



# Influences on Perth Housing Prices

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GROUP 5 – PROJECT 1

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# Introduction

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- This project utilises a Perth housing dataset to analyse influences Perth housing prices trends from 1990 to 2020.
- Aims to answer influences on the prices of properties in the Perth housing market

The data set consists of data from 322 Perth suburbs from Kaggle. The data set contains the following parameters:

	ADDRESS	SUBURB	PRICE	BEDROOMS	BATHROOMS	GARAGE	LAND_AREA	FLOOR_AREA	BUILD_YEAR	CBD_DIST	NEAREST_STN	NEAREST_STN_DIST	DATE_SOLD	POSTCODE	LATITUDE	LONGITUDE	NEAREST_SCH	NEAREST_SCH_DIST	NEAREST_SCH_RANK
0	1 Acorn Place	South Lake	565000	4	2	2.0	600	160	2003.0	18300	Cockburn Central Station	1800	09-2018lr	6164	-32.115900	115.842450	LAKELAND SENIOR HIGH SCHOOL	0.828339	NaN
1	1 Addis Way	Wandi	365000	3	2	2.0	351	139	2013.0	26900	Kwinana Station	4900	02-2019lr	6167	-32.193470	115.859554	ATWELL COLLEGE	5.524324	129.0
2	1 Ainsley Court	Camillo	287000	3	1	1.0	719	86	1979.0	22600	Challis Station	1900	06-2015lr	6111	-32.120578	115.993579	KELMSCOTT SENIOR HIGH SCHOOL	1.649178	113.0
3	1 Albert Street	Bellevue	255000	2	1	2.0	651	59	1953.0	17900	Midland Station	3600	07-2018lr	6056	-31.900547	116.038009	SWAN VIEW SENIOR HIGH SCHOOL	1.571401	NaN
4	1 Aman Place	Lockridge	325000	4	1	2.0	466	131	1998.0	11200	Bassendean Station	2000	11-2016lr	6054	-31.885790	115.947780	KIARA COLLEGE	1.514922	NaN

# Cleaning of data

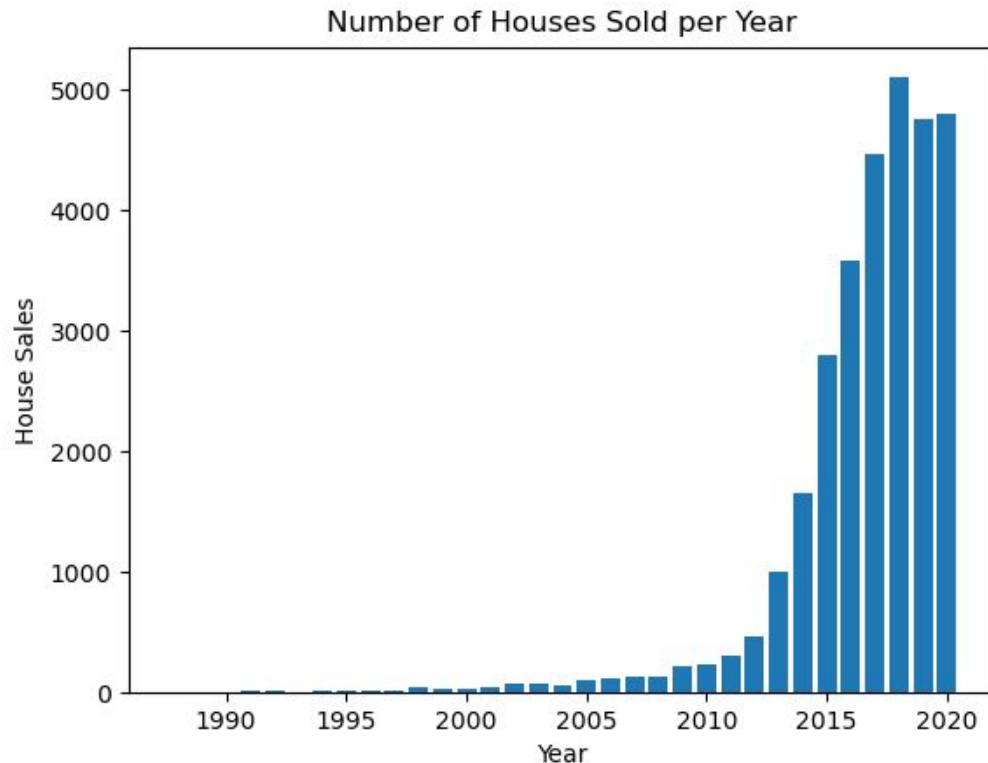
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	SUBURB	PRICE	BEDROOMS	BATHROOMS	LAND_AREA	BUILD_YEAR	CBD_DIST	NEAREST_STN	NEAREST_STN_DIST	DATE_SOLD	POSTCODE	LATITUDE	LONGITUDE	NEAREST_SCH	NEAREST_SCH_DIST
0	South Lake	565000	4	2	600	2003	18300	Cockburn Central Station	1800	2018-09-01	6164	-32.115900	115.842450	LAKELAND SENIOR HIGH SCHOOL	828
1	Wandi	365000	3	2	351	2013	26900	Kwinana Station	4900	2019-02-01	6167	-32.193470	115.859554	ATWELL COLLEGE	5524
2	Camillo	287000	3	1	719	1979	22600	Challis Station	1900	2015-06-01	6111	-32.120578	115.993579	KELMSCOTT SENIOR HIGH SCHOOL	1649
3	Bellevue	255000	2	1	651	1953	17900	Midland Station	3600	2018-07-01	6056	-31.900547	116.038009	SWAN VIEW SENIOR HIGH SCHOOL	1571
4	Lockridge	325000	4	1	466	1998	11200	Bassendean Station	2000	2016-11-01	6054	-31.885790	115.947780	KIARA COLLEGE	1514

