Airbnb Dynamic Pricing Recommendation Engine

Introduction

Airbnb hosts often struggle to determine competitive and optimal pricing for their listings. This project provides a machine learning-based recommendation engine that dynamically suggests prices based on listing characteristics such as location, property type, reviews, and availability.

Abstract

We analyzed historical Airbnb listing data and built a regression-based dynamic pricing engine. Our model incorporates seasonal trends, location data, review counts, and property attributes to accurately suggest listing prices. Additionally, we built a Tableau dashboard for interactive price recommendations.

Tools Used

- Python (Pandas, Sklearn, XGBoost)
- Tableau
- Excel
- Jupyter Notebook

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Steps Involved in Building the Project

1. Collected and cleaned Airbnb dataset from Kaggle.
2. Conducted EDA to understand pricing trends across property types, cities, and review ratings.
3. Engineered features such as: room type, availability, number of amenities, season, and reviews.
4. Built and tuned an XGBoost regression model to predict optimal prices.
5. Evaluated model with MAE = 18.7 and RMSE = 21.5.
6. Developed Tableau dashboard with filters for city, season, and listing type.
7. Enabled interactive price suggestion slider for hosts.

Conclusion

This project offers a practical solution for Airbnb hosts to make informed pricing decisions. With accurate predictions and an interactive dashboard, hosts can optimize revenue while staying competitive in dynamic markets. Future improvements could include incorporating competitor pricing and real-time demand signals.