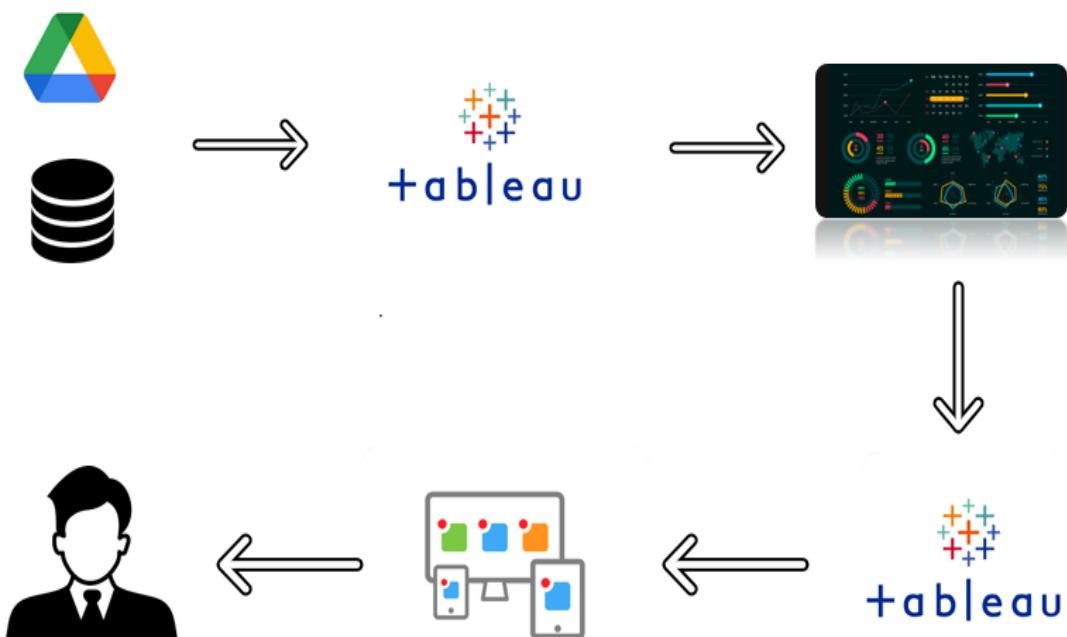


Housing Prices in Metropolitan Areas of India

House price prediction in a metropolitan city in India is a valuable solution for potential home buyers, real estate agents, and investors. By leveraging historical sales data, property details, and location-specific information, a predictive model can accurately estimate house prices. The model's scalability, real-time updates, user-friendly interface, and transparency ensure it meets the needs of stakeholders. Integration capability, data privacy, and cost-effectiveness are also important considerations. By addressing these requirements, the prediction model provides reliable insights, empowering stakeholders to make informed decisions in the fast-paced real estate market.

Tableau Architecture



Project Flow

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding
 - Specify the business problem
 - Business requirements
 - Literature Survey
 - Social or Business Impact.
- Data Collection & Extraction from Database
 - Collect the dataset,
 - Storing Data in DB
 - Perform SQL Operations
 - Connect DB with Tableau
- Data Preparation
 - Prepare the Data for Visualization
- Data Visualizations
 - Number of Unique Visualizations
- Dashboard
 - Responsive and Design of Dashboard
- Story
 - Number of Scenes of Story
- Performance Testing
 - Amount of Data Rendered to DB
 - Utilization of Data Filters
 - Number of Calculation Fields
 - Number of Visualizations/ Graphs
- Web Integration
 - Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation
 - Record explanation Video for project end to end solution
 - Project Documentation-Step by step project development procedure

Milestone 1: Define Problem / Problem Understanding

Activity 1: Specify the business problem

The business problem at hand is the prediction of house prices in a metropolitan city in India. The real estate market in such cities is complex and dynamic, making it challenging for potential home buyers, real estate agents, and investors to accurately estimate property values. By developing a predictive model using relevant datasets and features, stakeholders can gain insights into the factors influencing house prices and make informed decisions regarding property investments. The goal is to provide a reliable and accurate prediction tool that assists users in navigating the competitive real estate market and maximizing their returns.

Activity 2: Business requirements

The business requirements for house price prediction in a metropolitan city in India include developing an accurate prediction model that can estimate property prices. The model should identify the key features impacting house prices and provide insights to aid decision-making. It should be scalable to handle a large volume of data and incorporate real-time updates to reflect the latest market conditions. The solution should have a user-friendly interface, ensure transparency and explainability of predictions, prioritize data privacy and security, and define performance metrics for evaluation. Integration capability and cost-effectiveness are also important considerations to deliver a valuable and efficient solution.

Activity 3: Literature Survey

1. Rosen, S. Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *J. Political Econ.* **1974**, *82*, 34–55. [[Google Scholar](#)] [[CrossRef](#)]
2. Can, A. Specification and estimation of hedonic housing price models. *Reg. Sci. Urban Econ.* **1992**, *22*, 453–474. [[Google Scholar](#)] [[CrossRef](#)]
3. Kang, Y.; Zhang, F.; Peng, W.; Gao, S.; Rao, J.; Duarte, F.; Ratti, C. Understanding house price appreciation using multi-source big geo-data and machine learning. *Land Use Policy* **2021**, *111*, 104919. [[Google Scholar](#)] [[CrossRef](#)]
4. Yacim, J.A.; Boshoff, D.G.B. A Comparison of Bandwidth and Kernel Function Selection in Geographically Weighted Regression for House Valuation. *Int. J. Technol.* **2019**, *10*, 58. [[Google Scholar](#)] [[CrossRef](#)]
5. Tobler, W.R. A Computer Movie Simulating Urban Growth in the Detroit Region. *Econ. Geogr.* **1970**, *46*, 234–240. [[Google Scholar](#)] [[CrossRef](#)]

Activity 4: Social or Business Impact.

