Project Report

On

House Price Prediction

Submitted in partial fulfilment of the requirements for the award of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE & ENGINEERING

(Artificial Intelligence & Machine Learning)

by

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Under the esteemed guidance of

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Assistant Professor, CSE(AI&ML)

Department of Computer Science & Engineering

(Artificial Intelligence & Machine Learning)

BVRITHYDERABAD COLLEGEOF ENGINEERINGFOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with A Grade

Bachupally, Hyderabad – 500090

2024-25

Department of Computer Science & Engineering

(Artificial Intelligence & Machine Learning)

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CERTIFICATE

This is to certify that the major project entitled **"House Price Prediction"** is a Bonafide work carried out **by** Ms. B. Padmasri (22WH1A6632) Ms. A. Prashanthi (22WH1A6638) Ms. B.Niveda (22WH1A6642) Ms. P.Harshini (22WH1A6660) in partial fulfilment for the award of B. Tech degree in **Computer Science & Engineering (AI&ML), BVRIT HYDERABAD College of Engineering for Women, Bachupally, Hyderabad,** affiliated to Jawaharlal Nehru Technological University Hyderabad, Hyderabad under my guidance and supervision. The results embodied in the project work have not been submitted to any other University or Institute for the award of any degree or diploma.

Supervisor
Ms. A. Naga Kalyani
Professor

Dept of CSE(AI&ML)

Head of the Department
Dr. B. Lakshmi Praveena Assisstant
HOD & Professor

Dept of CSE(AI&ML)

DECLARATION

We hereby declare that the work presented in this project entitled **"Firewall Configuration tool"** submitted towards completion of Project work in III Year of B.Tech of CSE(AI&ML) at **BVRIT HYDERABAD College of Engineering for Women,** Hyderabad is an authentic record of our original work carried out under the guidance of **Ms. A. Naga Kalyani, Assistant Professor, Department of CSE(AI&ML).**

Sign with Date:

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Finally, we would like to thank our Coordinator, all Faculty and Staff of CSE(AI&ML) department who helped us directly or indirectly. Last but not least, we wish to acknowledge our **Parents and Friends** for giving moral strength and constant encouragement.

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Abstract :

This project focuses on developing a predictive model for house prices using an exploratory data analysis (EDA) on a dataset containing information about properties and their associated features. The dataset includes attributes such as location, size, number of rooms, year built, and other structural and locational factors influencing house prices. The project involves a comprehensive analysis of the data through visualizations, statistical summaries, and pattern detection to identify key factors driving property values. Techniques such as data cleaning, handling missing values, feature engineering, and normalization are applied to prepare the data for robust modeling. Predictive algorithms, including linear regression, decision trees, and ensemble methods, are utilized to estimate house prices accurately. The findings from this project aim to provide insights into market trends, assist stakeholders in making informed decisions, and identify patterns in housing data for better property valuation.

The Data Set that is used :

"C:\Users\admin\Downloads\Housing.csv"

CODE:

```
data.head(14)
```

OUTPUT:

	price	area	bedrooms	bathrooms	stories	mainroad	guestroom	basement	hotwaterheating	airconditioning	parking	prefarea	furnishingstatus
0	13300000	7420	4	2	3	1	0	0	0	1	2	1	0
1	12250000	8960	4	4	4	1	0	0	0	1	3	0	0
2	12250000	9960	3	2	2	1	0	1	0	0	2	1	1
3	12215000	7500	4	2	2	1	0	1	0	1	3	1	0
4	11410000	7420	4	1	2	1	1	1	0	1	2	0	0
5	10850000	7500	3	3	1	1	0	1	0	1	2	1	1
6	10150000	8580	4	3	4	1	0	0	0	1	2	1	1
7	10150000	16200	5	3	2	1	0	0	0	0	0	0	2
8	9870000	8100	4	1	2	1	1	1	0	1	2	1	0
9	9800000	5750	3	2	4	1	1	0	0	1	1	1	2
10	9800000	13200	3	1	2	1	0	1	0	1	2	1	0
11	9681000	6000	4	3	2	1	1	1	1	0	2	0	1
12	9310000	6550	4	2	2	1	0	0	0	1	1	1	1
13	9240000	3500	4	2	2	1	0	0	1	0	2	0	0
14	9240000	7800	3	2	2	1	0	0	0	0	0	1	1

CODE:

```
# Check for missing values
print(data.isnull().sum())

# Encode categorical variables
data_encoded = pd.get_dummies(data, drop_first=True)
```

OUTPUT:

price	0
area	0
bedrooms	0
bathrooms	0
stories	0
mainroad	0
guestroom	0
basement	0
hotwaterheating	0
airconditioning	0
parking	0
prefarea	0
furnishingstatus	0

