

Digital Arch. Final Project Proposal: Rent Pricing Analysis

Braxton Haynie

University of Tennessee
Dept. of Electrical Eng
and Computer Science
bhaynie@vols.utk.edu

Karan Patel

University of Tennessee
Dept. of Electrical Eng
and Computer Science
kpatel68@vols.utk.edu

Jacob Hawkins

University of Tennessee
Dept. of Electrical Eng
and Computer Science
jhawki41@vols.utk.edu

Matthew Rosenbalm

University of Tennessee
Dept. of Electrical Eng
and Computer Science
rrosenb4@vols.utk.edu

I. OBJECTIVE

Housing is a crucial cornerstone of our society and greatly impacts the standard of living. Whether it is a house or apartment, having somewhere to live that is affordable and in a good location is pivotal to the rest of one's life. Housing is commonly an individual's highest expense. Therefore, it is crucial to be aware of the trends the market is taking to help individuals make better decisions regarding the apartment they plan to rent with their hard-earned money.

The objective of our final project is to analyze and extract various trends from the historical pricing of apartments in a given area to the present day. We plan on analyzing datasets and APIs that keep track of various information regarding apartments for approximately the past 10 years in order to discern relevant trends that are impactful to the present day. We want to explore differences between floor plans, locations, size, pricing, etc. to determine how the industry has evolved and the direction it is planning on heading towards. For example, how the location of an apartment has impacted the price, if the size of an apartment has become more or less important, and how the influence of the housing market has affected rent. Being able to log the various trends in the industry would provide useful insights moving forward.

II. MOTIVATION

The housing market is constantly evolving: styles, sizes, locations all play a part in how an apartment is priced. Understanding how the market is changing, allows consumers to make better decisions regarding renting an apartment, understanding the true value of an apartment, as well as what to expect in the near future. The data we collect will hopefully help us answer important questions such as what apartments are within my budget? What locations best align with my needs and budget? What styles and sizes impact the price the most? Our aim is to help answer these questions through a data-driven approach to provide users with all the information they need to best prepare them for one of the most important investments of their lives.

III. APPROACH

There are a few methods that will be used to collect data for this project. It will most likely involve some web scraping for more recent data on recent rent listings. However, most of the data will be obtained through the use of pre-existing

APIs or datasets. Currently, we hope to look at data for a few different locations, sizes, and styles over the last 10-15 years.

Once enough data has been found and collected, analysis will be performed to see what can be pulled from it. We will use the data to look at how the various apartments varied in price over the last decade and a half and see how the location of each apartment affected the sale price. If time is permitted, we also hope to look at how the price of different apartments varied based on size and style. For example, how the price of a large apartment varied in a city versus in a more rural setting.

Lastly, we will be using Python to perform the web scraping and API calls for the needed data. Python will also help us to better understand the data through visualization by various graphing techniques.

IV. MEMBER RESPONSIBILITIES

A. Braxton Haynie

NetID: bhaynie

Responsibilities:

- Work on developing a web scraper to pull current apartment pricing
- Visualization of the data from web scraper
- Help develop ML model for price prediction

B. Karan Patel

NetID: kpatel68

Responsibilities:

- Work on pulling data from APIs
- Visualization of the data from APIs
- Help develop ML model for price prediction

C. Jacob Hawkins

NetID: jhawki41

Responsibilities:

- Work on pulling data from APIs
- Help develop ML model to identify key trends
- Visualize results of ML model

D. Matthew Rosenbalm

NetID: rrosenb4

Responsibilities:

- Develop web scraper to parse raw web data
- Model data to help identify key trends

V. TIMELINE

Week 1	Develop project idea and proposal.
Week 2	Collect relevant data.
Week 3	Clean up data.
Week 4	Begin writing scripts to analyze data.
Week 5	Continue writing scripts.
Week 6	Begin testing and training models.
Week 7	Complete testing.
Week 8	Present findings.

TABLE I
TABLE SHOWING THE PROJECT TIMELINE

VI. EXPECTED OUTCOME

From our analysis, we expect to find trends relating an apartment's rent over time to its location and size. Within this data, we expect to see a dramatic increase in prices over the COVID-19 pandemic as well as general price increases due to inflation over time. We also expect to see price increases in larger apartments in urban areas. By the end of this project, we hope to be able to accurately predict an apartments rent based on its location and size. We also hope to be able to accurately judge existing rent prices and determine if it is a fair price for the location and size.

REFERENCES

- [1] Zillow, "Listings API - Data & APIs," Listings API, <https://www.zillowgroup.com/developers/api/mls-broker-data/listing-api/>