Data Analysis Project:
Australian Real Estate

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PURPOSE AND SCOPE

Australian Real Estate Dataset (Primary Dataset)

The purpose of this EDA is to explore and analyse a real estate dataset to understand underlying patterns, relationships and trends withing the data.

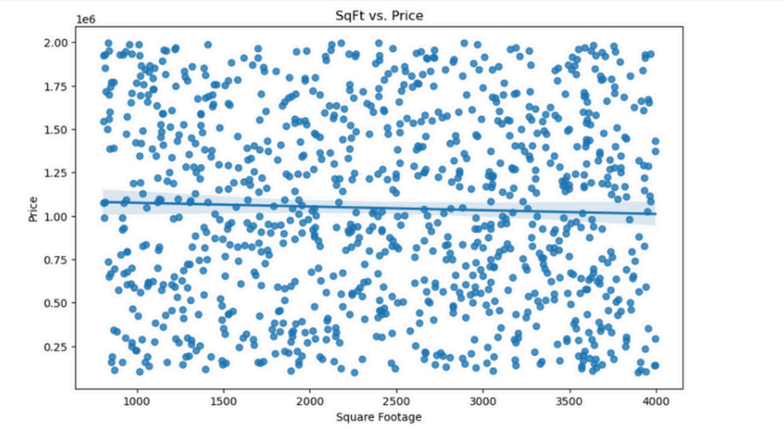
Key questions we tried to analyze.

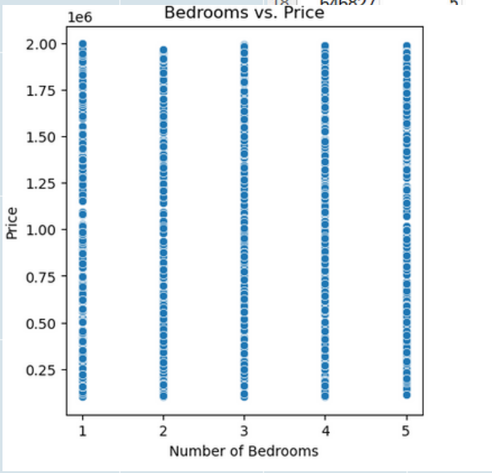
- What is the average price of properties in different cities?
- How does the price distribution look, and are there any outliers?
- Which features, such as the number of bedrooms, bathrooms, and square footage, are most strongly correlated with the price?

Change of Primary Dataset

- First attempt of choosing the data
- significant inconsistencies
- no-corerelation between the columns
- no outliers
- Data distibution

	A	B	C	D	E	F	G	H	I	J
1	Price	Bedrooms	Bathrooms	SqFt	City	State	Year_Built	Type	Garage	Lot_Area
2	982112	4	1	1561	Adelaide	QLD	2021	Townhouse	0	1357
3	571388	3	2	3735	Melbourne	VIC	1999	House	1	8397
4	866821	5	1	2032	Sydney	VIC	1976	Townhouse	0	3478
5	1230977	4	3	3861	Brisbane	SA	1978	House	0	7619
6	241787	4	2	3150	Perth	SA	1992	Apartment	0	8324
7	631871	4	2	1923	Brisbane	SA	2002	House	1	6638
8	550777	4	1	829	Adelaide	QLD	2022	Townhouse	0	2752
9	1509971	1	1	2447	Brisbane	QLD	1967	Apartment	1	2792
10	935088	4	2	3652	Melbourne	QLD	1985	House	0	1645
11	999053	1	1	3114	Sydney	NSW	1962	House	0	4195
12	679189	4	3	2891	Sydney	WA	1999	Apartment	0	2827
13	977320	1	1	2218	Adelaide	QLD	1972	Apartment	0	8425
14	901416	4	3	1771	Brisbane	QLD	1995	Apartment	1	8587
15	911184	4	3	3855	Sydney	WA	1955	House	0	5090
16	945381	3	2	1672	Brisbane	QLD	1989	House	0	9937
17	1453282	5	3	1842	Melbourne	NSW	1993	Townhouse	0	1298
18	646827	5	2	2211	Melbourne	NSW	1988	House	1	5629
			2	810	Melbourne	NSW	2013	Townhouse	1	7482
			2	1359	Adelaide	QLD	1991	House	0	9376
			1	1233	Adelaide	NSW	1964	Townhouse	0	7669
			1	1465	Brisbane	SA	1966	House	0	7456
			3	2231	Brisbane	QLD	1995	House	0	8726
			3	3578	Brisbane	QLD	1991	House	0	9936





Redefined Purpose And Scope

Northern Territory region -Property price (New Dataset)

we decided to pivot our focus to the Northern Territory (NT) region of Australia.
we redefined our goal and aimed to explore and analyze NT real estate market to understand underlying patterns, relationships and trends within the data.

Key questions we tried to analyze.

