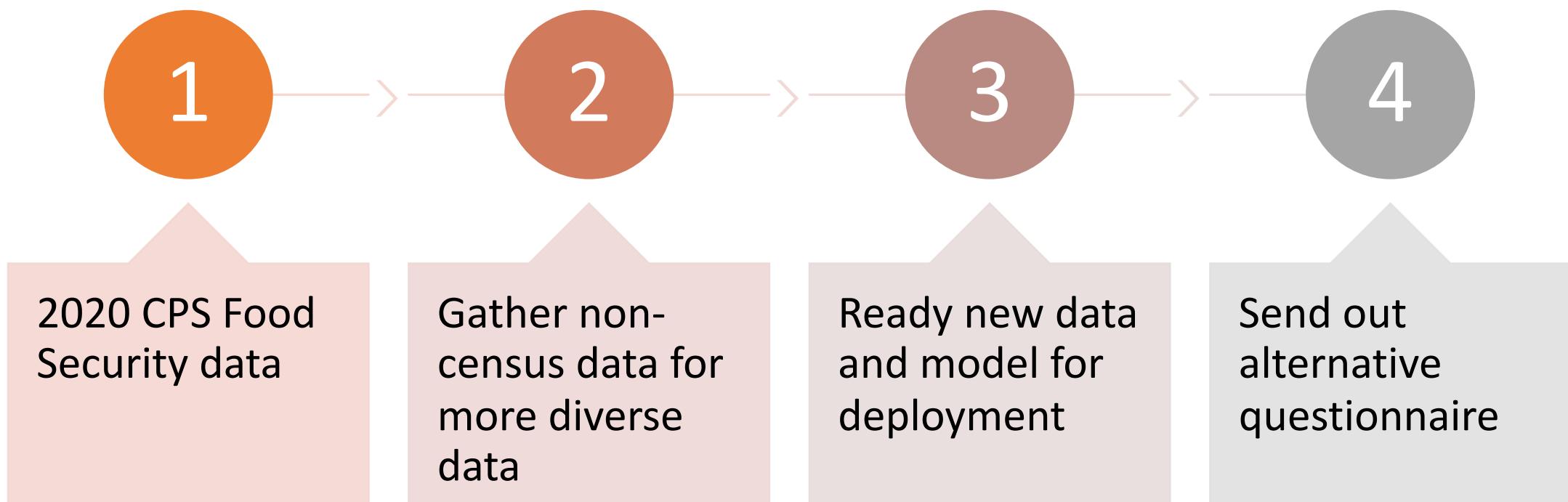


# Random Forest Model

- Well fit model
- Least amount of folks being misclassified as food secure when they are food insecure
- Highest f1 score for class 0 and class 1
- ROC-AUC score of 0.96

# Next Steps

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# Any Questions? ☺

