



# GOVERNMENT OF TAMIL NADU

## Naan Mudhalvan -Project-Based Experiential Learning

### ANALYSIS HOUSING PRICES OF METROPOLITAN AREAS OF INDIA

Submitted by

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TEAM ID : NM2023TMID37829

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### PG AND RESEARCH DEPARTMENT OF MATHEMATICS



**M.V.MUTHIAH GOVERNMENT ARTS COLLEGE FOR WOMEN**

(Affiliated To Mother Teresa Women's University, Kodaikanal)

Reaccredited with “A” Grade by NAAC

DINDIGUL-624001.

NOVEMBER-2023

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**Dindigul-624001**



**PG & RESEARCH DEPARTMENT OF MATHEMATICS**

**BONAFIDE CERTIFICATE**

This is to certify that this is a bonafide record of the project entitled, "**ANALYSIS HOUSING PRICES IN METROPOLITAN AREAS IN INDIA**" done by **Ms. R.ABINAYA (21321ER036)**, **Ms. J.ASHA (21321ER038)**, **Ms. P.BHAGAVATHI(21321ER039)** and **Ms. G.BUVANESHWARI (21321ER040)**. This is submitted in partial fulfillment for the award of the degree of **Bachelor of Science in Mathematics** in **M.V.MUTHIAH GOVERNMENT ARTS COLLEGE FOR WOMEN, DINDIGUL** during the period of June 2023 to November 2023.

**Project Mentor(s)**

**Head of the Department**

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# **ANALYSIS OF HOUSING PRICES OF METROPOITAN AREAS IN INDIA**

## **1.INTRODCTION:**

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.

### **1.1 OVERVIEW :**

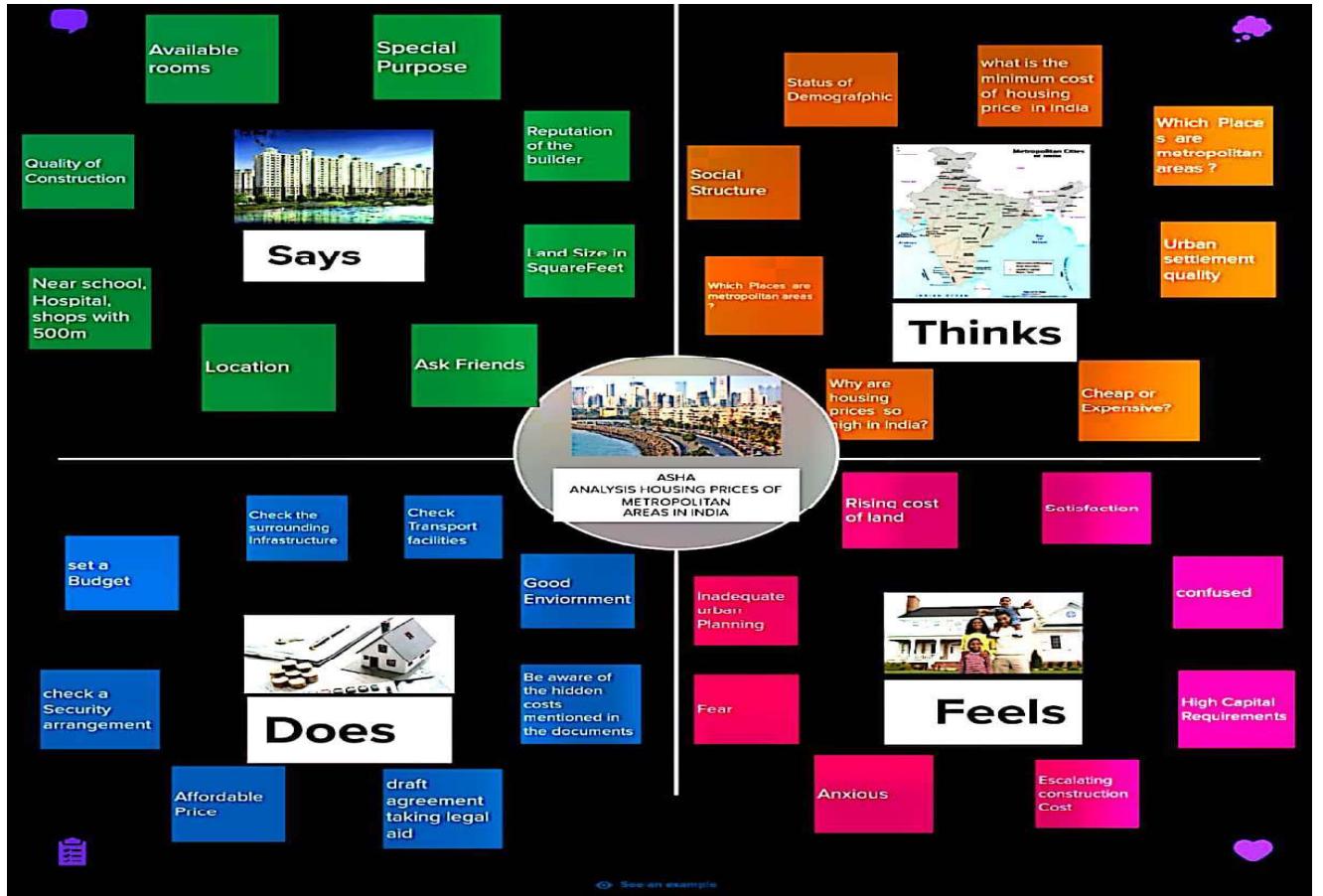
This project helps us to maintain and manage the housing prices of metropolitan areas problems which further can be modified based on the requirements.

### **1.2 PURPOSE:**

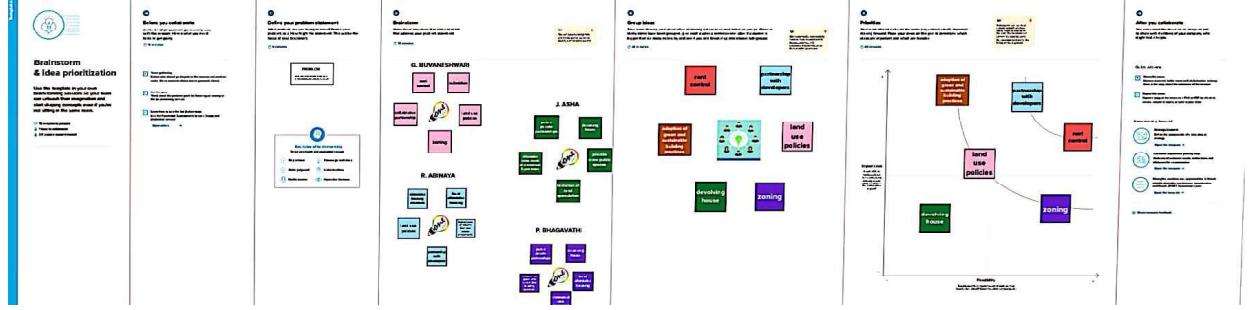
House price prediction in a metropolitan city in India is a valuable solution for potential home buyers, real estate agents, and investors. By leveraging historical sales data, property details, and location-specific information, a predictive model can accurately estimate house prices. The model's scalability, 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

