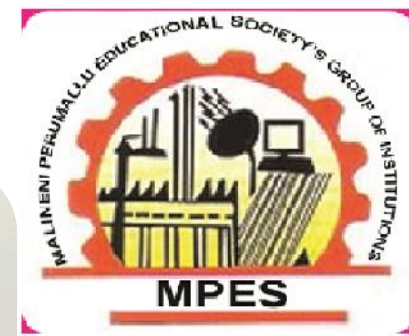


Team No: 123

Team Name: Passion Entrepreneur



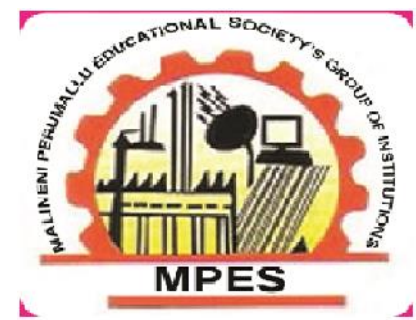
House Rental Prediction System

Guided by:
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Malineni
REVIEW
2022

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Story:



Importance of project:

→ Homeowners, real estate brokers, and investors all need accurate rent prices; a good rent price predictions model generates these prices.

→ Real estate agents or online real estate websites then show these optimal results to clients, making renting easy, no matter the apartment type, location, or features.

→ House is one of human life's most essential needs, along with other fundamental needs such as food, water, and much more.

→ Demand for houses grew rapidly over the years as people's living standards improved. While there are

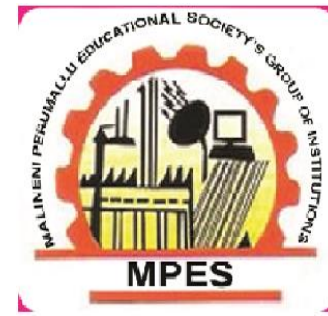
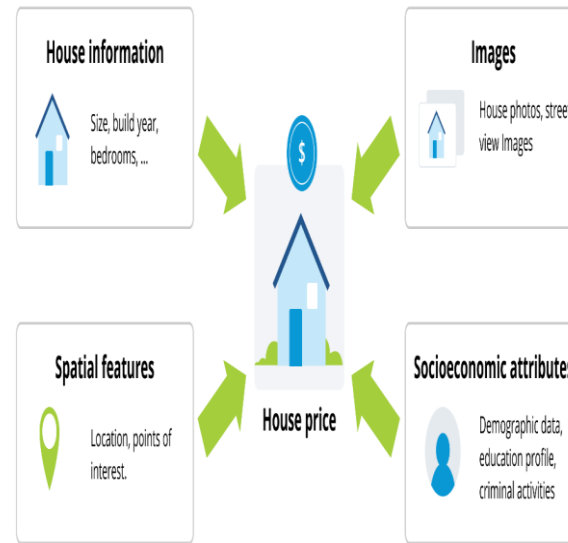
people who make their house as an investment and property, yet most people around the world are buying a house as their shelter or as their livelihood.

→ Much more it is important to predict housing prices without bias to help both the buyers

and sellers make their decisions

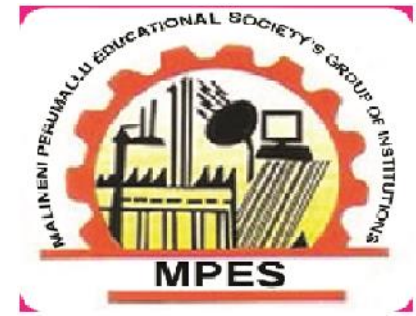


HOUSE PRICE PREDICTION CHALLENGE



- The aim is to predict the efficient house pricing for real estate customers with respect to their budgets and priorities.
- It helps the people who plan to buy a house so they can know the price range in the future, then they can plan their finance well.
- Predicting house prices can help to determine the selling price of a house of a particular region and can help to find the right time to buy a home.

Problem for house rental prediction system:



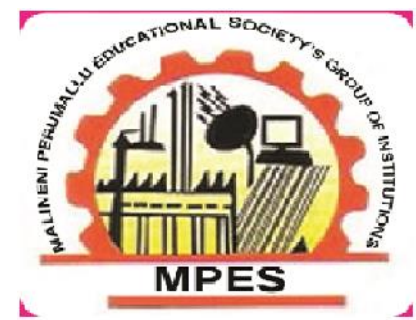
Problem Statement:

The goal of the statistical analysis is to help us understand the relationship between house features and how these variables are used to predict house

Objective:

- Predict the house price
- Using two different models in terms of minimizing the difference between predicted and actual rating.
- With increasing demand of housing, prices of houses are also going up.
- It is critical to provide accurate predictions of housing prices.

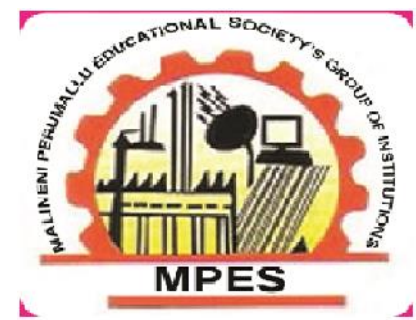
Project:



- ☐ The Rental Management System is **used to easily identify the suitable place in**
Save time, cost also.
- ☐ In reality, only **the banks and those with many properties** benefit from high house prices: high prices mean that people will have to take out larger mortgages for longer periods of time, which means more money in interest payments for the banks.
- ☐ Real estate business and investment **provide a source of revenue for millions.**
- ☐ **Housing prices can impact residential investment and therefore affect economic growth.**

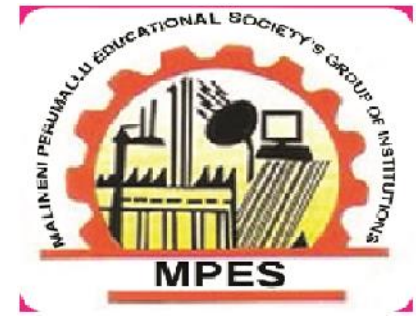


Existing system:



- The Existing system for House Rental Prediction is: Data is at the heart of technical innovations, achieving any result is now possible using predictive models.
- Machine Learning is extensively used in this House Rental Prediction System.
- Although development of correct and accurate model is needed.
- SVM are not suitable for complex real world data. SVM is nothing but Support Vector Machine.

Tools:



→The tools that are used in the projects is:

- 1.Google Collab
- 2.Csv kit
- 3.Data Wrangler
- 4.Excel

1. Google Collab:

- Collab allows Google collab is a product from google search. Collab is especially well suited to machine learning, Data Analysis and Education
- Any body to write and execute any python code through the browser.
- Collab notebooks are sorted in google drive can be loaded from GitHub.
- Collab supports many popular machine learning libraries which can be easily loaded in your notebook

2. Csv kit:

- Csv kit is used for converting the raw data into csv kit

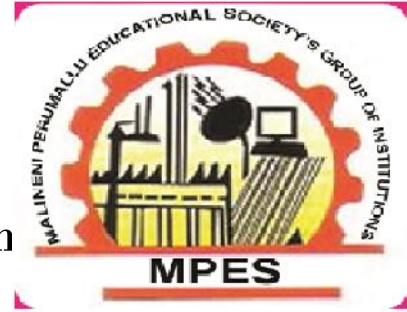
3.Data wrangler:

- Data Wrangler is used for data cleaning and transformation

4.Excel:

- Excel is used to collect the data set

Packages:



→ The packages that are used in the House Rental Prediction

1. Pandas
2. NumPy
3. sklearn

1. Pandas: Pandas has been one of the most commonly used tools for data science and machine learning which is used for data cleaning and analysis.

