Housing Market Analysis

MELBOURNE, AUSTRALIA

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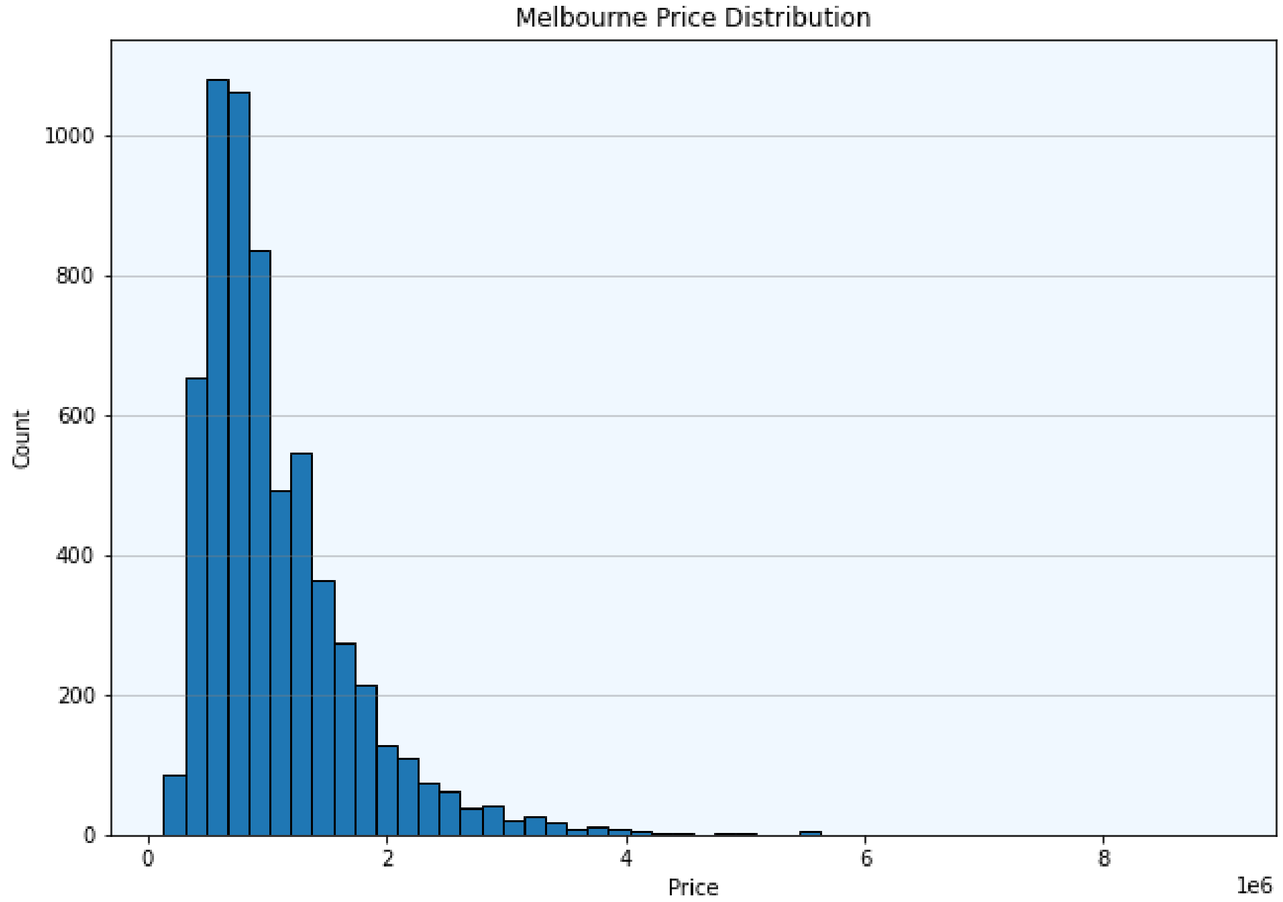
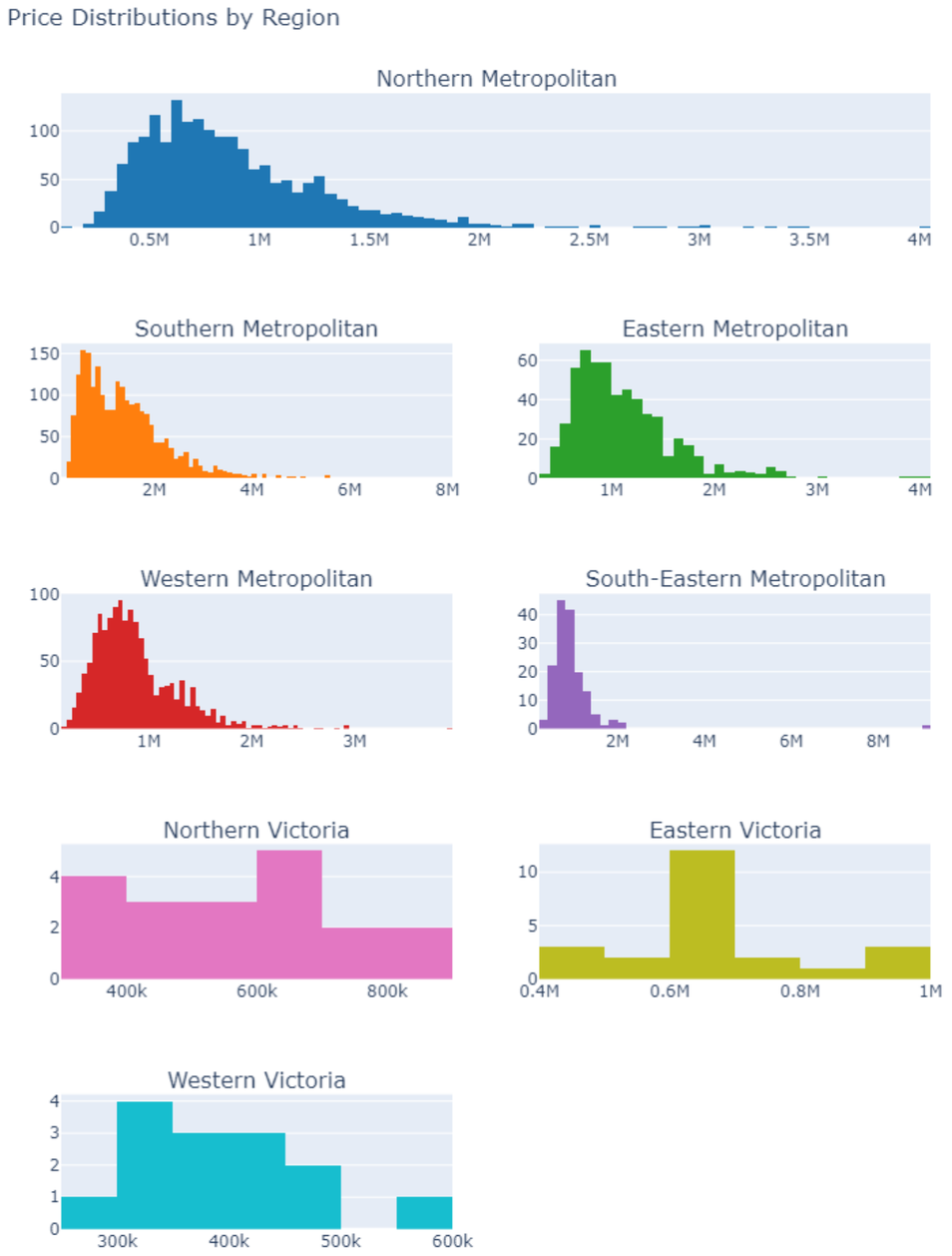
Background