## 2. PROBLEM DEFINITION AND DESIGN THINKING:

### 2.1 EMPATHY MAP:



## 2.2 IDEATION AND BRAINSTORMING MAP:



## 3.RESULT:

### Milestone 1:

#### Activity-1: Creating Tableau Sales Force Account

Creating a tableau sales force account

1. Go to Tableau for Students.
2. Click the free academic license.
3. Enter the details of Contact information
  1. First &Last name
  2. Email
  3. Date of Birth
  4. Preferred Language
  5. Country
4. School Information
  1. Country
  2. School Name
  3. Anticipated Graduation year

The screenshot shows a contact information form on a website. The form fields are as follows:

- Legal First Name\***: Asha
- Legal Last Name\***: Johnpeter
- School-Issued Email\***: ashavasa13@gmail.com
- Confirm School-Issued Email\***: ashavasa13@gmail.com
- Date of birth\***:
  - Month: September
  - Day: 6
  - Year: 2003

5. Verify Student status
6. Upload ID Card
6. After sometimes I will get my tableau license in Email.

**Hi ASHA,**

*Please retain this email for your records. You will need the product key and instructions enclosed.*

Welcome to Tableau for Students! Your academic license now includes Tableau Desktop, Tableau Prep, and eLearning for free.

The product key below can be used to activate both Tableau Desktop and Tableau Prep on two separate computers, Windows or Mac. This key will expire in one year.

- Download Tableau Desktop
- Download Tableau Prep
- Activate with your product key: **TCM5-1430-69A0-4509-5186**
- If you're receiving the error "product key is invalid" visit the [knowledge base page](#) to resolve your issue.

Get started with free eLearning online self-paced courses:

1. Go to <https://elearning.tableau.com>
2. Create (or login to) your TableauID account, and confirm email address via the TableauID confirmation email
3. Go to <https://elearning.tableau.com> and log on using your TableauID
4. Register at the Tableau Learning Center with this Access Key: **2rx45uoo6iqsl-umamnhoF3**

These keys are for your personal use only. Please do not share them. Need additional help? check out the FAQ's or submit a case for installation support.

## Milestone 2:

### 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 3: 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:

<https://www.google.com/url?q=https://drive.google.com/drive/folders/1pm04WDkkRqK7MefHeybYYszi32puOj7u?usp%3Dsharing&sa=D&source=editors&ust=1696921802272371&usg=AOvVaw2hVaDfIXMrohJLevUOirx2>

### **Activity 1.1: Understand the data**

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

## **Milestone 4: 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.

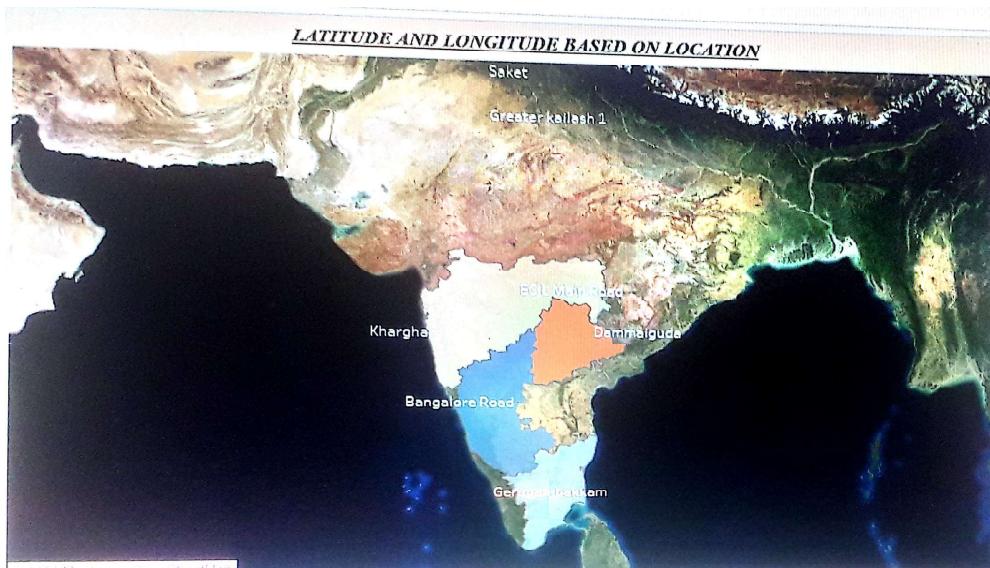
### **Activity 2: Number of Unique Visualizations**

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:**

1. Go to tableau.
2. First Extract the Data source.
3. Next go to create a sheet 1.
4. Drag Location into Filters &Edit location.
5. Drag Latitude in columns and Longitude in rows.
6. Click Edit Location
7. Drag Location into colors and lable.