- What is the distribution shape of real estate prices in the northern territories ?
- Which property type has the highest demand in the Northern Territory market.
- How does different features (bedrooms, bathrooms, carpark) influence the price of the properties ? And how it correlated ?
- Compare the market share of different real estate agencies
- what is the Average Listing Price by Top 10 Agencies?

OUR FRAMEWORK

DataSet

1. Identify the right data to use

Scope

2. Determine the scope of analysis

Data Preparation

3. Clean and prepare the data

Data Exploration

4. Familiarize with data, Check the distributions, analyze basis statistics

Analysis & Visualisation

5. Do analysis and solve the key questions. Use visualization to show the outcomes.

Summarize

6. Summarize all the findings and insights from the analysis

Data cleaning

index	TID	property_type	price	location_type	location_name	city	state	latitude	longitude	product_depth
8	1350996	Unit	$439,000	Buy	$439,000	Darwin City	NT			premiere
9	1350997	Apartment	$455,000	Buy	$455,000	Darwin City	NT			premiere
10	1350998	Apartment	$280,000	Buy	$280,000	Darwin City	NT			premiere
11	1350999	Apartment	Openn Negotiation	Buy	Openn Negotiation	Darwin City	NT			premiere
12	1351000	Unit	PRICE GUIDE $439,000	Buy	PRICE GUIDE $439,000	Darwin City	NT			premiere
13	1351001	House	$775,000	Buy	$775,000	Darwin City	NT			premiere
14	1351002	Apartment	$625,000	Buy	$625,000	Darwin City	NT			premiere

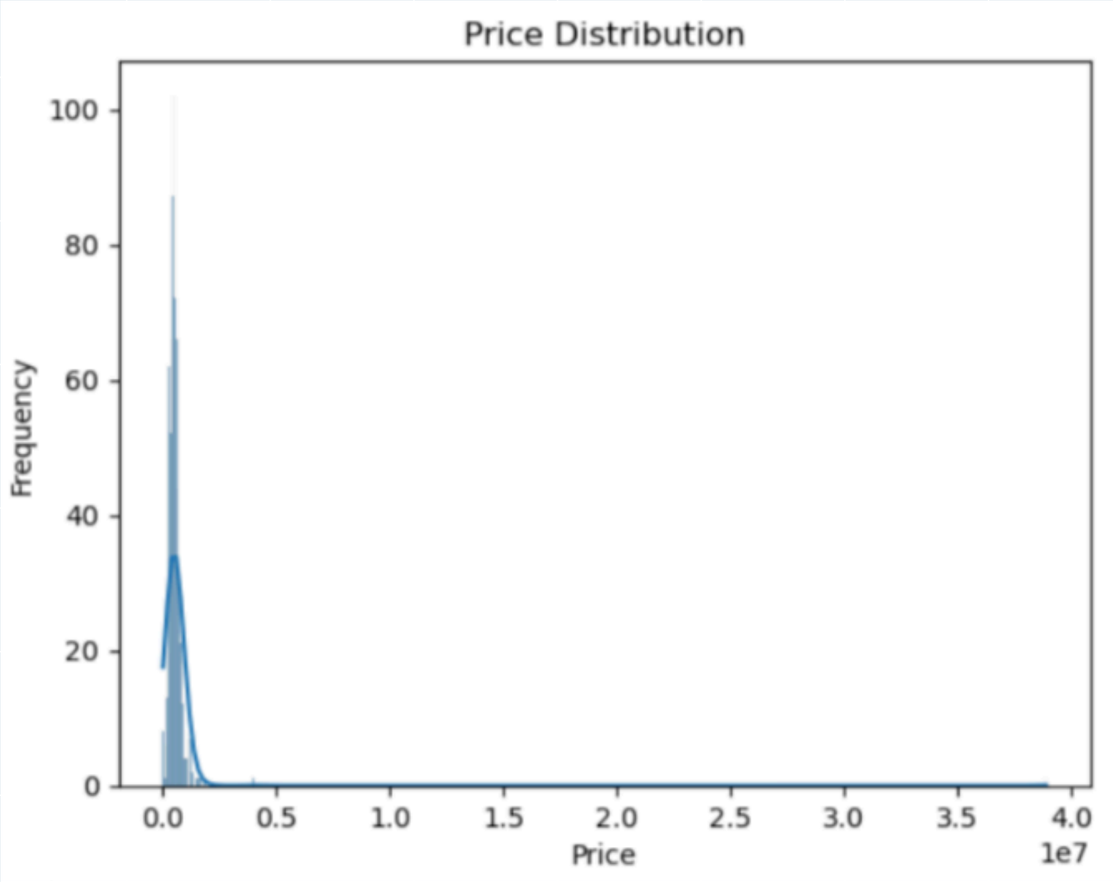
Shape of Dataset : 1000 rows : 27 Columns

