



EMORY
COLLEGE
OF ARTS AND
SCIENCES

Department of Quantitative
Theory and Methods

Metro Atlanta Rental Housing Submarkets



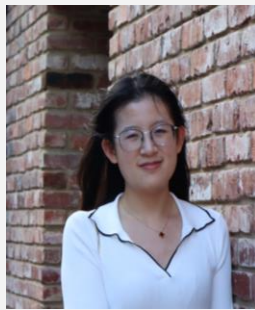
Microsoft



MEET OUR TEAM



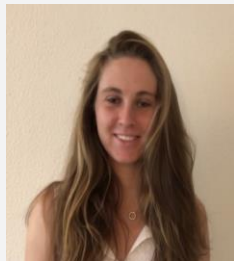
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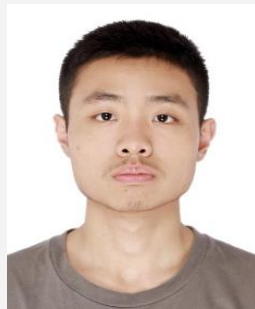
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Economics



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CONTENTS

01

INTRODUCTION

02

SOCIAL
DEMOGRAPHIC
LANDSCAPE

03

SPATIAL
PREDICTION

04

CLUSTERING

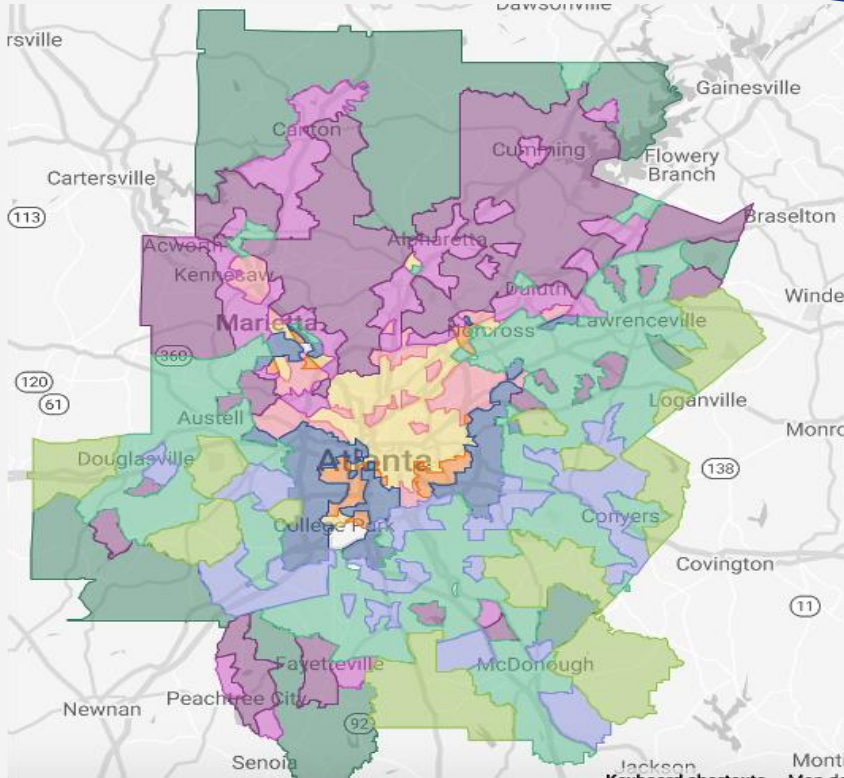
05

CONCLUSION

Introduction



MAIN QUESTION



Submarkets of Rental Housing in Metro Atlanta

METHODOLOGY

**Social
Demographical
Patterns**

Similarity

**Geographical
Contiguity**

Social Demographic Landscape

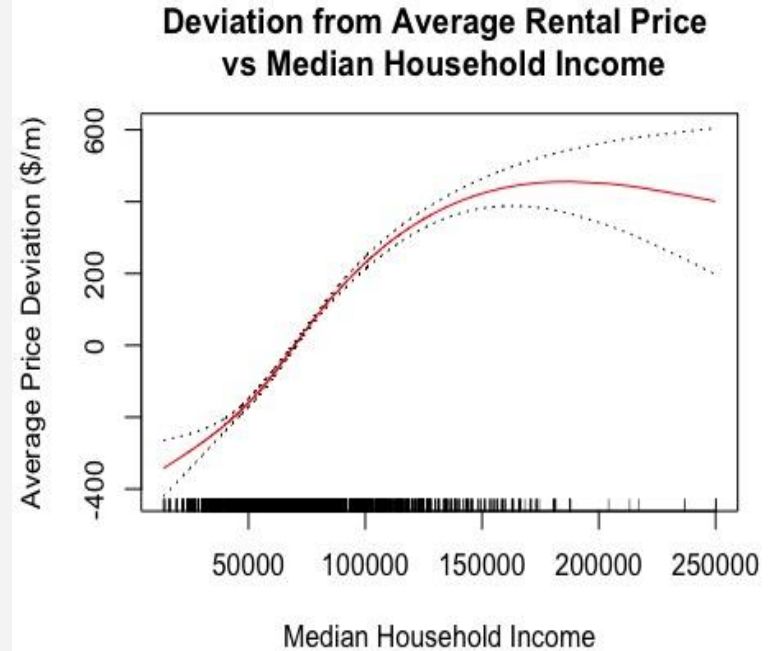
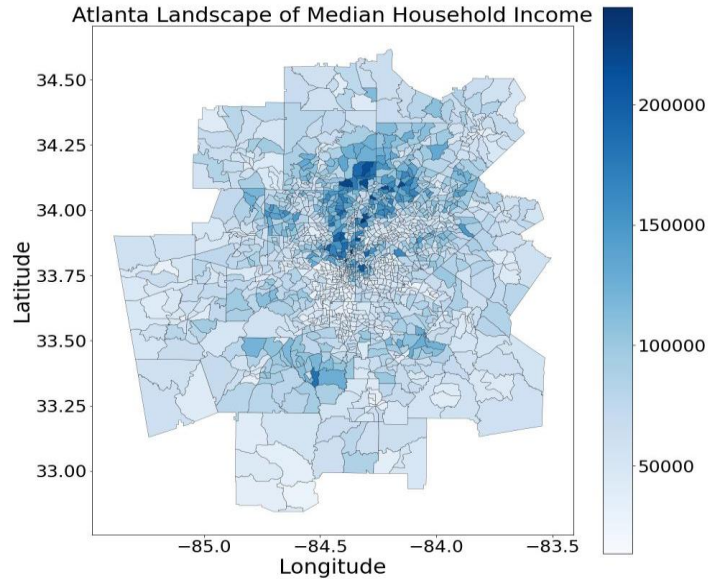


Household Income

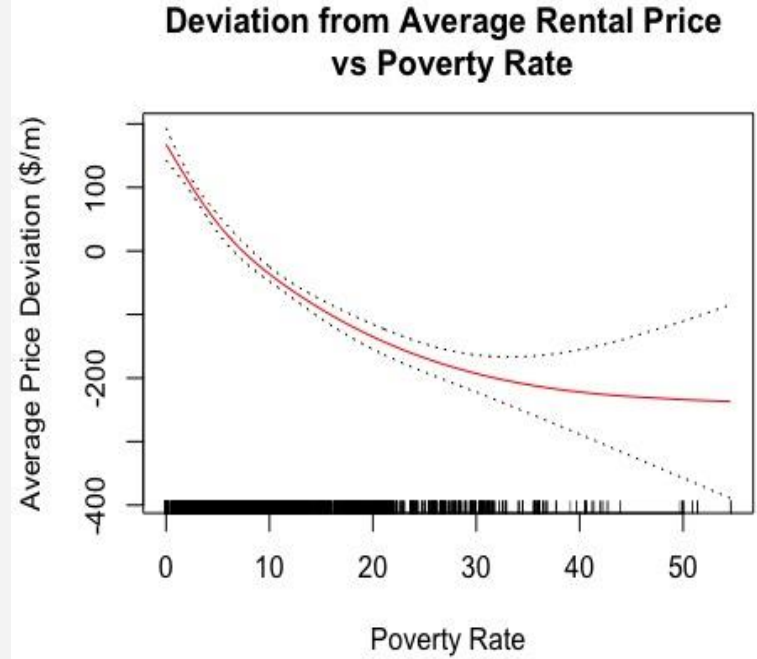
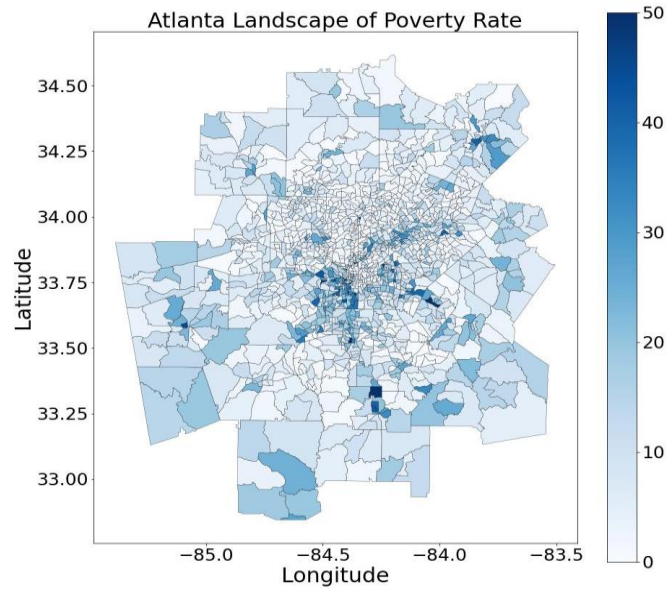
**Landscape
map**