- The goal is to predict the sales price for homes in Melbourne, Australia (2016-2017)
- Data consists of 13,580 data points and 19 features describing every aspect of the house.
- Our framework utilizes these Python libraries:
  - Pandas: handling structured data
  - Scikit Learn: ML
  - NumPy: linear algebra and mathematics
  - Seaborn: Data visualization
  - Plotly, Matplotlib: Data visualization
  - Javascript: Data visualization

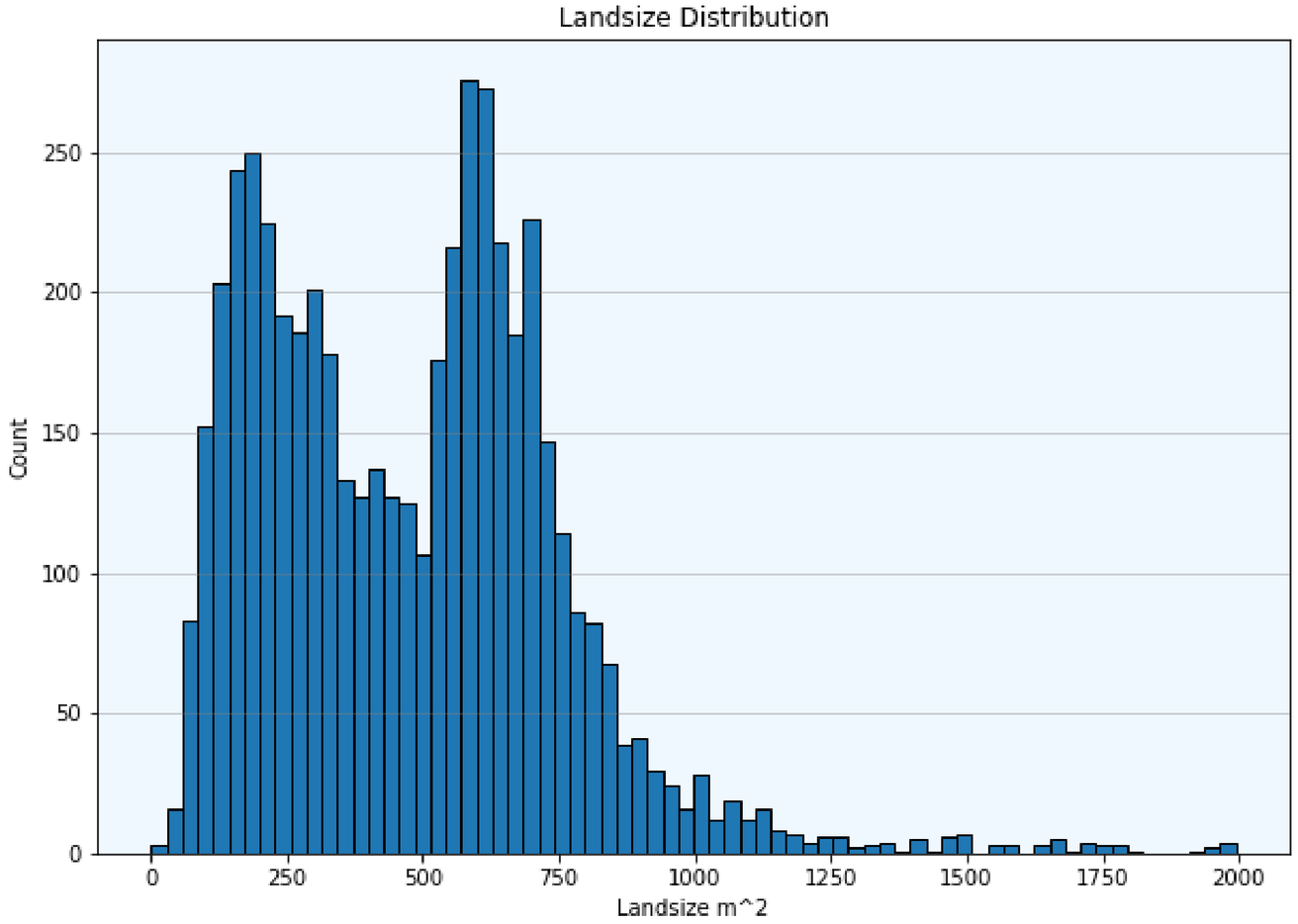
Exploratory Data Analysis



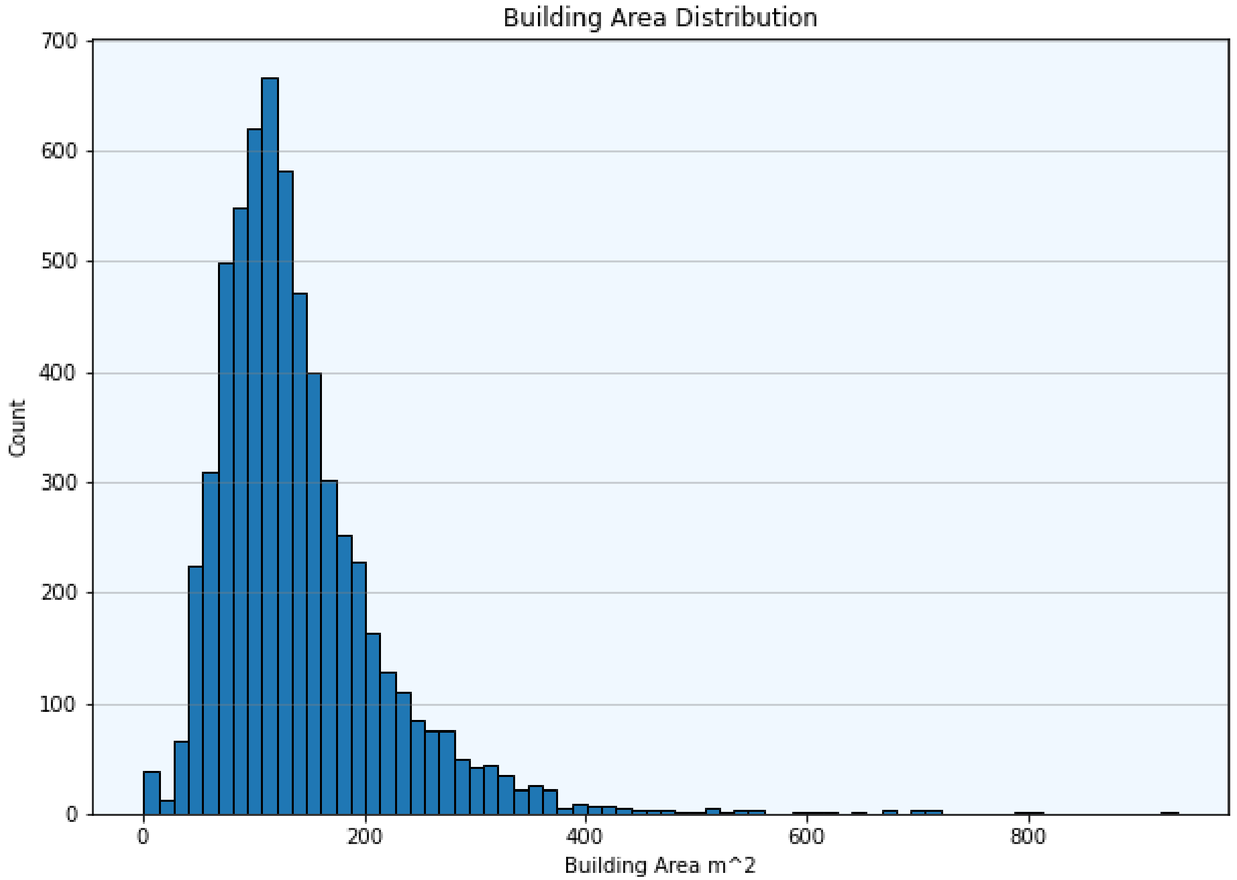
Exploratory Data Analysis



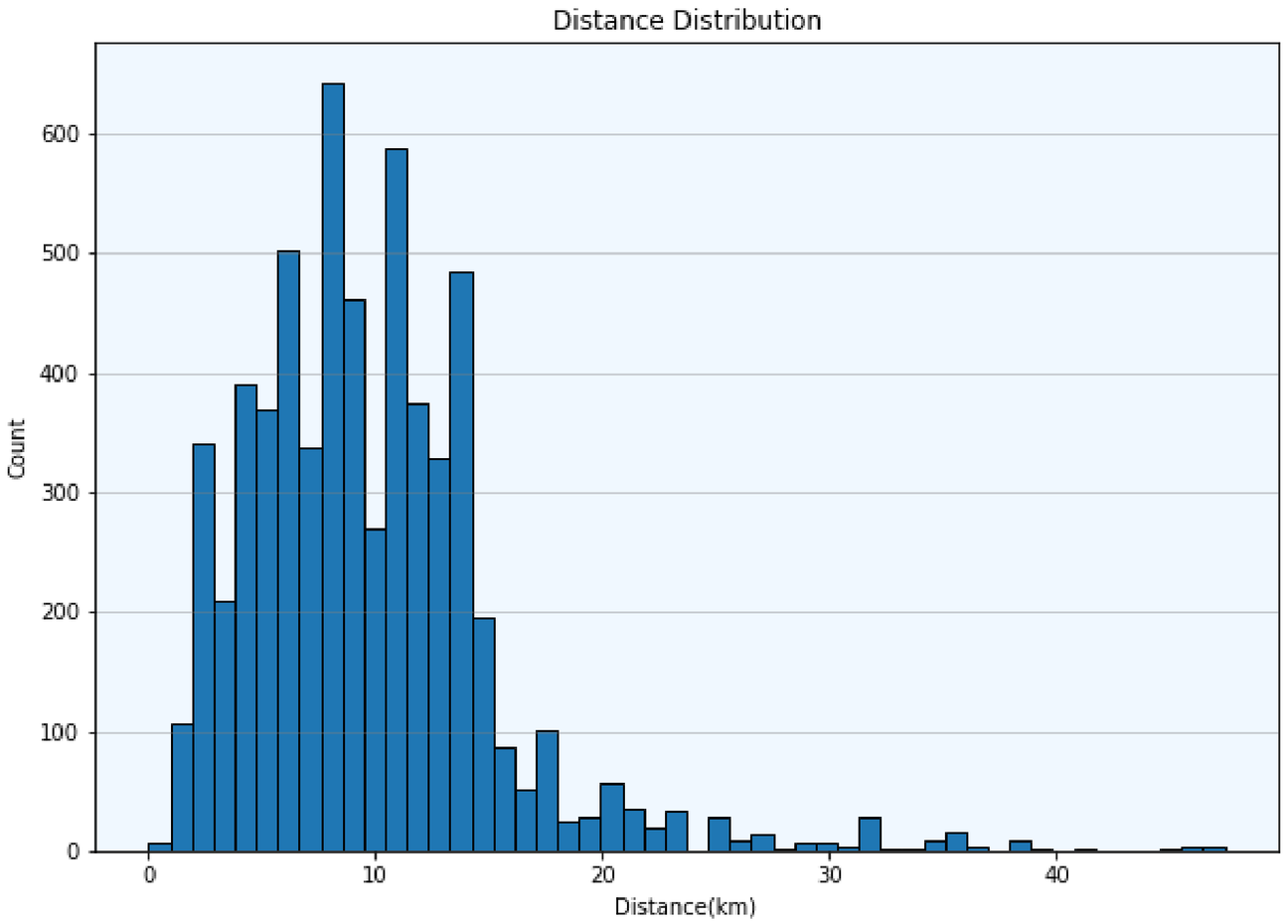
Exploratory Data Analysis



Exploratory Data Analysis



Exploratory Data Analysis



Clusters

In [6]:
```
method_encoded = pd.get_dummies(df['Method'])
suburb_encoded = pd.get_dummies(df['Suburb'])
type_encoded = pd.get_dummies(df['Type'])
seller_encoded = pd.get_dummies(df['SellerG'])
zip_encoded = pd.get_dummies(df['Postcode'])
region_encoded = pd.get_dummies(df['Regionname'])
```

In [7]:
```
df_scaled_encoded = pd.concat([df_scaled, method_encoded, type_encoded, regio

df_scaled_encoded
```

Out[7]:

	Price	Rooms	Distance	Bedroom2	Bathroom	Car	Landsize	BuildingArea
0	-0.050108	-0.959224	-1.292159	-0.929954	-0.810257	-1.692272	-0.351031	-0.688873
1	0.586833	0.070641	-1.292159	0.100999	0.595611	-1.692272	-0.375546	0.092828
2	0.786802	1.100507	-1.292159	0.100999	-0.810257	0.458562	-0.391147	0.004749
3	1.195630	0.070641	-1.292159	1.131952	0.595611	-1.692272	-0.251853	0.753421
4	0.840128	-0.959224	-1.292159	-0.929954	-0.810257	0.458562	-0.239595	-0.380597