- Dropped irrelevant columns ,
  columns with constant values ('state', 'RunDate') , and
  those with a high similarity to other columns ('price', 'location_name')
- Dropped rows with missing values
- Formatted data type of price column (Overs Over $599,000 Considered) to 599000
- Identified number of outliers: 42 , removed those records
- Post-cleaning, we were left with 702 rows and 10 columns

Statistical Analysis Techniques Used

- Hypothesis Test
- Outlier Detection and Removal (IQR Method)
- Linear Regression Analysis
- Visualization through Scatter Plots and Bar Charts

Price distribution in Northern Territory

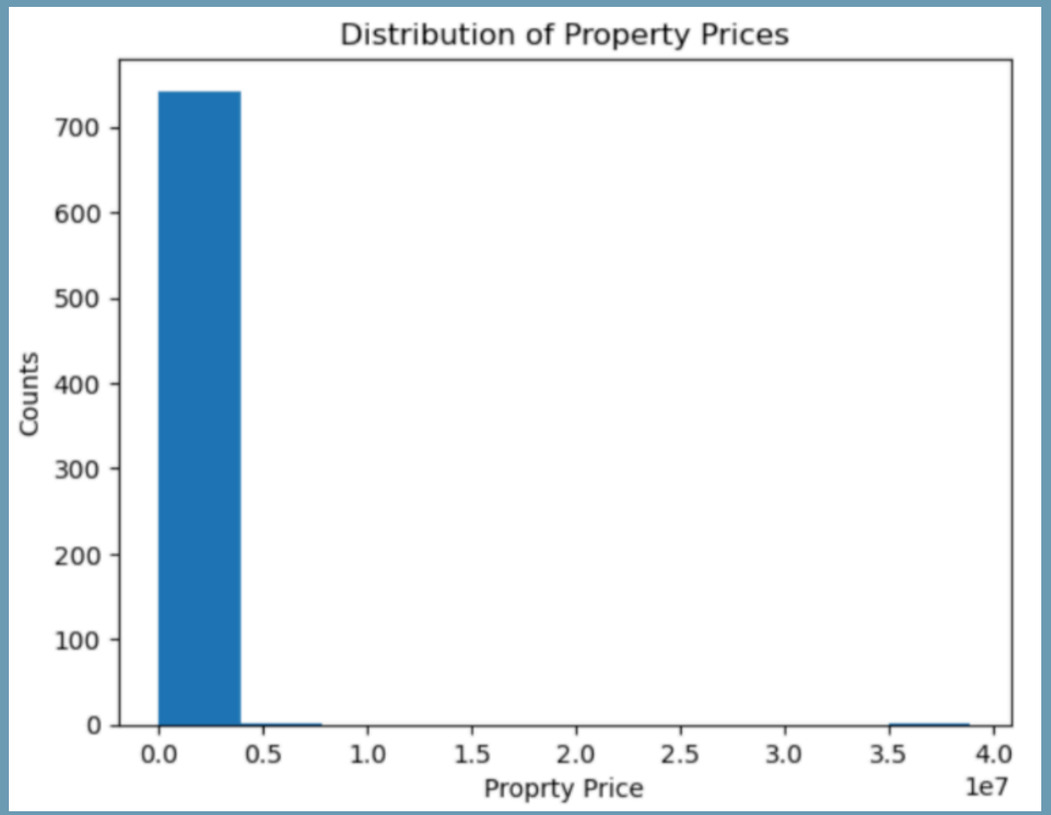


Question:
What is the distribution shape of real estate prices in the Northern Territory.

Null hypothesis:
Property prices are normally distributed.