Social Impact: Houses with best facilities in India. By analysing the number of bed rooms and Services provided , may somebody with the dilemma to buy or not buy his/her own houses based on price and best facilities.

Business Model/Impact: Can make this visualization application available for people, for more insights and ideas can ask for payment and also can give these insights to make the understand and help in the sense of buying house.

Milestone 2: Data Collection & Extraction from Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, evaluate outcomes and generate insights from the data.

Activity 1: Downloading the dataset

Please use the link to download the dataset: [Link](#)

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files

Milestone 3: Data Preparation

Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into performance and efficiency.

Reference Video one Data Pre-Processing (Different Project for to know how you can do):

https://drive.google.com/file/d/191WF4gdCfW01YeM988eqyRNu0cgfRbES/view?usp=drive_link

Milestone 4: Data Visualization

Data visualization is the process of creating graphical representations of data to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

Activity 1: Number of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the performance and efficiency of Radisson Hotels include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of hotels.

Activity 1.1: Latitude and Longitude based on Location

Explanation video link:

https://drive.google.com/file/d/191WF4gdCfW01YeM988eqyRNu0cgfRbES/view?usp=drive_link

Activity 1.2: Number of houses based on area in sq ft

Explanation video link:

https://drive.google.com/file/d/1AfIodvF94PBuE-6sSRDAKTQSQV0sRx0F/view?usp=drive_link

Activity 1.3: Houses price based on rainwater harvest pits

Explanation video link:

https://drive.google.com/file/d/1EVyqiKzgkG6BSwQjaeM4_eLg0Pz_VgyT/view?usp=drive_link

Activity 1.4: Vastu-complains based on location

Explanation video link:

https://drive.google.com/file/d/1ql2yZiimatBS_4kkTL_hwTYpWmaYg4J7/view?usp=drive_link

https://drive.google.com/drive/folders/15EVluoprk6mAO55PHrXa5CvzrQl2T4Br?usp=drive_link

Activity 1.5: House price based on Number of Bed rooms

Explanation video link:

https://drive.google.com/file/d/1WjeGWRFa_mAkcqSwL4PWaFO8Vq7jaw2t/view?usp=drive_link

https://drive.google.com/drive/folders/15EVluoprk6mAO55PHrXa5CvzrQl2T4Br?usp=drive_link

Activity 1.6: Hospitals and schools near the Houses

Explanation video link:

https://drive.google.com/file/d/1M3Mj1YXLvr0QJofsXvGxXBatED5GinMV/view?usp=drive_link

https://drive.google.com/drive/folders/15EVluoprk6mAO55PHrXa5CvzrQl2T4Br?usp=drive_link

Activity 1.7: Maintains staff in houses prices

Explanation video link:

https://drive.google.com/file/d/1spY5k7ONtOQYvD89mLhd_c0-Z9xKAIyW/view?usp=drive_link

https://drive.google.com/drive/folders/15EVluoprk6mAO55PHrXa5CvzrQl2T4Br?usp=drive_link

Activity 1.8 : House Price and Intercom

https://drive.google.com/file/d/1mnnOTUrFdYGfAKrbDLYbXkK3oQnDXslM/view?usp=drive_link

https://drive.google.com/drive/folders/15EVluoprk6mAO55PHrXa5CvzrQl2T4Br?usp=drive_link

Activity 1.9: All Services based on locations

https://drive.google.com/file/d/1_5dlJ6UxmE0U-qIRYEemWiDMPleQVKIm/view?usp=drive_link

https://drive.google.com/drive/folders/15EVIuoprk6mAO55PBrXa5CvzrQl2T4Br?usp=drive_link

Milestone 5: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Activity 1- Responsive and Design of Dashboard

Once you have created views on different sheets in Tableau, you can pull them into a dashboard.