- Removal of null values.
- Removal of irrelevant columns for analysis the following was removed from the dataset: address, garage, floor area and school ranking (only in the initial data set as it had too many null values)
- Adjusting distance unit to be consistent, all distances converted to meters.
- Formatting of values e.g. Date sold to datetime and numbers to integers

# Housing Background

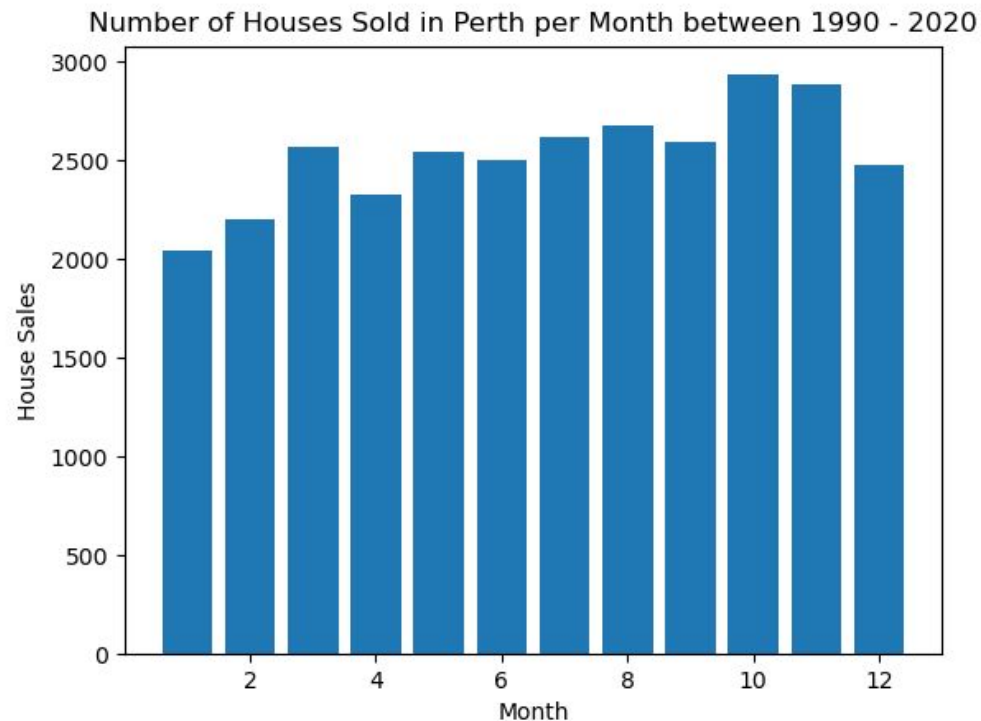
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- After the exponential growth in house sales until 2018, sales have been slow in the subsequent two years.
- Sales during the covid year of 2020 seem to be strong despite the lockdowns.

# Housing Background

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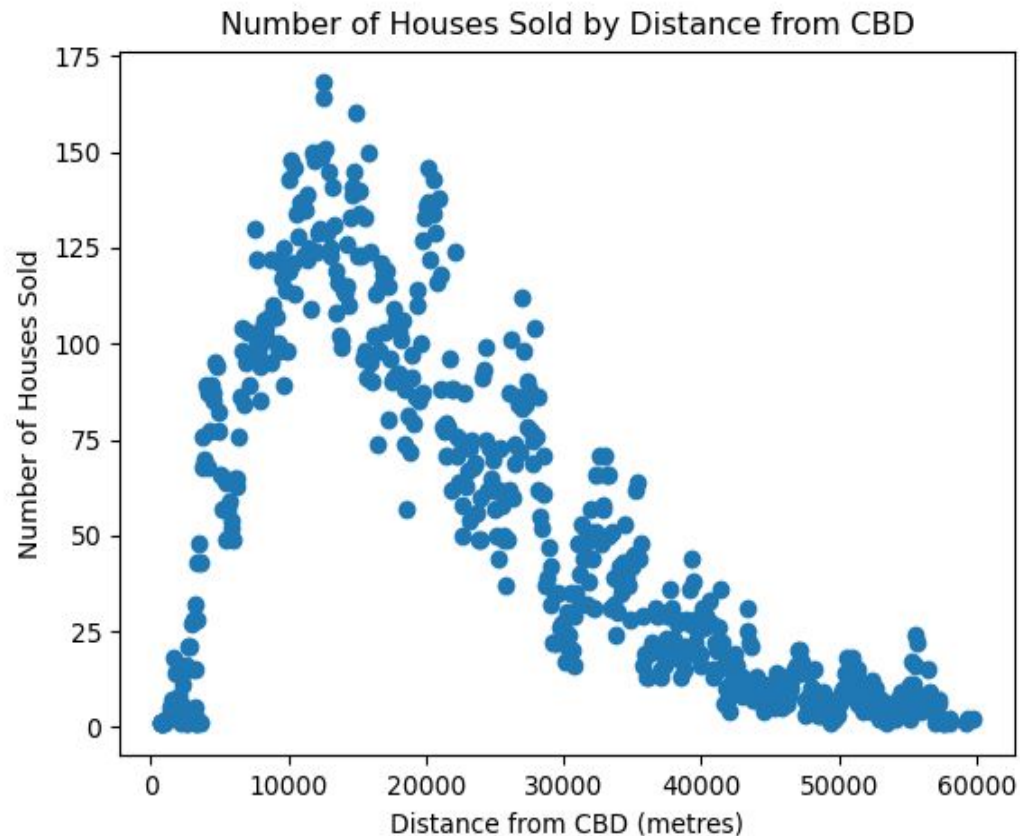


- Over the last decade, October and November seem to have the most number of sales.
- People might be closing in the sales before heading into the holiday season.
- This could potentially be why the volumes are lower at the beginning of the year.