Alternative hypothesis:
Property prices are not normally distributed

Price distribution in Northern Territory

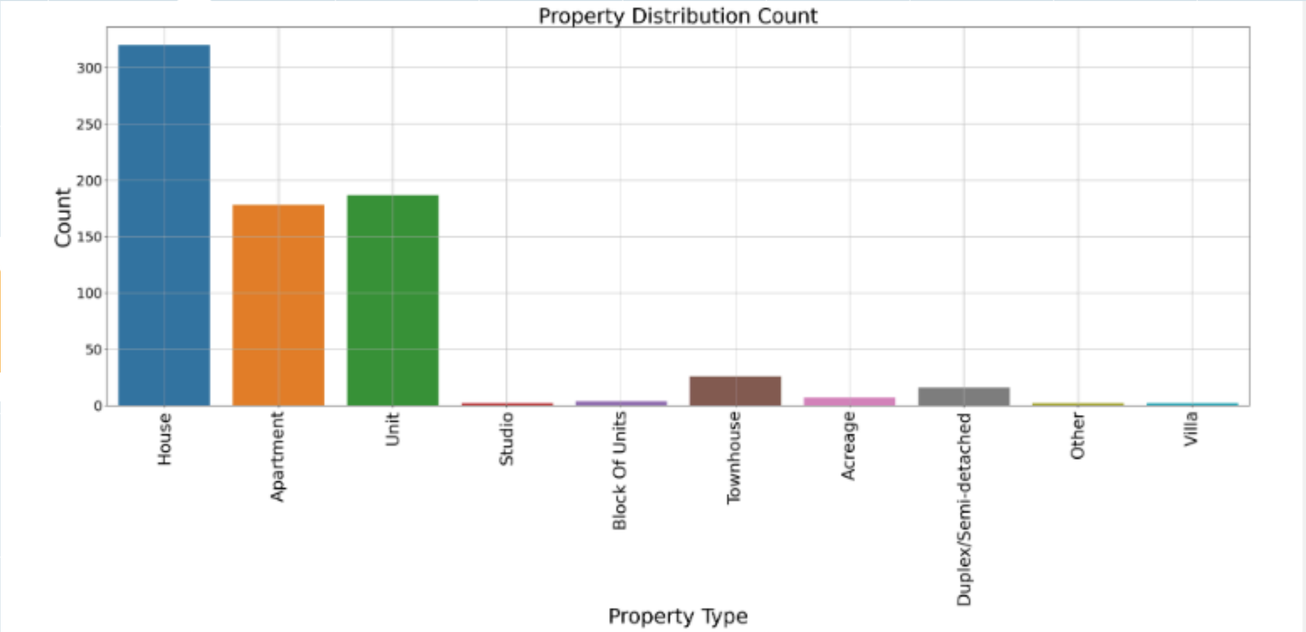


- Reject null hypothesis:
  - P-value of 0.000566
  - As the data is not normally distributed.
- Right-Skewed Distribution:
  - Most properties are priced at the lower end
- Most Common Price Range:
  - It lies in between 0 and 0.5 million AUD.
- Presence of Outliers:
  - A few high-priced properties extends up to 38.9 million AUD.

	price	location_number	zip_code	bedroom_count	bathroom_count	parking_count
count	736.00	7.360000e+02	736.00	736.00	736.00	736.00
mean	581085.26	1.415119e+08	816.22	2.76	1.69	2.07
std	1437865.65	4.161221e+07	13.67	1.09	0.60	1.47
min	99950.00	1.085305e+08	800.00	0.00	1.00	0.00
25%	383750.00	1.386080e+08	800.00	2.00	1.00	1.00
50%	490000.00	1.389919e+08	812.00	3.00	2.00	2.00
75%	612725.00	1.392750e+08	830.00	3.00	2.00	2.00
max	38900000.00	7.001996e+08	839.00	8.00	5.00	12.00

*1. Price Statistics: -Price Range: The minimum price is AUD 99,950 , maximum price is 38900000.00

Which property type has the highest demand in the Northern Territory market



- Under the sample data, house is the most common property type (> 300 counts).
- Apartment and Unit have similar counts (slightly below 200).
- Townhouse has a notable count but is significantly less than House, Apartment, and Unit.
- Other property types (Studio, Acreage, Duplex/Semi-detached, Other, Villa) have very low counts, with Villa being the least common.

Conclusion:

- Houses dominate the market, indicating higher availability and preference for this property type.

