

# **LONG-TERM INTERNSHIP**

## **HOUSING PRICES IN METROPOLITAN AREAS OF INDIA**



### **TEAM DETAILS**

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- 3. M Lohit**
- 4. K Pushpak**
- 5. B Samuel**

## Introduction :-

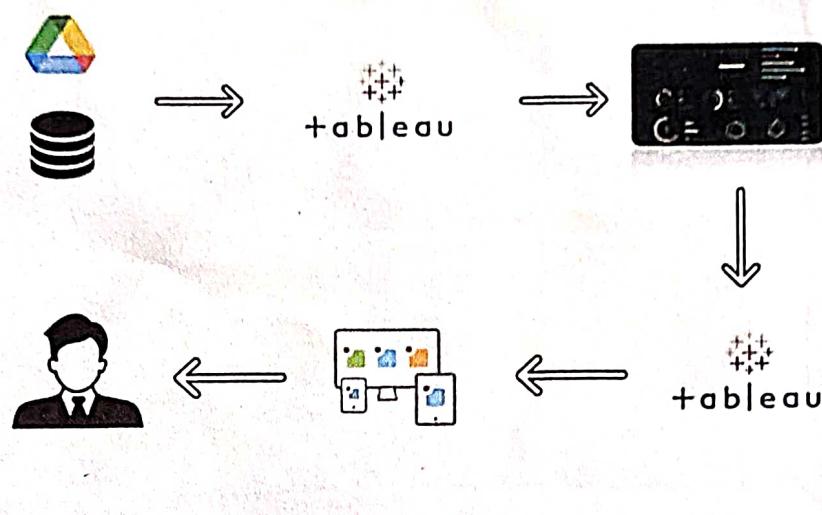
House price prediction in a metropolitan city in India is a valuable solution for potential home buyers, real estate agents, and investors.

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.

Overall, the Indian real estate market is currently displaying a robust picture, with strong demand, a positive economic outlook, and balanced growth across various segments. This scenario is expected to continue in the near future, making it an attractive market for both investors and home buyers.

### Technical Architecture:



### Project Flow:-

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

- Data collection:
  - Collect the data set and save it as project name after that upload the data in Tableau.
  - Make some modifications in that data.
  - Use some operations like union or intersection etc.
  - Coming to my project work we merge the data into a single data set using Union operation. Save the data set in your desktop.
- Database / Spreadsheet Connection:
  - After uploading the data set understand the data and make modifications what do you want after that click save

To save the modification.

- Make some parameters to create visualizations easy and use different type of data to create different types of visualizations.
- Connect Tableau Desktop to Database Server.
- Before connecting the data into the database server check it once and after that upload into the server.
- Visualizations are created.

### \* Visualizing and analyzing data

\* Understand the Data and The Business Questions

\* Based on the Business questions develop the different visualizations.

### \* Dashboard:

- Develop the Dashboard by using various visualizations and name it as related data.
- It is one of the best way to understand and easy to learn and easy to explain to others.
- After saving the dashboard it is very important to publish dashboard in Tableau public because it easy to copy the code for web integration and downloading is very easy.
- Before publishing the data into the Tableau public to create a account in Tableau public after that go to publish work book by clicking publish workbook option.
- This process is same for every dashboard and story.
- No worries to create multiple times account creation only once done it is over for every time it will ask to login.
- After publishing the dashboard into the public account we will go to the right side drop by clicking share option we will see pop up page by clicking embeded code that code will be copied.

## Story

- In story also some features as we discussed in the above but some slight changes are there in dashboard single page contains 4 or more visualizations but in this one single sheet contains only one visualization.
- By clicking add, a new sheet will be opened in story page and we will add minimum of 4 visualizations but in this one single sheet we create perfect story.
- After completing the story we will publish the story into the tableau public.

## \* Publishing to the Tableau Public & Web Application

### Integration :-

- Developed Visualizations, Dashboard and story will be published to Tableau Public Account
- Once it is published, we will get the shareable links.
- Develop a web application using HTML, CSS using bootstrap.
- Integrate the Visualizations, Dashboard, and Story with the Web Application.