→ Pandas module is mainly works with the numerical data.

2. NumPy: NumPy is a very popular python library for multi-dimensional arrays.

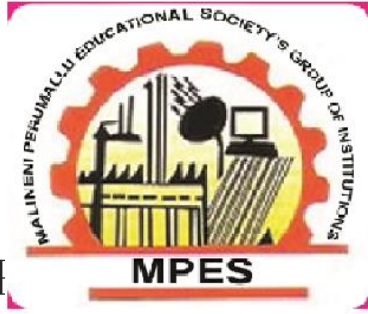
→ The NumPy module is works with in the numerical data.

3. SKlearn: Sklearn is the most useful and robust library for machine learning

In python.

→ It provides a selection of efficient tools for machine learning and Statisitcal modelling including classification, regression ,clustering And dimensionality in python.

Programming Languages and why:



→The programming languages that are used in the House Rental System is: Python

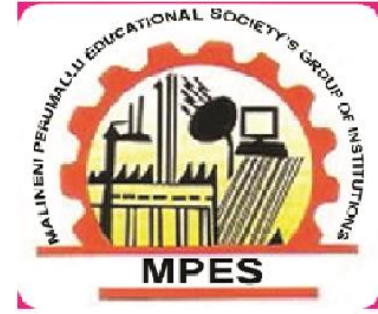
Python: Python provides easy access to geoprocessing tools and simple function of listening data .,describing data, and reading and writing data.

→Python is a popular programming language.

→Python can be used on a server to create web applications. Python programming is used to build websites, software , automate tasks, conduct data analysis.

→Python is a computer programming language often used to **build websites and software, automate tasks, and conduct data analysis.**

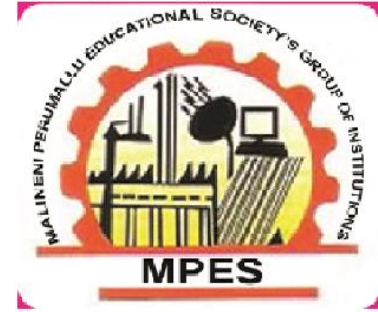
Pros of the project:



→The pros of the House Rental Prediction System:

1. Huge investments not required
2. Easier to shift out
3. Limited responsibilities
4. No down payment
5. Fixed rent amount
6. No maintainance costs or repair bills
7. Level of freedom
8. Very little maintenance

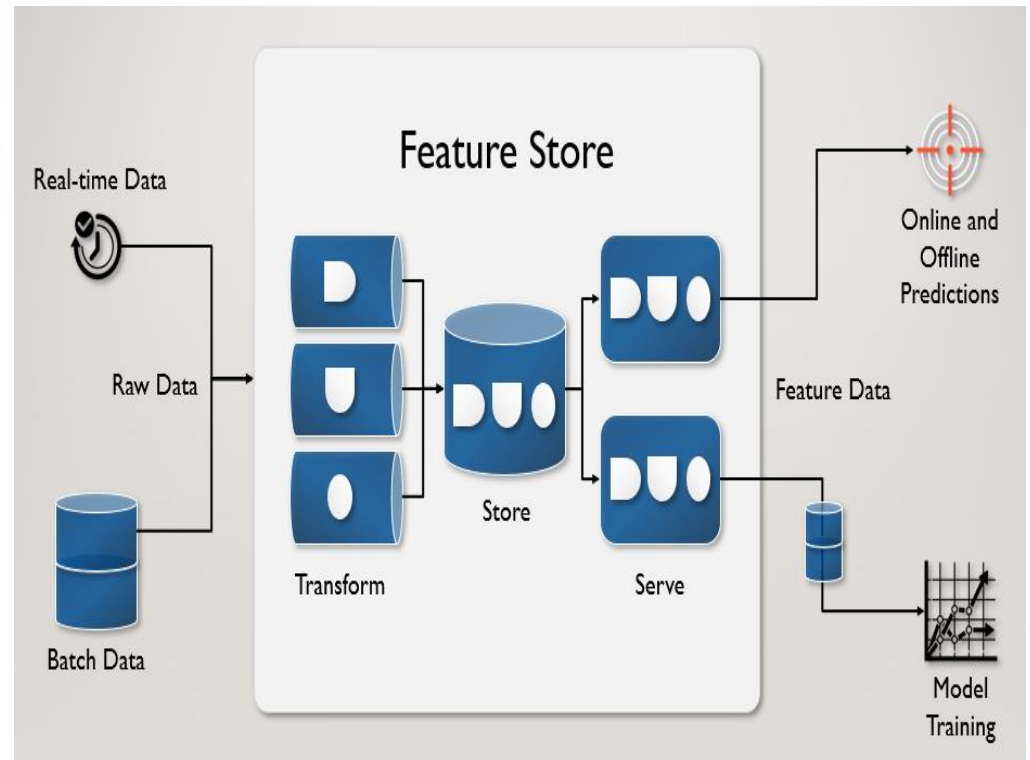
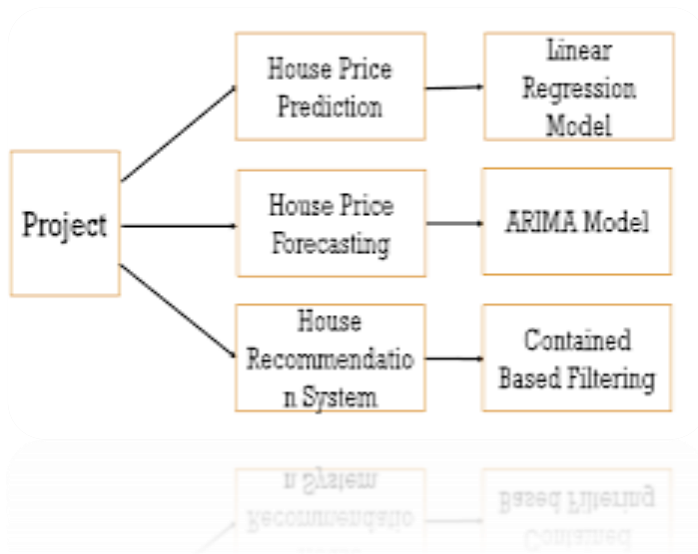
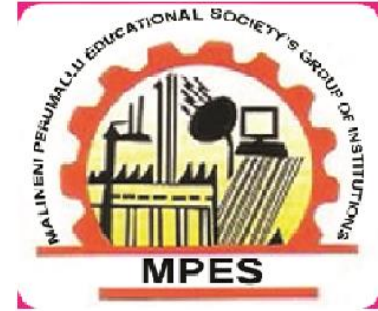
cons of the project:



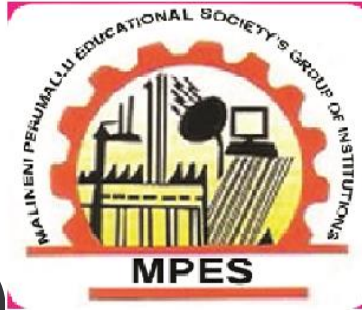
→ The cons of the House Rental Prediction System:

1. No return on rental paid
2. Maintenance issue
3. Rental agreement renewals are difficult
4. Too much restrictions
5. Throwing money away
6. Ability to decorate and personalize
7. Rent increase

Block Diagram:



Working Procedure for House Rental Prediction System:

The screenshot shows a Google Colab notebook titled "House Rental Prediction System-1". The code cell contains the following code:

```
[17] import pandas as pd
dataset=pd.read_csv('House_Rent_Dataset.csv')
```