Count of the property type

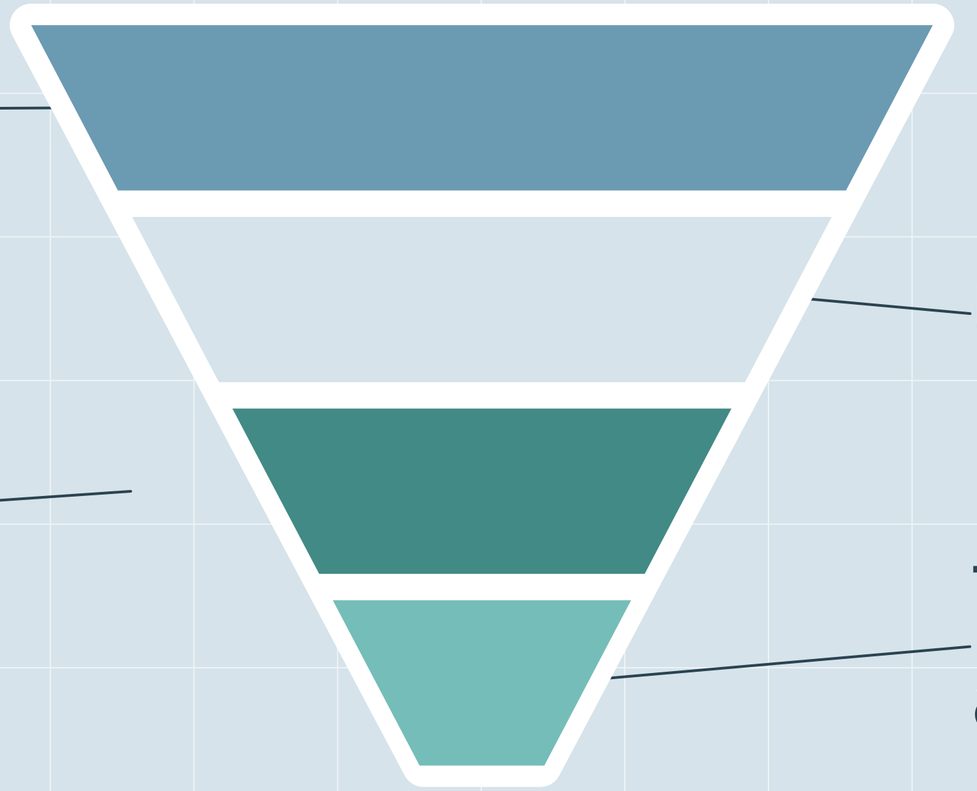
House

House is the highest number in NT

Unit

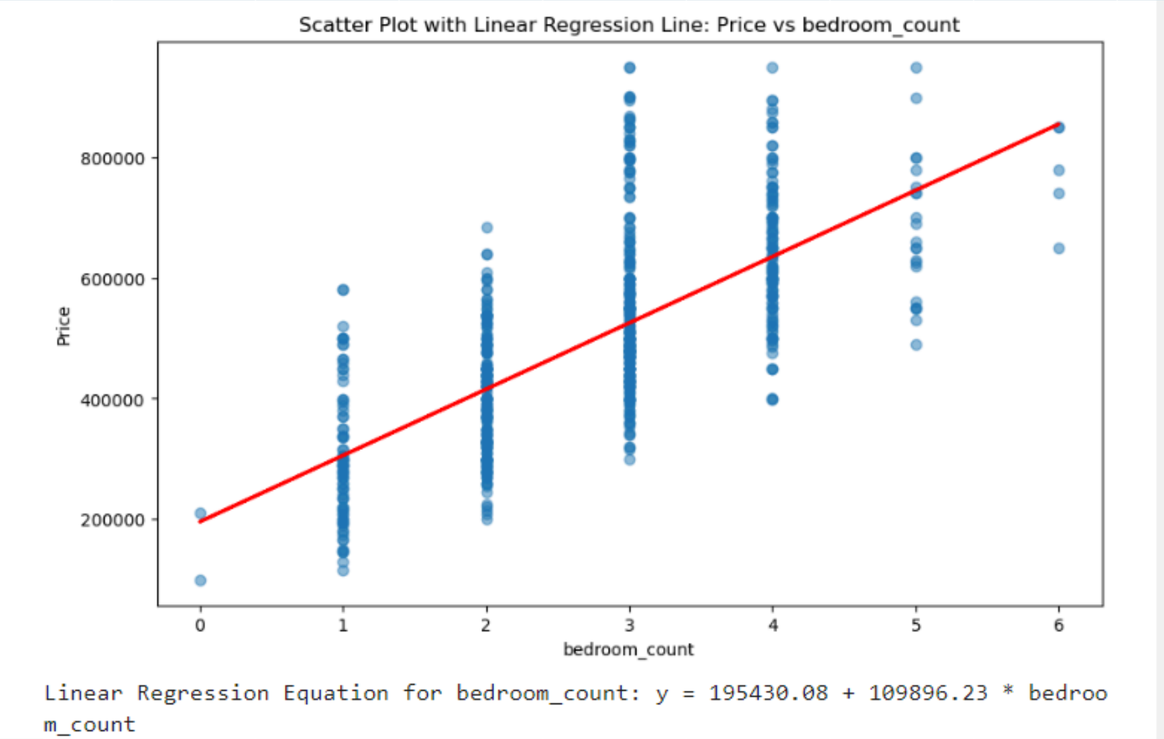
Apartment

Townhouse and others



How does different features influence the price of the property?

Is there any correlation between number of bedrooms and property price?

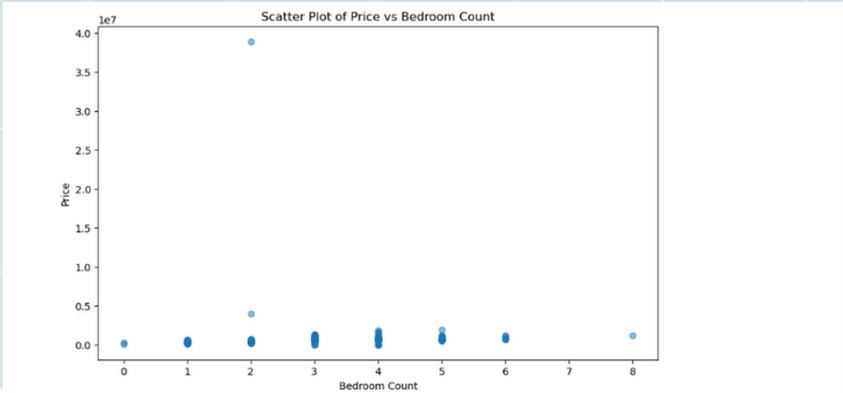


Linear Regression Equation for bedroom_count: y = 195430.08 + 109896.23 * bedroom_count

