



## **TDS3401: Data Visualization**

### **Project: Creating Interactive Visualization**

**Project Title :**

**A Visual Journey through KL-Selangor Rental Market**

**Tutorial Section: TT2L**

**Group 35**

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## **A Visual Journey through KL-Selangor Rental Market**

Renting has grown in popularity as a housing alternative for singles, couples, and families, and its effects on the housing market and society at large cannot be underestimated. Our data visualization project titled, A Visual Journey through KL-Selangor Rental Market, will explore the captivating world of renting in Kuala Lumpur and Selangor. Numerous aspects of the rental market can be illuminated through the power of data visualization, offering a thorough grasp of its dynamics and trends. Efficient analysis of the rental market data is critical for investors and renters to understand the rental market and seek appropriate properties to invest in or live in. We provide a breakdown of the Property Rental Market in the KL-Selangor area through our visualization.

Our visualization includes the following components:

- A dynamic map visualization that enables users to conveniently explore property locations and access relevant details based on their preferences.
- Illustrate the total number of property listings for each property type based on the selected location.
- Analysis of property type counts to identify the most prevalent property type in the selected location.
- Distribution analysis of the number of rooms, parking spaces and bathrooms for each property type based on the selected location.
- Illustrating the pricing hierarchy of property types by their monthly rent based on the selected location.
- Illustrating the growth of property types over time, based on their completion year within the selected location.

## Proposed Dataset

The chosen dataset for this project is '[Rental Pricing Dataset, Malaysia](#)' provided by ARIEWIJAYA on Kaggle. It is a rental pricing dataset surrounding Kuala Lumpur and Selangor, Malaysia. The author collected the data by scraping the website [mudah.my](#), it contains 19,991 rows with 14 columns. Each row represents a rental listing, and each column represents a specific attribute or feature of the rental property including a unique identifier, property name, property completion year, monthly rent, location, property type, number of rooms, number of parking spaces, number of bathrooms, size, furnishing status, facilities, additional facilities, and region.

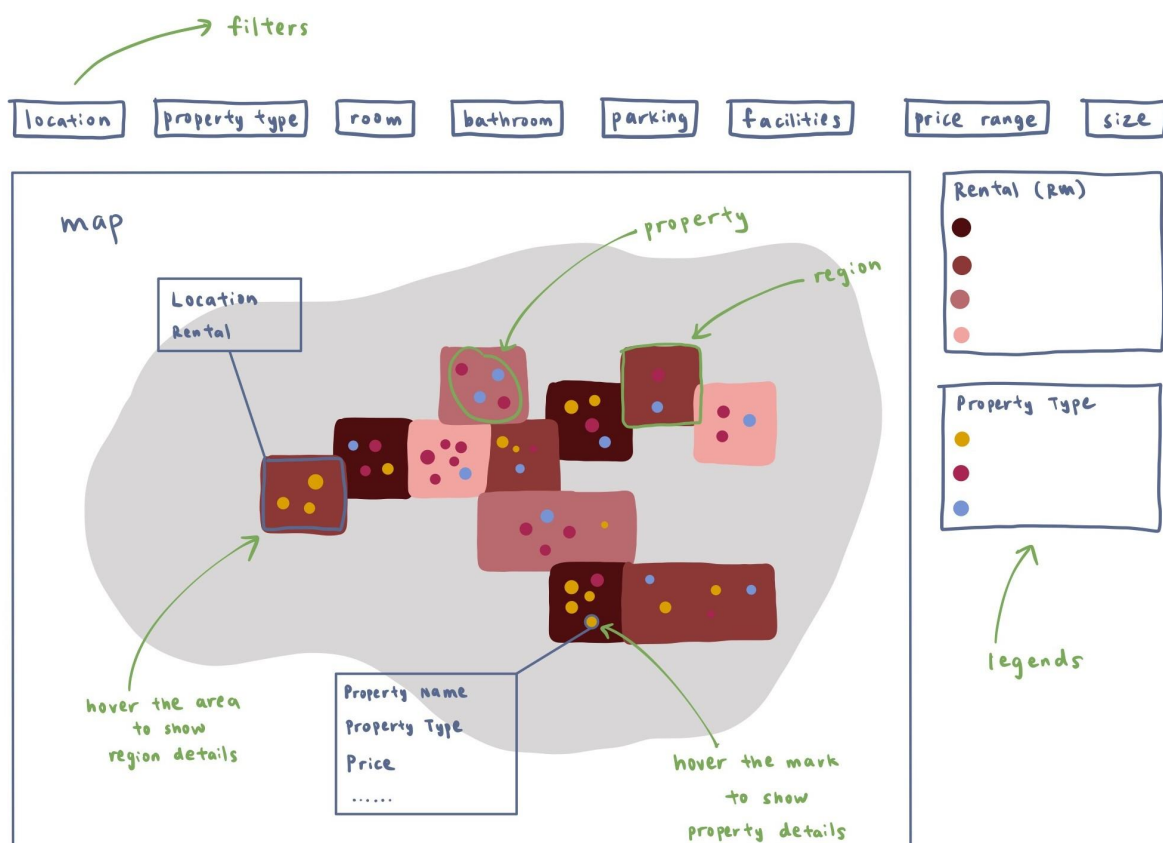
In addition to the rental pricing dataset, we have also collected geospatial data files to enhance our analysis and generate interactive maps. These geospatial data files were obtained from two GitHub repositories. The first repository provides boundary shapefiles for Selangor regions, while the second repository offers shapefiles for Kuala Lumpur regions.