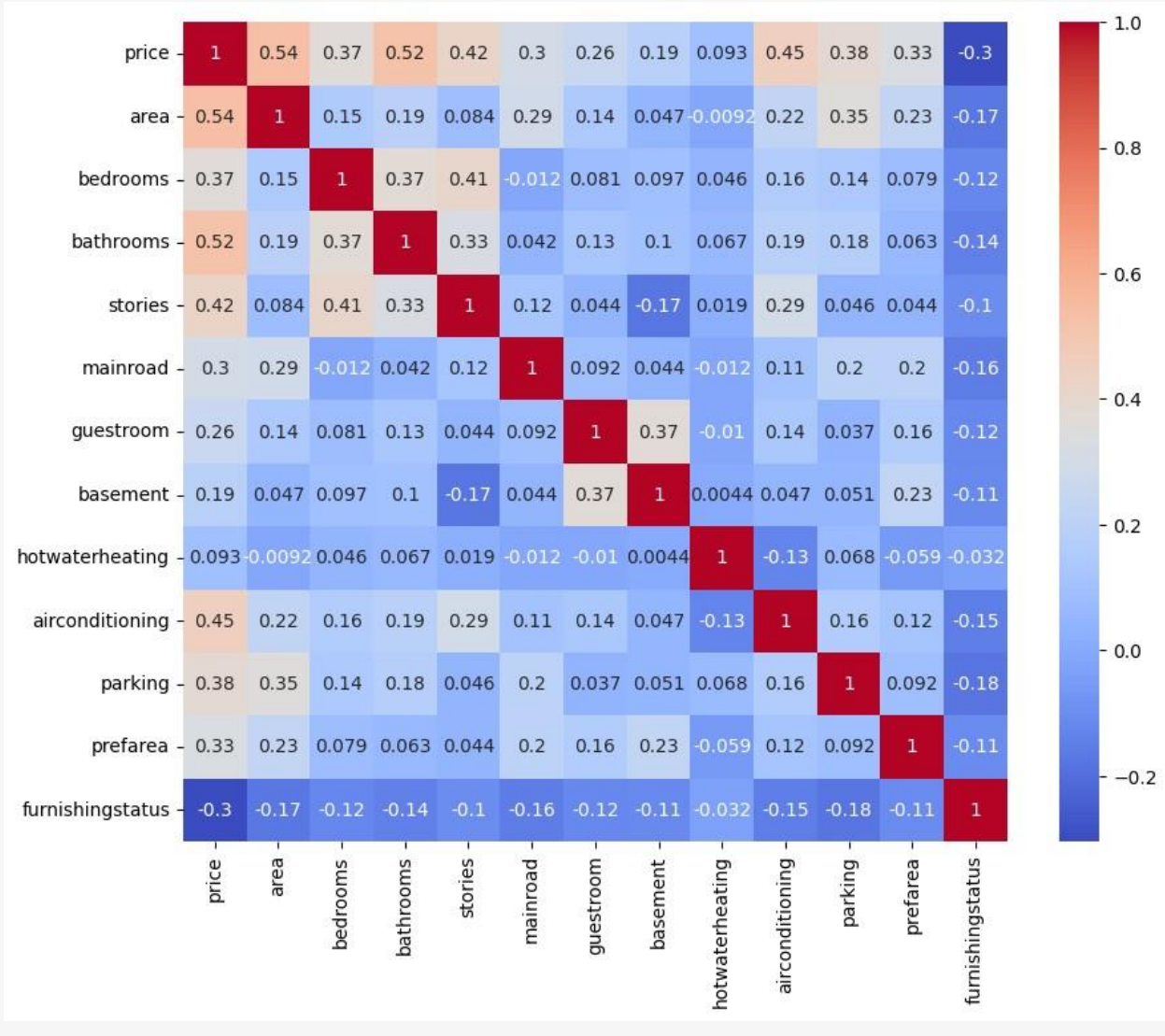
dtype: int64

CODE:

```
import matplotlib.pyplotseaborn as plt
import as sns

# Correlation heatmap plt.figure(figsize=(10, 8))
```

```
sns.heatmap(data_encoded.corr(),  annot=True,cmap='coolwarm')
plt.show()

# Pairplot sns.pairplot(data)plt.show()
```

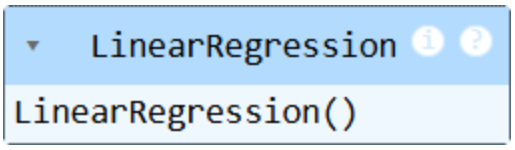
OUTPUT



CODE:

```
from sklearn.model_selection import train_test_split

# Define features and target
X = data_encoded.drop('price', axis=1)
y = data_encoded['price']

# Split the dataset
X_train, X_test, y_train, y_test = train_test_split(X,
y, test_size=0.2, random_state=42)

# Initialize the model
linear_model = LinearRegression()

# Train the model
linear_model.fit(X_train, y_train)
```

OUTPUT:



CODE:

```
# Predict on test data
y_pred = linear_model.predict(X_test)

# Evaluate performance
print("Mean Absolute Error (MAE):",
mean_absolute_error(y_test, y_pred))
```

```
print("Mean Squared Error (MSE):",
mean_squared_error(y_test, y_pred))
print("Root Mean Squared Error (RMSE):",
np.sqrt(mean_squared_error(y_test, y_pred)))
print("R2 Score:", r2_score(y_test, y_pred))
```