- There is extreme values that deviate significantly from the rest of the data we have remove those outliers.
- Removing Outliers: Helps in improving the model accuracy (below scatterplot
- formula: y= 195430.08 + 109896.23 * bedroom count
  1 bedroom more, $109k more on the property price

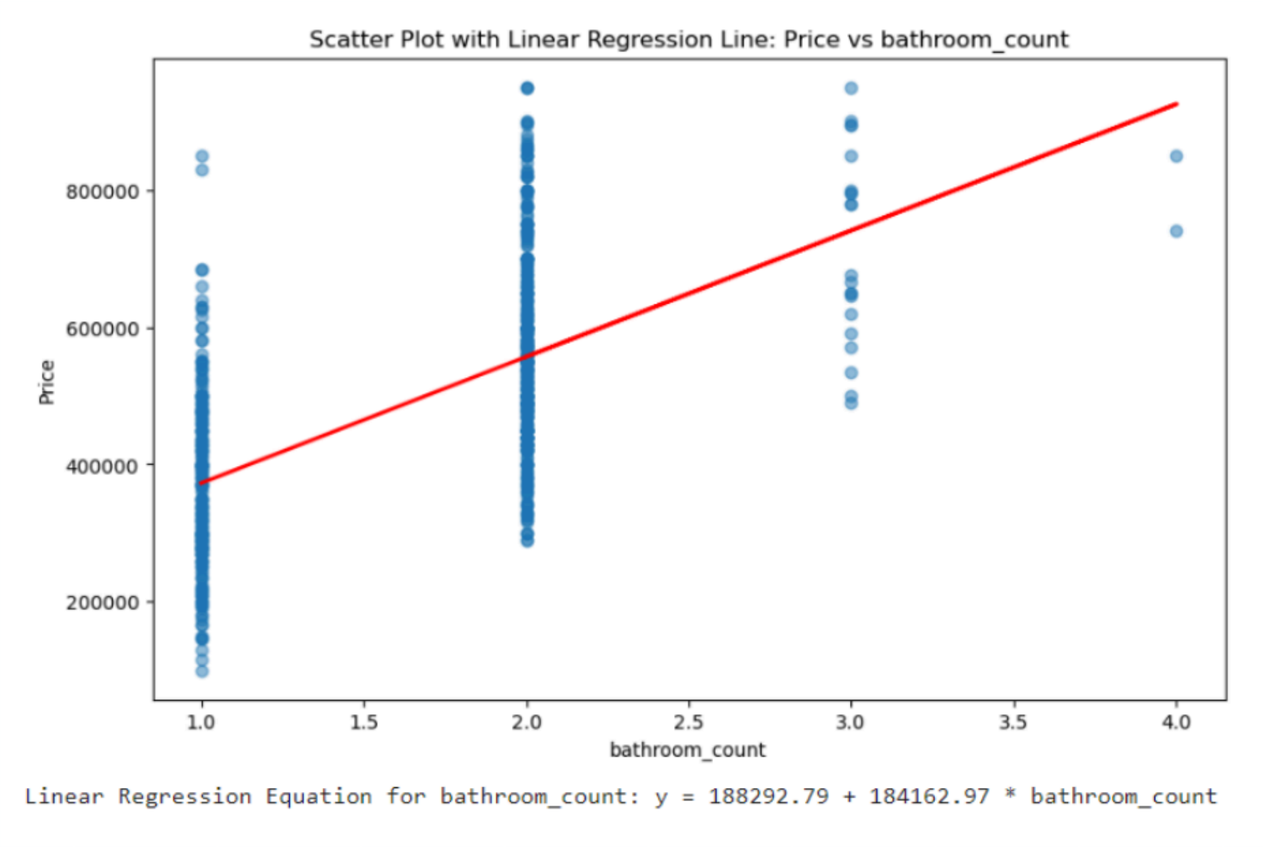
Clear positive correlation observed.

- Conclusion: More bedrooms generally lead to higher property prices.



How does different features influence the price of the properties ?And how it correlated ?
Bathroom vs Price

Is there any correlation between number of bathrooms and property price?