## Milestone : Data Visualization :-

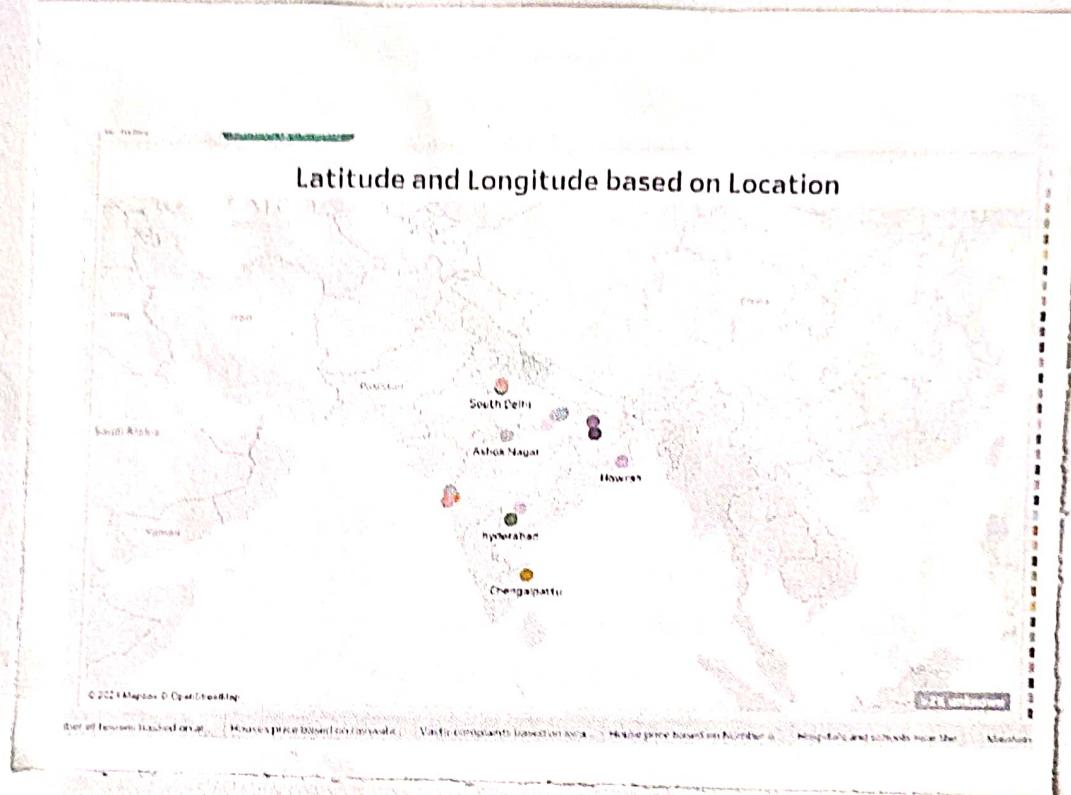
Data Visualization is the process of creating the graphical representation of data to help people to understand and explore the information. The goal of the data visualization is to make complex datasets more accessible, intuitive and easier to interpret. By using visualization statements such as charts,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