# Housing Background

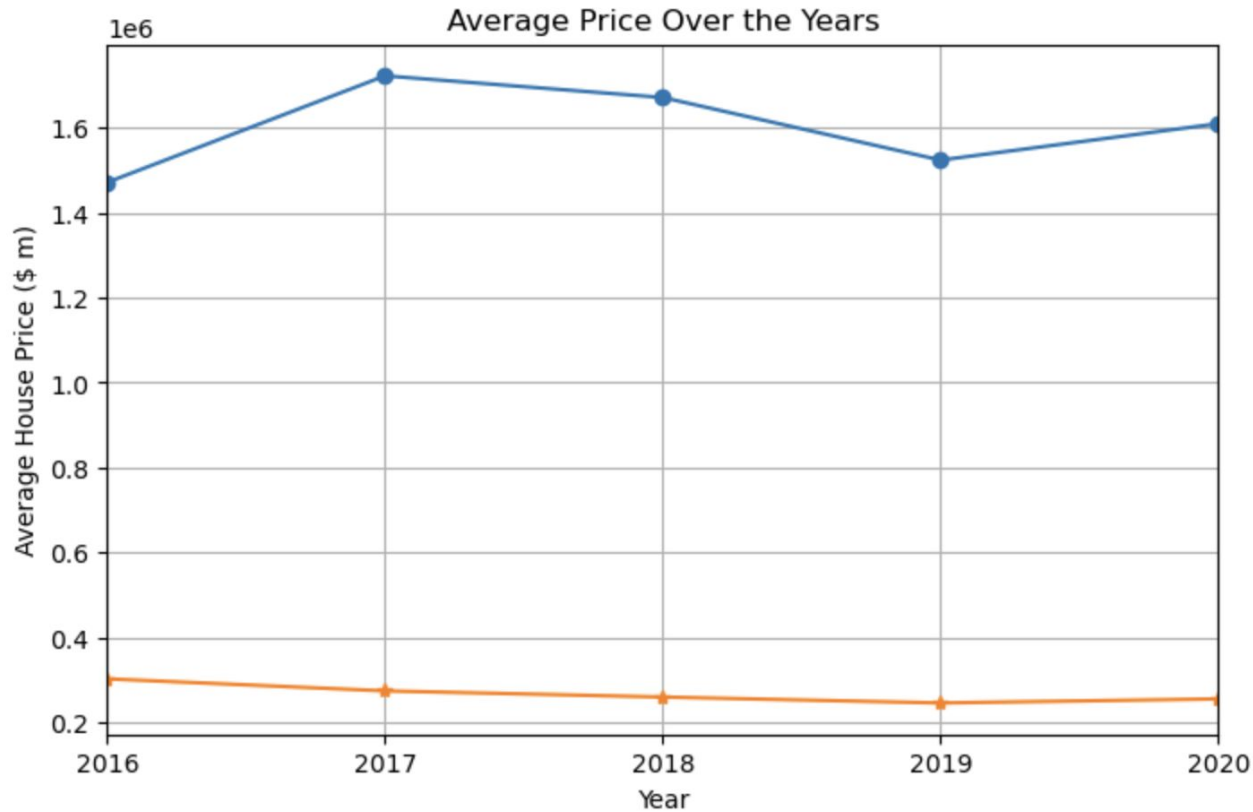
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- Most sales seem to be occurring in the 10-20 km radius from the city.
- Inner city suburbs are saturated and have limited inventory changing hands.
- New suburbs/hot-spots are in the 20-30 km radius. This is where the majority of the new construction is happening.