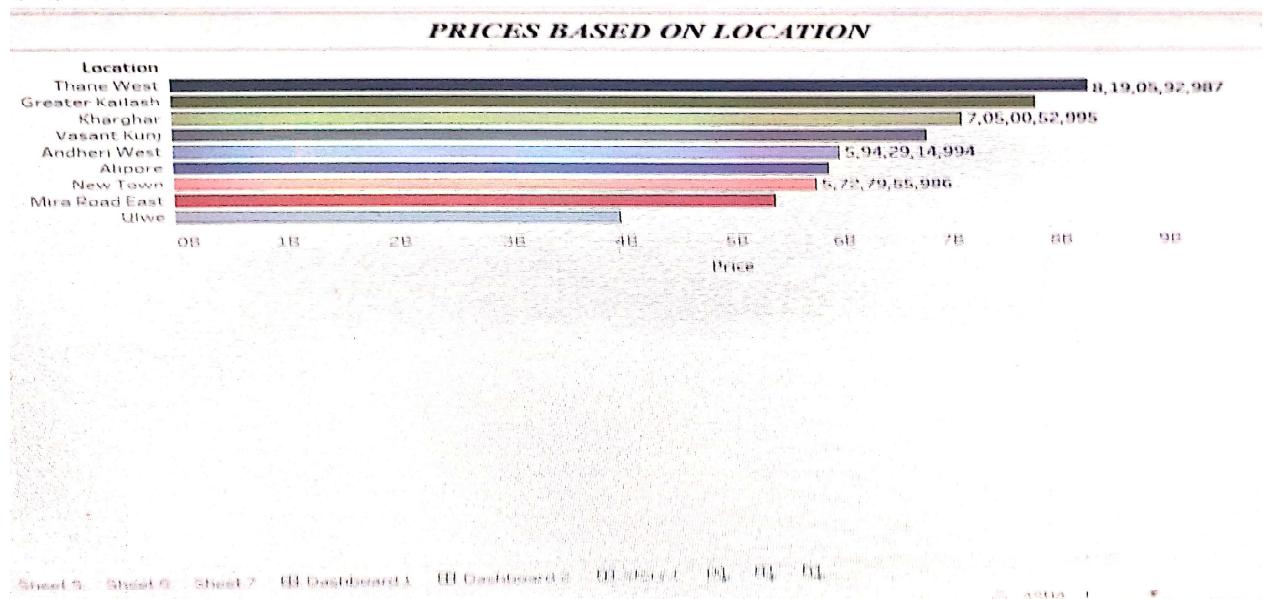


### **Activity 1.2: PRICES BASED ON LOCATION**

1. Go to next sheet
- 2 .Click horizontal bars
3. Drag location into filters and edit
4. Drag price in columns and Location in rows

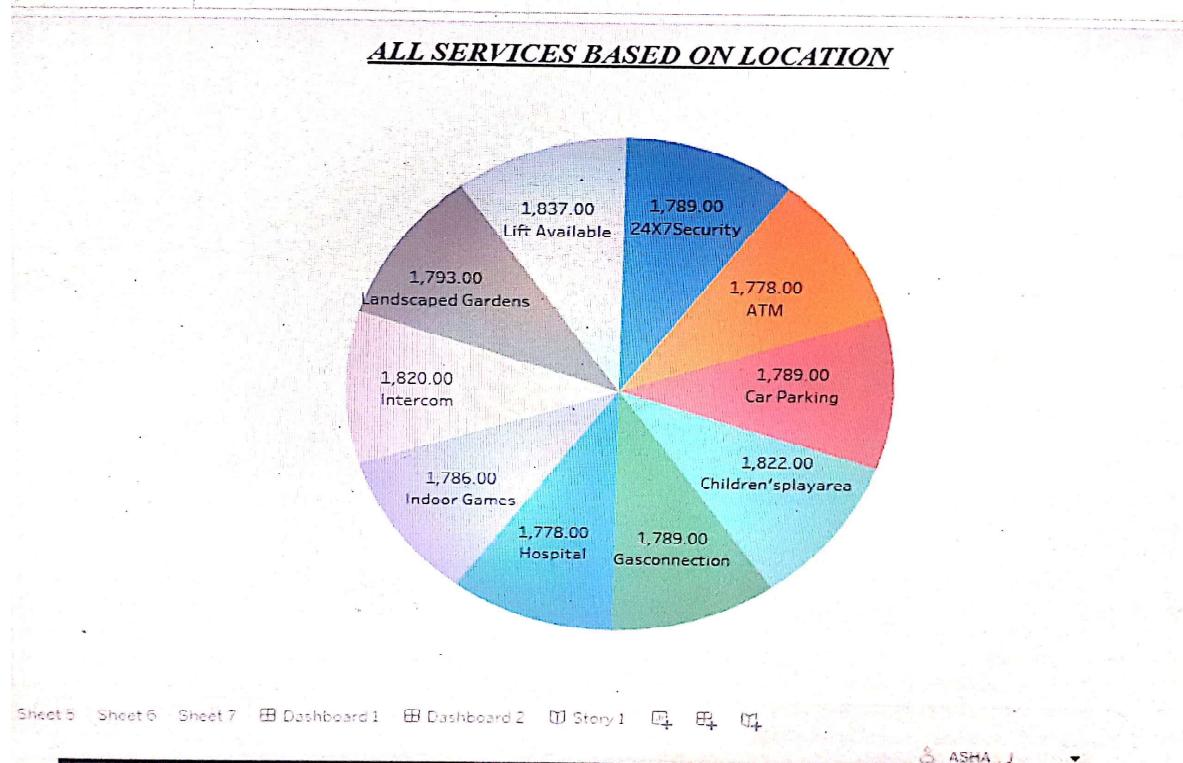
5.Drag location into colors.

6.Drag Price into labels.



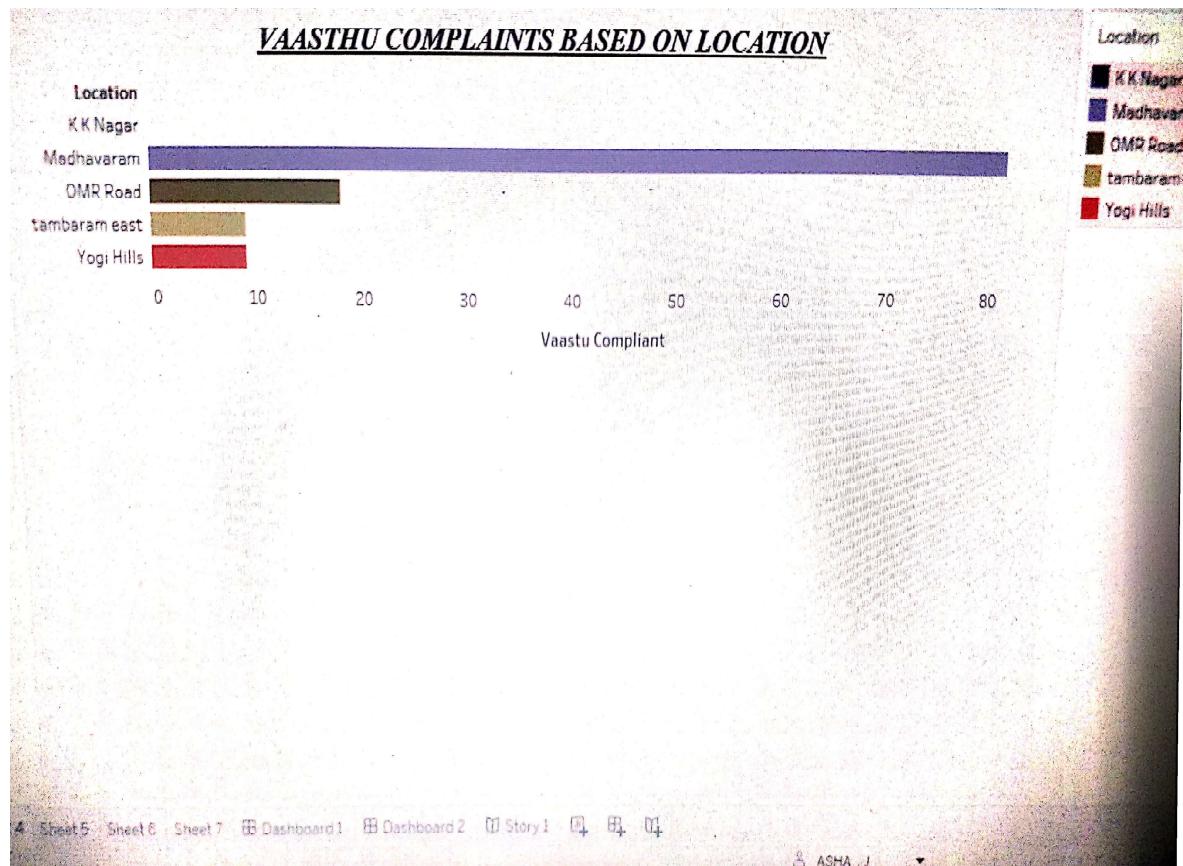
### Activity 1.3 ALL SERVICES BASED ON LOCATION