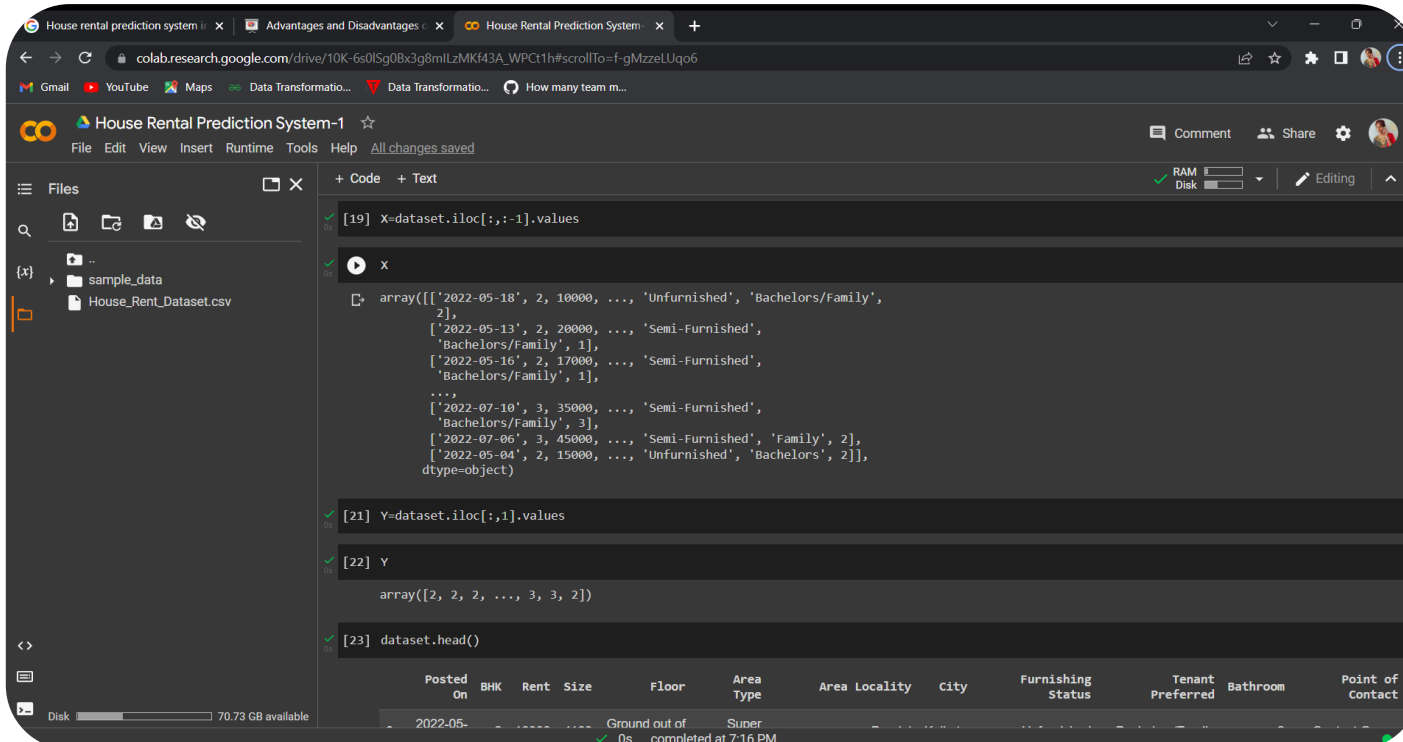
The output shows a preview of the dataset with columns: Posted On, BHK, Rent, Size, Floor, Area Type, Area Locality, City, Furnishing Status, Tenant Preferred, Bathroom, and Point of Contact. The first few rows of data are displayed, showing properties in Kolkata and Hyderabad.

	Posted On	BHK	Rent	Size	Floor	Area Type	Area Locality	City	Furnishing Status	Tenant Preferred	Bathroom	Point of Contact
0	2022-05-18	2	10000	1100	Ground out of 2	Super Area	Bandel	Kolkata	Unfurnished	Bachelors/Family	2	Contact Owner
1	2022-05-13	2	20000	800	1 out of 3	Super Area	Phool Bagan, Kankurgachi	Kolkata	Semi-Furnished	Bachelors/Family	1	Contact Owner
2	2022-05-16	2	17000	1000	1 out of 3	Super Area	Salt Lake City Sector 2	Kolkata	Semi-Furnished	Bachelors/Family	1	Contact Owner
3	2022-07-04	2	10000	800	1 out of 2	Super Area	Dumdum Park	Kolkata	Unfurnished	Bachelors/Family	1	Contact Owner
4	2022-05-09	2	7500	850	1 out of 2	Carpet Area	South Dum Dum	Kolkata	Unfurnished	Bachelors	1	Contact Owner
...
4741	2022-05-18	2	15000	1000	3 out of 5	Carpet Area	Bandam Kommu	Hyderabad	Semi-Furnished	Bachelors/Family	2	Contact Owner
4742	2022-05-15	3	29000	2000	1 out of 4	Super Area	Manikonda, Hyderabad	Hyderabad	Semi-Furnished	Bachelors/Family	3	Contact Owner
4743	2022-07-	2	35000	1750	2 out of 5	Carpet	Himayath Nagar, NH	Hyderabad	Semi-Furnished	Bachelors/Family	2	Contact Owner

Step-1:

→ Exploratory Data Analysis(EDA):

First, let's import the data and have a look to see what kind of data we are dealing with



```
[19] X=dataset.iloc[:,1:].values
```

```
[20] X
```

```
[21] Y=dataset.iloc[:,1].values
```

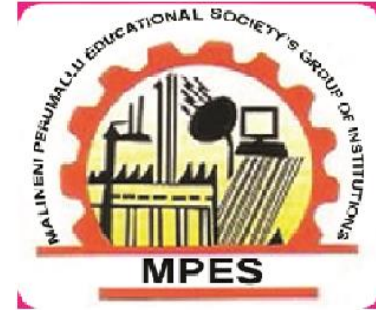
```
[22] Y
```

```
[23] dataset.head()
```

Posted On	BHK	Rent	Size	Floor	Area Type	Area Locality	City	Furnishing Status	Tenant Preferred	Bathroom	Point of Contact
2022-05-18	2	10000	Unfurnished	Bachelors/Family	2

Step-2:

- In this step, Split the data into inputs and outputs
- And .values is used to print the total data into array type



House rental prediction system | Advantages and Disadvantages | House Rental Prediction System

colab.research.google.com/drive/10K-6s0ISg0Bx3g8mLzMKf43A_WPCt1h#scrollTo=f-gMzzeLUqo6

House Rental Prediction System-1

File Edit View Insert Runtime Tools Help All changes saved

Files

- sample_data
- House_Rent_Dataset.csv

Code

```
[23] 3 2022-07-04 2 10000 800 1 out of 2 Super Area Dumdum Park Kolkata Unfurnished Bachelors/Family 1 Contact Owner
      4 2022-05-09 2 7500 850 1 out of 2 Carpet Area South Dum Dum Kolkata Unfurnished Bachelors 1 Contact Owner
```

```
[24] dataset.tail()
```