# Housing Background

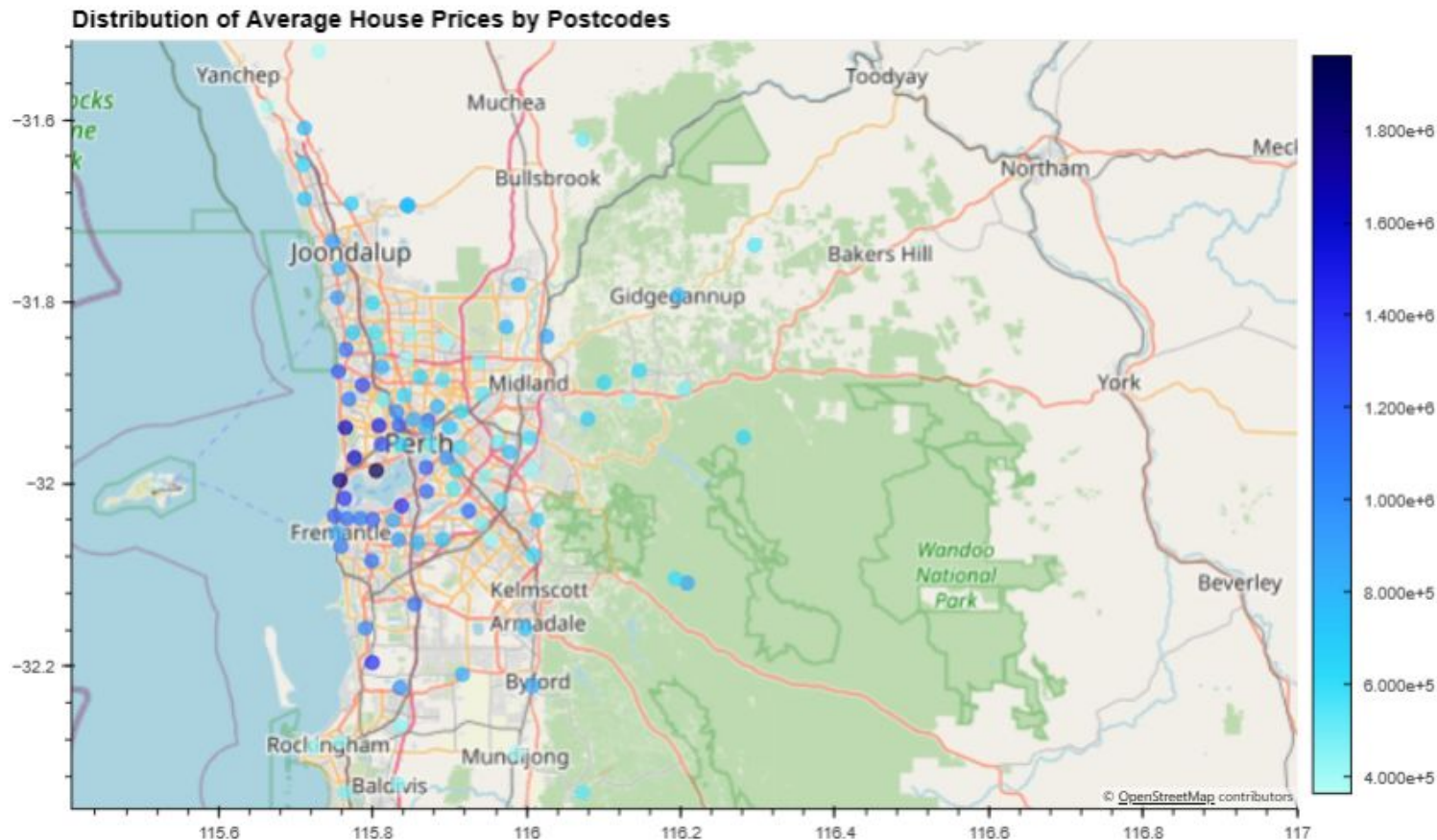
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- Contrasting trends in average prices across the both ends of the spectrum.

# Influences on house pricing

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## Outcomes

- Higher average house price around Perth city
- Possibly higher house prices North of Swan River

## Limitations

- Duplicate postcodes for suburbs
- Dataset from 1990 to 2020



# Influences on house pricing

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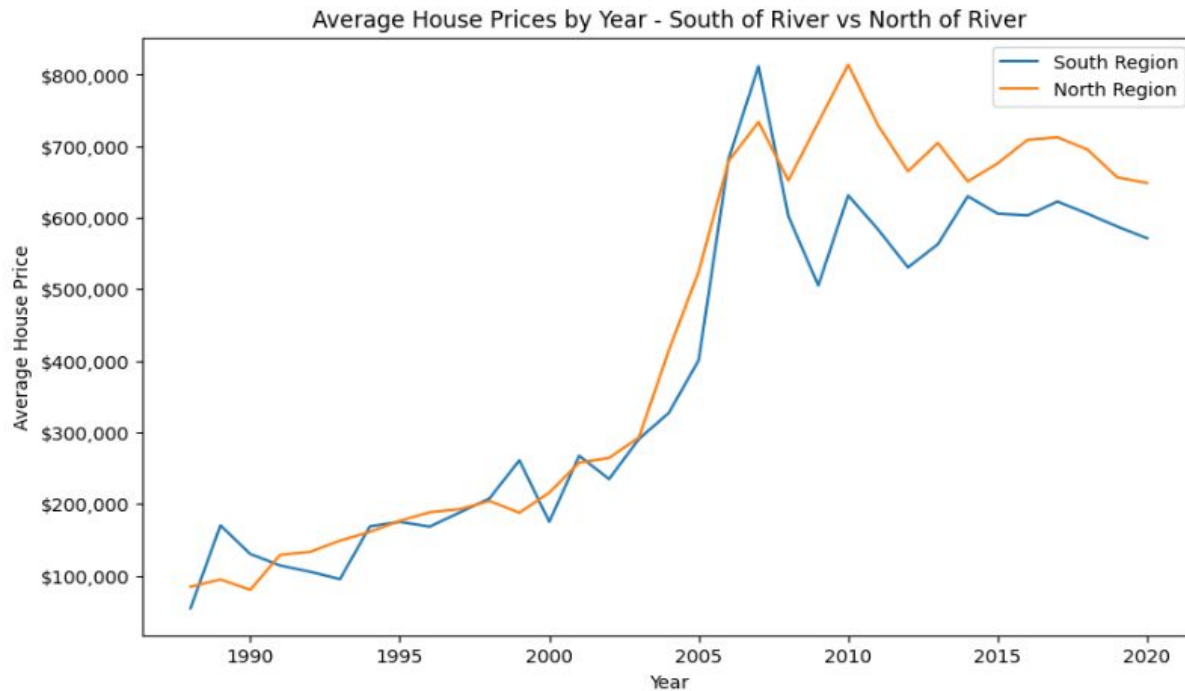
**South of Swan River: Postcodes  $\geq$  6100**

**North of Swan River: Postcodes 6000 - 6099**

# Influences on house pricing

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- Do houses north or south of the Swan River have a higher house average price?