OUTPUT:

Mean Absolute Error (MAE): 979679.6912959901Mean Squared Error (MSE): 1771751116594.0352
Root Mean Squared Error (RMSE): 1331071.4167895108R2 Score: 0.6494754192267803

CODE:

```
# Display coefficients
coefficients = pd.DataFrame({
    'Feature': X.columns,
    'Coefficient': linear_model.coef_
})
print(coefficients)
```

OUTPUT:

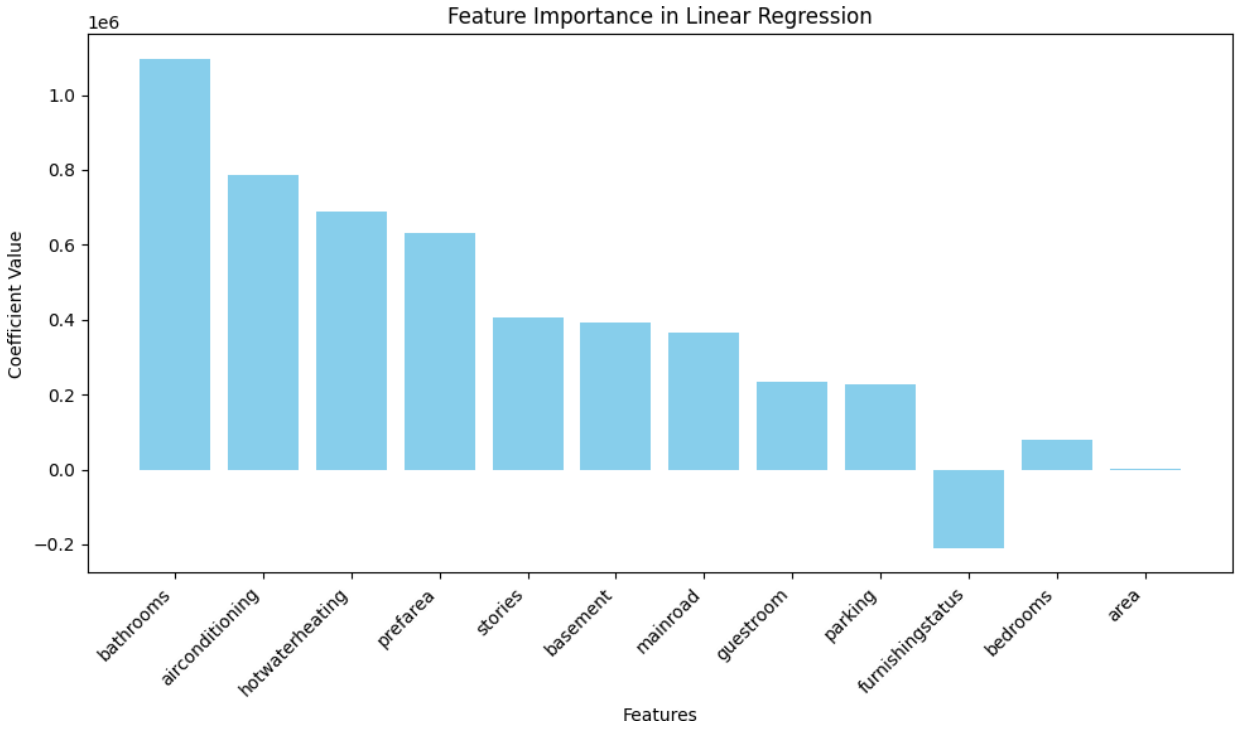
	Feature	Coefficient
0	area	2.358488e+02
1	bedrooms	7.857449e+04
2	bathrooms	1.097117e+06
3	stories	4.062232e+05
4	mainroad	3.668242e+05
5	guestroom	2.331468e+05
6	basement	3.931598e+05
7	hotwaterheating	6.878813e+05
8	airconditioning	7.855506e+05

9	parking	2.257565e+05
10	prefarea	6.299017e+05
11	furnishingstatus	-2.103971e+05

CODE:

```
import matplotlib.pyplot as plt


# Get feature names and coefficientscoefficients = pd.DataFrame({
        'Feature': X.columns, 'Coefficient':
        linear_model.coef_
})


# Sort by absolute value of coefficients for bettervisualization
coefficients = coefficients.sort_values(by='Coefficient',   key=abs,
ascending=False)


# Plot the bar graph plt.figure(figsize=(10, 6))
plt.bar(coefficients['Feature'],
coefficients['Coefficient'],   color='skyblue')plt.xlabel('Features')
plt.ylabel('Coefficient Value')
plt.title('Feature Importance in Linear Regression')plt.xticks(rotation=45,
ha='right') plt.tight_layout()
plt.show()
```

OUTPUT:


Feature Importance in Linear Regression
1e6
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
Coefficient Value
bathrooms
airconditioning
hotwaterheating
prefarea
stories
basement
mainroad
guestroom
parking
furnishingstatus
bedrooms
area
Features