1. Go to next sheet.
2. Click automatic into pie.
3. Drag measure names and location into filters and edit it
4. Drag measure names into colors
5. Drag measure values and measure names into label



#### Activity 1.4 VAASTHU COMPLAINTS BASED ON LOCATION

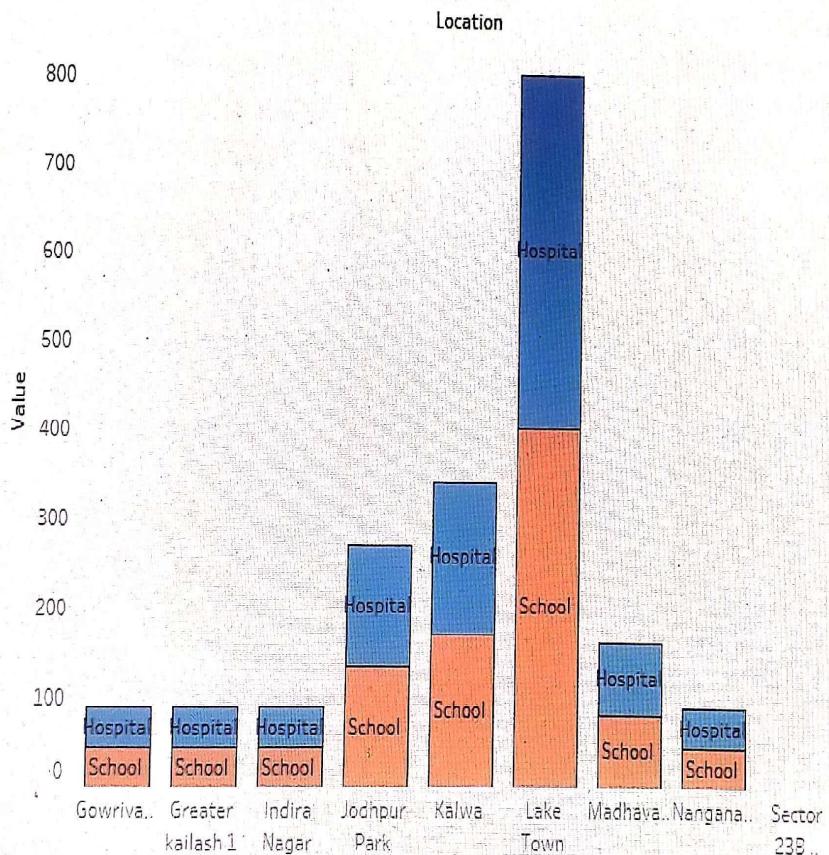
1. Go to next sheet.
2. Drag location into filters and edit it.
3. Drag vaasthu complaints on columns and location on rows.
4. Drag location on colors.



### Activity 1.5 HOSPITALS AND SCHOOLS NEAR ON LOCATION:

1. Go to next sheet.
2. Drag location and measure names on filters and edit.
3. Drags location on columns and measure values on rows
4. Use Stacked bars in this sheet.
5. Drag measure names on colors and label it.