## Outcomes

- Generally a consistent trend in both South and North
- Change between 2005 and 2010
- Limitations

## Limitations

- Dataset from 1990 to 2020 only
- Dataset Skewed mostly from 2005

# Influences on house pricing

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- Top 10 - Highest Average House Prices by Suburb

SUBURB	POSTCODE	AVERAGE_PRICE
Darkeith	6009	1961922.0
Peppermint Grove	6011	1771982.0
Cottesloe	6011	1646282.0
City Beach	6015	1644756.0
Nedlands	6009	1620000.0
Sunbury	6010	1500742.0
Forest	6014	1474612.0
Naval Base	6165	1408000.0
Applecross	6153	1396130.0
Mosman Park	6012	1383912.0

## Outcomes

- 8 out of 10 suburbs in the Top 10 House Price Average were in North

```
# Check how many postcodes are SOR in the top 10 average house prices
south_count_top_10 = (average_prices.head(10)['POSTCODE'] >= 6100).value_counts()
print(south_count_top_10)
```

```
POSTCODE
False    8
True     2
Name: count, dtype: int64
```

# Influences on house pricing

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- Bottom 10 - Lowest Average House Prices by Suburb

SUBURB	POSTCODE	AVERAGE_PRICE
Camilla	6111	298090.0
Calista	6167	293397.0
Coolbongup	6168	288303.0
Keelungia	6056	282938.0
Parmelia	6167	275728.0
Medina	6167	270912.0
Haynes	6112	265126.0
Armadale	6112	249044.0
Kwinana Town Centre	6167	185598.0
Kwinana Beach	6167	170000.0

## Outcomes

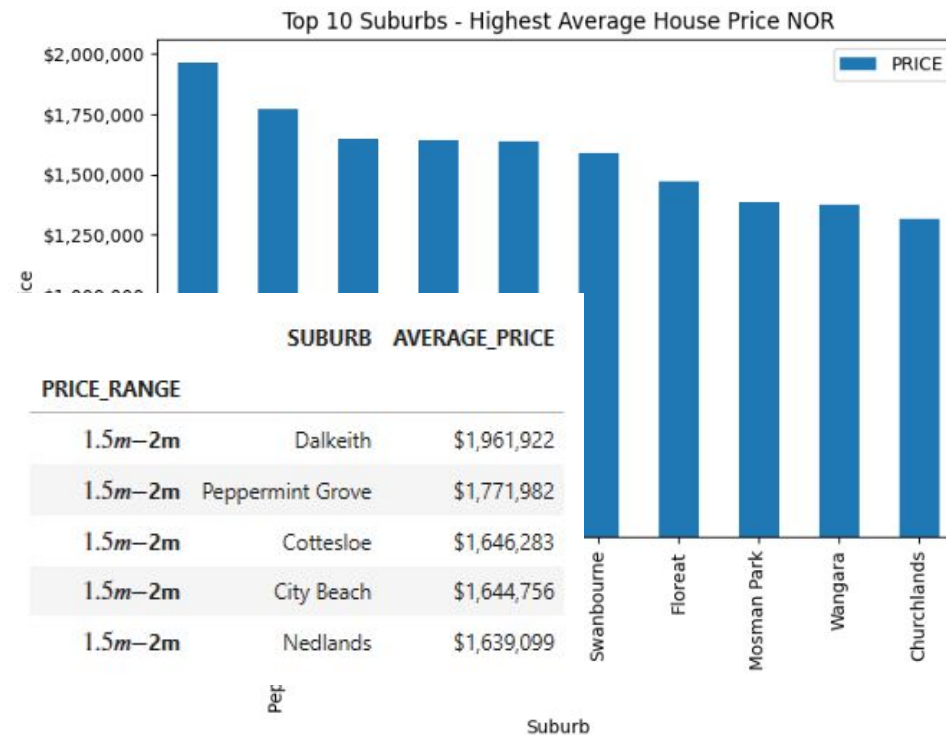
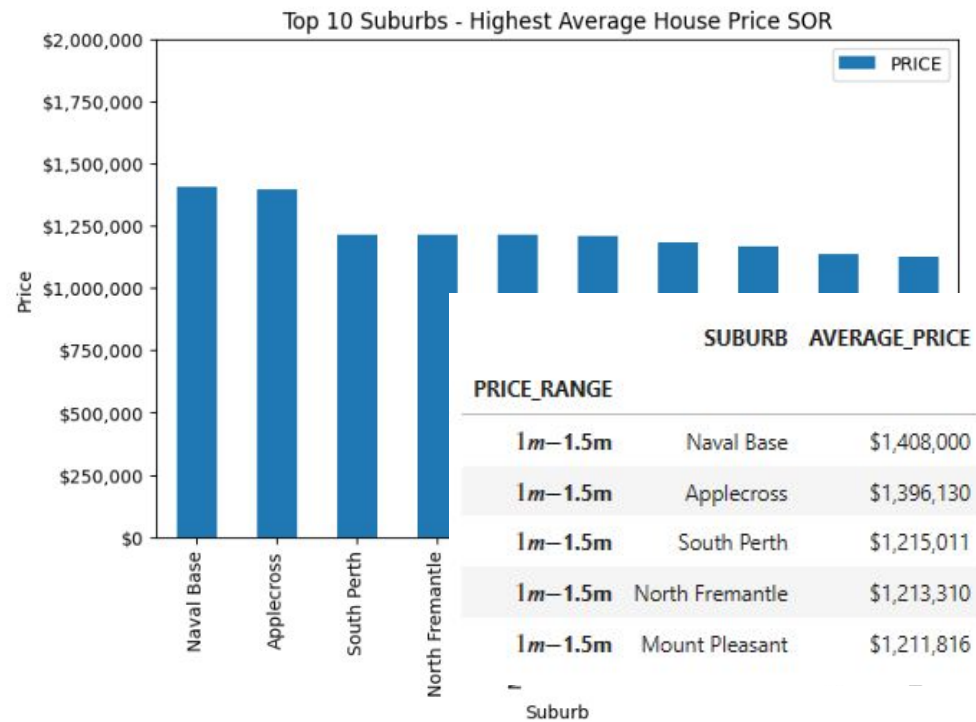
- 8 out of 10 suburbs in the Top 10 House Price Average were in North
- 9 out of 10 suburbs in the Bottom 10 House Price Average were in the South

```
## Check how many postcodes are SOR in the top 10 average house prices
south_count_bottom_10 = (average_prices.tail(10)['POSTCODE'] >= 6100).value_counts()
print(south_count_bottom_10)
```

```
POSTCODE
True      9
False     1
Name: count, dtype: int64
```