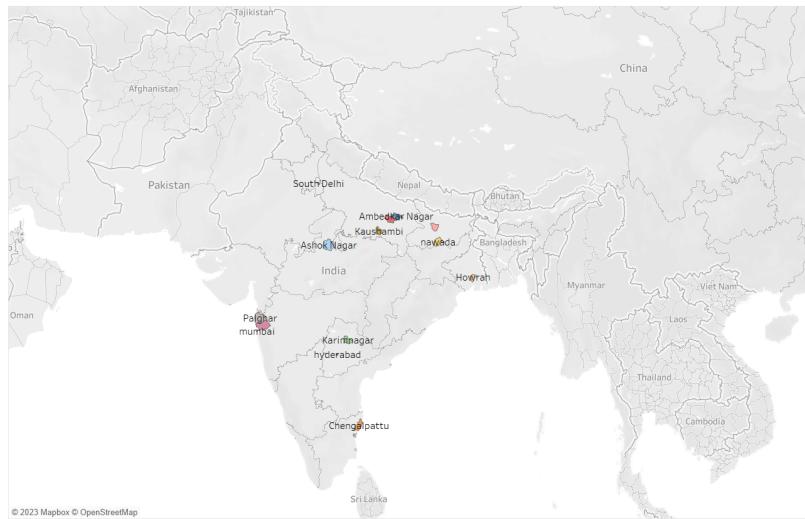
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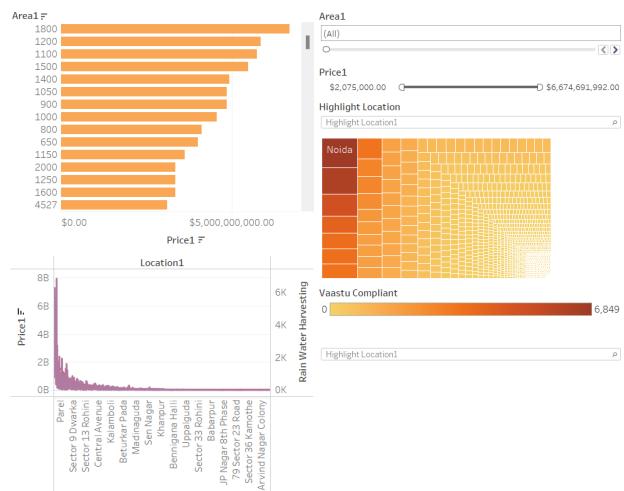
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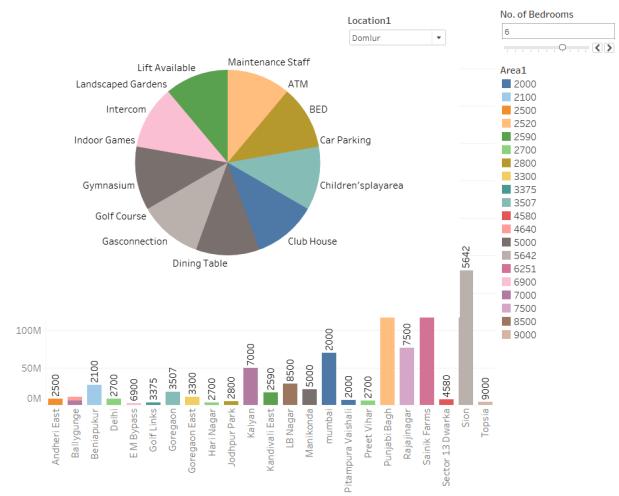
HOUSE PRICE PREDICTION IN INDIA



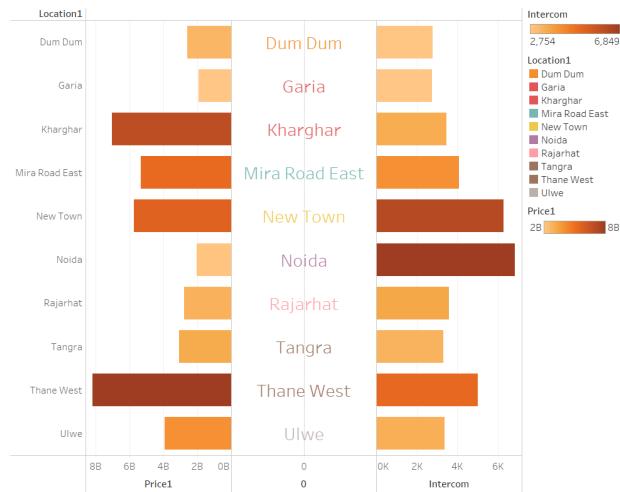
Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1



Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1



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Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1

Milestone 6: Story

A data story is a way of presenting data and analysis in a narrative format, intending to make the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis logically and systematically, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

Activity 1- Number of Scenes of Story

The number of scenes in a storyboard for a data visualization analysis of the performance and efficiency of Radisson Hotels will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

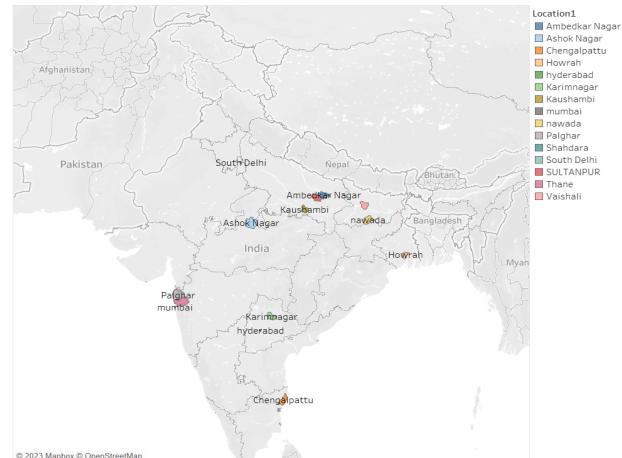
Explanation video link:

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/view?usp=drive_link](https://drive.google.com/file/d/1UN5_E228Fb0OIIWuNXM7-mHbvCKzd4RE/view?usp=drive_link)

[https://drive.google.com/drive/folders/15EVIuoprk6mAO55PHrXa5CvzrQI2T
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House Price Prediction

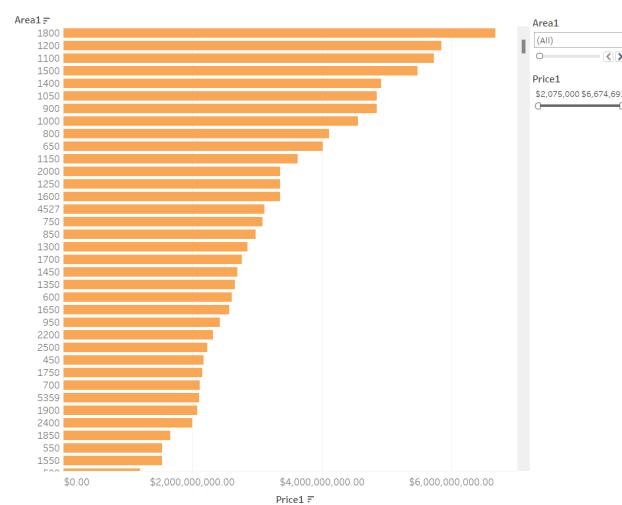
< Our houses in this 5 metropoliton Our Pices based on Area in Sq Our Prices based on the best places Our houses in the Locations Average price based on number Our prices based on best facilities Our houses in the Locations >



Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1

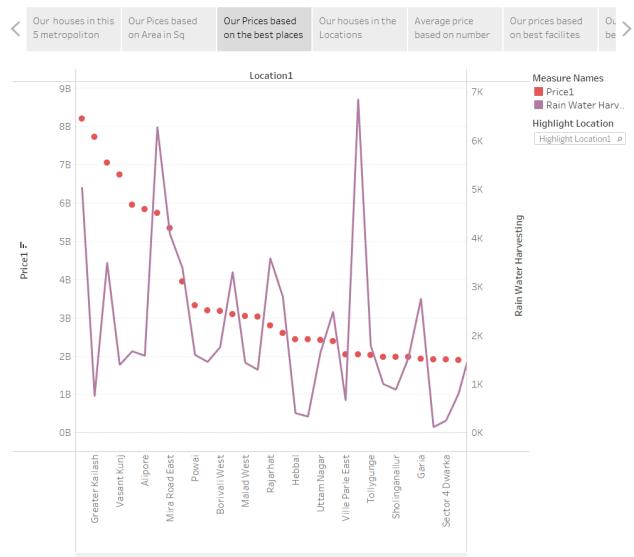
House Price Prediction

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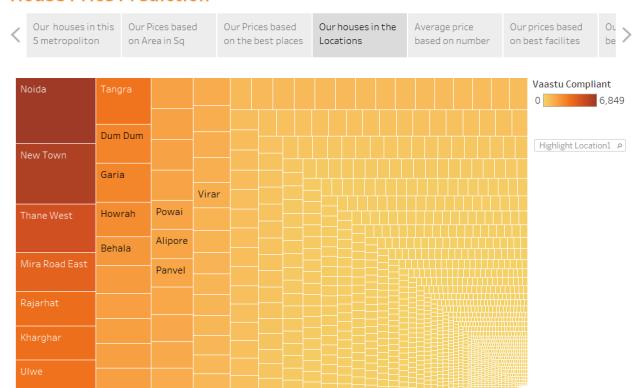
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House Price Prediction



Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1

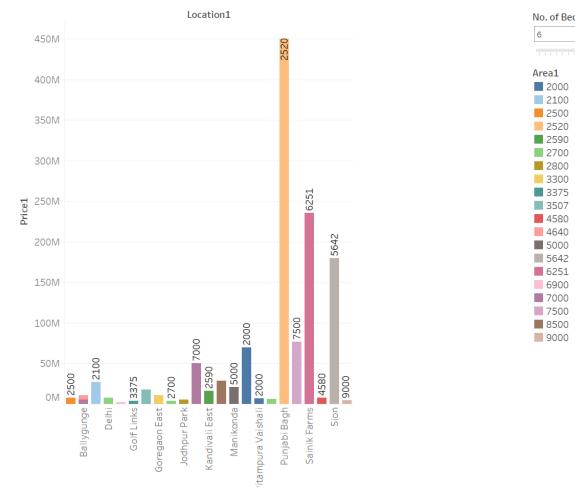
House Price Prediction



Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1

House Price Prediction

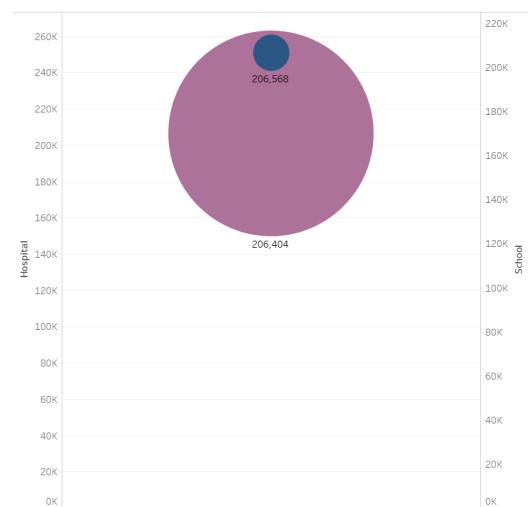
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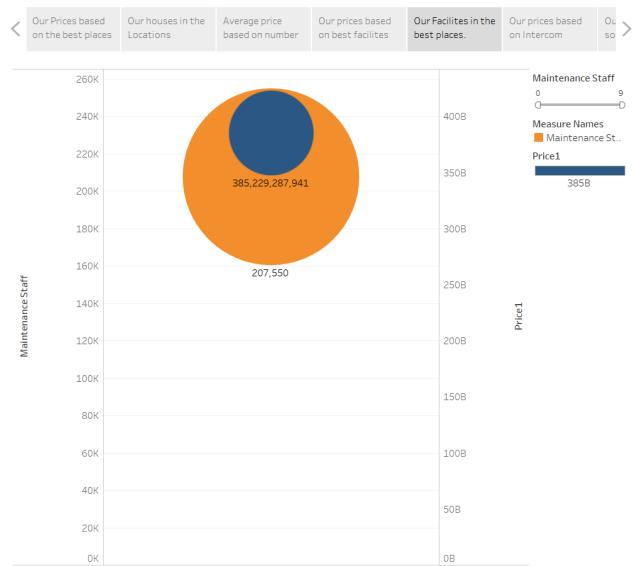
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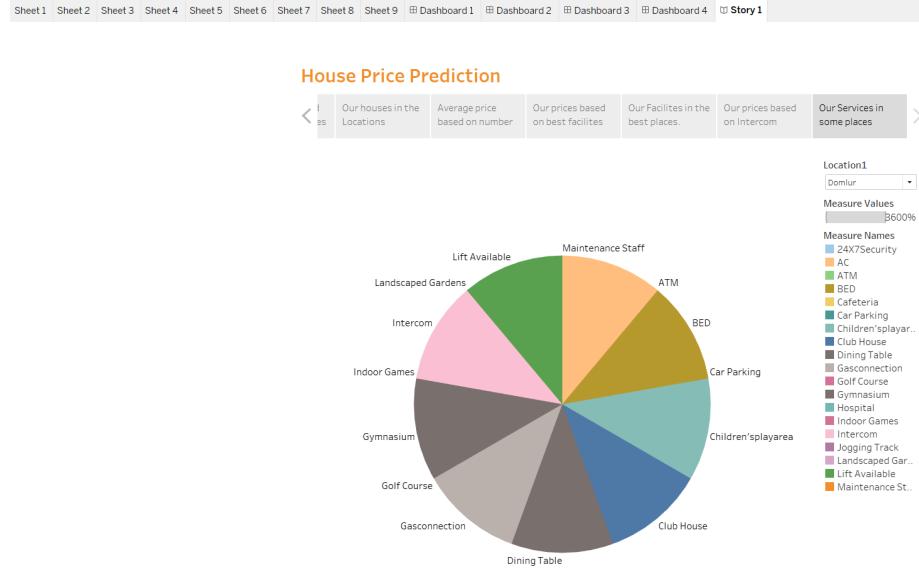
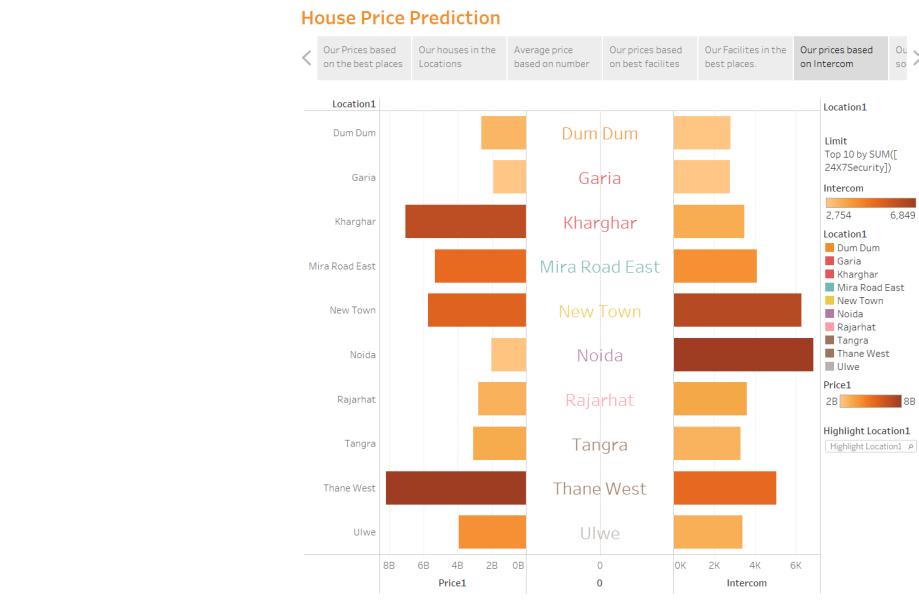


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House Price Prediction



Sheet1 Sheet2 Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet8 Sheet9 Dashboard1 Dashboard2 Dashboard3 Dashboard4 Story1

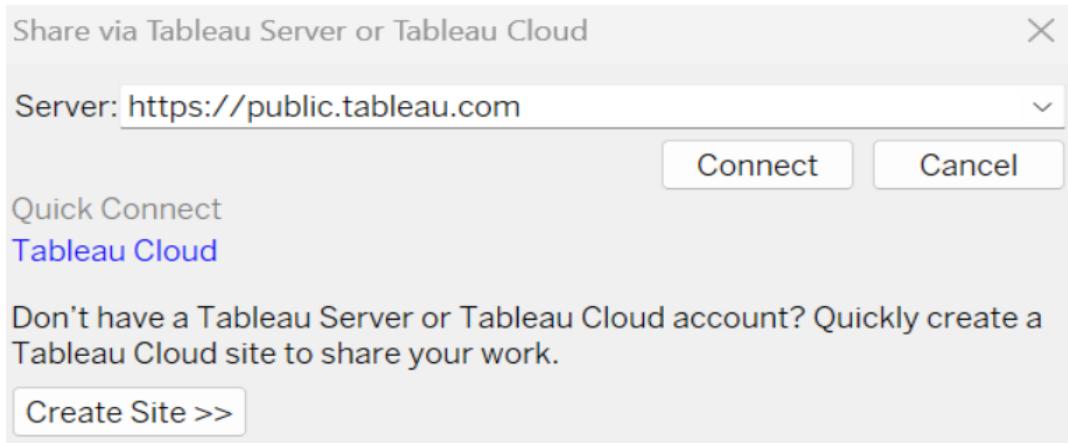


Milestone 7: Web integration

Publishing helps us to track and monitor key performance metrics and to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

