

Boston Student Housing Analysis

Project Report

DS 5110: Introduction to Data Management and Processing

Section 4

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1 ABSTRACT

This project investigates the housing options available to students in the Boston area. By analyzing various factors such as location, cost, and distance from various universities, the study aims to provide insights into the current housing landscape for students and offer recommendations for prospective student tenants.

2 INTRODUCTION

Boston is renowned globally as an educational hub, home to prestigious institutions like Harvard University, the Massachusetts Institute of Technology, Boston University, and Northeastern University. Each year, the city attracts a large and diverse student population from across the United States and around the world. While Boston offers unparalleled academic opportunities, the influx of students has led to a rising demand for housing, which has made finding affordable and suitable accommodations increasingly challenging. Securing the right housing is a major concern for students, as it directly impacts their academic performance, mental health, and overall well-being. Key factors such as affordability, proximity to campus, safety, and access to essential amenities strongly influence their housing choices.

The competitive Boston housing market, marked by rapidly increasing rental prices and limited availability, poses particular difficulties for students, especially those on tight budgets. This project explores

the current state of student housing in Boston, focusing on factors like location, cost, and proximity to universities. By analyzing these variables, we aim to uncover patterns and trends in housing availability and affordability. Our solution provides the ability to find housing options within a specific proximity to universities and within budget constraints. The recommendations generated by this study will not only help prospective student tenants but also serve as valuable insights for university housing offices, property developers, and policymakers, all of whom play a crucial role in shaping the student housing landscape in Boston.

3 OBJECTIVES

The main goal of this project is to comprehensively analyze student housing in Boston through a multiplicity of factors. First, it examines what types of housing—one-, two-, three-bedroom apartments, shared housing, and other rental types of housing—are available for students to try to understand the range and diversity. Affordability is another significant concern; the project also researches cost trends across student accommodation, mapping rentals based on neighborhood and housing type. This study assesses the proximity of housing to major universities in Boston, considering the need for convenience that makes the location accessible for students with multiple responsibilities to attend to in school and outside of school. These objectives have the potential to provide valuable insights into the student housing landscape of Boston, helping to answer current challenges and suggest future solutions.

4 METHODOLOGY

This project employs a data-driven approach to analyze the student housing landscape in Boston. Data is collected from Zillow to ensure comprehensive coverage of the housing market. The raw data undergoes extensive preprocessing to address inconsistencies, clean anomalies, and format it for effective analysis. The analysis is conducted using Python, leveraging robust libraries such as Pandas for data manipulation and Matplotlib for creating detailed visualizations. Interactive and dynamic plots are generated using Plotly, enabling users to explore trends and relationships in the dataset.

To calculate the proximity of housing options to major universities in and around Boston, the Googlemaps library is utilized, with support from the Google Maps API, accessed via the Google Cloud Console. Geographic visualizations are developed using Folium, providing an intuitive representation of housing locations and their spatial relationships to universities. A dashboard is being developed using Streamlit to present the findings in a user-friendly, interactive format. This dashboard displays key insights, including cost trends, location analysis, and proximity measures, accompanied by interactive plots and maps for deeper data exploration. The project also integrates the machine learning model XGBoost to identify patterns and predict housing demand trends. The ultimate goal is to provide actionable insights and predictive tools to support students and stakeholders in navigating Boston's complex student housing market.

5 RESULTS AND DISCUSSIONS

Yet to be added

6 CONCLUSION

Yet to be added

7 REFERENCES

Yet to be added

8 APPENDIX