**Association
with house
rental price**

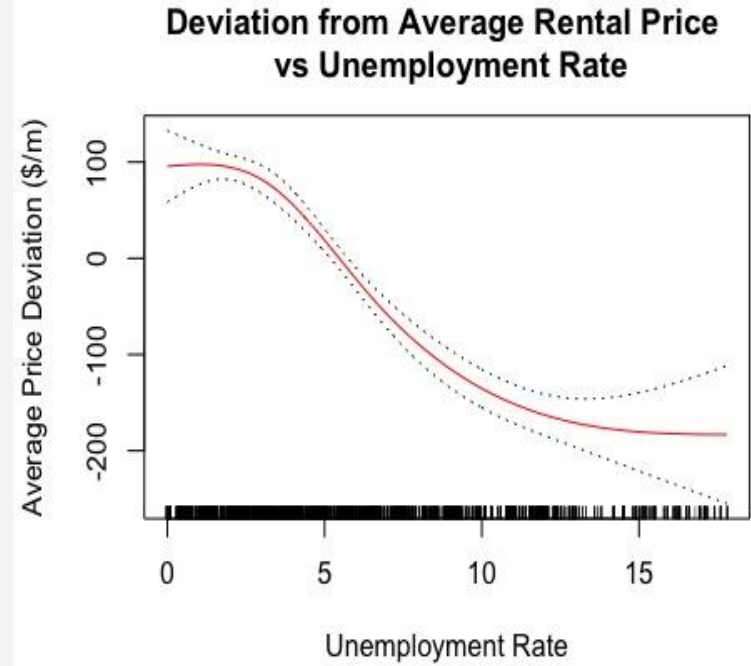
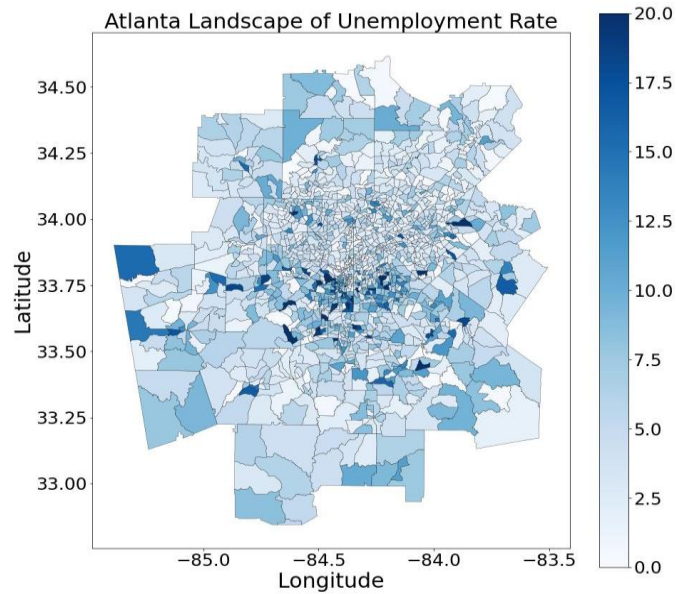
MEDIAN HOUSEHOLD INCOME