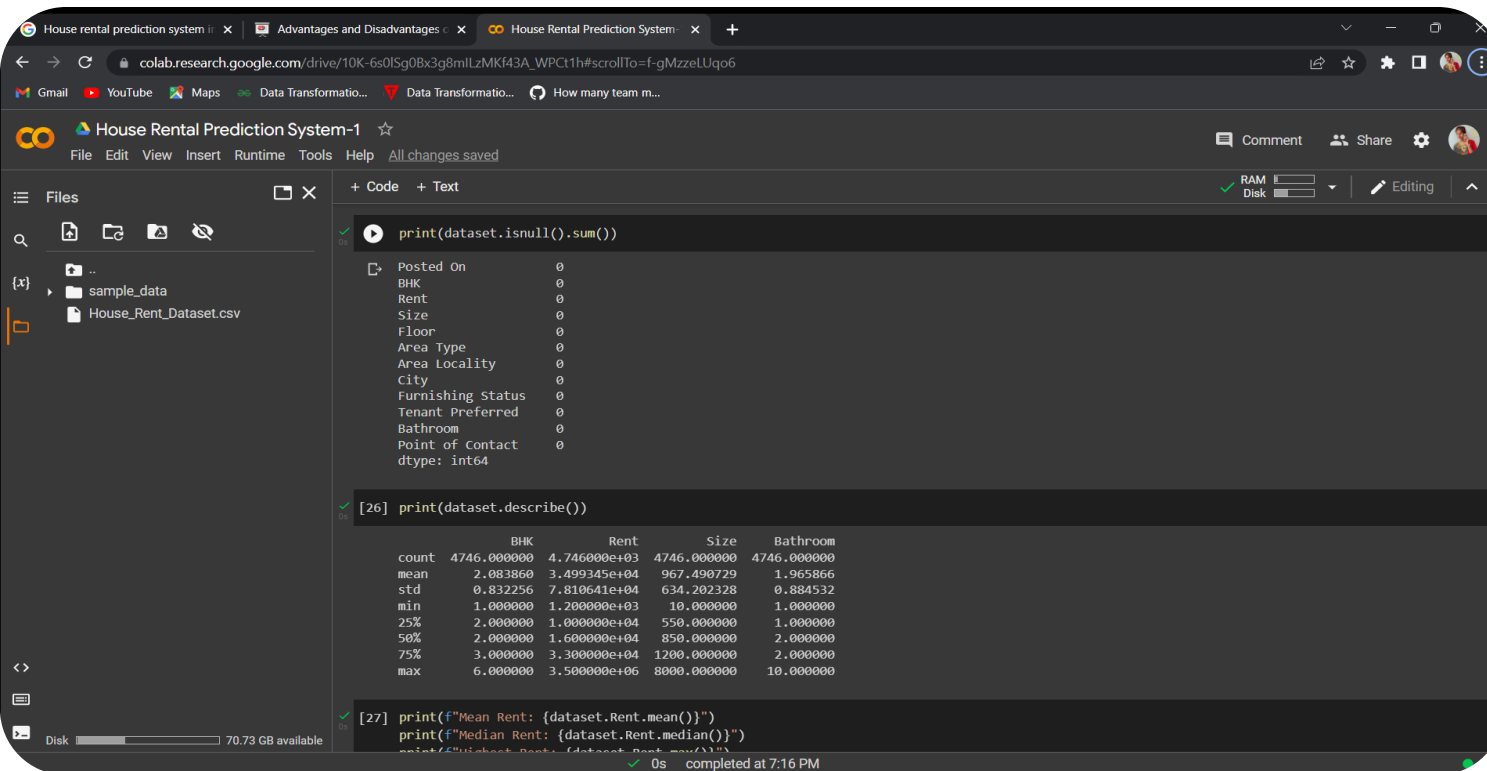
	Posted On	BHK	Rent	Size	Floor	Area Type	Area Locality	City	Furnishing Status	Tenant Preferred	Bathroom	Point of Contact
4741	2022-05-18	2	15000	1000	3 out of 5	Carpet Area	Bandam Kommu	Hyderabad	Semi-Furnished	Bachelors/Family	2	Contact Owner
4742	2022-05-15	3	29000	2000	1 out of 4	Super Area	Manikonda, Hyderabad	Hyderabad	Semi-Furnished	Bachelors/Family	3	Contact Owner
4743	2022-07-10	3	35000	1750	3 out of 5	Carpet Area	Himayath Nagar, NH 7	Hyderabad	Semi-Furnished	Bachelors/Family	3	Contact Agent
4744	2022-07-06	3	45000	1500	23 out of 34	Carpet Area	Gachibowli	Hyderabad	Semi-Furnished	Family	2	Contact Agent
4745	2022-05-04	2	15000	1000	4 out of 5	Carpet Area	Suchitra Circle	Hyderabad	Unfurnished	Bachelors	2	Contact Owner

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79°F Raining now

→.head() is used to access the first n rows of the dataset or series. It returns a smaller version of the caller object with the first few entries

→.tail() is used to return the last n rows . The function returns last n rows from the object based on position



```
print(dataset.isnull().sum())
```

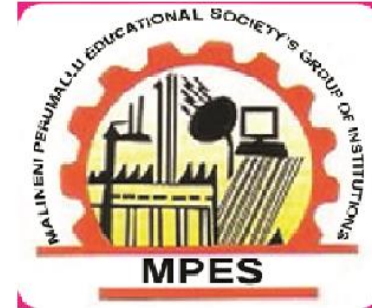
```
Posted On      0
BHK             0
Rent            0
Size            0
Floor           0
Area Type       0
Area Locality   0
City            0
Furnishing Status 0
Tenant Preferred 0
Bathroom        0
Point of contact 0
dtype: int64
```

```
[26] print(dataset.describe())
```

	BHK	Rent	Size	Bathroom
count	4746.000000	4.746000e+03	4746.000000	4746.000000
mean	2.083860	3.499345e+04	967.490729	1.965866
std	0.832256	7.810641e+04	634.202328	0.884532
min	1.000000	1.200000e+03	10.000000	1.000000
25%	2.000000	1.000000e+04	550.000000	1.000000
50%	2.000000	1.600000e+04	850.000000	2.000000
75%	3.000000	3.300000e+04	1200.000000	2.000000
max	6.000000	3.500000e+06	8000.000000	10.000000

```
[27] print(f"Mean Rent: {dataset.Rent.mean()}")
print(f"Median Rent: {dataset.Rent.median()}")
print(f"Highest Rent: {dataset.Rent.max()}")
```

