20250604_01

June 4, 2025

[1]:

```
import pandas as pd
```

[4]:

```
# Load data
data = pd.read_csv('melb_data.csv')

# Drop rows with missing values (simple approach for now)
data = data.dropna()
```

[19]:

```
# Take a look at the data
data.describe()
```

[19]:

```
             Rooms         Price     Distance     Postcode     Bedroom2  \
count  6196.000000  6.196000e+03  6196.000000  6196.000000  6196.000000
mean      2.931407  1.068828e+06     9.751097  3101.947708     2.902034
std       0.971079  6.751564e+05     5.612065    86.421604     0.970055
min       1.000000  1.310000e+05     0.000000  3000.000000     0.000000
25%       2.000000  6.200000e+05     5.900000  3044.000000     2.000000
50%       3.000000  8.800000e+05     9.000000  3081.000000     3.000000
75%       4.000000  1.325000e+06    12.400000  3147.000000     3.000000
max       8.000000  9.000000e+06    47.400000  3977.000000     9.000000

          Bathroom          Car      Landsize  BuildingArea    YearBuilt  \
count  6196.000000  6196.000000   6196.000000   6196.000000  6196.000000
mean      1.576340     1.573596    471.006940    141.568645  1964.081988
std       0.711362     0.929947    897.449881     90.834824    38.105673
min       1.000000     0.000000      0.000000      0.000000  1196.000000
25%       1.000000     1.000000    152.000000     91.000000  1940.000000
50%       1.000000     1.000000    373.000000    124.000000  1970.000000
75%       2.000000     2.000000    628.000000    170.000000  2000.000000
max       8.000000    10.000000  37000.000000   3112.000000  2018.000000

         Lattitude   Longtitude  Propertycount
count  6196.000000  6196.000000    6196.000000
mean    -37.807904   144.990201    7435.489509
std       0.075850     0.099165    4337.698917
min     -38.164920   144.542370     389.000000
25%     -37.855438   144.926198    4383.750000
50%     -37.802250   144.995800    6567.000000
```

```
75%      -37.758200   145.052700   10175.000000
max      -37.457090   145.526350   21650.000000
```

[12]:

```python
# Select features and target
y = data['Price']

features = ['Rooms', 'Bathroom', 'Landsize', 'BuildingArea', 'YearBuilt',␣
 ↪'Lattitude', 'Longtitude']
X = data[features]
```

[10]:

```python
# Split the data
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, random_state = 42)
```

[14]:

```python
# First : linear regression
from sklearn.linear_model import LinearRegression

linear_model = LinearRegression()
linear_model.fit(X_train, y_train)
```

[14]:

```
LinearRegression()
```

[30]:

```python
# Use MAE to evaluate
from sklearn.metrics import mean_absolute_error

linear_predictions = linear_model.predict(X_test)
linear_mae = mean_absolute_error(y_test, linear_predictions)
print(f"MAE: {linear_mae:.0f}")
```