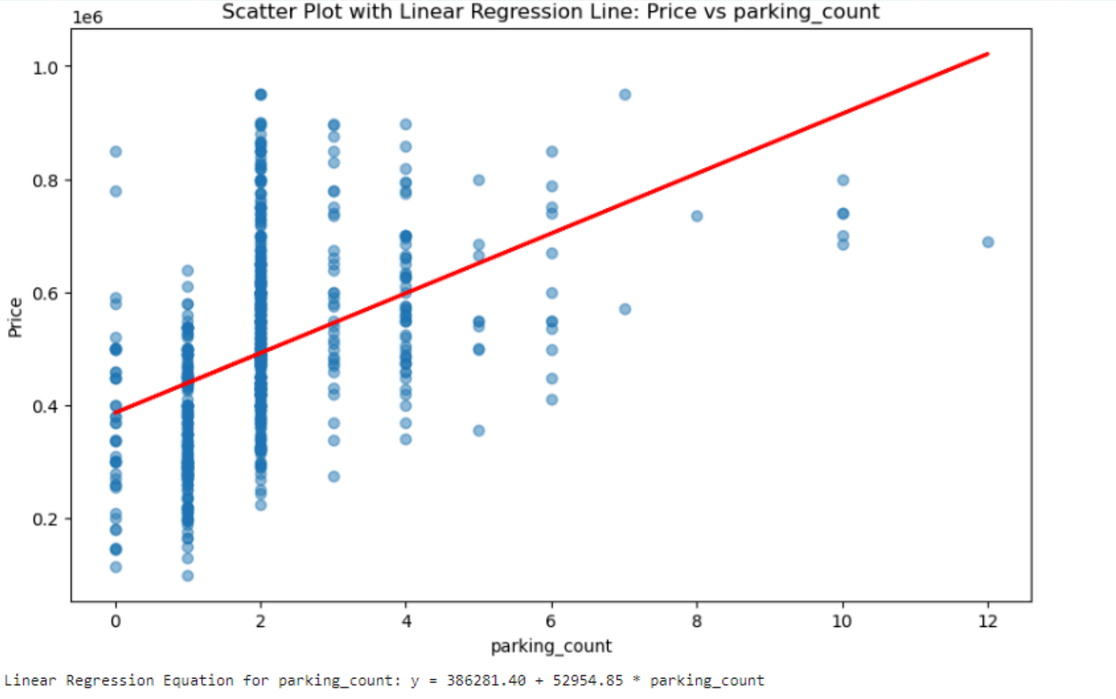


- Positive correlation observed.
- y= 188292.79 + 184162.97 * bathroom count
- 1 bathroom more, $184k more on the property price

- Conclusion: More bathrooms correlate with higher property prices.

How does different features influence the price of the properties ?And how it correlated ? Parking vs Price

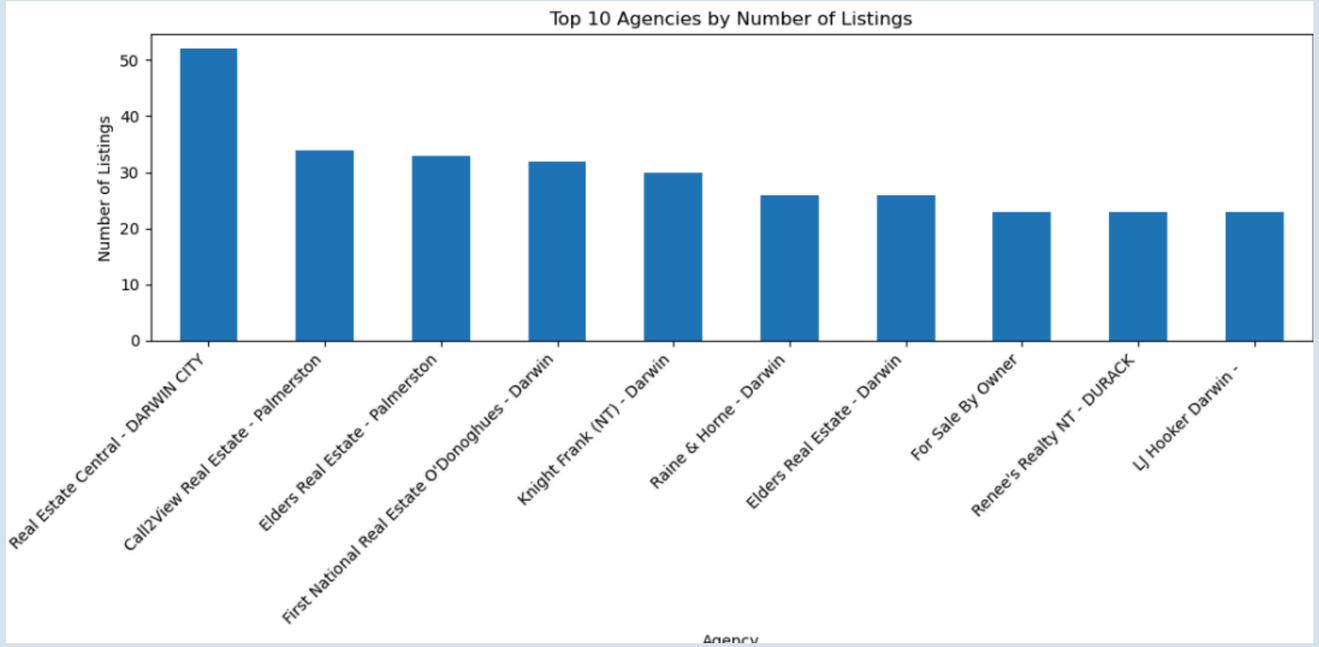
Is there any correlation between number of parking and property price?