## HOSPITALS AND SCHOOLS NEAR ON HOUSES

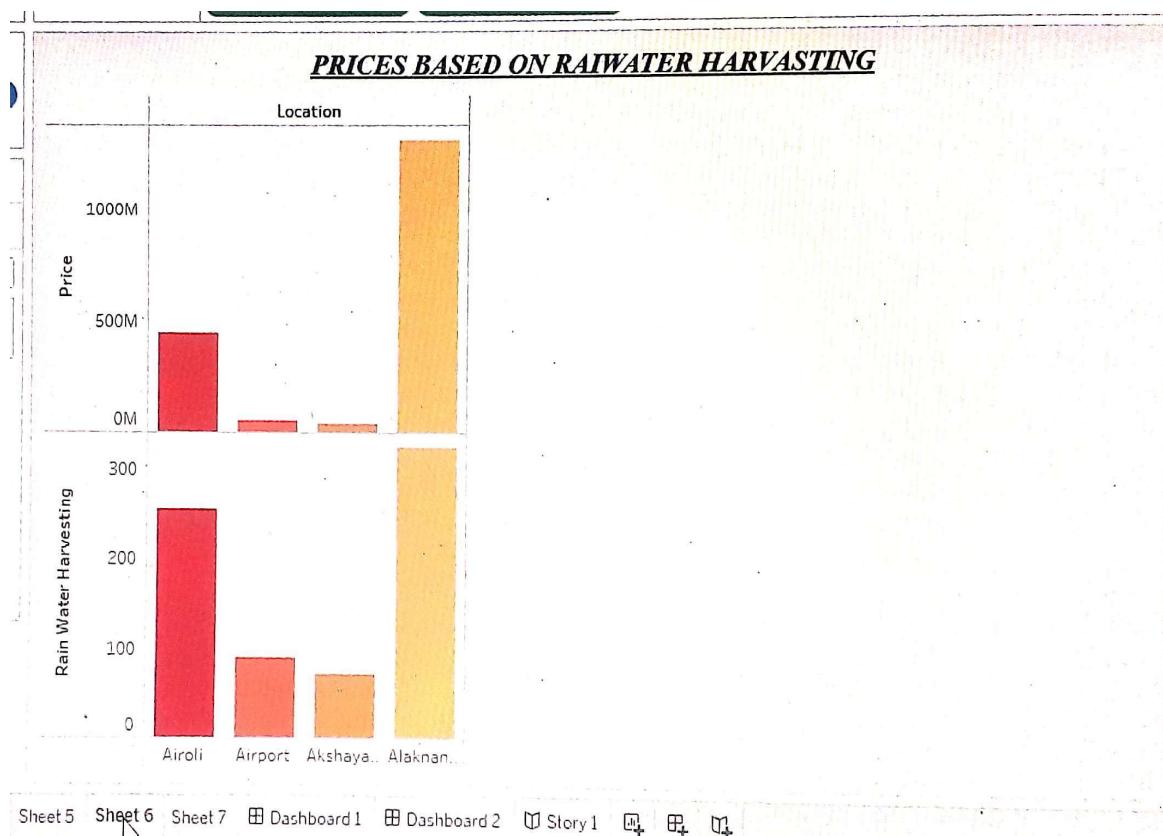


Sheet 5 Sheet 6 Sheet 7 Dashboard 1 Dashboard 2 Story 1

ASHA 1

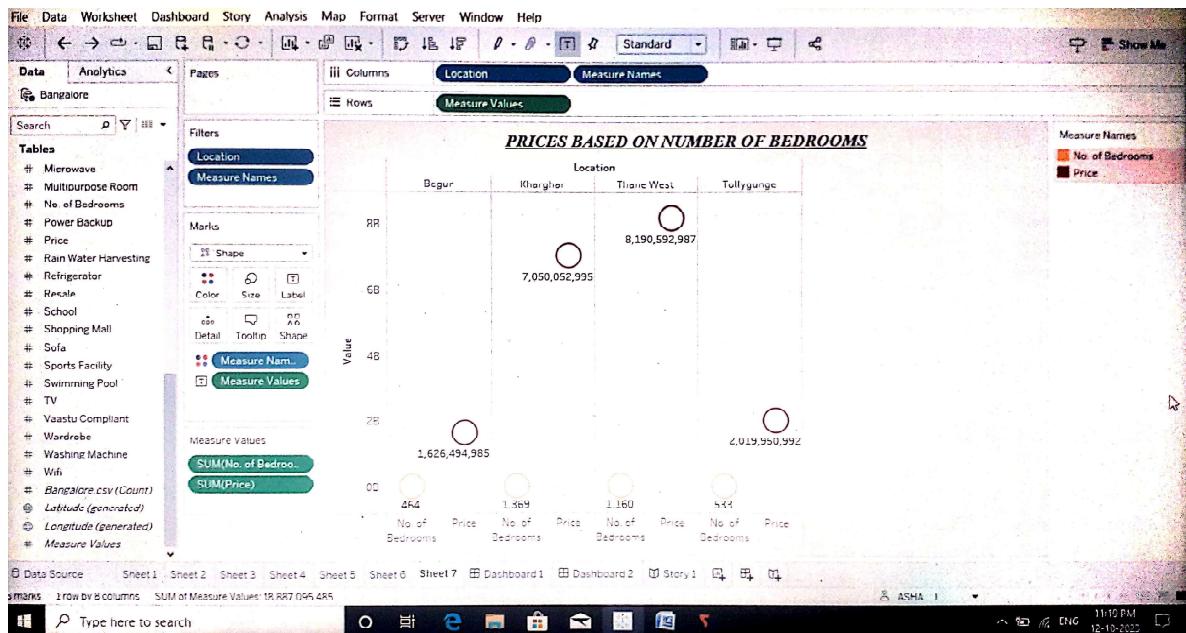
### Activity 1.6 PRICES BASED ON RAINWATER HARVESTING:

1. Go to next sheet
2. Drag location on filter and edit
3. Drag location on columns
4. Drag price and rainwater harvesting on rows
5. Drag location on colors



### 1. Activity 1.7 PRICES BASED ON NUMBER OF BEDROOMS:

1. Go to next sheet.
2. Use side by side circles chart
3. Drag location and measure values on filters and edit it.
4. Drag location and measure names on columns.
5. Drag measure values on rows.
6. Drag measure names on colors.



## Milestone 5: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format.

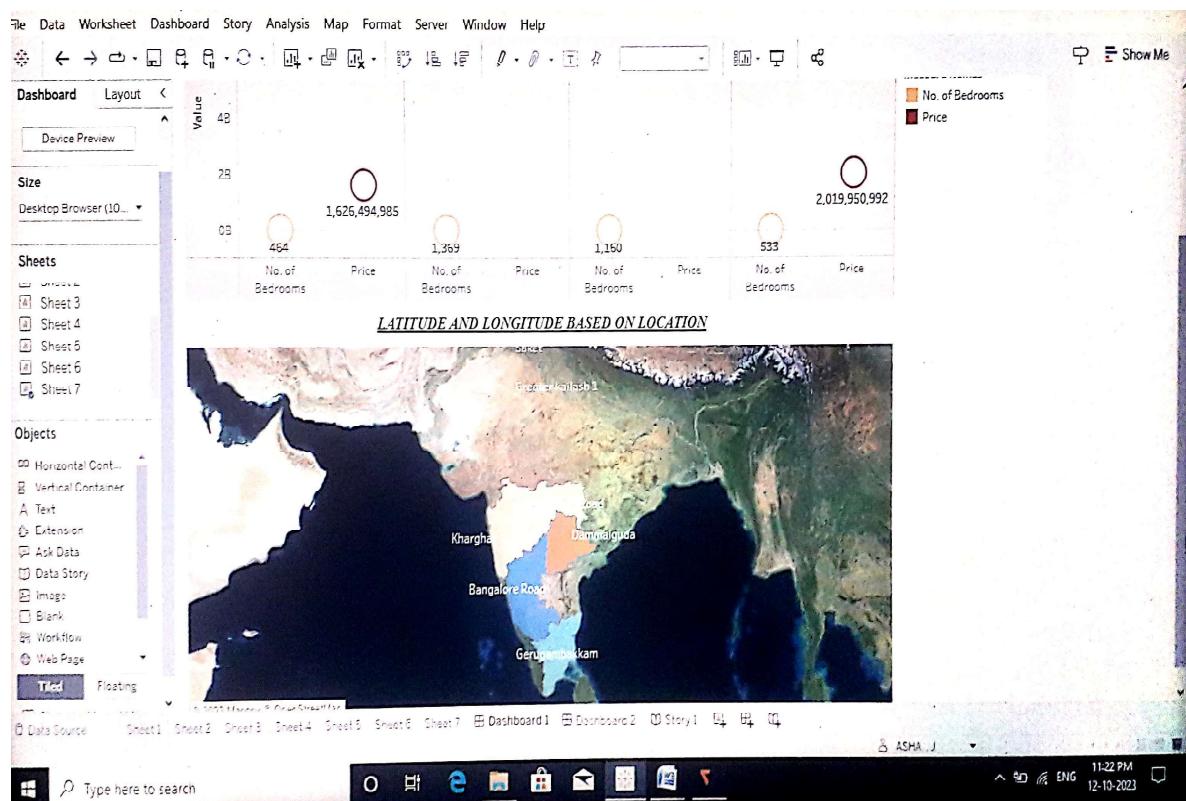
Dashboards are often used to provide real-time monitoring and analysis of data and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key 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.