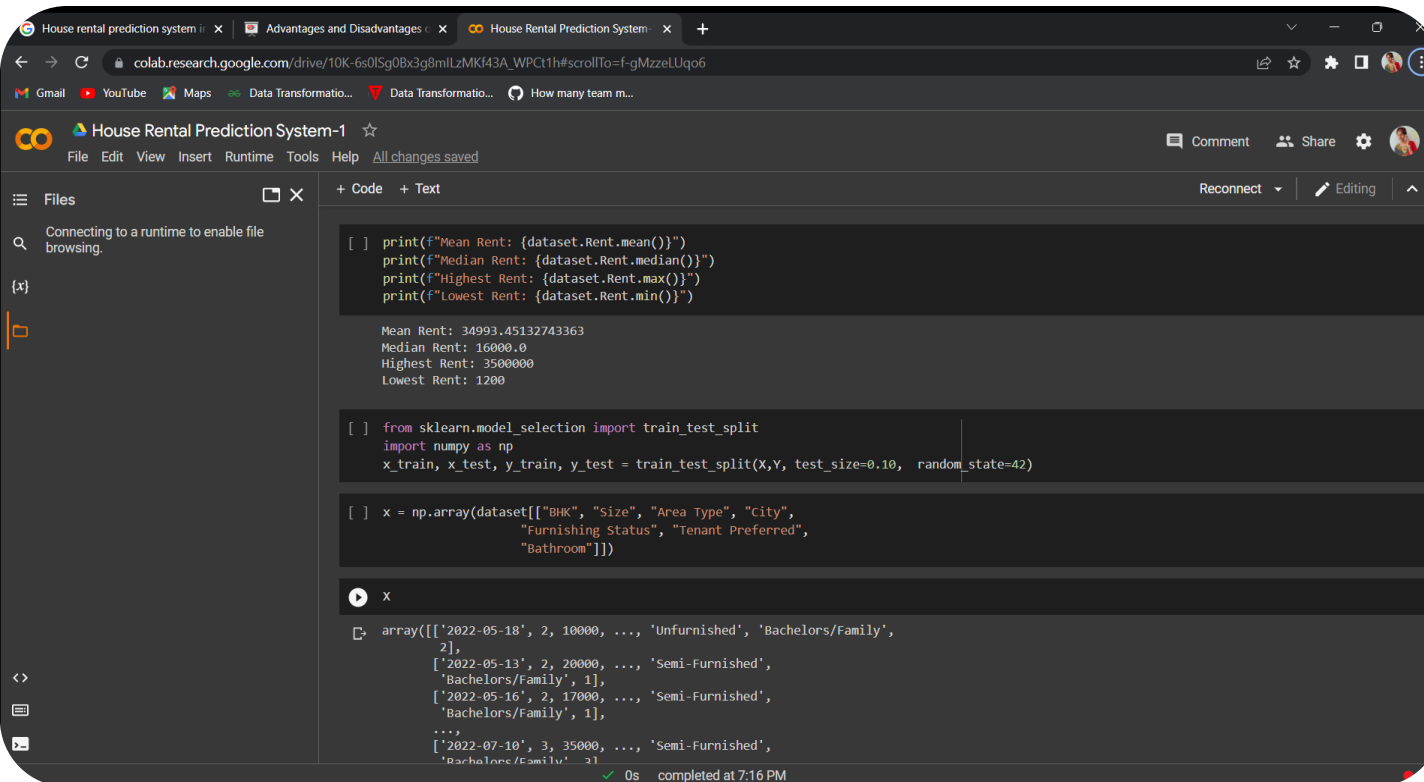
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Step-3:

→ dataset. Isnull().sum() returns the number of missing values in the dataset

→ dataset . describe() is used for calculating some statistical data like percentile, mean and std of the numerical values of the numerical values of the series or data frame



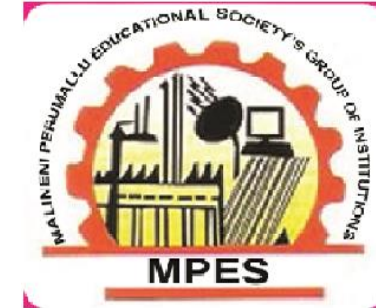
```
[ ] print(f"Mean Rent: {dataset.Rent.mean()}")
print(f"Median Rent: {dataset.Rent.median()}")
print(f"Highest Rent: {dataset.Rent.max()}")
print(f"Lowest Rent: {dataset.Rent.min()}")

Mean Rent: 34993.45132743363
Median Rent: 16000.0
Highest Rent: 350000
Lowest Rent: 1200

[ ] from sklearn.model_selection import train_test_split
import numpy as np
x_train, x_test, y_train, y_test = train_test_split(X,V, test_size=0.10, random_state=42)

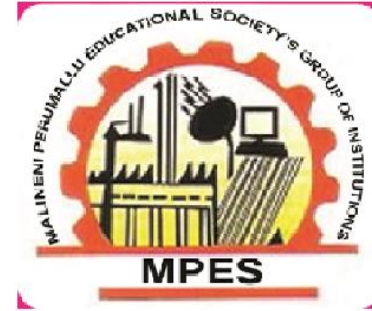
[ ] x = np.array(dataset[["BHK", "Size", "Area Type", "City",
                        "Furnishing Status", "Tenant Preferred",
                        "Bathroom"]])

X
array([[ '2022-05-18', 2, 10000, ..., 'Unfurnished', 'Bachelors/Family',
        2],
       [ '2022-05-13', 2, 20000, ..., 'Semi-Furnished',
        'Bachelors/Family', 1],
       [ '2022-05-16', 2, 17000, ..., 'Semi-Furnished',
        'Bachelors/Family', 1],
       ...,
       [ '2022-07-10', 3, 35000, ..., 'Semi-Furnished',
        'Bachelors/Family', 2],
```



Step-4: Data set Preparation (Splitting)

→ Data is divided into the Train set and Test set. We use the Train set to make the algorithm learn the data's behaviour and then check the accuracy of our model on the Test set



```
dtype=object)

[ ] y = np.array(dataset[["Rent"]])

y

array([[10000],
       [20000],
       [17000],
       ...,
       [35000],
       [45000],
       [15000]])

import matplotlib.pyplot as plt
import plotly.express as px
import plotly.graph_objects as go

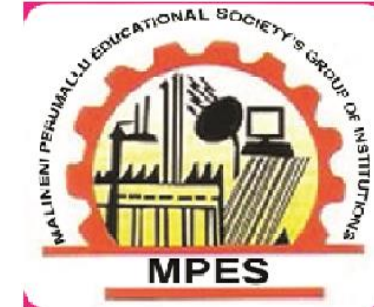
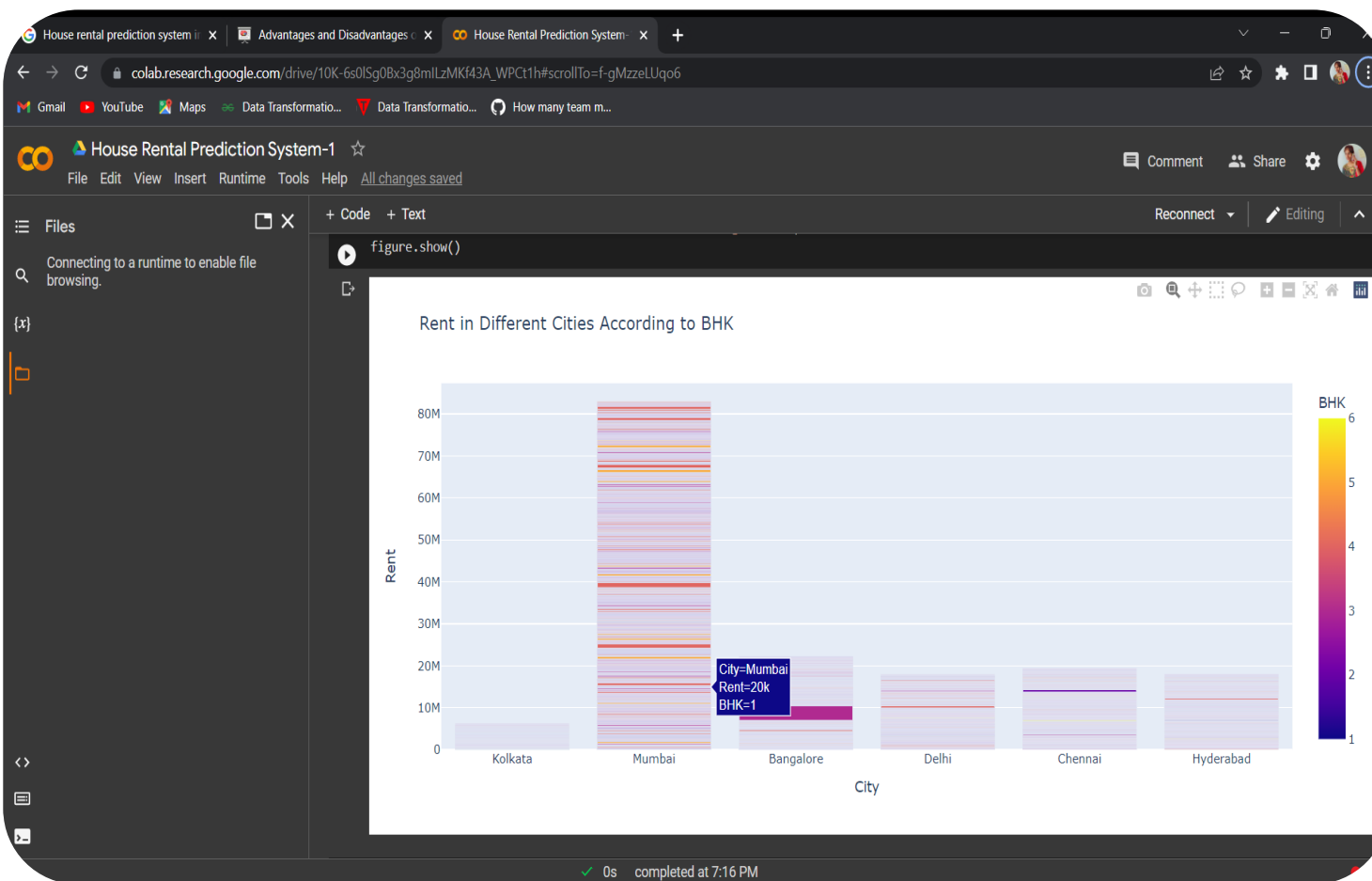
[ ] figure = px.bar(dataset, x=dataset["City"],
                    y = dataset["Rent"],
                    color = dataset["BHK"],
                    title="Rent in Different Cities According to BHK")
figure.show()
```