# Influences on housing prices

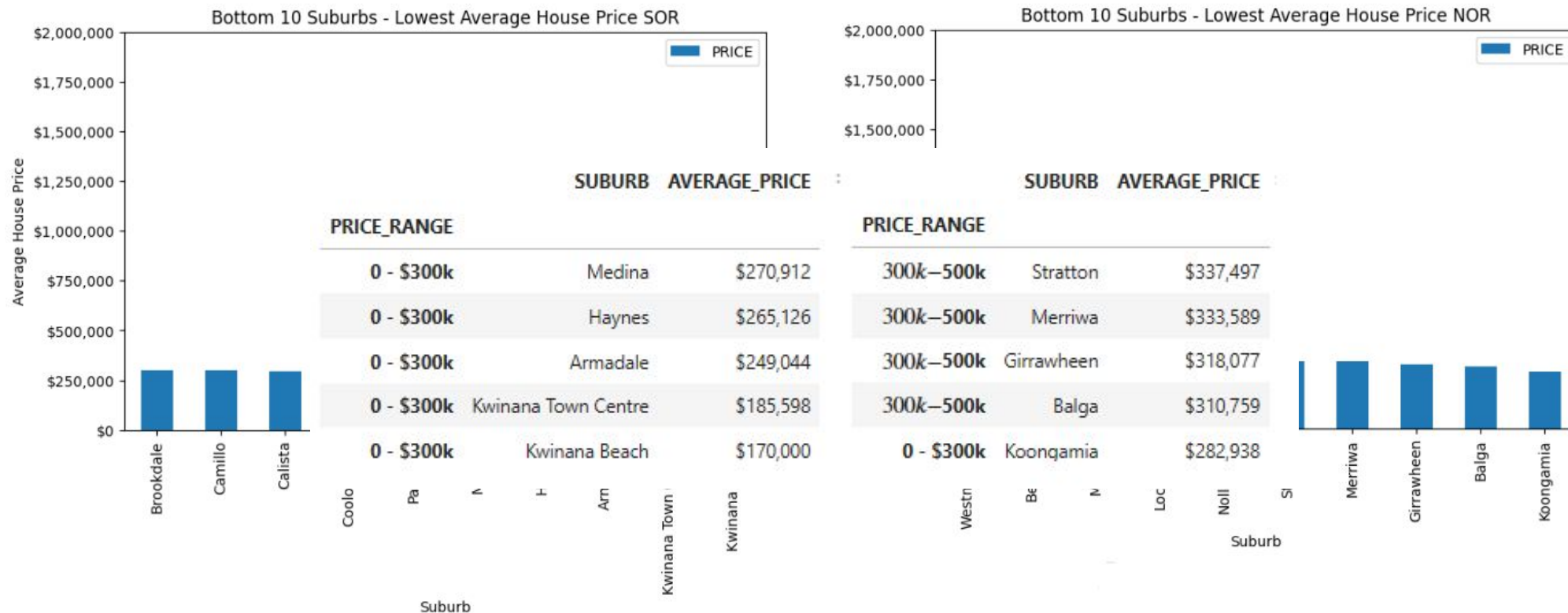
- Is there a price trend between houses in the south vs north of the Swan River?





# Influences on housing prices

- Is there a price trend between houses in the south vs north of the Swan River?



# Influences on house pricing

- Does the high school type (government vs. non-government) in the area affect house prices?

Outcome:

- Average house price was higher where the nearest high school was non-government