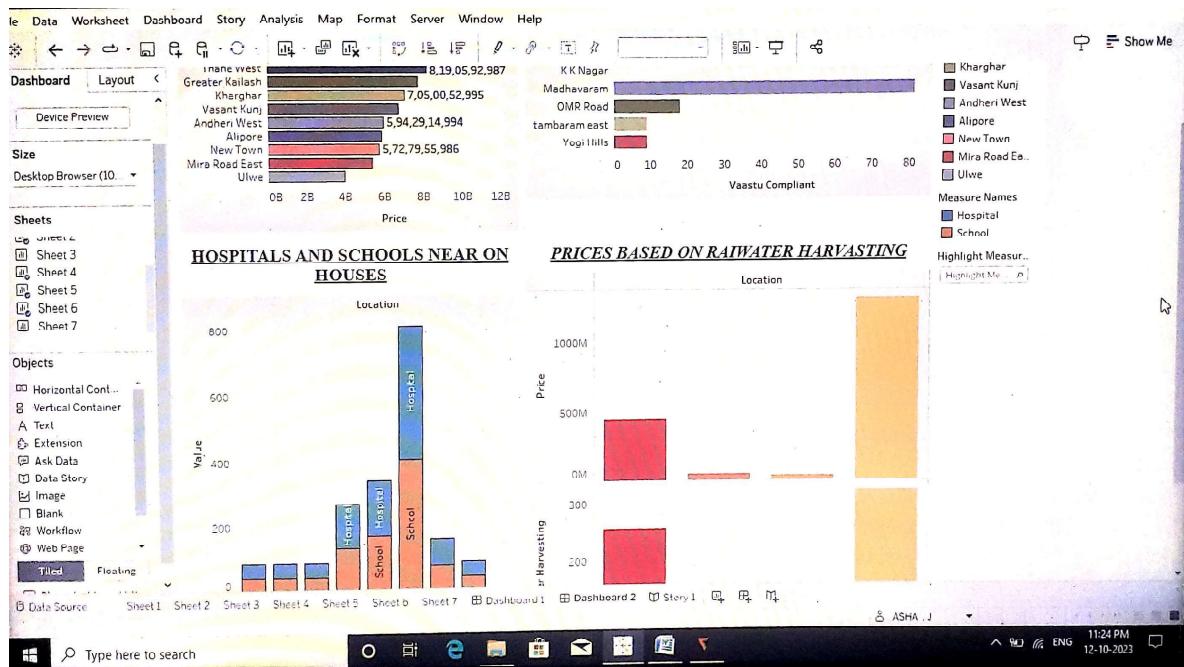
Dashboard 1 link:

[https://public.tableau.com/views/DASHBOARD1\\_16966944650920/Dashboard1?:language=en-US&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/DASHBOARD1_16966944650920/Dashboard1?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link)



Dashboard 2 link :

[https://public.tableau.com/views/DASHBOARD2\\_16966946382170/Dashboard2?:language=en-US&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/DASHBOARD2_16966946382170/Dashboard2?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link)



## 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.

## Story Link:

[https://public.tableau.com/views/STORY\\_16966949332920/Story1?:language=en-US&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/STORY_16966949332920/Story1?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link)

OUR HOUSES IN THIS METROPOLITAN CITIES IN INDIA

THANE WEST IS THE CITY OF HIGHEST HOUSE PRICES

LIFT SERVICE IS THE MAJORITY OF ALL SERVICES BASED ON

VAASTHU PROBLEMS ARE MOST IN MADHAVAPAM

LAKE TOWN HAS MORE HOSPITALS AND SCHOOLS ARE

AIRPORT HAS MORE AFFORDABLE HOUSES WITH LARGE PLACES

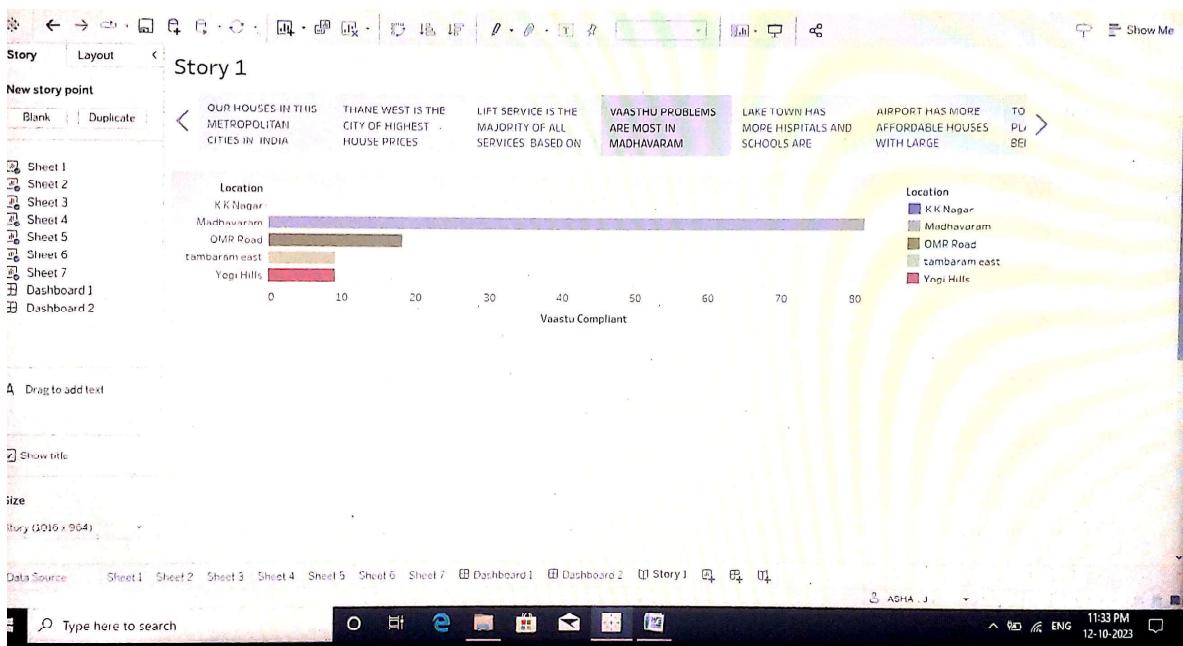
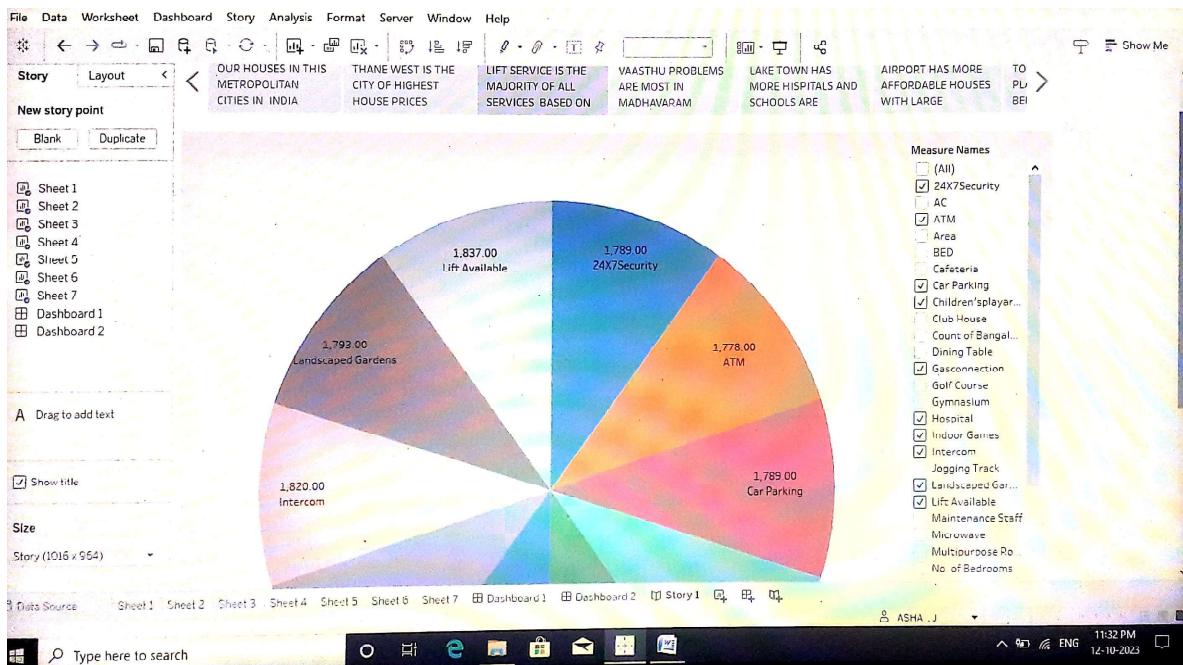
**Location**