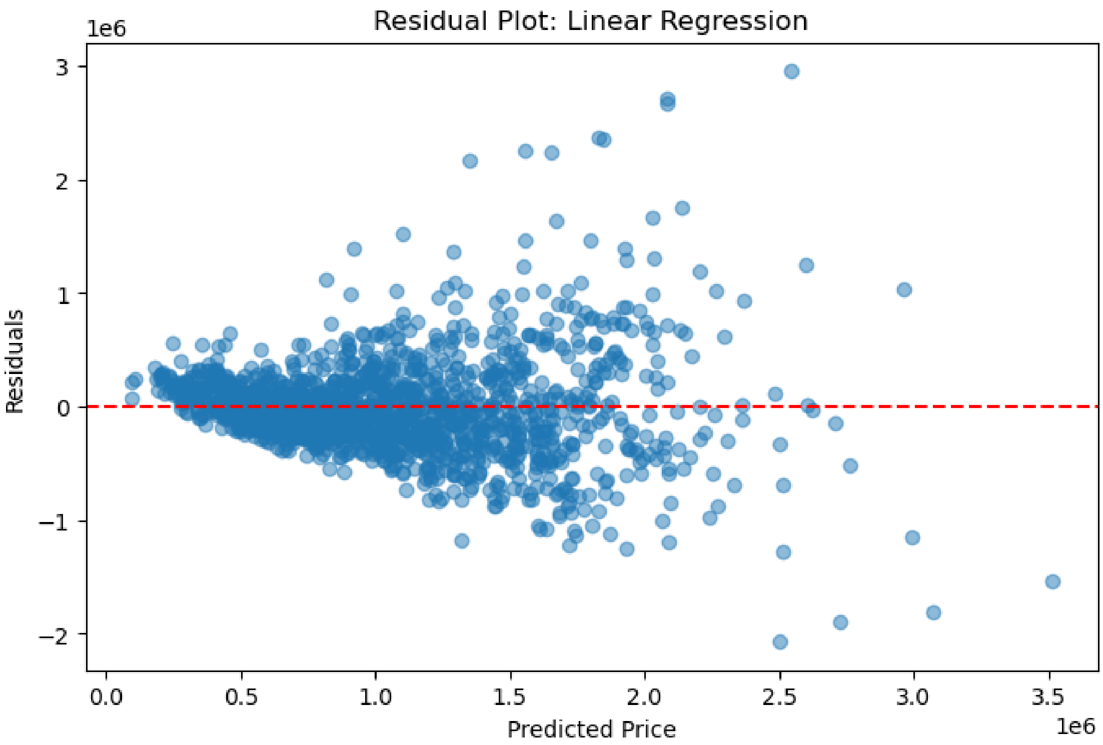
```
MAE: 293072
```

[31]:

```python
# Make plot
import matplotlib.pyplot as plt

# Residuals
linear_residuals = y_test - linear_predictions

plt.figure(figsize = (8, 5))
plt.scatter(linear_predictions, linear_residuals, alpha = 0.5)
plt.axhline(y = 0, color = 'r', linestyle = '--')
plt.xlabel("Predicted Price")
plt.ylabel("Residuals")
plt.title("Residual Plot: Linear Regression")
plt.show()
```



```
[26]: # Second : Decision Tree
      from sklearn.tree import DecisionTreeRegressor

      tree_model = DecisionTreeRegressor(random_state = 42)
      tree_model.fit(X_train, y_train)
```

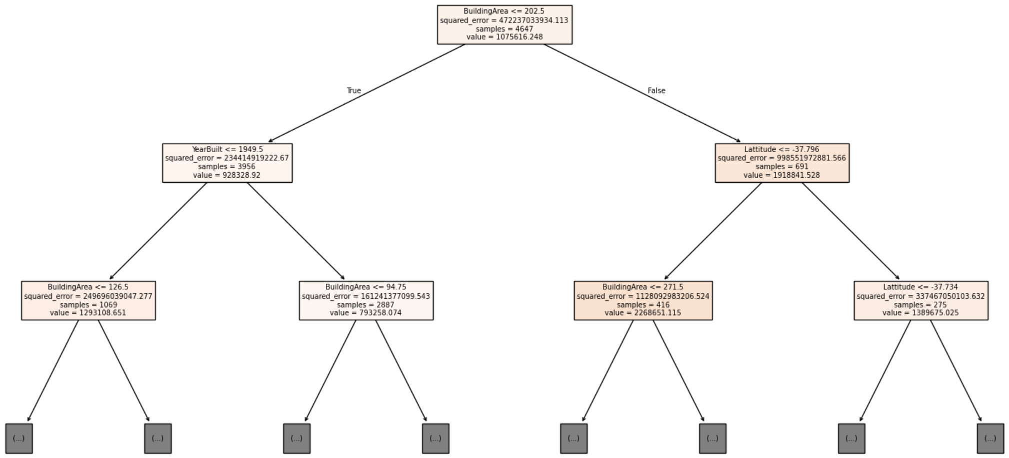
```
[26]: DecisionTreeRegressor(random_state=42)
```

```
[32]: tree_predictions = tree_model.predict(X_test)
      tree_mae = mean_absolute_error(y_test, tree_predictions)
      print(f"Decision Tree MAE: {tree_mae:.0f}")
```

```
Decision Tree MAE: 247902
```

```
[35]: # Make plot
      from sklearn.tree import plot_tree

      plt.figure(figsize = (20, 10))
      plot_tree(tree_model, feature_names = features, filled = True, max_depth = 2)
      plt.show()
```



[37]:
```
# Try to make it better
pruned_tree = DecisionTreeRegressor(max_depth = 5, random_state = 42)
pruned_tree.fit(X_train, y_train)

pruned_predictions = pruned_tree.predict(X_test)
pruned_mae = mean_absolute_error(y_test, pruned_predictions)
print(f"Pruned Tree MAE: {pruned_mae:.0f}")
```

```
Pruned Tree MAE: 260739
```