Average House Price	
School Type	
GOVERNMENT	\$650,877
NON-GOVERNMENT	\$757,513



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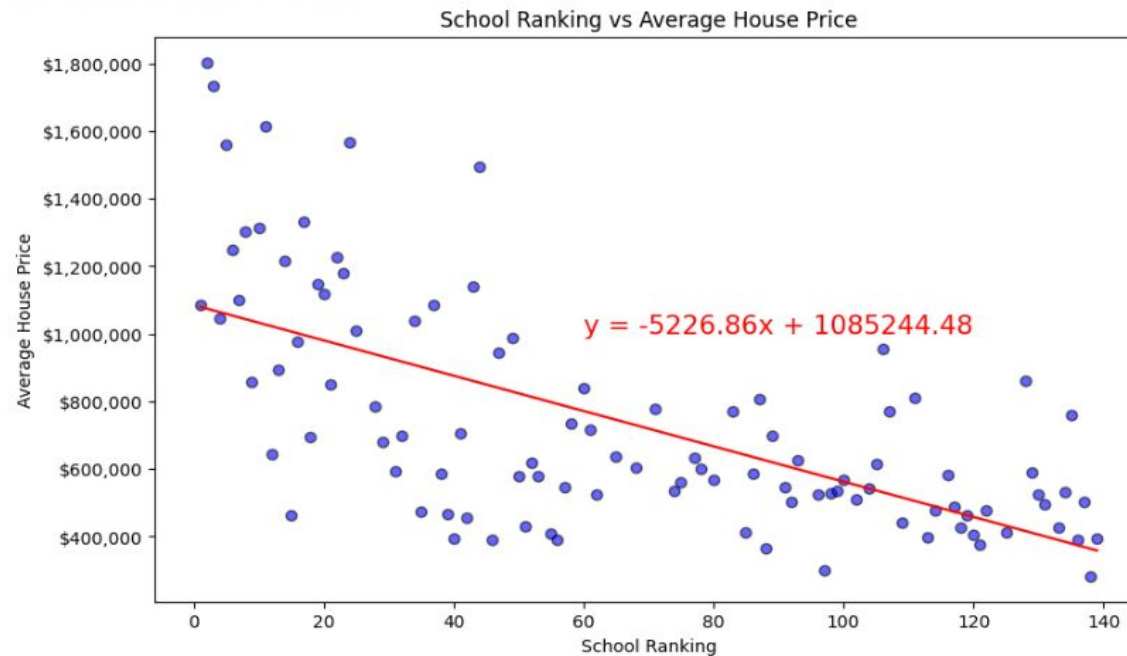
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# Influences on house pricing

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Does the ranking of schools in the area affect house prices?

The r-squared is: 0.4256534729900981



Outcome:

- r -value of 0.4256 - some correlation between school ranking and average house prices

Limitations

- Ranking only went up to 140
- Dataset was from 1990 to 2020. Ranking may be different in 2023
- Schools not ranked, excluded from dataset.

# Influences on housing prices

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- Does the distance from the city affect house prices?



## Outcomes

- Proximity from CBD does influence housing prices.
- Housing within 7 km have the lowest average prices.
- Housing within 40 km had the lowest average prices.

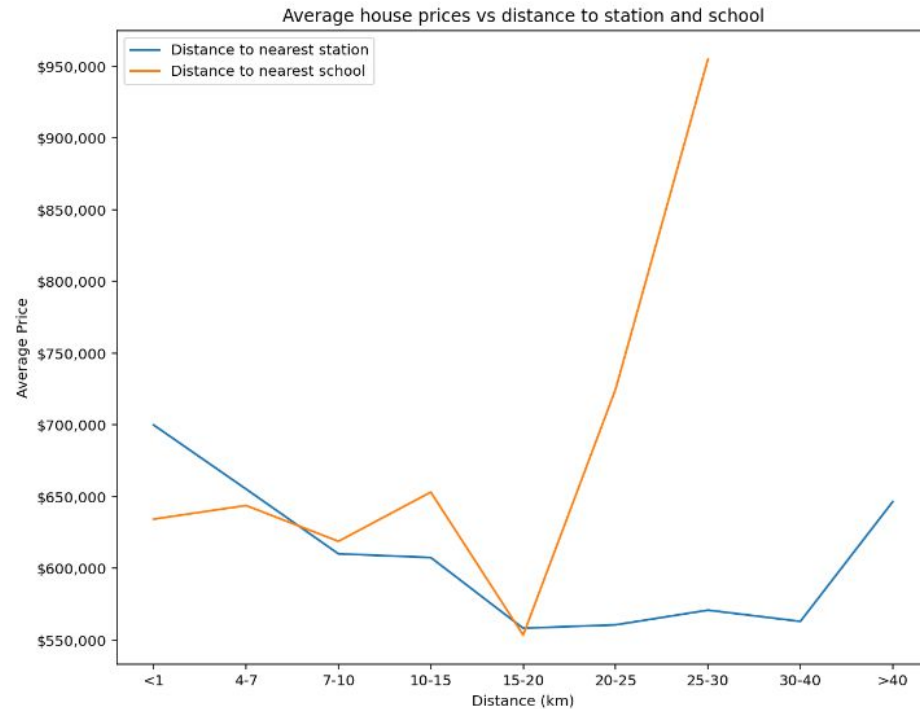
## Limitations

- Housing type

# Influences on housing prices

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- Does the proximity of schools and train stations affect house prices?