POVERTY RATE



UNEMPLOYMENT RATE



THINK QUESTIONS

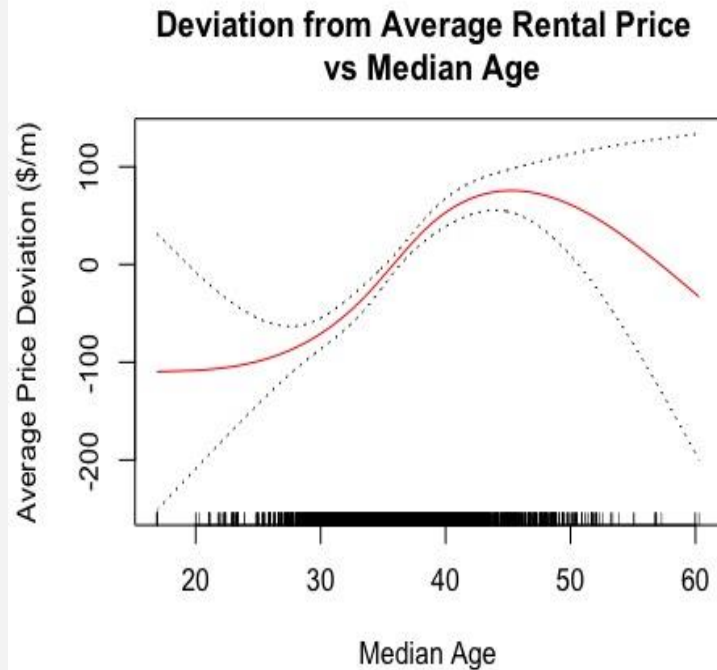
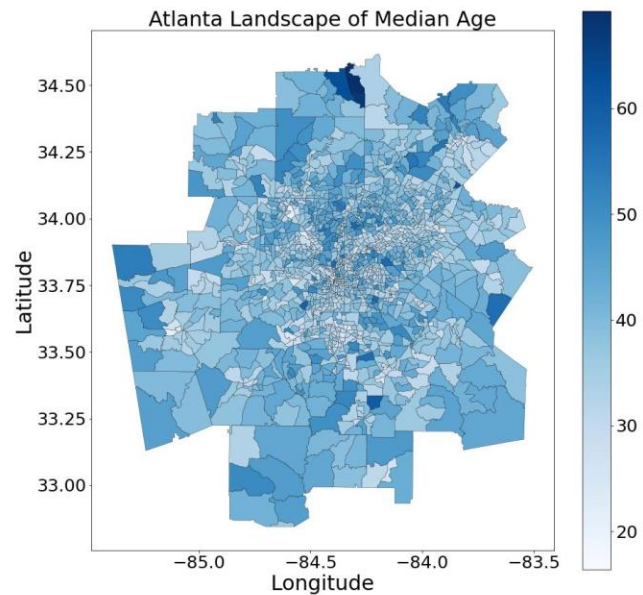


Age

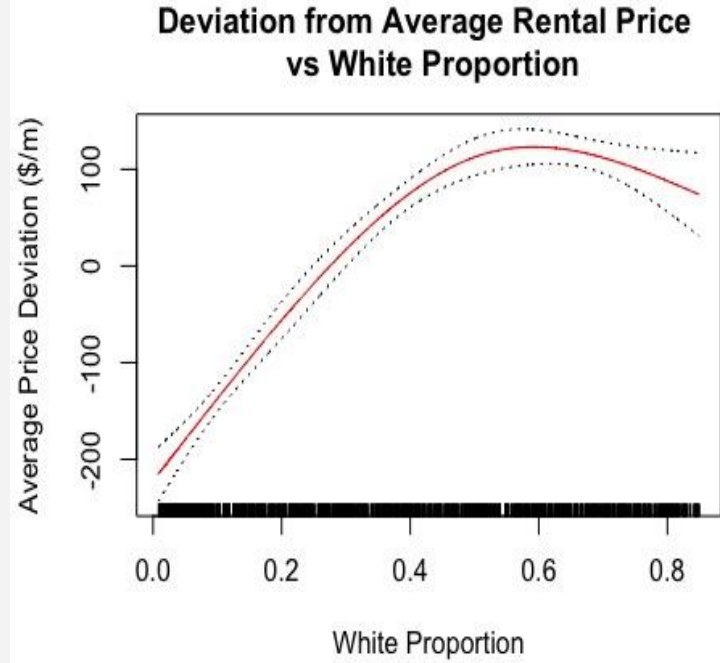
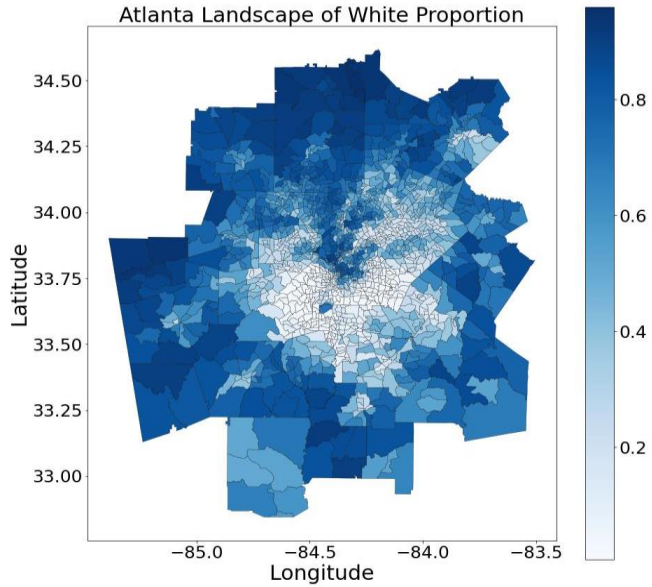