In [4]:
```
# Use the StandardScaler module and fit_transform function to
# scale all columns with numerical values
df_scaled = StandardScaler().fit_transform(df[["Price", "Rooms" , "Distance", "B

# Diplay the first three rows of the scaled data
df_scaled[0:3]
```

Out[4]:
```
array([[-0.05010829, -0.95922445, -1.29215935, -0.92995401, -0.8102572 ,
        -1.69227228, -0.35103059, -0.6888734 , -1.68182726],
       [ 0.58683256,  0.0706412 , -1.29215935,  0.10099876,  0.59561051,
        -1.69227228, -0.37554647,  0.09282823, -1.68182726],
       [ 0.78680236,  1.10050686, -1.29215935,  0.10099876, -0.8102572 ,
         0.4585624 , -0.39114749,  0.00474917,  1.31009469]])
```

In [5]:
```
df_scaled = pd.DataFrame(
    df_scaled,
    columns=["Price", "Rooms" , "Distance", "Bedroom2", "Bathroom", "Car", "Land
)
df_scaled
```

Out[5]:

	Price	Rooms	Distance	Bedroom2	Bathroom	Car	Landsize	BuildingArea	Ye
0	-0.050108	-0.959224	-1.292159	-0.929954	-0.810257	-1.692272	-0.351031	-0.688873	-1.
1	0.586833	0.070641	-1.292159	0.100999	0.595611	-1.692272	-0.375546	0.092828	-1.
2	0.786802	1.100507	-1.292159	0.100999	-0.810257	0.458562	-0.391147	0.004749	1.
3	1.195630	0.070641	-1.292159	1.131952	0.595611	-1.692272	-0.251853	0.753421	-1.
4	0.840128	-0.959224	-1.292159	-0.929954	-0.810257	0.458562	-0.239595	-0.380597	-1.

Clusters

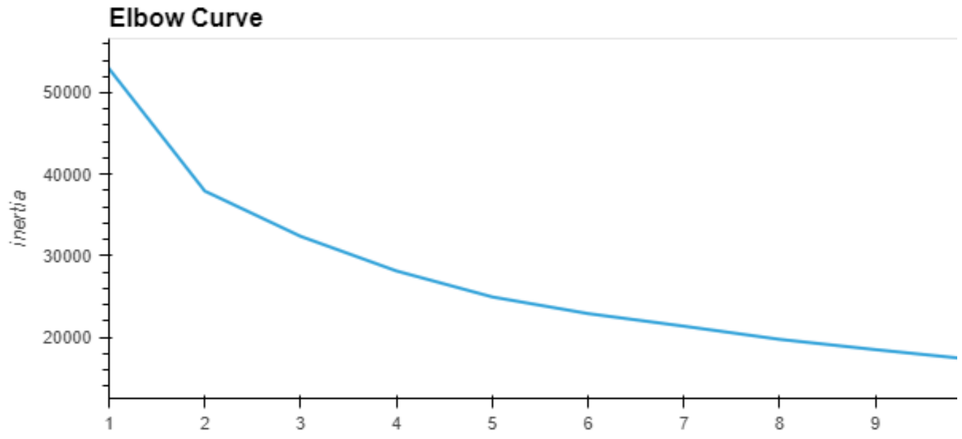
Out[22]:

	k	inertia
0	1	52963.009877
1	2	37938.148518
2	3	32379.945373
3	4	28131.521577
4	5	24942.215790

WITHOUT PCA

In [23]:
```
# Plot a line chart with all the inertia values computed with
# the different values of k to visually identify the optimal value for k.
elbow = df_elbow.hvplot.line(
    x="k",
    y="inertia",
    title="Elbow Curve",
    xticks=k
)
elbow
```

Out[23]:



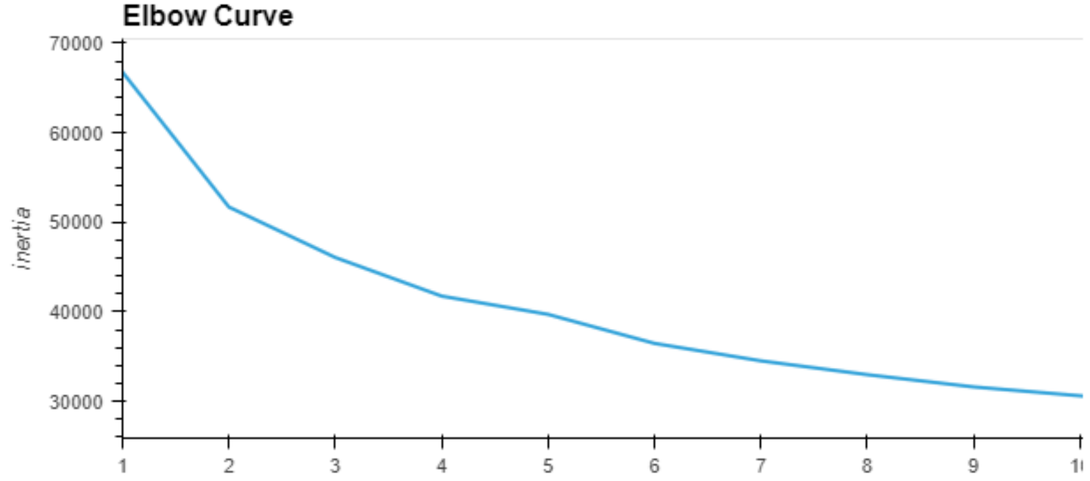
Out[12]:

	k	inertia
0	1	66751.236927
1	2	51698.889556
2	3	46068.421030
3	4	41758.325041
4	5	39719.331794