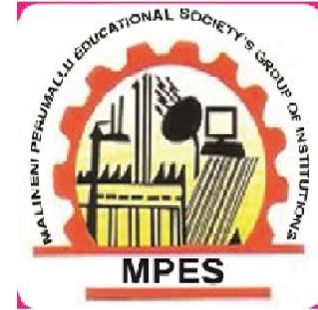
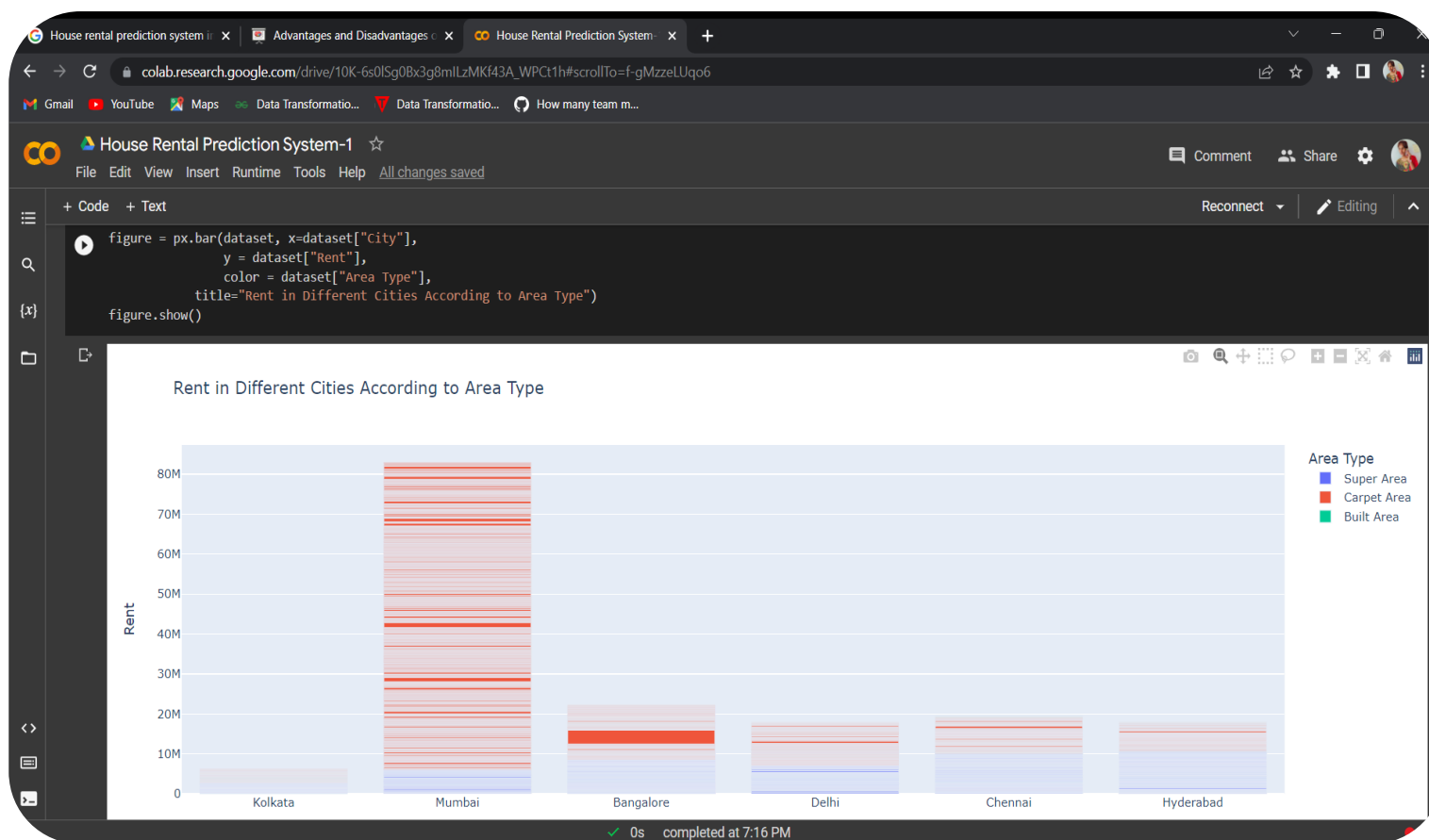
Rent in Different Cities According to BHK

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Step-5:

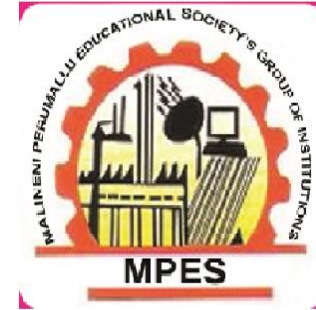
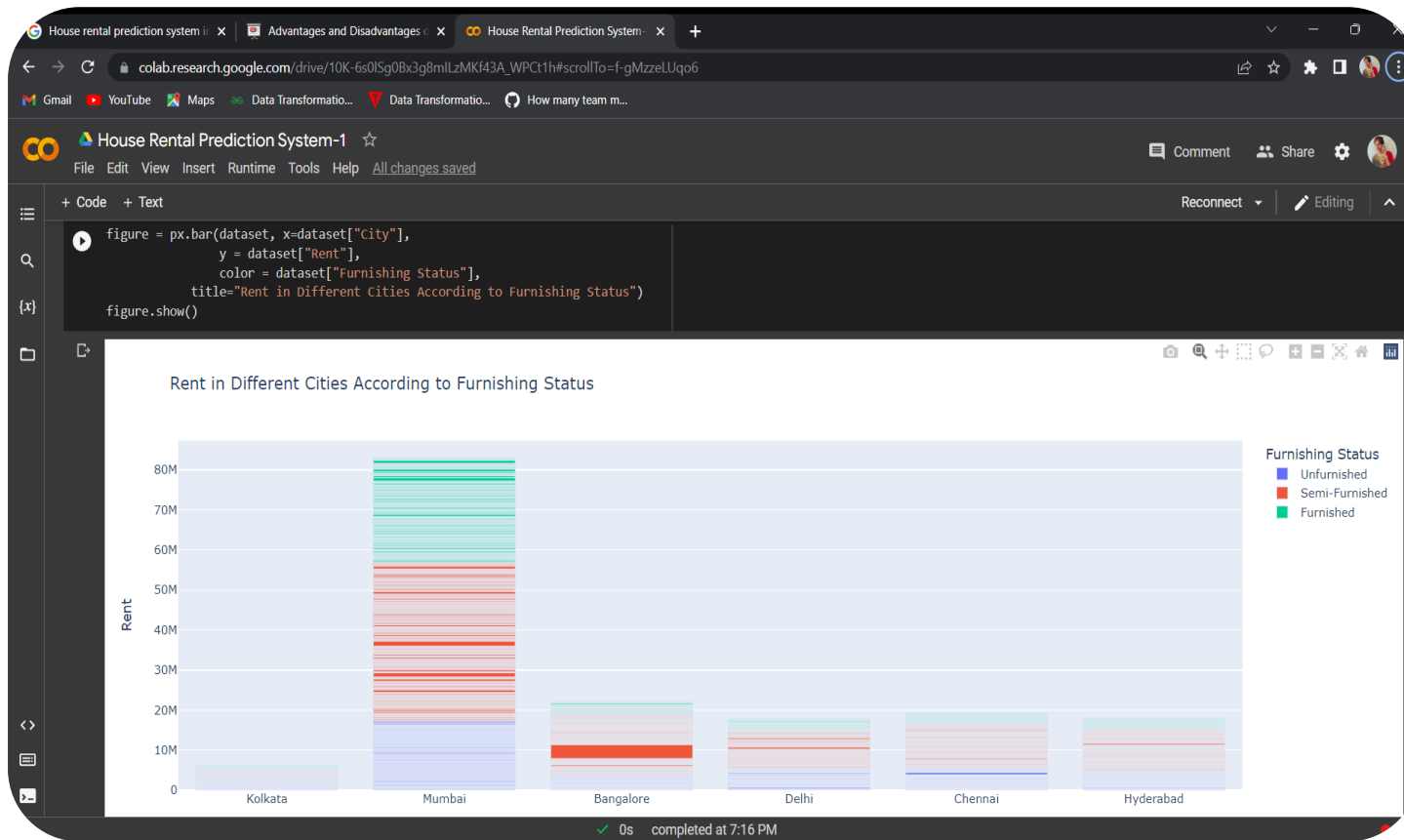
→ Matplotlib is imported to present the data in the form of graph

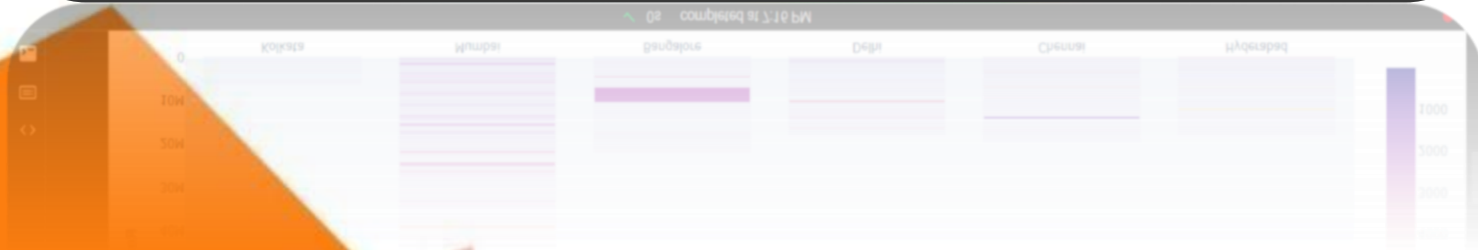
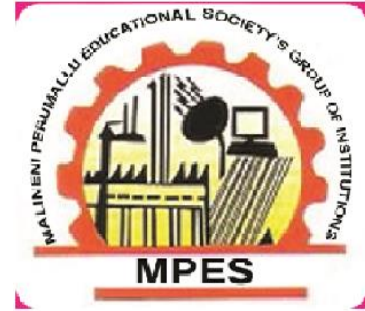
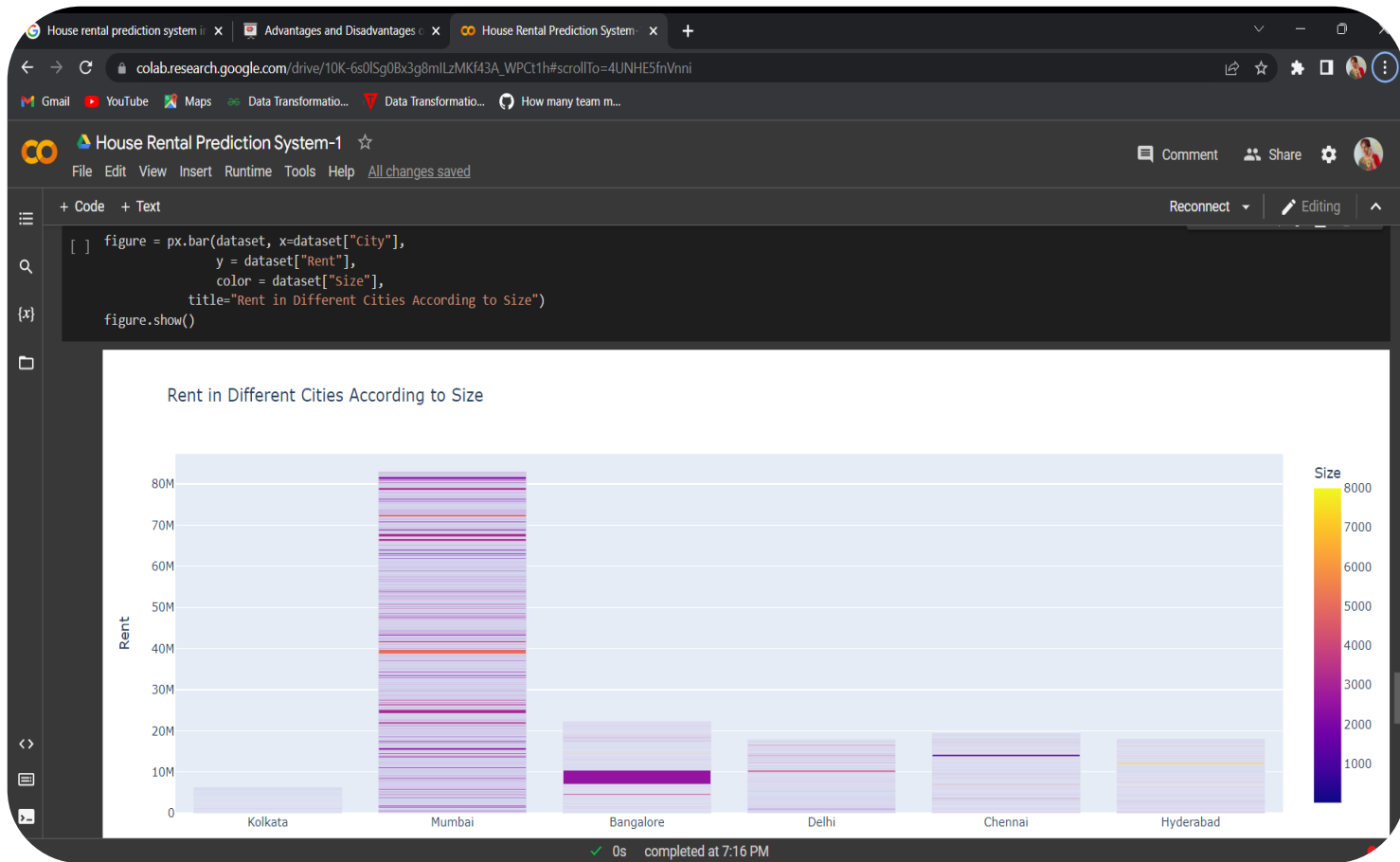


