



Housing Prices & Food Access

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Background

- What is a food desert?
 - **“geographic areas where residents have few to no convenient options for securing affordable and healthy foods — especially fresh fruits and vegetables.**
- What is the connection between housing prices and food access?

10% of

census tracts in the United States are food deserts



Agenda

- Objective & Questions
- Methods and Materials
- Results
- Conclusions & Limitations
- Recommendations
- Sources

How did we get here?



Immigration on Housing Prices and Houselessness

Wanted to understand how the immigration and migration impacted housing

Housing Prices on Houselessness in California

Wanted to know if housing prices impacted houselessness over the last 20 years

Impact of Organic Food vs Fast Food business on Housing Prices in California

Areas of with whole foods and trader joes vs areas with only fast food locations impact housing market

Understanding Relationship between Low food access areas and Housing Prices

Decided to study census data collected on low food access and housing prices using publically available data

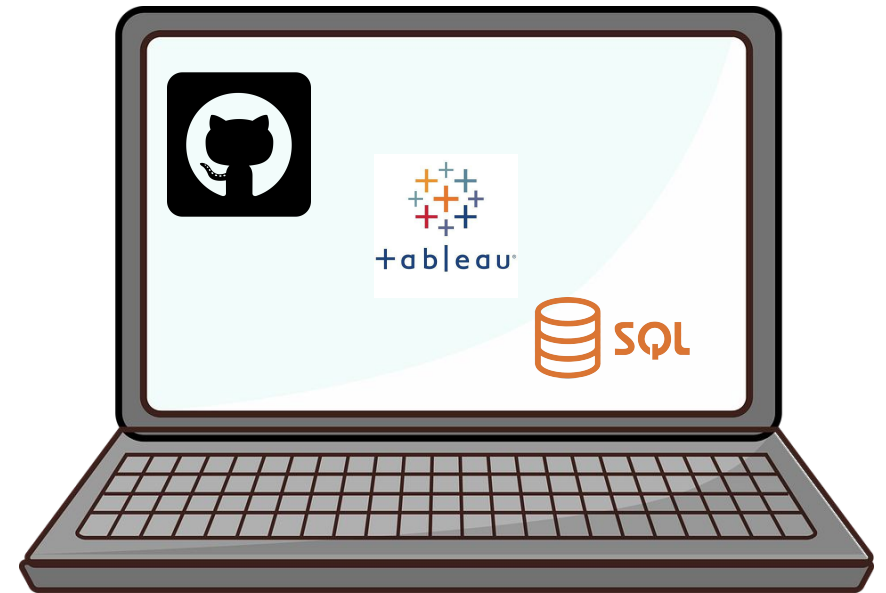
Our Research Questions

- Does access to food sources impact housing prices in California?
 - Compared 2015 and 2019
- Which zip codes have the most organic grocery stores vs. fast food locations?

How does our research inform our audience's decision making?

Methods & Materials

- Data Acquisition and Cleaning
 - Google Searches/API
 - Web Scraping
 - Jupyter Notebook/Pandas
- Data Management
 - SQL/SQLite
- Machine Learning
 - Supervised Learning
- Data Visualization
 - Tableau
 - HTML



What kind of data did we use?

| Data | Used For | Origin |
|------------------------------------|---------------------|-------------------|
| Low Food Access | Machine Learning | US Census |
| Housing Prices | Machine Learning | Zillow/ US Census |
| Whole Foods Locations | Data Visualizations | Google API |
| Trader Joe's Locations | Data Visualizations | Google/Geopy |
| Burger King & McDonald's Locations | Data Visualizations | Google API |



Choosing a Machine Learning Model

Tried several machine learning models

- Linear Regression
- Polynomial Regression
- Decision Tree
- Random Forest
- Neural Networking Model

Results

This is what we
learned..



Machine Model Results 2015

- Simple Regression Methods
- Polynomial Regression
- Decision Tree Model
- Random Forest Model
- Neural Networking Model

| | Model Name | RMSE | RSquare |
|---|-----------------------|----------|----------|
| 0 | Linear Regression | 0.550760 | 0.691346 |
| 1 | Polynomial Regression | 0.561544 | 0.684669 |
| 2 | Decision Tree | 0.659223 | 0.565426 |
| 3 | Random Forest | 0.477541 | 0.767059 |
| 4 | NeuralNetworking | 0.527304 | 0.703786 |