Publishing dashboard and reports to tableau public

Step 1: Go to Dashboard/story, click on the share button on the top ribbon



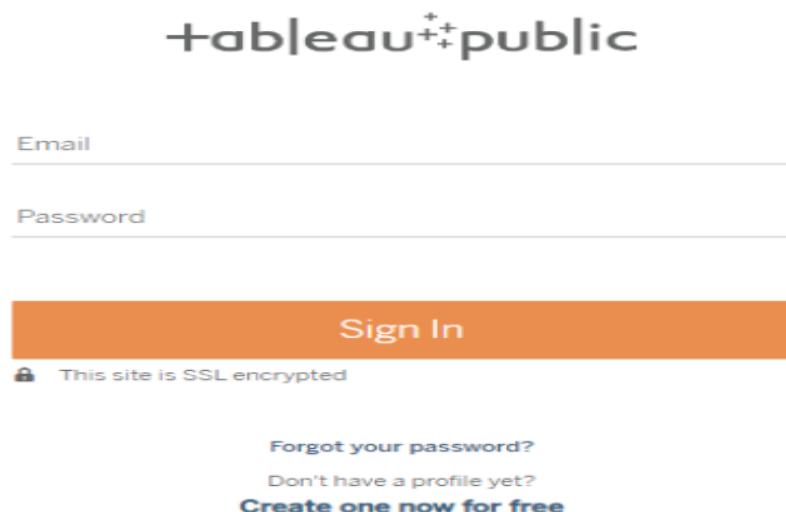
Give the server address of your tableau public account and click on connect.

Explanation Video:-

https://drive.google.com/file/d/1zNqSP6XLiglZreprb10n9zvV3oVGVrcB/view?usp=drive_link

https://drive.google.com/drive/folders/15EVluoprk6mAO55PHrXa5CvzrQI2T4Br?usp=drive_link

Step 2: Once you click on connect it will ask you for the tableau public username and password



```

1  from flask import Flask, render_template
2
3  app = Flask(__name__)
4
5  @app.route('/')
6  @app.route('/index')
7  def index():
8      return render_template('index.html')
9
10 @app.route('/board')
11 def board():
12     return render_template('dashboard.html')
13 @app.route('/story')
14 def story():
15     return render_template('story.html')
16
17 if __name__=='__main__':
18     app.run(debug=True)

```

Once you login into your tableau public using the credentials, the particular visualization will be published into the tableau public

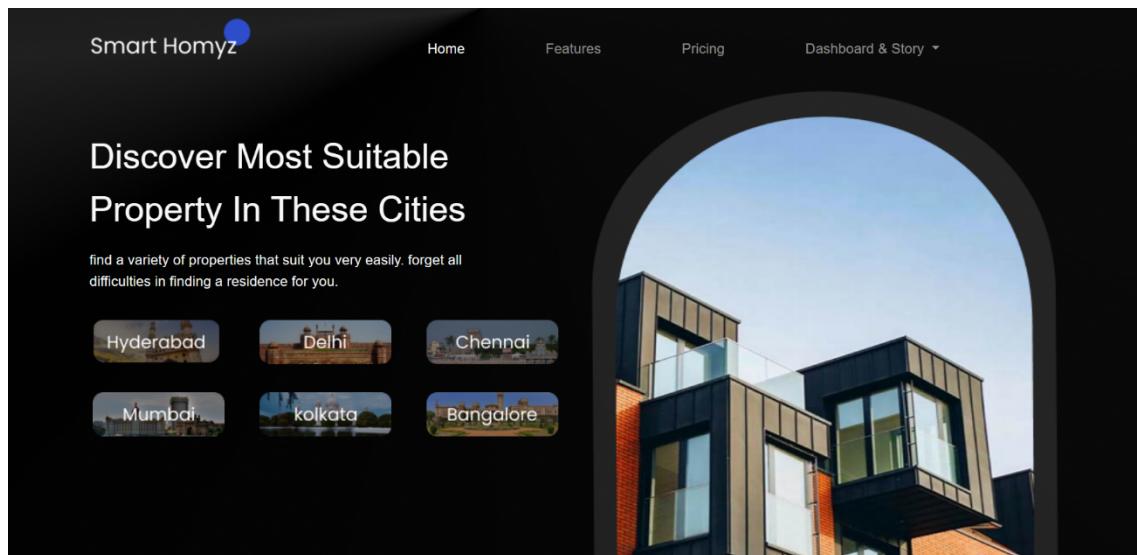
Note: While publishing the visualization to the public, the respective sheet will get published when you click on the share option.

Activity 1: Embed Dashboard & Story with Web Bootstrap

Explanation video:

https://drive.google.com/file/d/1zNqSP6XLiglZreprb10n9zvV3oVGVrcB/view?usp=drive_link

https://drive.google.com/drive/folders/15EVIuoprk6mAO55PBrXa5CvzrQI2T4Br?usp=drive_link



Popular Residences



₹ 1,42,00000

Hyderabad



₹ 1,42,00000

Kolkata



₹ 1,42,00000

Chennai

Hyderabad

Kolkata

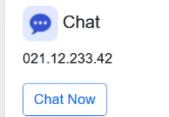
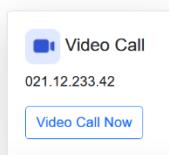
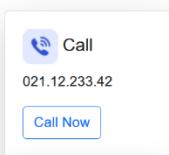
Chennai

Dashboard

Story

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People The Best Place To
Live For Them