- a. <https://github.com/TindakMalaysia/Selangor-Maps>
- b. <https://github.com/TindakMalaysia/Federal-Territories-Maps>

# Project Description

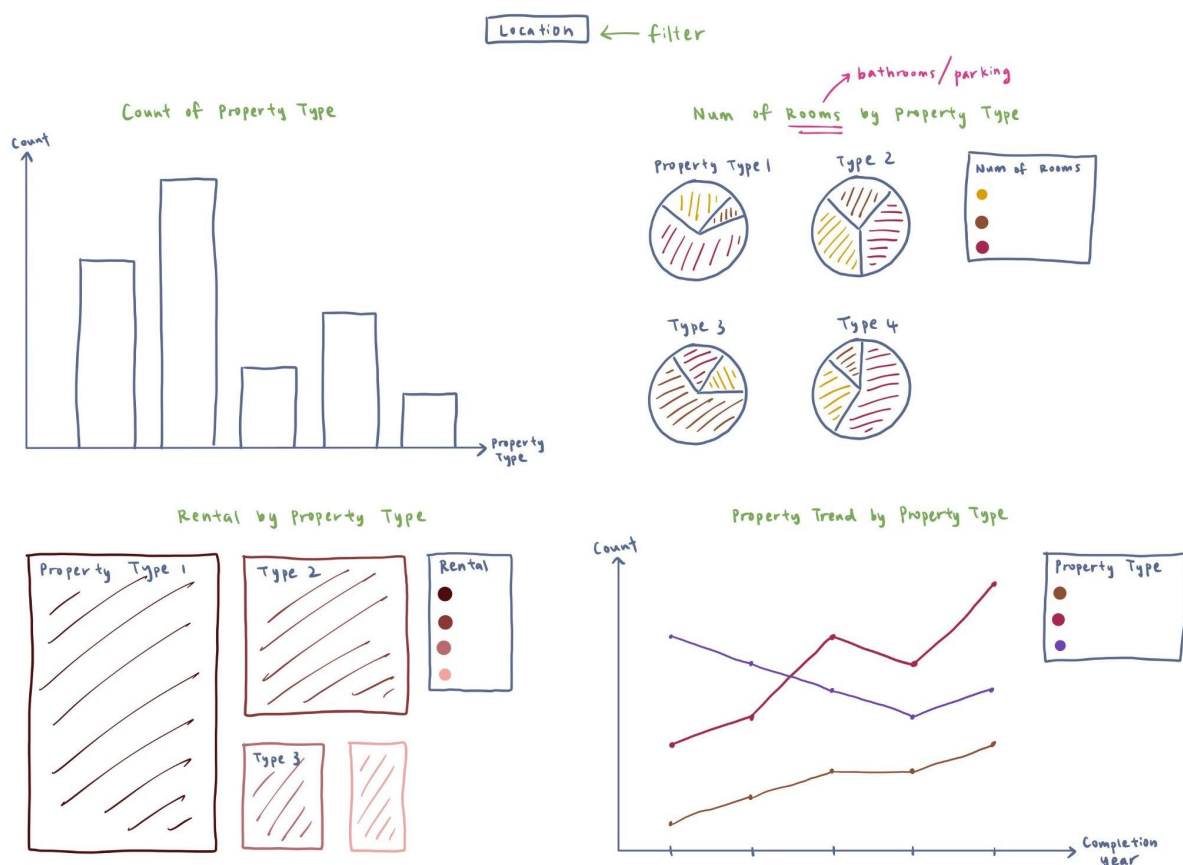
## First Dashboard

In the first dashboard, we will create a 'House Seeker' map visualization that allows users to easily explore property locations and details based on their preferences. We will be using the heatmap to show the average rental in each region, and the marks overlaid on the heatmap represent the property distribution. The map is interactive so when users hover their pointer over a specific region on the map, detailed information about that region will be shown. Similarly, when the pointer hovers over a selected property, its specific details will be displayed. The map visualization is accompanied by various filters, including location, property type, room, and other attributes. Users can select their desired filters, and the map will dynamically update to display properties that meet their criteria. Additionally, on the right pane of the dashboard, legends can be seen.



## Second Dashboard

In this dashboard, we will delve into the analysis based on property types. We plan to plot a bar graph on the count of each property type (upper left), such as apartment, condominium, duplex, etc. This is to find out which property type is the most popular. Other than that, the number of rooms of each property type will be used to plot pie charts (upper right), to gain more insight on the property's characteristics. The number of rooms can also be replaced with the number of parking spaces, bathrooms, or sizes based on which information is needed. Furthermore, a tree map will also be created according to the monthly rent of each property type (lower left). This allows us to explore the typical pricing for each property. A line graph showing the trend of property types will be plotted to show the growth in the number of properties based on the completion year (lower right). A filter function will also be provided if users want to focus the analysis on a specific location.

