

# Analyzing US Apartment Rental Market Dynamics

## Introduction

This project utilizes a dataset of 100,000 US apartment listings from UCI, featuring diverse attributes such as pricing, amenities, location, and more. It presents a unique opportunity to delve into the real estate market, particularly focusing on rental trends, geographical influences, and the impact of amenities on pricing.

## Dataset Justification

- **Multivariate Analysis:** With numerical and categorical data exceeding 50K observations, the dataset supports comprehensive analysis, including trend identification and predictive modeling.
- **Public Source:** Sourced from UCI, it's accessible and complies with project requirements for public, non-classified data.
- **Feature Engineering Potential:** Allows for creative insights, such as price per square foot or luxury versus budget listings categorization.

Geographical Analysis: Exploring how location influences rental prices and apartment features.

Market Trends: Identifying trends over time, such as rising rental prices or changes in amenities offerings.

Amenities Impact: Assessing how different amenities affect rental prices and popularity.

## Static Plots

Key static plots will include:

- Heatmaps to visualize rental price distributions across different states.
- Bar charts comparing average rental prices by number of bedrooms and bathrooms.
- Histograms showing the distribution of rental prices and square footage.
- Box plots to compare rental prices based on pet policies.

These visualizations will provide snapshots of the market, revealing patterns and trends at a glance.

## Interactive Dashboard Features

The web-based dashboard will leverage the Dash framework to offer:

- **Dynamic Filtering:** Users can filter listings by city, price range, number of bedrooms, and available amenities.
- **Interactive Maps:** Showcasing rental listings by location, allowing users to explore different regions.
- **Time-Series Analysis:** Tracking changes in rental prices over time, with the ability to select specific regions or apartment types.
- **Amenities Analysis Tool:** Comparing average rental prices of apartments with vs. without specific amenities.

The dashboard will be designed for usability, with intuitive controls and responsive design, ensuring accessibility across devices.

## Conclusion

This project will illuminate the complexities of the US apartment rental market, providing valuable insights for potential renters, real estate professionals, and policymakers. By analyzing this comprehensive dataset, we aim to uncover the multifaceted dynamics at play, offering a detailed picture of the current state of apartment rentals across the nation.