WITH PCA

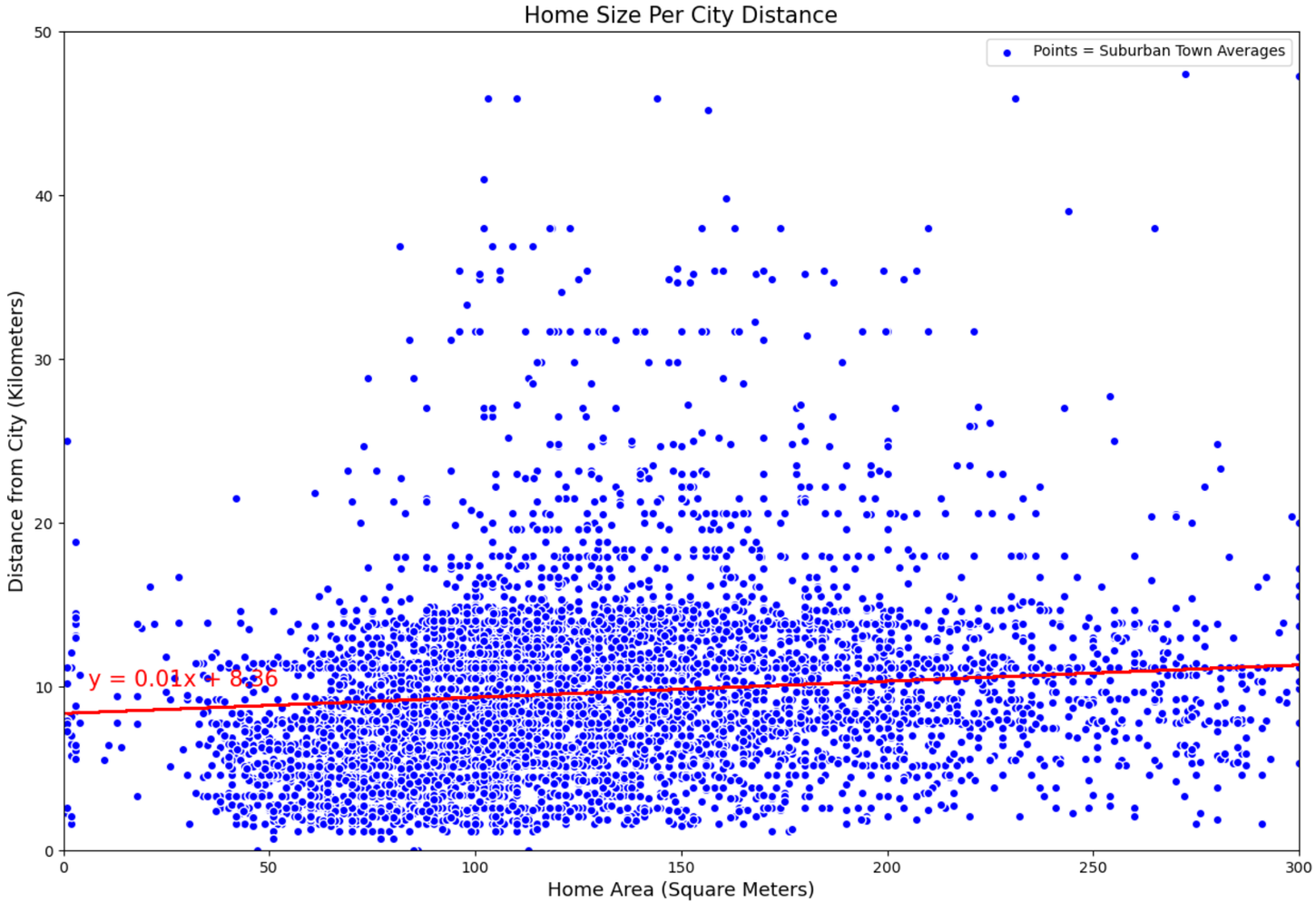
In [13]:
```
# Plot a line chart with all the inertia values computed with
# the different values of k to visually identify the optimal value for k.
elbow = df_elbow.hvplot.line(
    x="k",
    y="inertia",
    title="Elbow Curve",
    xticks=k
)
elbow
```

Out[13]:

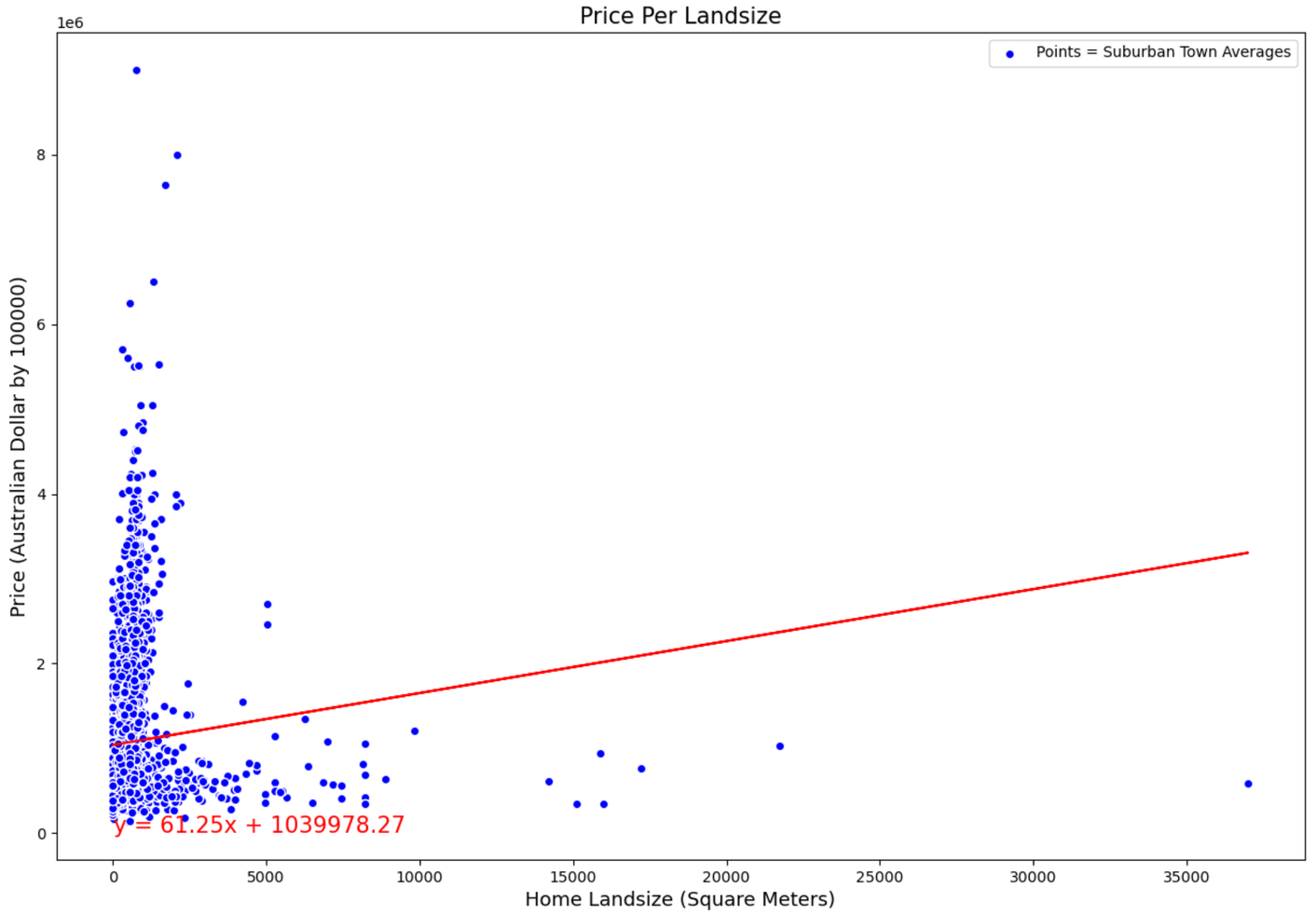


LINK

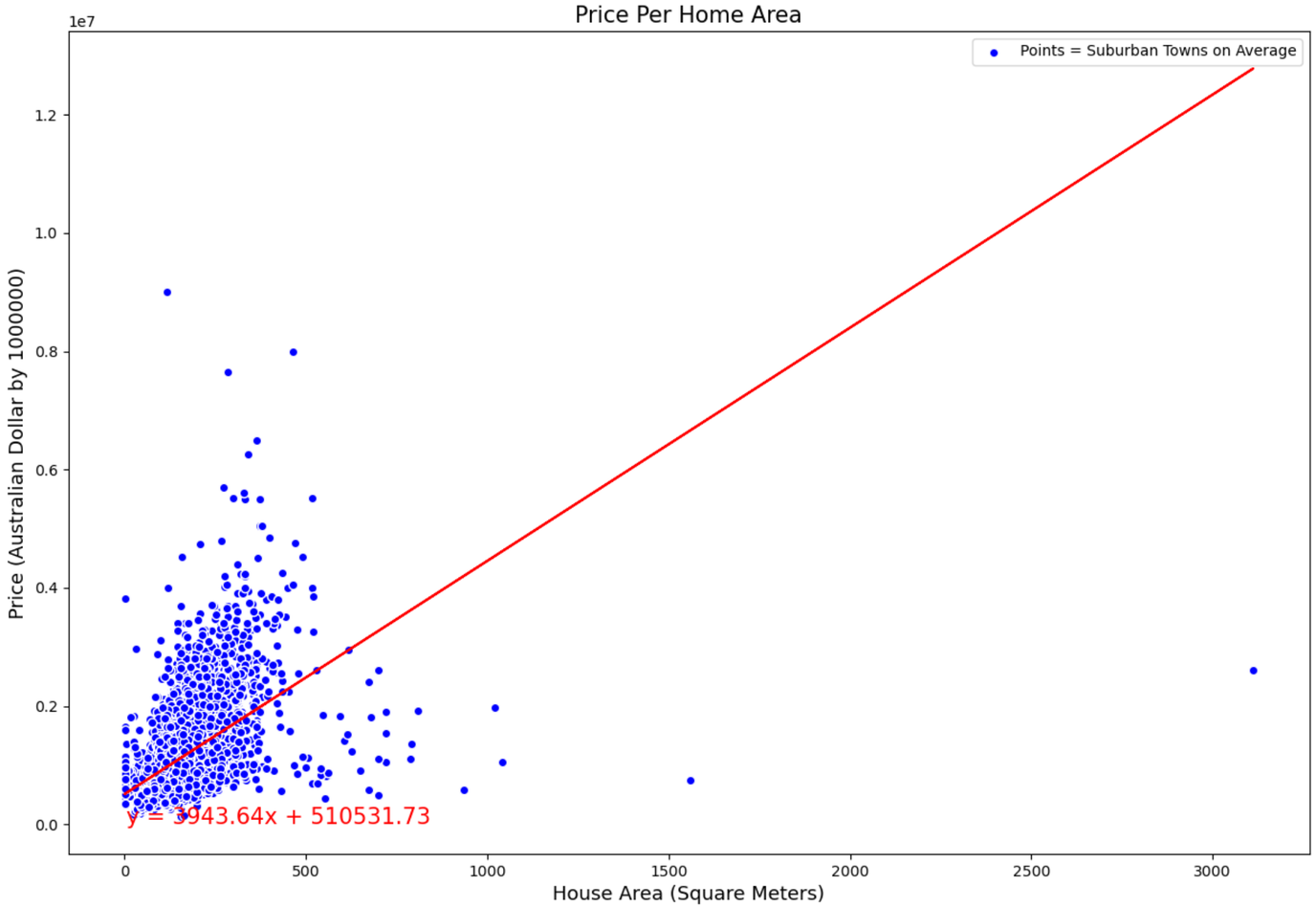
Correlation



Correlation



Correlation