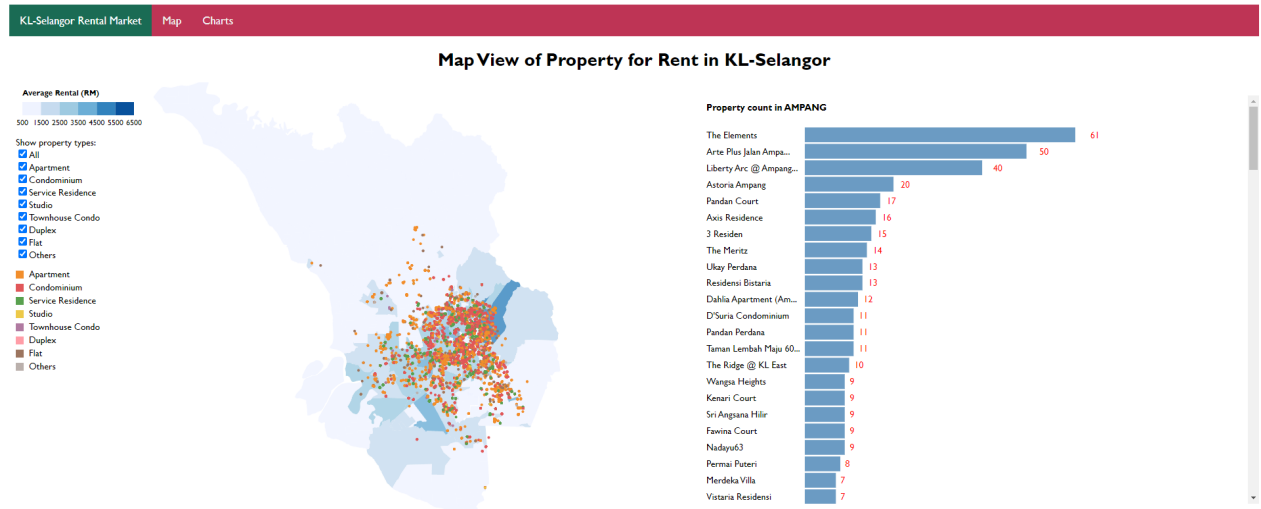


## Changes between the Storyboard and the Final Implementation

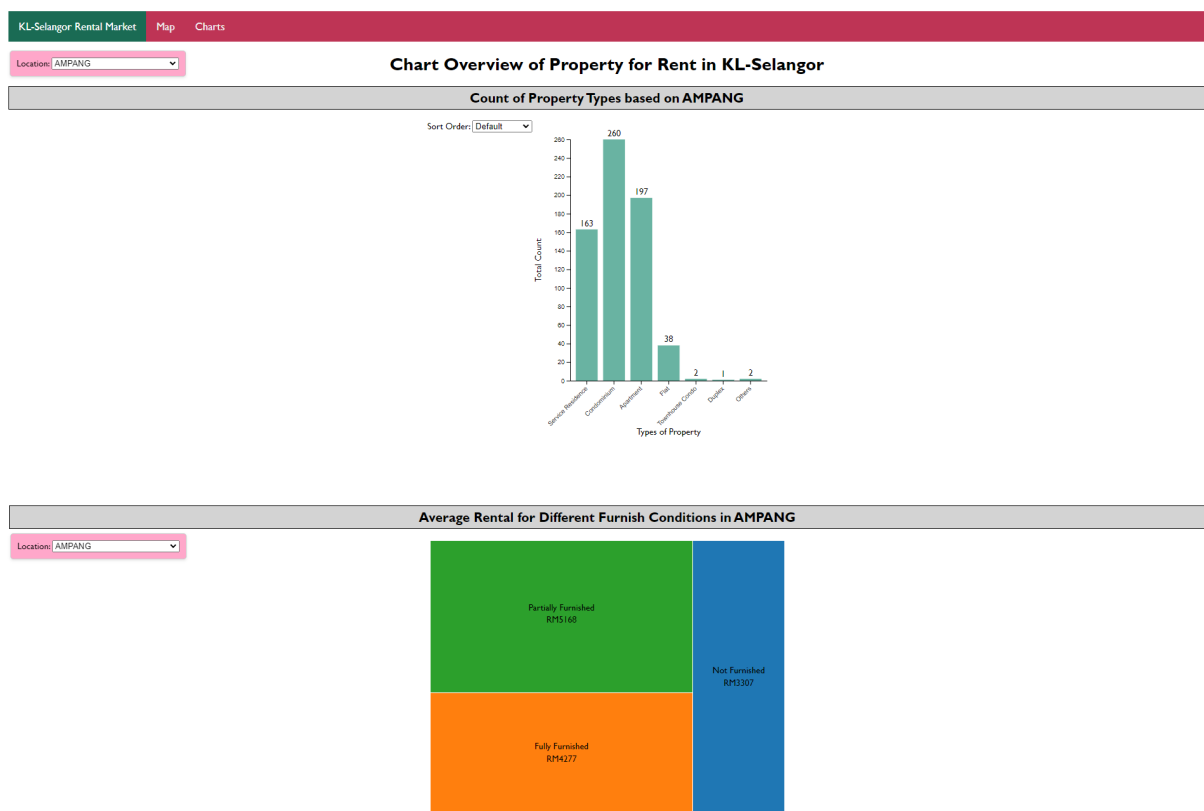
- We have included a navigation bar to improve user browsing in the dashboard. It allows easy navigation between different dashboards.
- In the map visualization, instead of a heatmap, we opted for a choropleth map to represent the average rental prices in different locations. The main filter available in the final implementation is the property type filter. Users can select specific property types, such as apartments, studios, or condominiums, and the map will dynamically plot properties that match the selected criteria.
- We added an additional visualization that corresponds with the map visualization. When users click on a specific location or region on the map, a bar chart is displayed. This bar chart shows the count of properties available in the selected region, providing users with insights into the availability of properties in different areas.
- The layout of the second dashboard has been modified from the original plan of four equal square sections to a vertical storyboard design. This change was implemented to address space limitations and enhance the visibility of the visualizations, allowing users to scroll vertically to explore the content more effectively.
- A floating location filter has been introduced to improve user navigation by providing easy access to select specific locations within the dashboard.
- In the treemap, the different colours originally represented the different average monthly rent for each property type. However, we realized that the monthly rent varied too much to be used to categorize the data. The decision was then made to use the furnishing condition to separate the treemap into 3, which are Fully Furnished, Not Furnished and Partially Furnished, with different colours. This also provided a different perspective on the average monthly rent by property type.