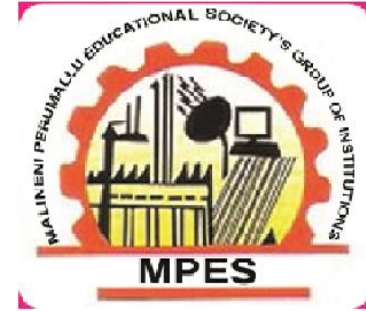
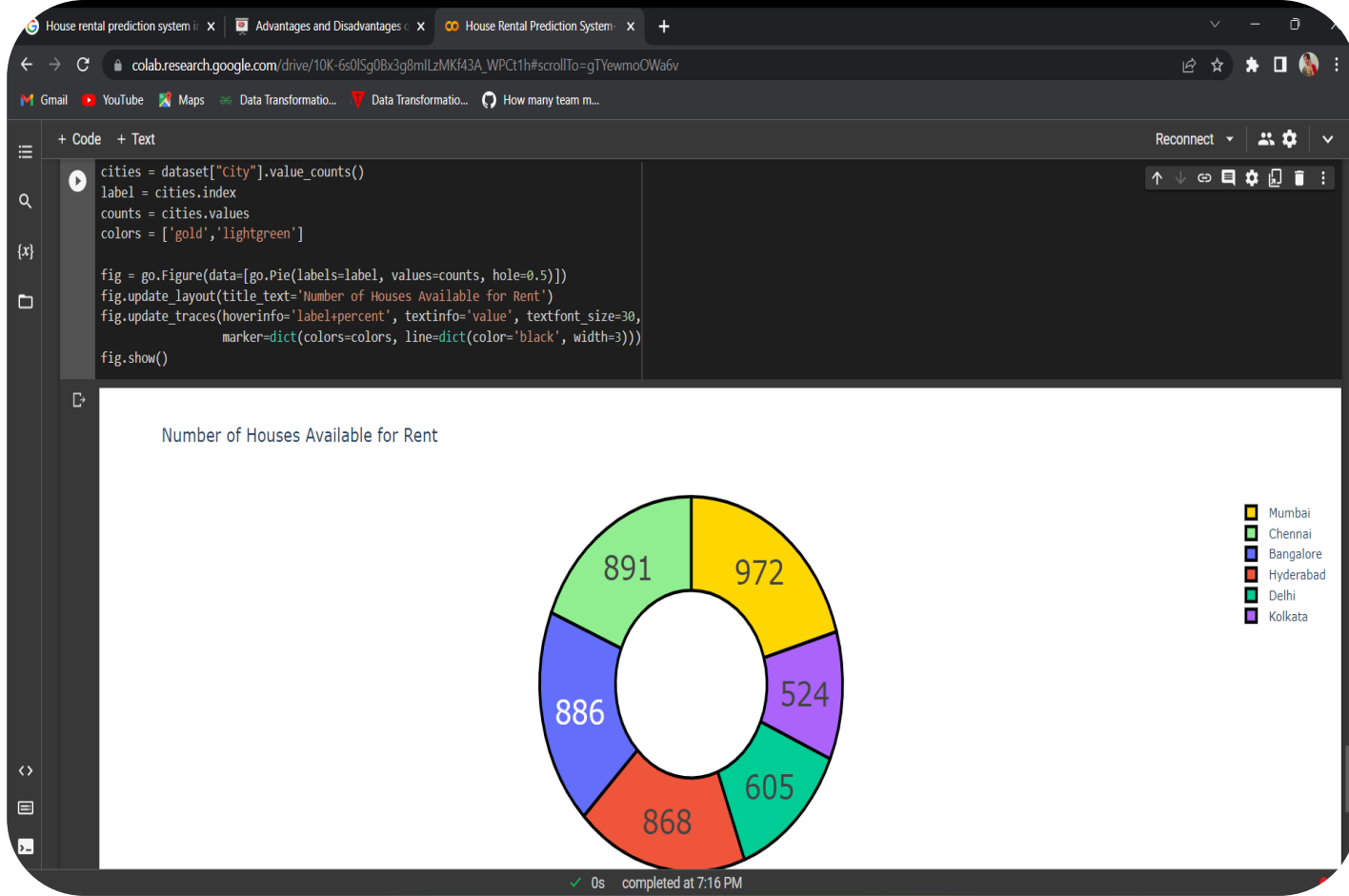


Step-6:

→ `px.bar` is used to represent each row in rectangular mark.



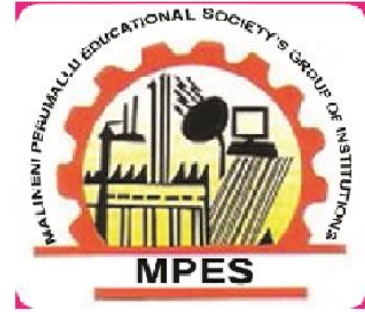




Step-7:

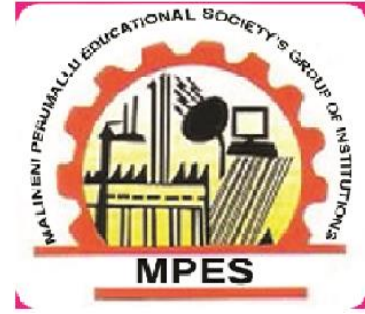
→ At the end, it shows the number of houses available for rent

Results:

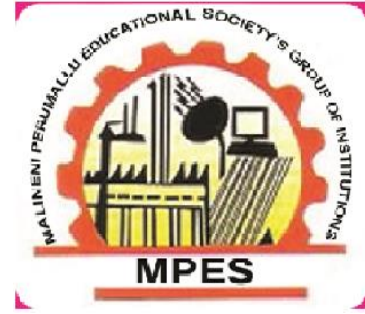


- The results of the House Rental Prediction is:
- Is to predict the efficient house pricing for real estate customers with respect to their budgets and priorities.
- By analysis previous market trends and price ranges, and also upcoming developments future prices will be predicted.
- The result of this project is expected to create prediction models for property rent price for property owners.
- Machine Learning model to predict the rent prices of the house based on the parameters like, area, no of bedrooms, society , location.

Conclusion Remarks:



- From, this House Rental Prediction System we have learnt that prediction house prices expected to help people who plan to buy a house so they can know the price range in the future, then they can plan their finance well.
- From the training and testing of dataset on the model, a strong deduction can be made that the model effectively on the data producing lower levels of errors.
- Hence, We can conclude that deep learning techniques prove useful in the implementation and estimation of house rental prediction system.
- Machine Learning model helps to predict the price of the property based on the training provided by the dataset.

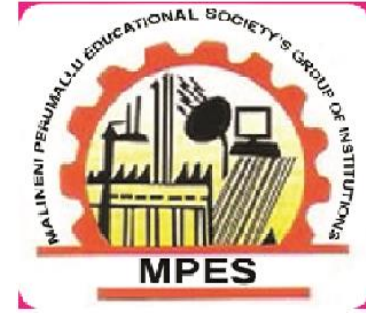


Outcomes:

- The standard approach to predict the housing value for such surveys is based on the rental cost of the house.
- House Rental Predictions are also beneficial for property investors to know the trend of housing prices in a certain location.
- Predicting house prices using graph lab.

Achieved from the Project:

- Achieved from the project is to predict the efficient house pricing for real estate customers with respect to their budgets and priorities.



Thank You!

Malineni
REVIEW
2022