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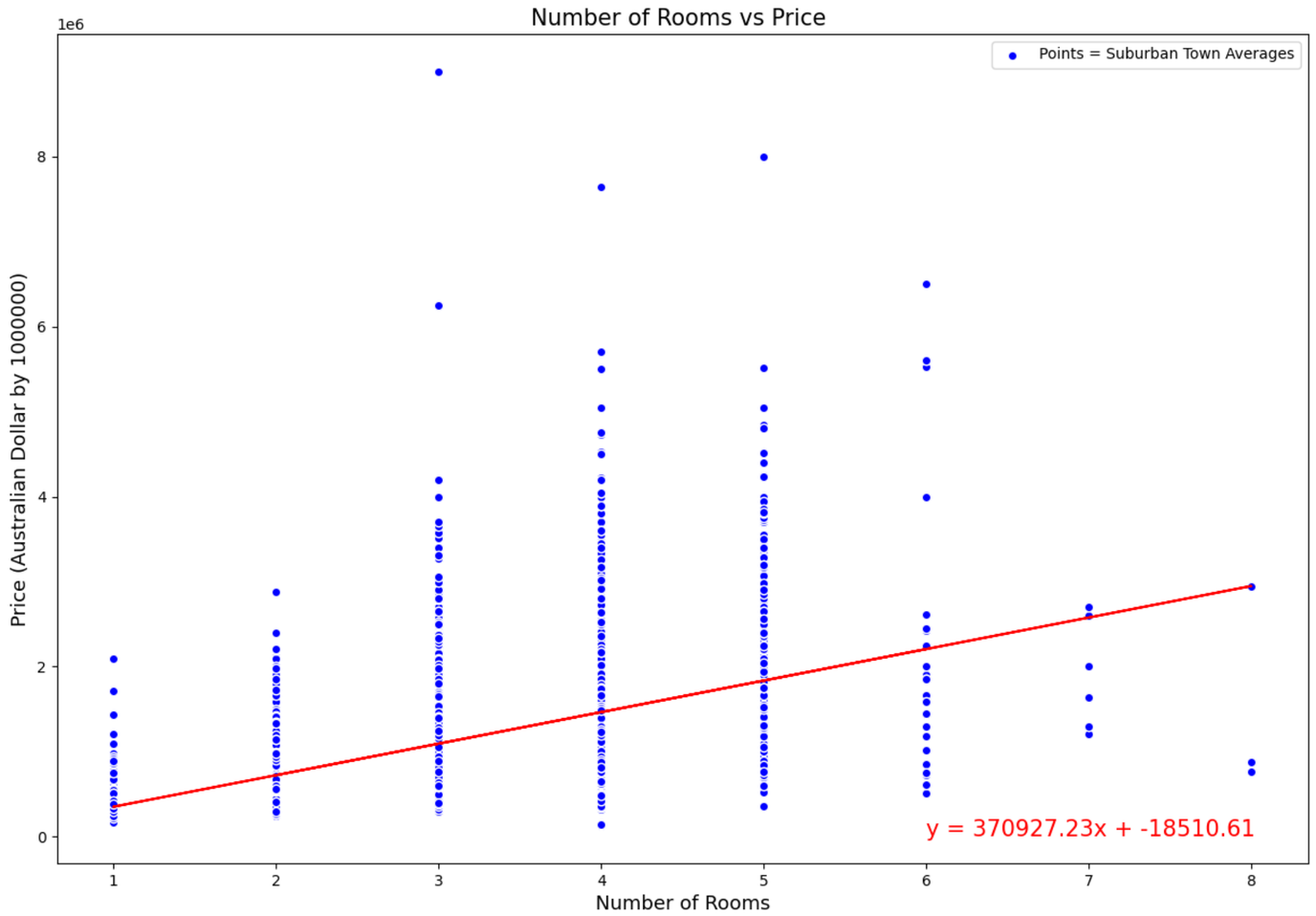
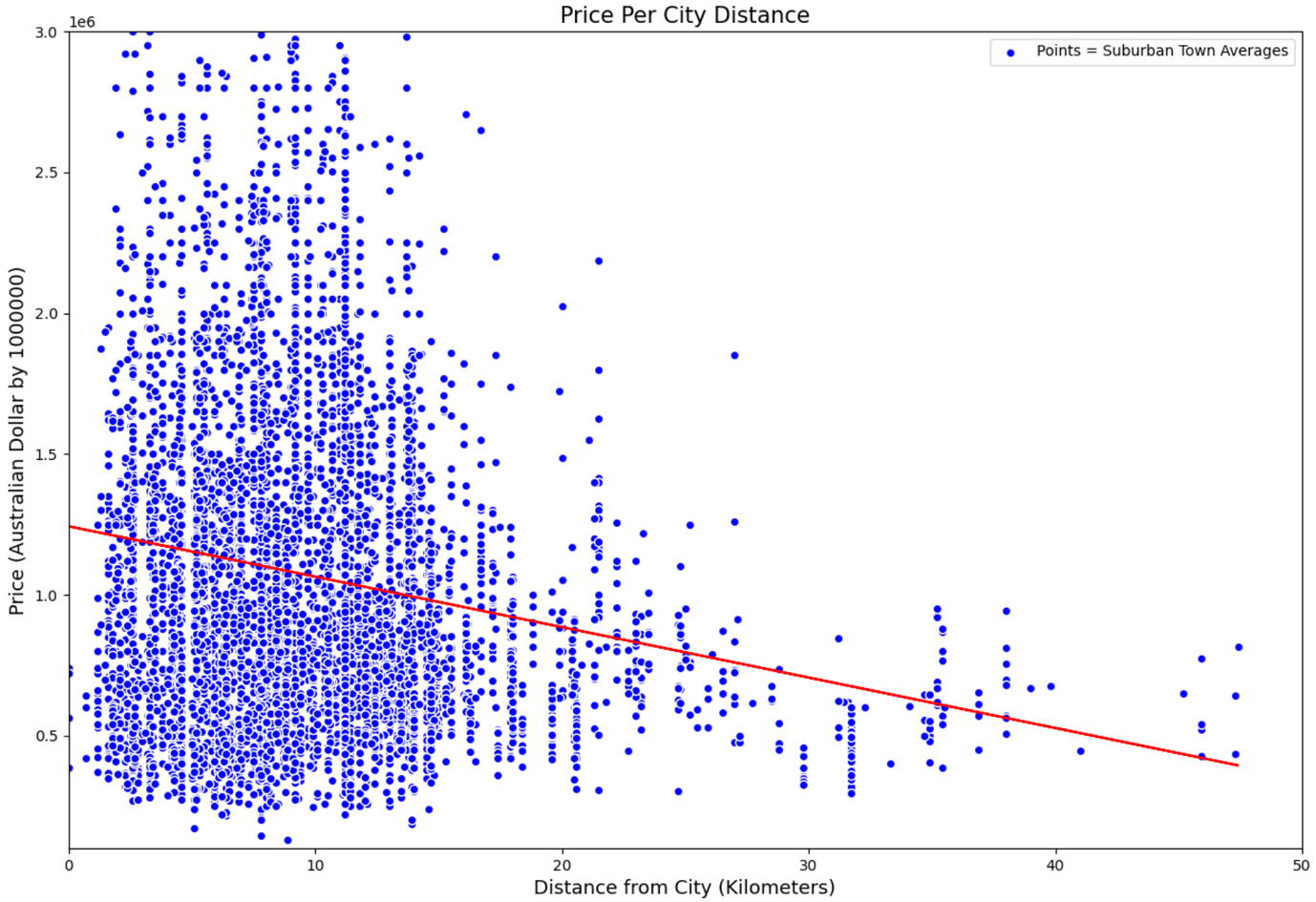
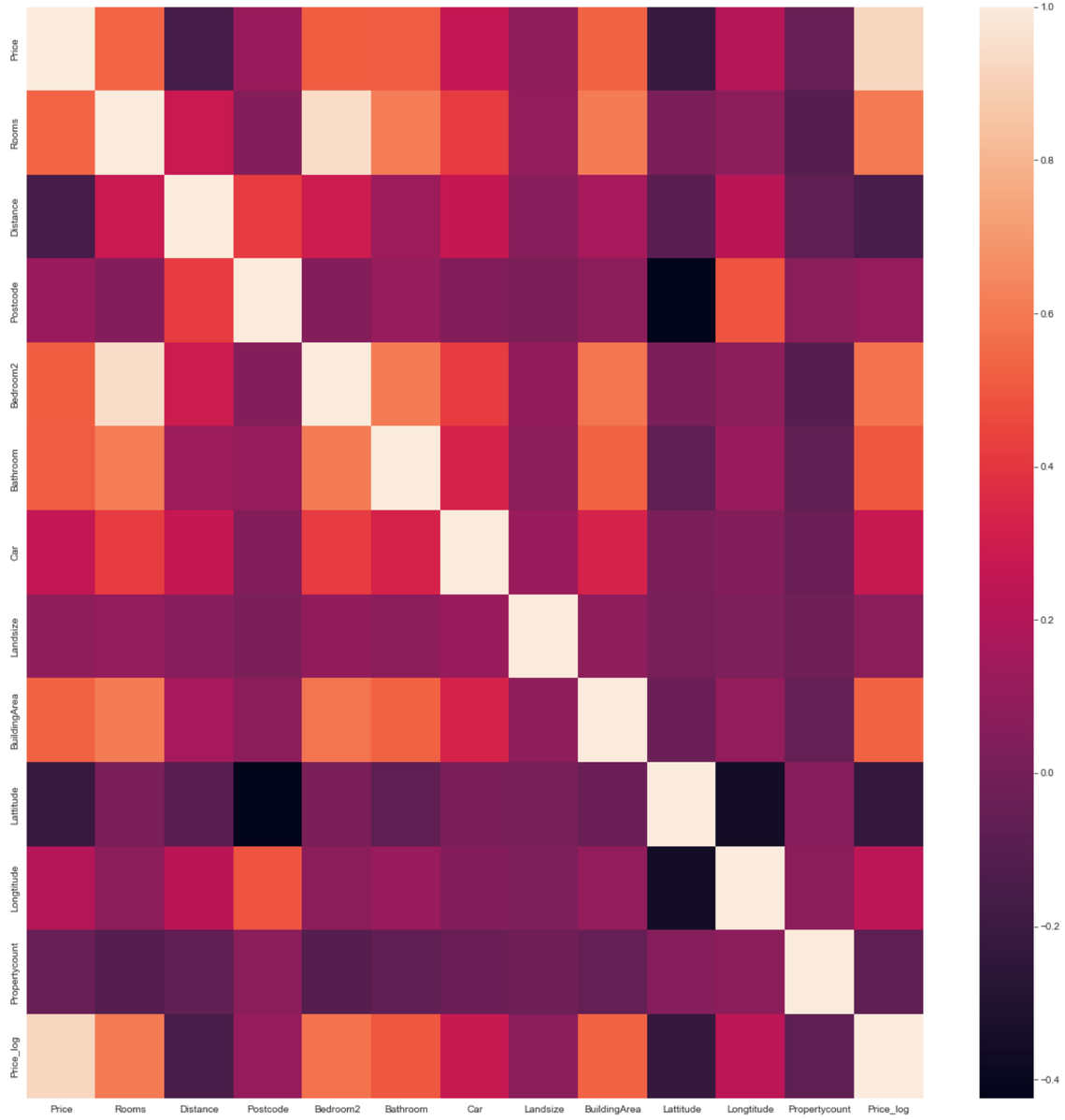


