

Objective

- As Singapore's population has grown, so have housing and rental prices, making it difficult for many to find suitable housing. It is difficult for tenants to obtain accurate rental information, which affects their rental decisions.
- Therefore, our goal in building the visual analytic application is to democratize data and analytics to provide tenants with transparent, accurate rental information to help them make more informed rental decisions.
- Through the visual analytic application, we aim to break down information barriers and improve tenants' understanding of the rental market, thereby promoting fairness and transparency in the rental market.
- To achieve the project's objective, our team has employed the following analysis models:
 - Exploratory Data Analysis Model
 - Confirmatory Data Analysis Model
 - Clustering Analysis Model
 - Prediction Models

Data Preparation

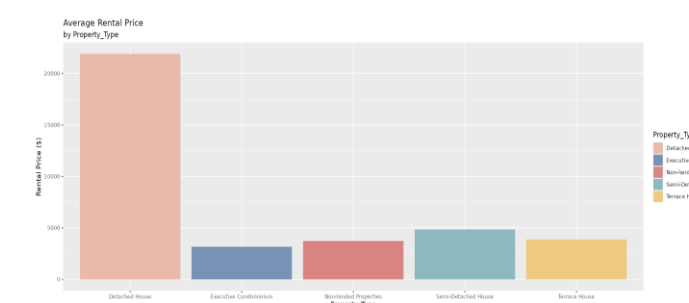
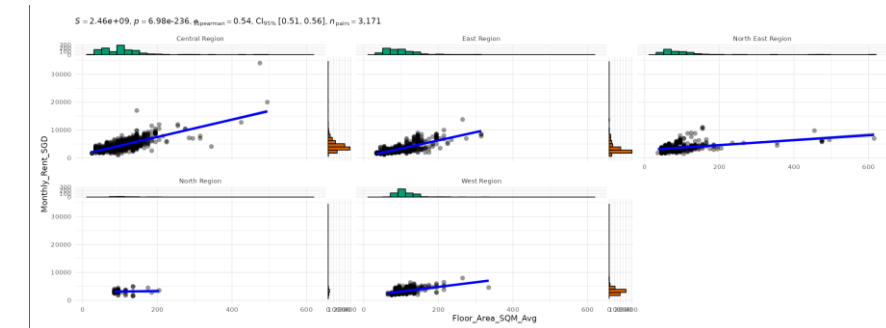
- Source of our data:
 - Urban Redevelopment Authority
 - Singapore's national open data collection
- Main data:
 - Lease Start Date
 - Project Name
 - Street Name
 - Planning Areas
 - Property Type
 - Monthly Rent(SGD)
 - Average Floor Area
 - Number of Bedrooms
 - Nearest MRT Station
 - Distance to MRT
 - Latitude and Longitude
- Our team collect detailed data related to past home rents, consolidate and clean up detailed and diverse data to build a comprehensive dataset that provides a solid foundation for building predictive models. This allows us to gain insight into the factors that affect rents and more accurately predict future rental prices.