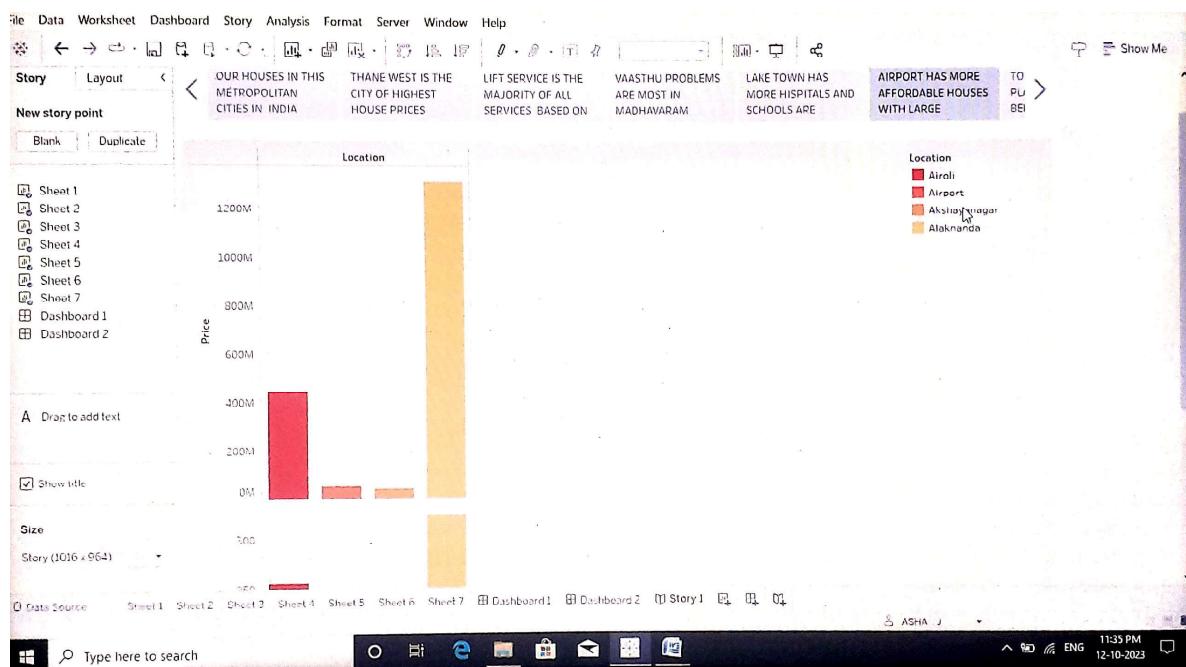
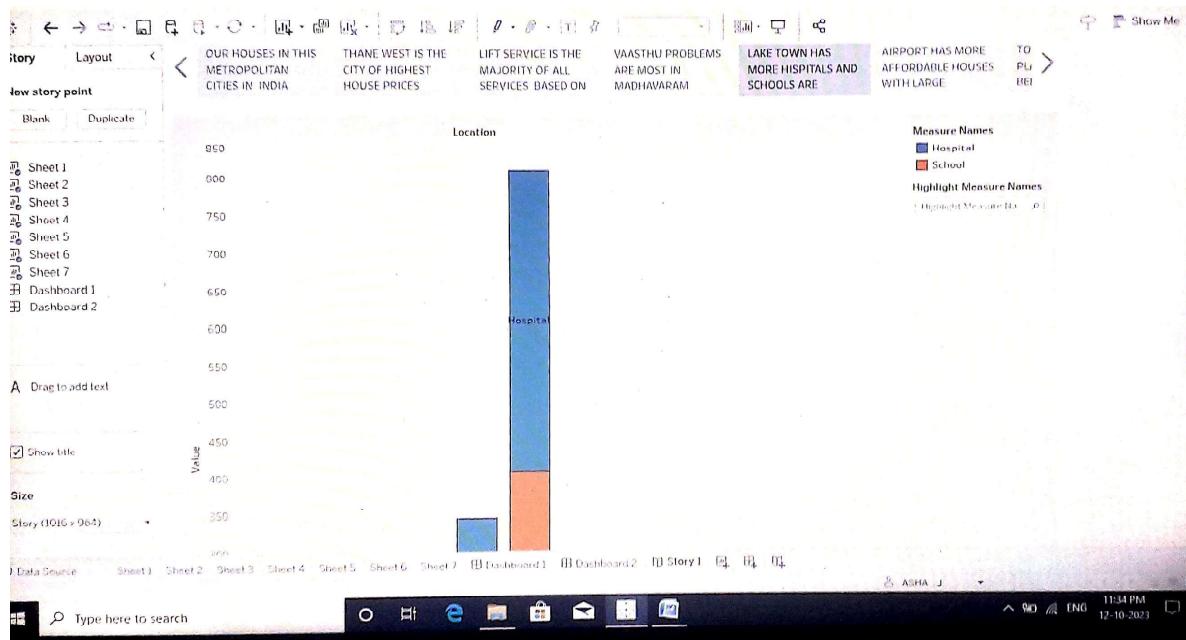
- Bangalore Road
- Dammaguda
- ECIL Main Road
- Greater Kailash
- Greater Kailash 1
- Kharghar
- Saket