### Number of unique visualization:-

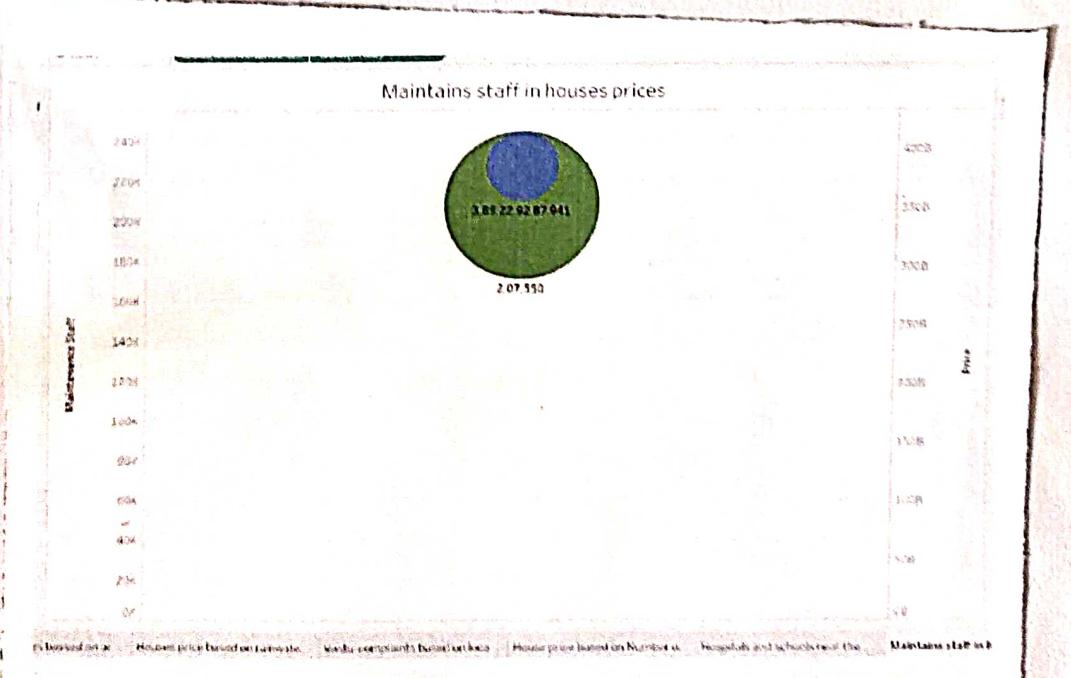
The number of unique visualizations that can be created with a given dataset. Some common types of the visualizations that can be used to analyze the performance and efficiency of Radisson Hotels include bar charts, line charts, heat maps, scatter plots, pie charts, maps etc.

These visualizations can be used to compare the performance, track changes over time, show the various distributions - relationships between variables, breakdown of revenue and custom demographics, workload, resource allocation and location of hotels.

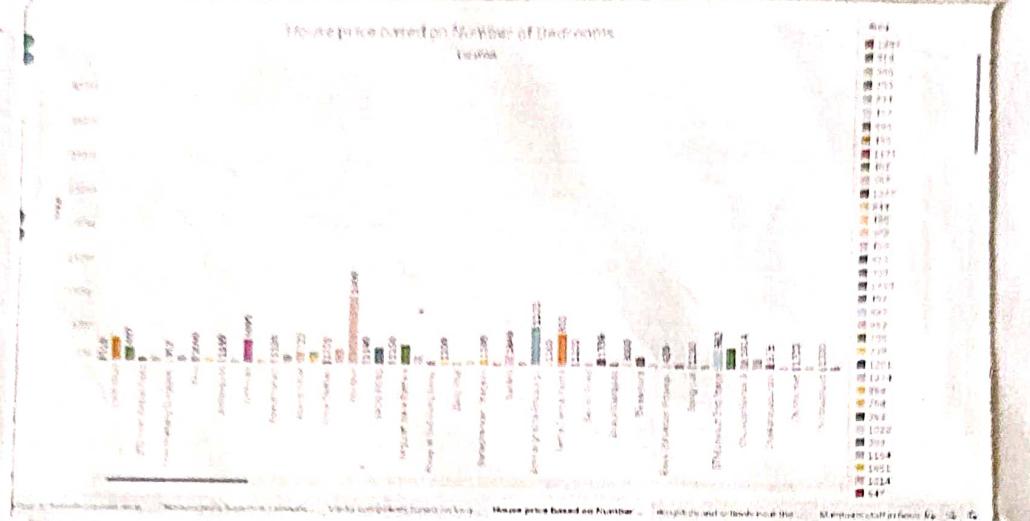
Activity 1: Latitude and Longitude based on Location