Race

MEDIAN AGE



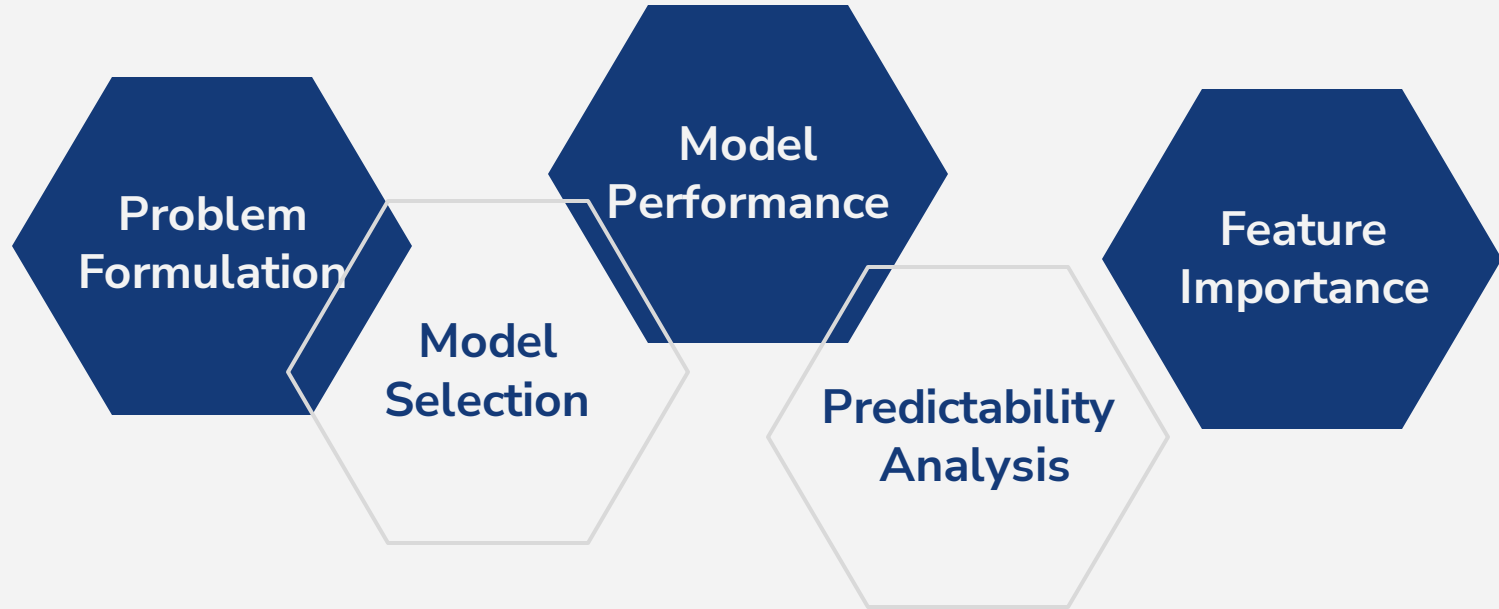
WHITE PROPORTION



Spatial Prediction



SPATIAL PREDICTION FOR RENTAL HOUSING PRICE



PROBLEM FORMULATION & MODEL SELECTION

Given point-based spatial observations, predict the rental price given location and corresponding demographical covariates

Targeted ML-based Models:

1. Random Forest
2. Neural Networks

Decision Criterion:

1. Accuracy
2. Interpretability & Time

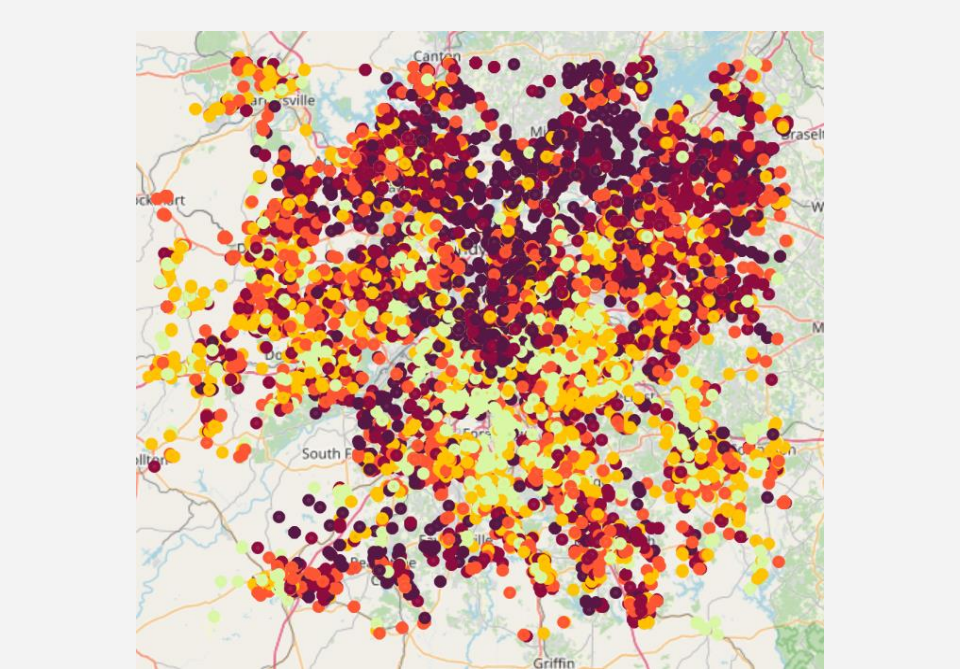
RANDOM FOREST MODEL PERFORMANCE

**Is Rental Price
Predictable?**

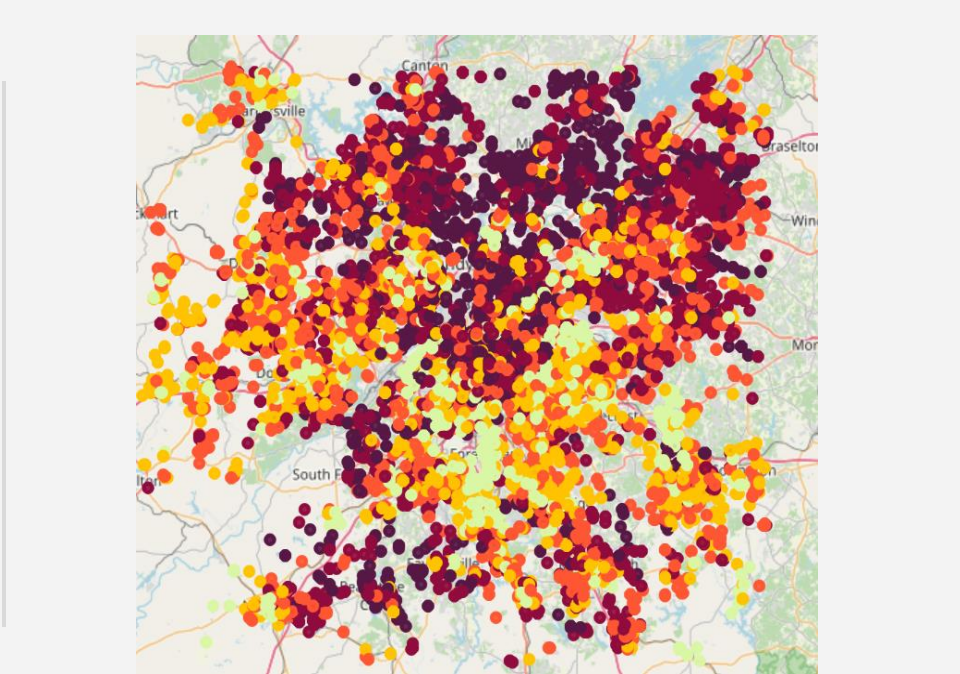
OOB score: 0.656

PREDICTABILITY ANALYSIS

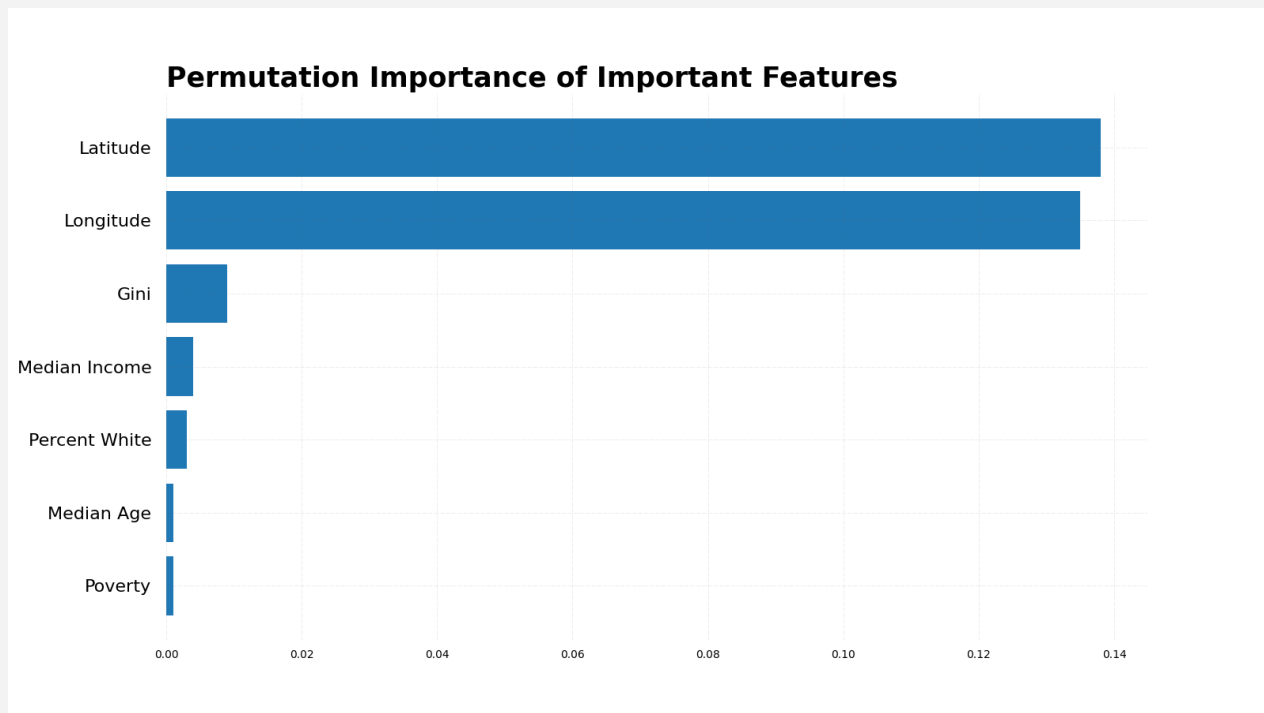
Real Data



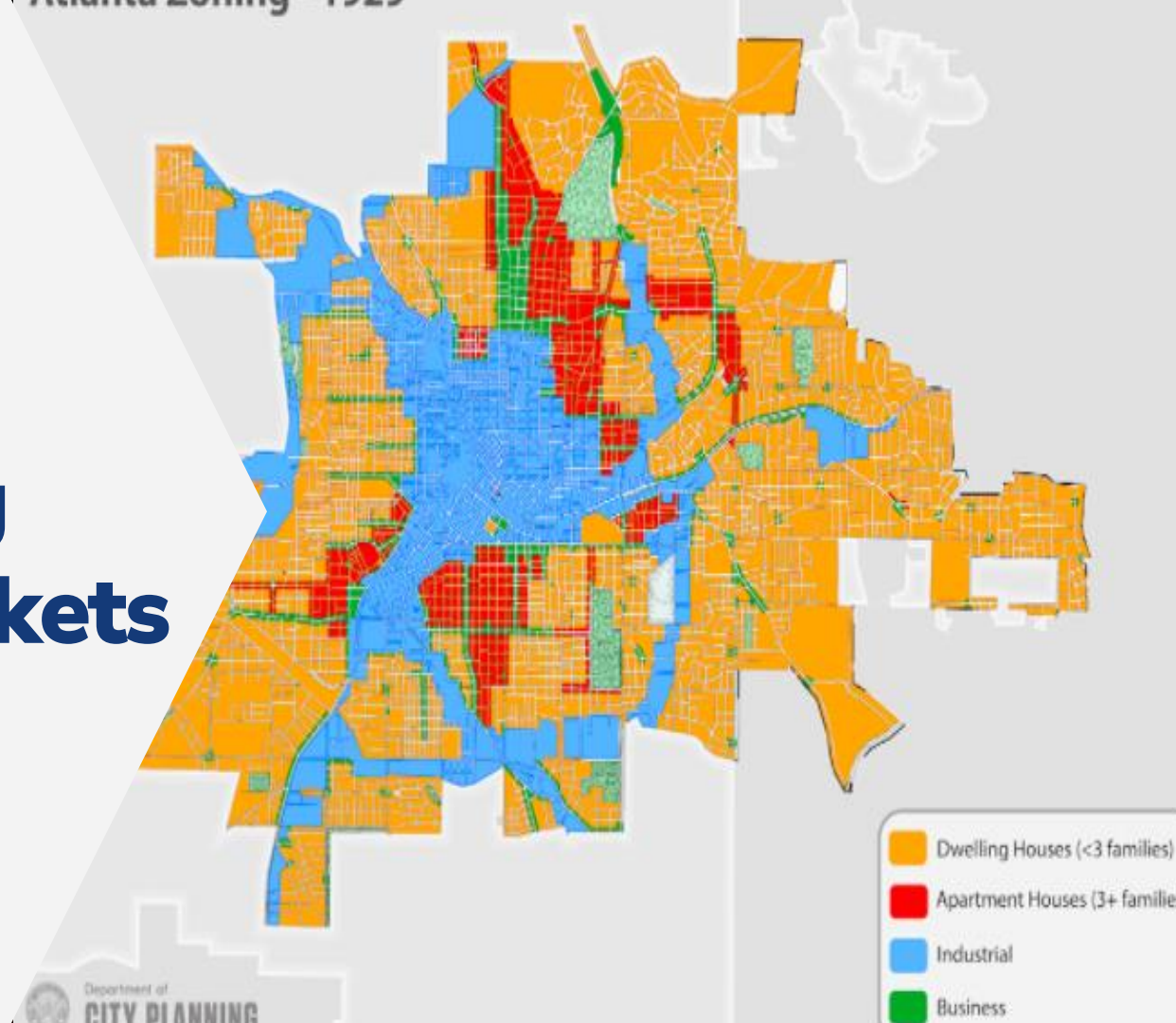
Predicted Data



IMPORTANT FEATURES