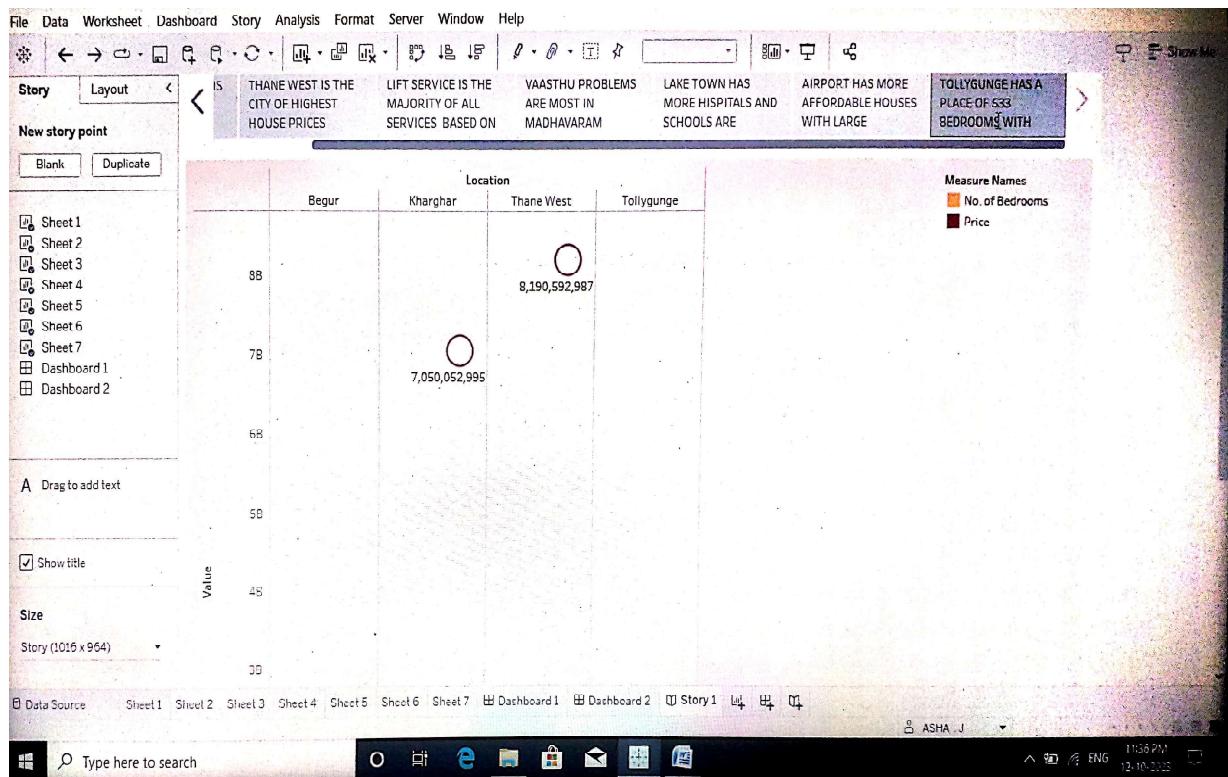
Location	Price
Thane West	8,19,05,92,987
Greater Kailash	7,05,00,52,995
Kharghar	5,94,29,14,994
Vasant Kunj	5,72,79,55,986
Andheri West	5,60,00,00,000
Alipore	5,50,00,00,000
New Town	5,40,00,00,000
Mira Road East	5,30,00,00,000
Ulwe	4,50,00,00,000

**Location**

- Thane West
- Greater Kailash
- Kharghar
- Vasant Kunj
- Andheri West
- Alipore
- New Town
- Mira Road East
- Ulwe





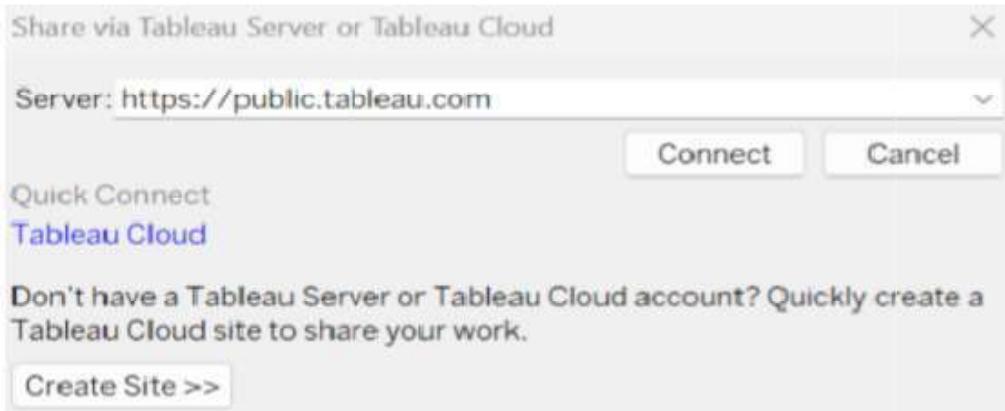


## Milestone 7: Web integration

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**

Step1: 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.

Step2:Once you click on connect it will ask you for the tableau public username and password

#### **Milestone8:Project Demonstration & Documentation**

Below mentioned deliverables to be submitted along with other deliverables

##### **Activity1:-**

Record explanationVideo for the project's end-to-end solution.

<https://drive.google.com/file/d/1Z9muMppUvEQN8LBDMRhqki53XhGatC-7/view?usp=drivesdk>

#### **4. ADVANTAGE AND DISADVANTAGE:**

1. The uses of price prediction include increasing customer loyalty and engagement.
2. Income stability and financial support opportunities are both underrated.
3. Reduce cost in health care and other public services.

#### **5.APPLICATIONS:**

House price prediction can help the developer determine the selling price of a house and can help the customer to arrange right time to purchase a house. Price prediction uses an algorithm to analyze a product or service based on its characteristics, demand, and current market trends.

**6.CONCLUSION:**

Salesforce is a great platform and easy to use, powerful, quick as well as have good community. This project showed in the above text, what concept of cloud computing and salesforce is all about. After reading this paper easily know, that salesforce offers a conclusive concept to deliver an easy to use CRM Software as a service using a dynamic scale free cloud computing approach and also how to make college management system using salesforce. So Salesforce.com is an excellent example for an e-Commerce company, management of information in college, universities, with mobile friendly salesforce application, these reports would be accessible anywhere, anytime.

**7.FUTURE SCOPE:**

This used pre-processing methods do help in the prediction accuracy. However, Experimenting with different combinations of pre processing methods to achieve better prediction accuracy. Make use of the available features and if they could be combined as binning features has shown that data got improved.