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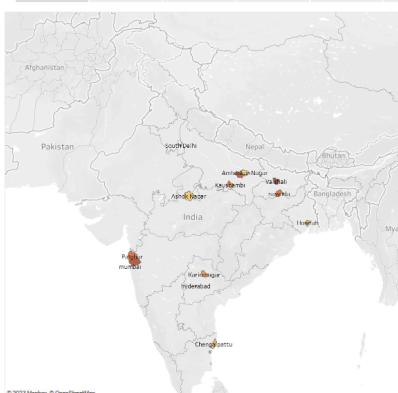
Movement

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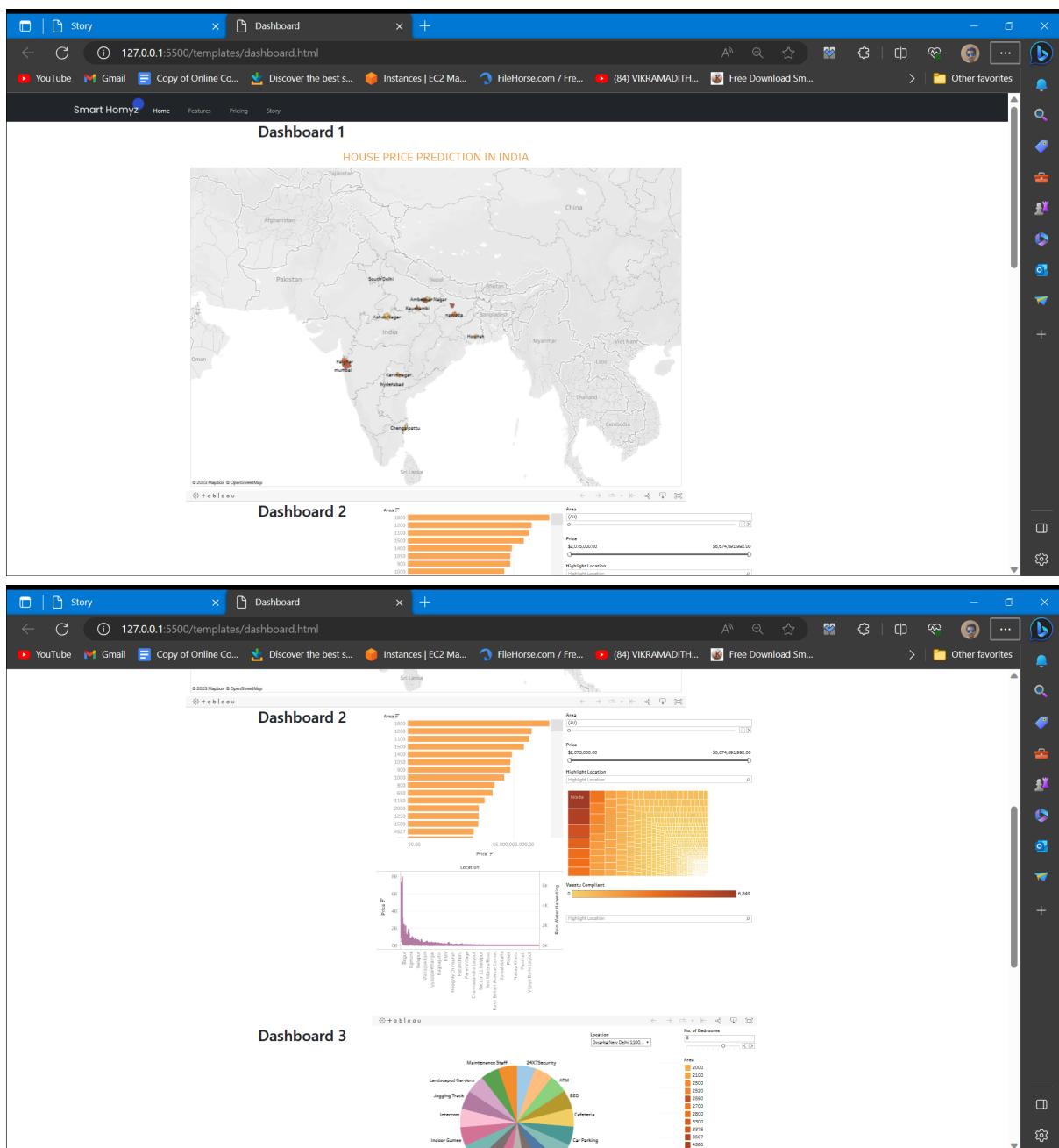
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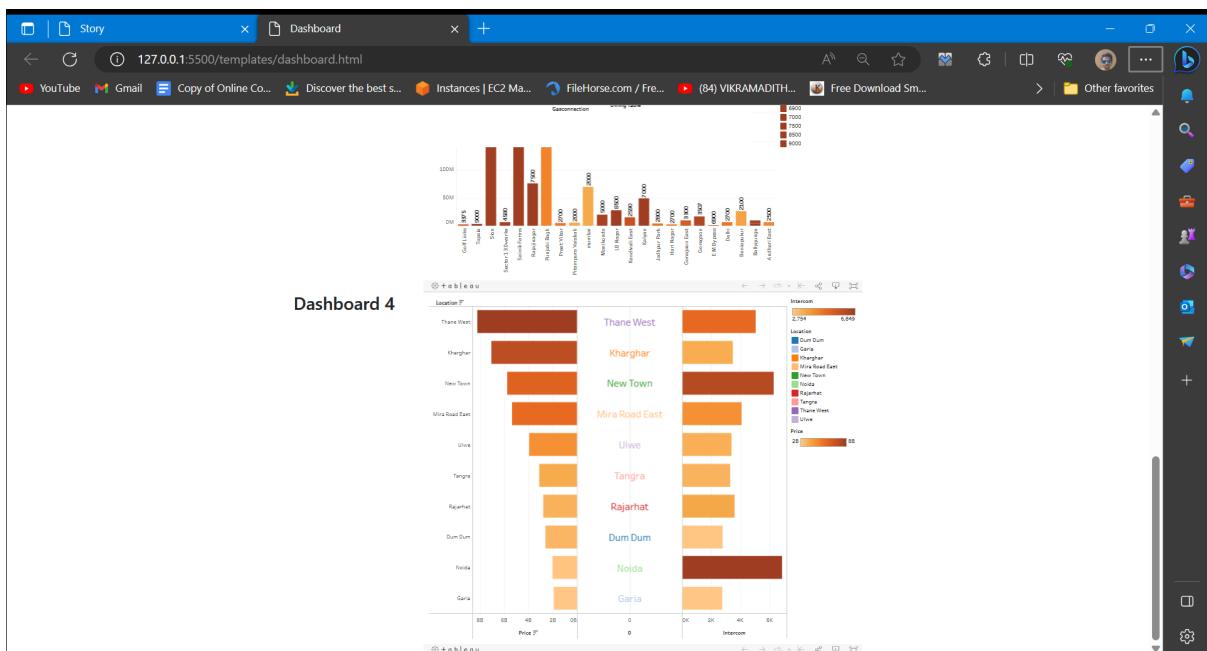
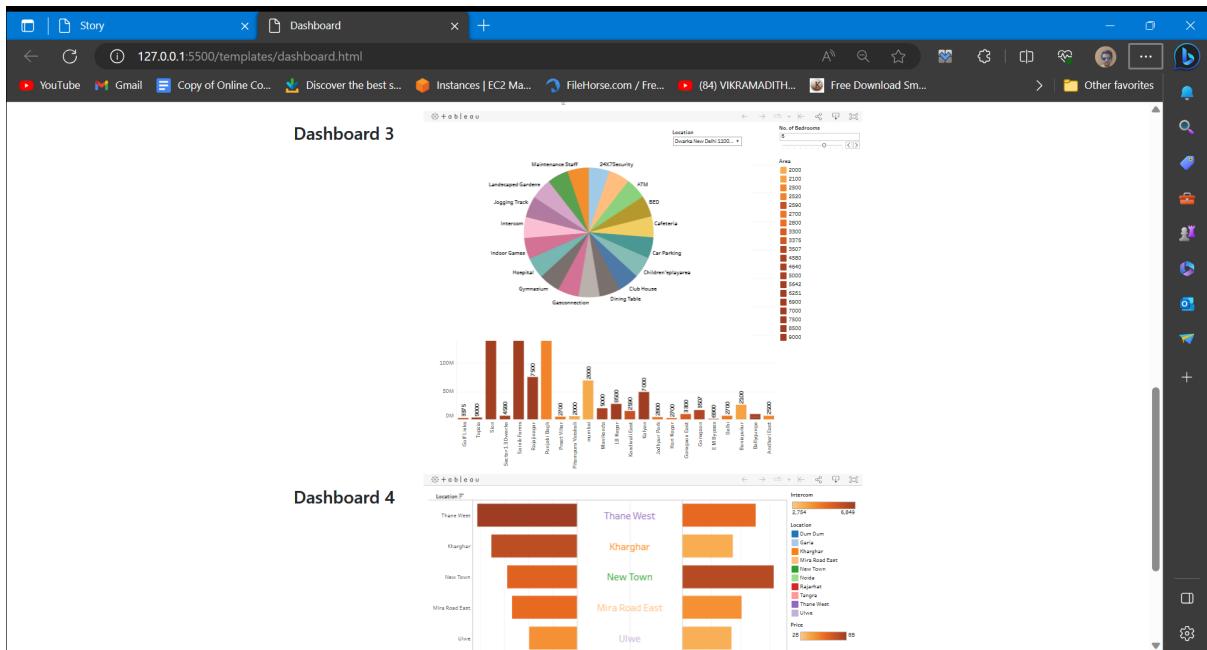
Story [House Price Prediction](#)