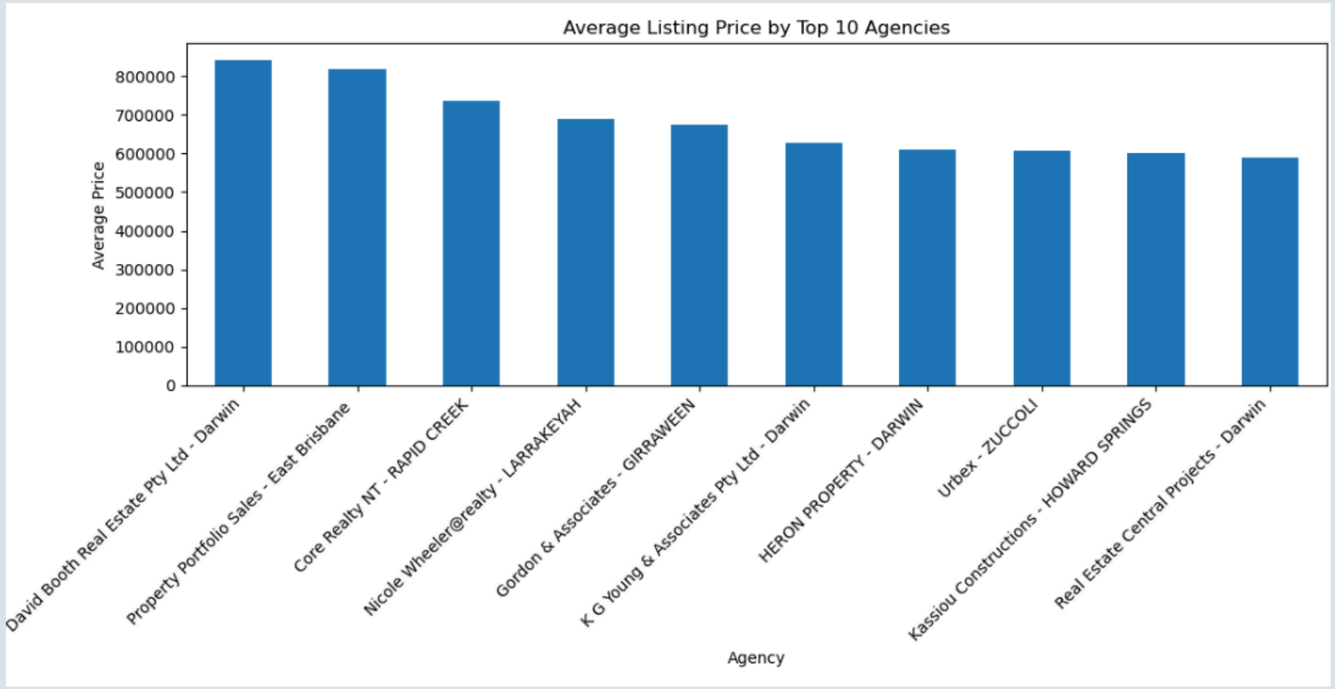
- Positive correlation observed.
- y= 386281.40 + 52954.85 * parking count
- 1 parking more, $52k more on the property price

- Conclusion: More parking spaces correlate with higher property prices.

Kajal



Here is the quick comparison of the market share of top 10 real estate agencies in terms of active property listings.



Average listing price of top 10 real estate agencies in the area, with some agencies seemingly specializing in higher-end properties while others focus on more moderately priced listings.

Summary

- As part of the project scope, the project team has identified dataset that has real estate information of Northern Territory region. The data was then cleansed, explored and analyzed to understand the patterns, relationships and trends within this region.

- Three focus areas of our analysis Price Distribution (selected properties ranging from 99,950 to 38million), P*roperty Distribution, Agency distribution*

- ***The data was presented visually by various graphs as you have seen in the previous slides,***

    - From the **Property distribution** graph, it is clear that houses are the highest in demand followed by units and apartments. Indicating that units are more expensive than apartments (Alternative hypothesis --> true)

    - **Price distribution** graph shows that prices are highly concentrated in lower end and few properties prices are in the high range, proving that the price distribution is not normally distributed (alternative hypothesis --> true)

Summary

- Various linear regression plots are created with price in comparison to various features like bedroom count, bathrooms and they are strongly correlated with the price
    - Positive slope: The red regression line has a clear upward slope, indicating that as the number of bed/bathrooms increases, the price also increases
- Finally, some analysis was carried out and presented in terms of agencies operating in NT along with their market share in each segment.

Overall, the data presented in this slide pack can be effectively used by real investors, which helps them make an informative decision.

Thank you