Analysis

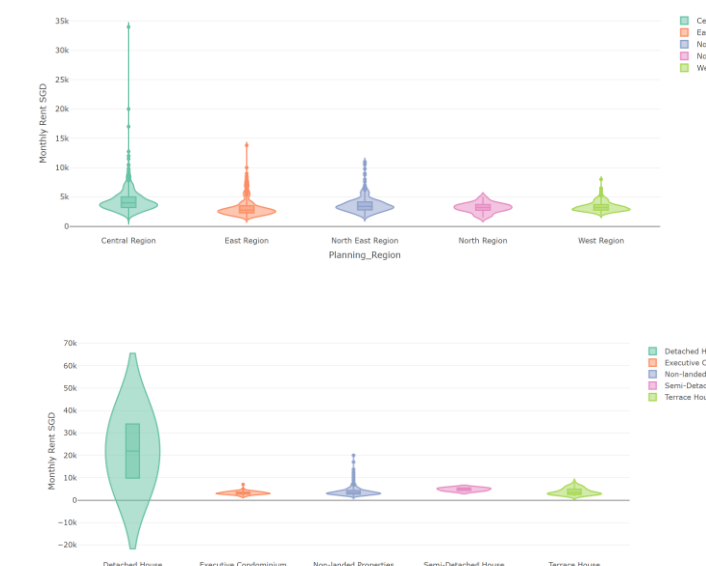
Exploratory Data Analysis

- In correlation analysis, there is a significant positive correlation between the average floor area of a house and the monthly rent, and this relationship is also fully reflected in different planning areas.
- In other words, the larger the average floor area of a house, the higher its monthly rent, and this relationship is consistent across different planning areas.
- In categorical variable analysis, detached houses have the highest rental prices, exceeding \$20,000.
- This suggests that detached houses are likely to be the high-end residential type in the area, often with larger square meters and more luxurious amenities, and therefore relatively high rental prices.



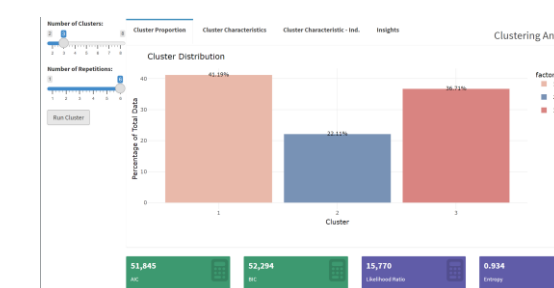
Confirmatory Data Analysis

- The central region has the highest proportion, with rents ranging from the lowest \$1,100 to the highest \$34,000. The median rent in the central region was \$4,000, compared with \$3,200 in Q1 and \$5,021 in Q3. We can see that rents in the central region are relatively concentrated, but there are also some high outliers.
- The highest share of detached houses, with rents ranging from \$9,800 in Q1 to \$34,000 in Q3. The median rent for a detached house is \$21,900. This indicates that detached houses have a higher level of rent and dominate the overall rent distribution.



Clustering Analysis

- When the number of categories is 5 or less, the number of repetitions has a small impact on the statistics, but when the number of categories is more than 5, the BIC score is significantly affected by the number of repetitions.
- In addition, the score trends for AIC and Likelihood Ratio are like those for BIC, but not for Entropy, therefore, models with the lowest BIC score do not always have the best Entropy score.



Prediction Models



Lease Commencement Date
2024-03-22

Distance to School
0.52 2.25229768

Distance to mrt
0.137501448 0.7 2.349158961

Floor Area (SQFT)
350 553 5,900

Property Type
Non-landed Properties

Area
GEYLANG

Predicted Monthly Rent:
3699.9

Prediction Interval:
2883.85 - 4595.94

- For renters, all they need to do is enter the date they want to rent, the distance from the school, the distance from the MRT station, the size of the house they want, the type of property and the area where the house is located.
- Our forecasting model estimates a forecast monthly rental price based on these inputs and provides a forecast rental range.
- For landlords, all they need to do is enter the project name of their house, the date they want to rent it, and the square footage of the house.
 - Our model will provide them with a forecast monthly rental price, while also showing the prices of other homes for rent in the same area with the same project name, giving landlords an idea of how similar homes are renting on the market.

| Project Name | Predicted Monthly Rent |
|--------------|------------------------|
| 1,007 | 3699.9 |
| 1,007 | 3699.9 |
| 1,007 | 3699.9 |
| 1,007 | 3699.9 |
| 1,007 | 3699.9 |

Conclusion & Future Work



- Our project successfully developed a visual analytics application designed to provide transparent and accurate rental information to tenants and landlords in Singapore.
- By leveraging past lease data and advanced predictive modeling techniques, we have created a tool that enables users to make more informed leasing decisions.

FUTURE WORK:

- We plan to enhance the user experience and further optimize the functionality of our application. This may involve integrating more features, such as interactive to better meet users' needs.
- In addition, we plan to expand the scope of our analysis to incorporate more data sources and variables. For example, we will explore the impact of socioeconomic factors, demographic trends or market dynamics on rental prices to gain a more comprehensive understanding of the rental market in Singapore.