Machine Model Results 2019

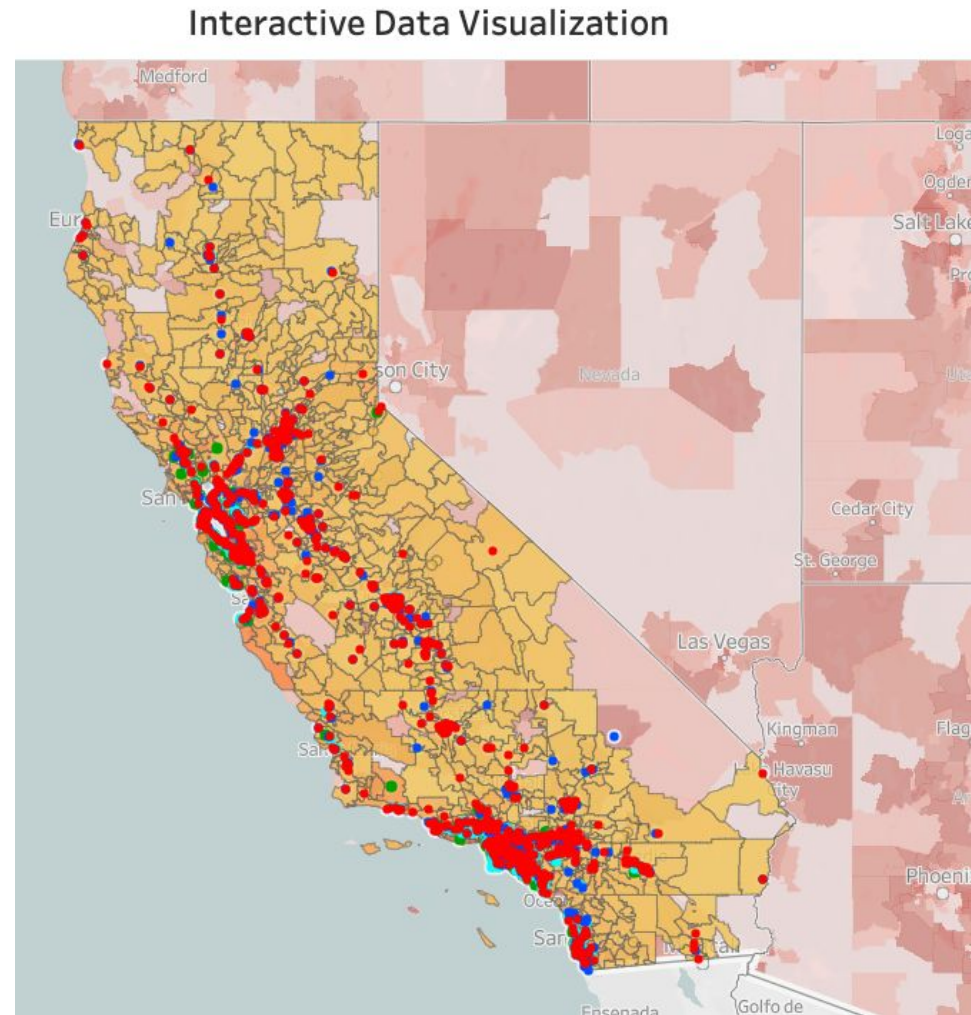
- Simple Regression Methods
- Polynomial Regression
- Decision Tree Model
- Random Forest Model
- NeuralNetworking Model

| | Model Name | RMSE | RSquare |
|---|-----------------------|----------|----------|
| 0 | Linear Regression | 0.784649 | 0.393701 |
| 1 | Polynomial Regression | 0.669987 | 0.551118 |
| 2 | Decision Tree | 0.794943 | 0.368066 |
| 3 | Random Forest | 0.617491 | 0.623784 |
| 4 | NeuralNetworking | 0.585519 | 0.653330 |

Data Visualization

- Organic grocery stores:
 - Zip Codes with more Organic grocery stores: 94103, 91105, 90046, 90036
 - 3 of these zip codes are in LA county and one in SF county.
 - The median house value for these zip codes is \$1.72M
- Zip codes with more fast food locations
 - There are 132 zip codes with 2 fast food locations.
 - The median house value for these zip codes is \$850K

The median house value next to more organic grocery stores is double than the house value next to location with more fast food.



Conclusion & Limitations

- 77% of food access accessibility explains housing prices in California in 2015
- 65% for 2019 (Neural Networking)



Limitations

- Cannot establish a strong relationship
- Outdated data
- Analysis does not include other confounding factors
 - Ex: Date of opening of Whole Foods and Trader Joe's

Recommendations/ Key Lessons Learned

- Food accessibility thought to be focused on distance, but it actually encompasses a combination of variables.
- Future analyses should review:
 - Housing price changes over time. Include data from multiple years.
 - Other demographic data like median household income, poverty rate, school district, race and ethnicity, location of corporate business
 - Interest rate
 - Migration data
- Have more complete datasets that can be merged to provide a comprehensive understanding

Sources

- [This is how grocery chains affect a home's value](#)
- [Does the New Whole Foods in Your Neighborhood Increase Your Home Value?](#)
- [USDA Food Access Data](#)