## Outcomes

- Trend between 1 km to 15 kms

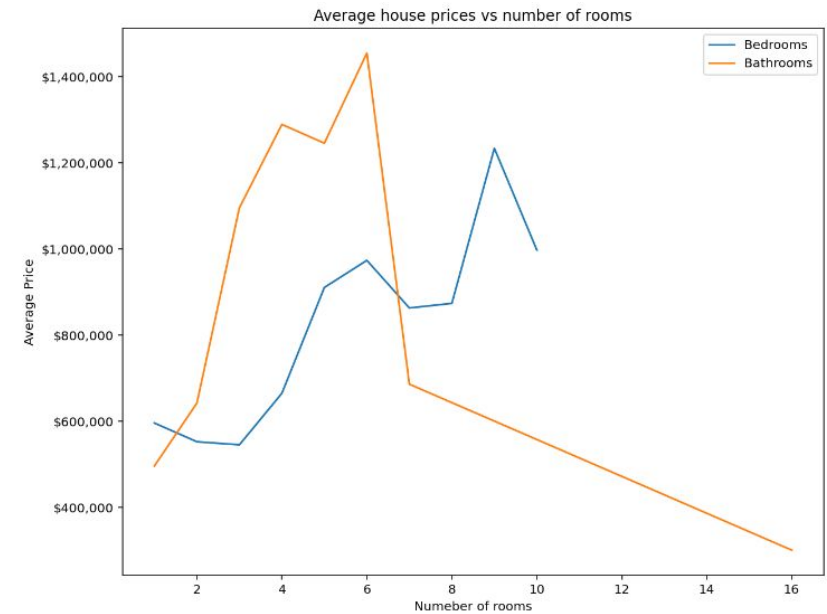
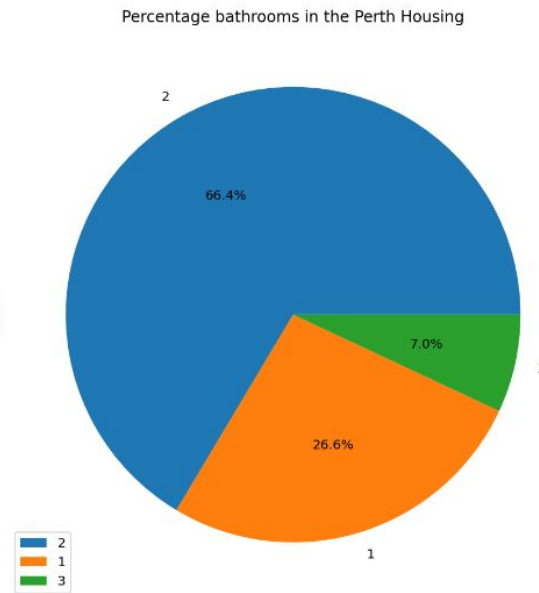
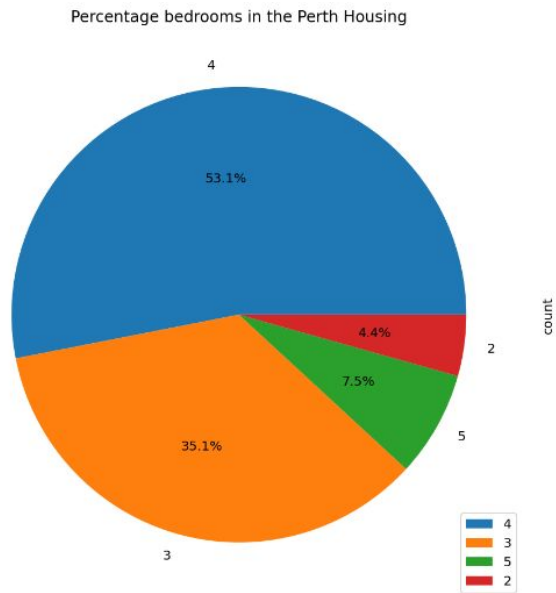
## Limitations

- Analyses only does not take bus routes into considerations
- School ranking and status could influence housing prices



# Influences on housing prices

- Percentages of bedrooms and bathrooms in the Perth housing market?



# Influences on housing prices

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- Does land area influence pricing?



The r-squared is: 0.002961291531073862

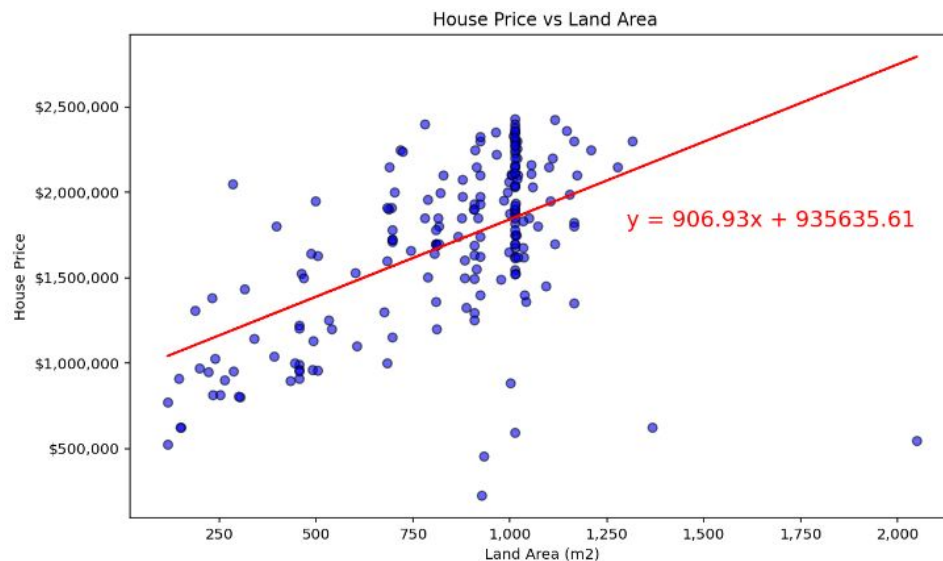
## Outcomes

- $r = 0.00296$  – indicating no correlation or that the variables are independent

# Influences on housing prices

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- Does land area influence pricing?



The r-squared is: 0.28625681882207415

## Outcomes

- $r = 0.286$  weak positive correlation

## Other considerations

- Property type
- Renovated properties
- Location within the suburb

# Conclusion and Limitations

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## Limitations:

- Does include the type of housing
- The data set does not contain data for all the house sales in Perth

## Conclusions

- There are various factors that influences the housing market
- The location, proximity to the city, suburb and school type have an influenced