# The Final Implementation

## First Dashboard



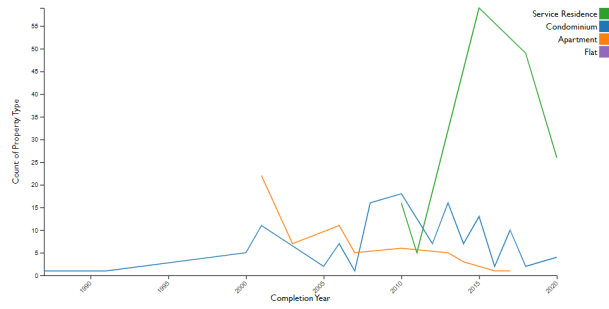
## Second Dashboard





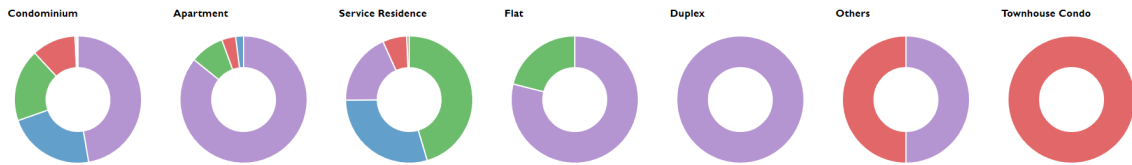
Property Type Count by Completion Year in AMPANG

Location: AMPANG



Number of rooms by Property Types in AMPANG

Filter By: Rooms Bathroom Parking  
0 1 2 3 4 5 6 7 8 9 More than 10



## Development Process

- Before developing our visualization application, we took about 5 hours for the data collection and preprocessing. This includes collecting an external dataset for geocode sources and cleaning the data to remove any outliers, duplicates, null values, etc.
- We also spent around 3 hours constructing the Exploratory Data Analysis so we have a better understanding of the data.
- See Jie was in charge of drawing the storyboard for the proposal and that took about 2 hours. Wei Jie and Chen Zhi were responsible for writing the description of the storyboard and the proposal, it took roughly 1 hour to complete.
- The workload was distributed evenly among us such that each of us had to produce 2 charts. See Jie was in charge of the map and its corresponding bar chart. Wei Jie was in charge of the donut chart and bar chart. Chen Zhi was in charge of the tree map and line chart.
  - See Jie
    - Generating map: 5 hours
    - Filtering function: 3 hours
    - Map bar chart: 2 hours
    - Interaction between map and bar chart: 8 hours
    - Alignment and styling: 4 hours
    - Transition: 2 hours
  - Chen Zhi
    - Generating line chart: 4 hours
    - Line chart transition: 2 hours
    - Generating treemap: 4 hours
    - Treemap interaction: 4 hours
    - Treemap transition: 5 hours
    - Filtering function: 3 hours
  - Wei Jie

- Generating bar chart: 4 hours
- Generating donut chart: 6 hours
- Filtering function: 4 hours
- Bar chart transition: 3 hours
- Donut chart transition: 8 hours
- Combining all visualisation into dashboards: 12 hours
- There were a few aspects of the visualization that took a lot of time. One of them was applying transitions on some of the charts. For example, the transition in the treemap, donut chart and construct interaction between the map and bar chart took a huge amount of time and formulation. Furthermore, applying interaction and fixing the alignment in the dashboards were some of the most time-consuming tasks in this project, such as arranging the charts and filtering them according to the location in a dashboard.