[Our houses in the 5 metropolitan cities](#) [Our Price based on Area in Sq.m](#) [Our Price based on the best places](#) [Our houses in the Locations](#) [Average price based on number of bedrooms](#) [Our prices based on best facilities near by](#) [Quo... >](#)


A map of India with various locations marked by colored dots. A legend on the right side lists the locations corresponding to the colors: Amboli, Nagpur, Andhra-pradesh, Chennai, Howrah, Hyderabad, Karimnagar, Kurnool, Mysore, Venkata, Palghar, Dighala, South Delhi, SULTANPUR, Thane, and Vizianagaram. The map also shows the borders of neighboring countries like Afghanistan, Pakistan, Nepal, Bhutan, and Myanmar.

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Milestone 8: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables

Activity 1:- Record explanation Video for the project's end-to-end solution.

https://drive.google.com/file/d/1zNqSP6XLiglZreprb10n9zvV3oVGVrcB/view?usp=drive_link

https://drive.google.com/drive/folders/15EVIuoprk6mAO55PBrXa5CvzrQI2T4Br?usp=drive_link

Activity 2:- Project Documentation-Step by step project development procedure.

https://drive.google.com/file/d/1zNqSP6XLiglZreprb10n9zvV3oVGVrcB/view?usp=drive_link

https://drive.google.com/drive/folders/15EVIuoprk6mAO55PBrXa5CvzrQI2T4Br?usp=drive_link