Rental Housing Submarkets



SPATIAL CLUSTERING



Algorithm



Implementation



Analysis

SPATIAL CLUSTERING

SKATER

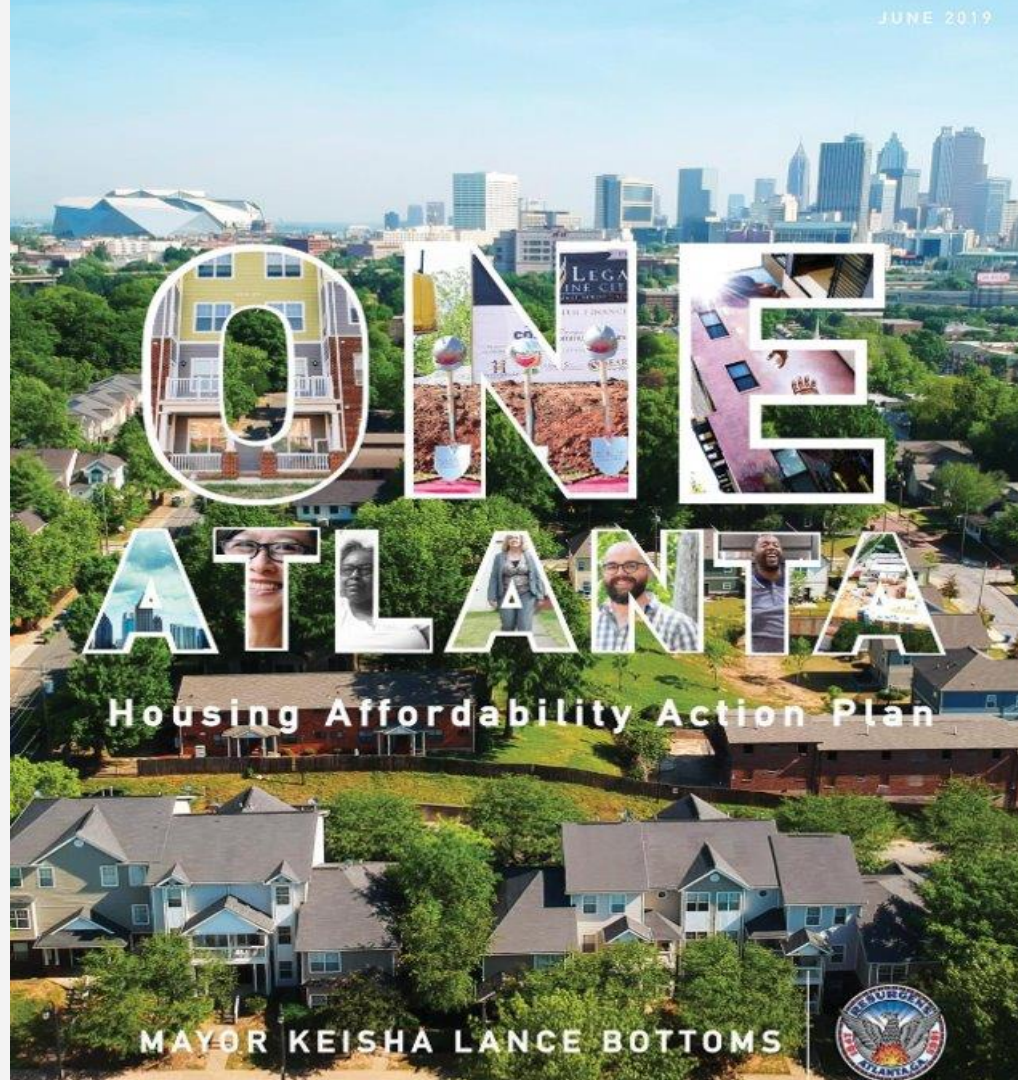
1. Spatial C(K)luster Analysis by Tree Edge Removal
2. Weight Computation

Clustering Algorithm & Implementation

Cluster based on polygons

1. Each polygon has its unique Census Tract ID and a group of points
2. Represent each polygon with its centroid

Conclusion



FUTURE WORK

**SELECTION
BIAS**

**RENTING +
HOME
OWNERSHIP**

**FROM
DESCRIPTION TO
POLICY**

**COMMUNITY
VS.
RENTING**

THANK YOU VERY MUCH!

Questions?

<https://emoryqtm.z13.web.core.windows.net/>

<https://github.com/kmcalist682336/EmoryQTMSummerDataThink2022>

References

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