Correlation

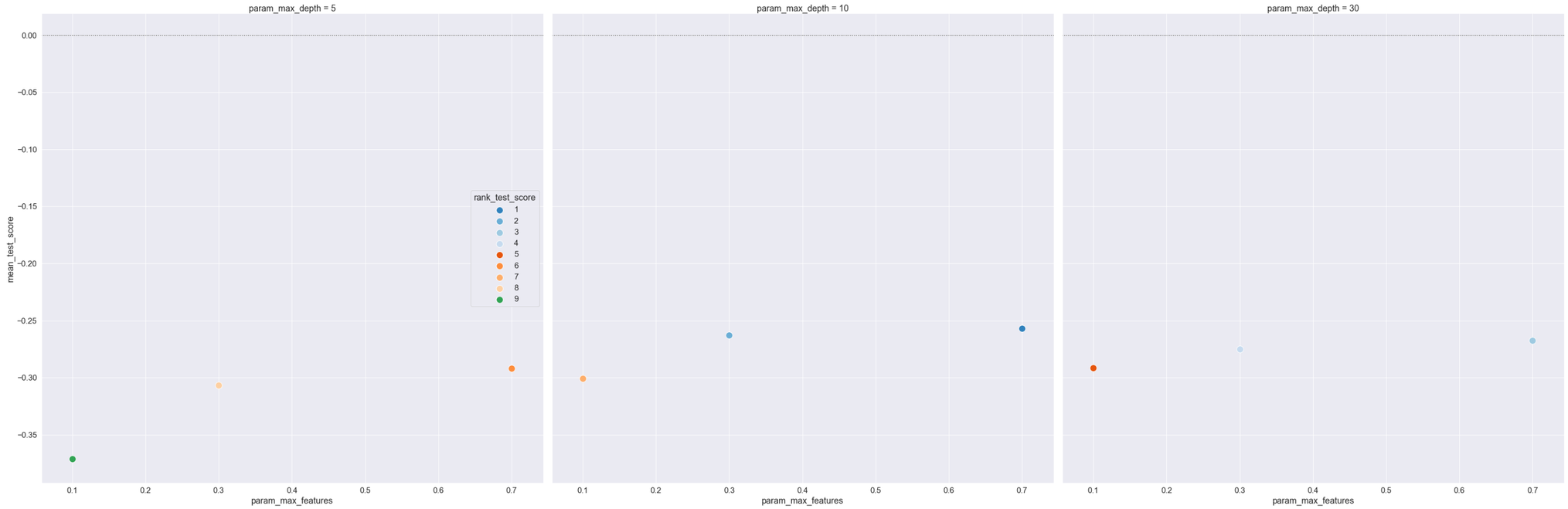


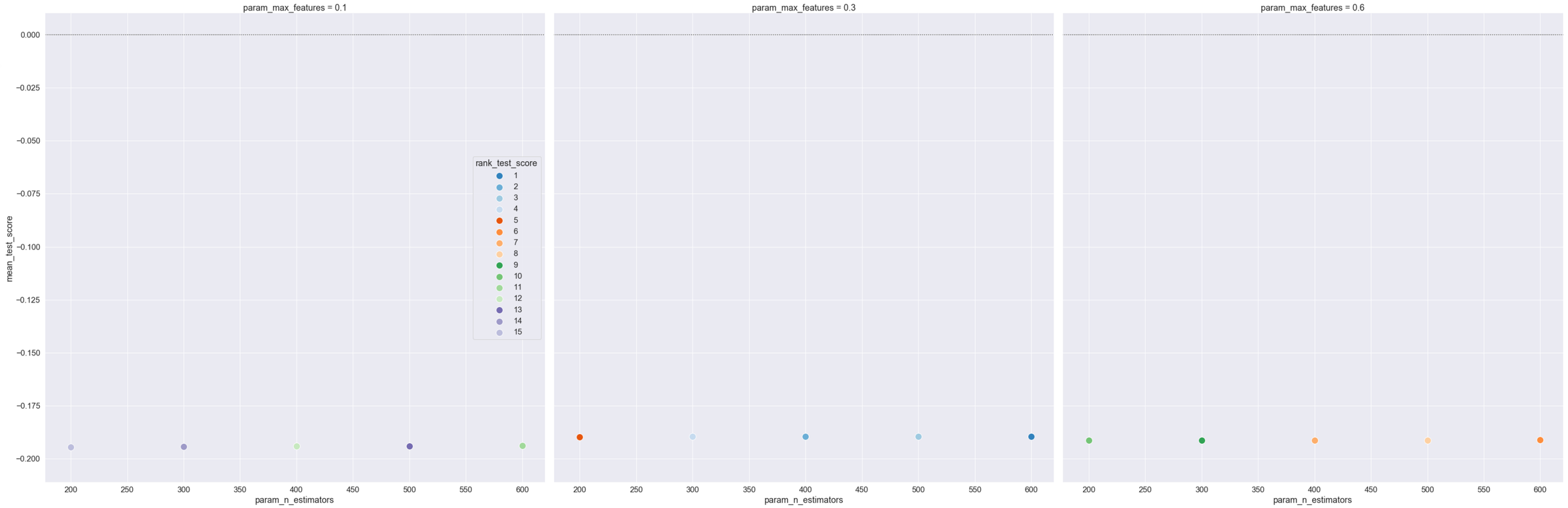
Correlation Matrix

Presentations are communication tools that can be used as demonstrations, lectures, speeches, reports, and more. It is mostly presented before an audience.



Correlation Matrix

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param_max_features = 0.6
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−0.025
−0.050
−0.075
−0.100
−0.125
−0.150
−0.175
−0.200
200
250
300
350
400
450
500
550
600
param_n_estimators
rank_test_score
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15


Thank You