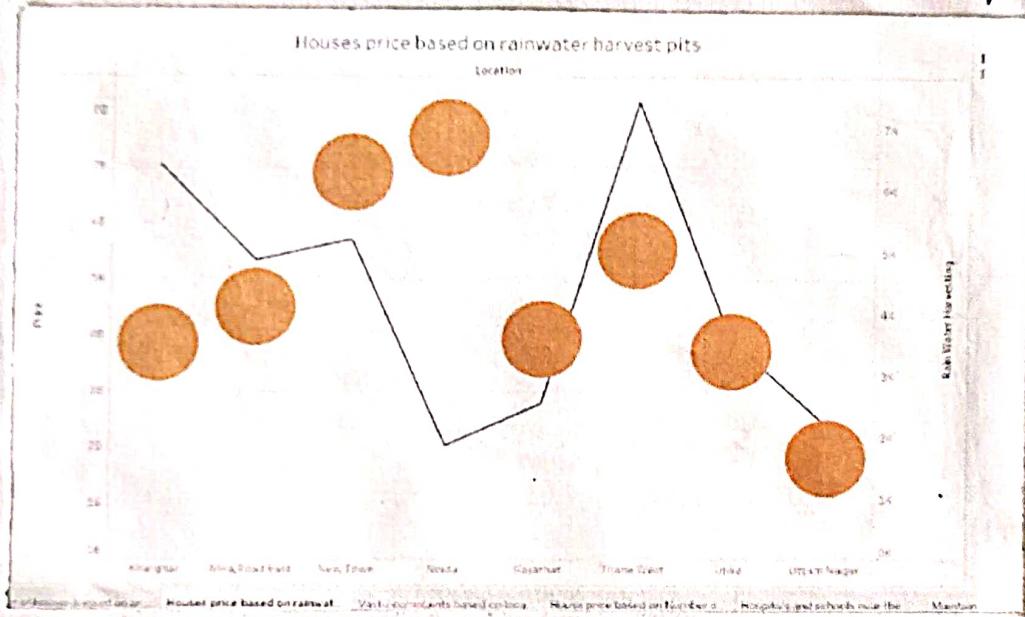
Activity 2: Maintains staff in house prices



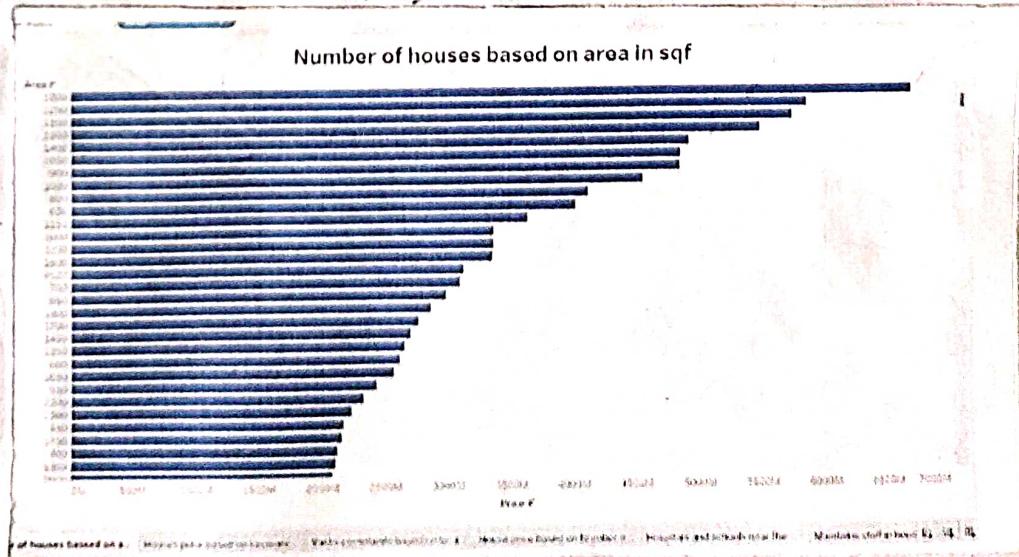
## Activity 1.3 :- House price based on Number of BedRooms



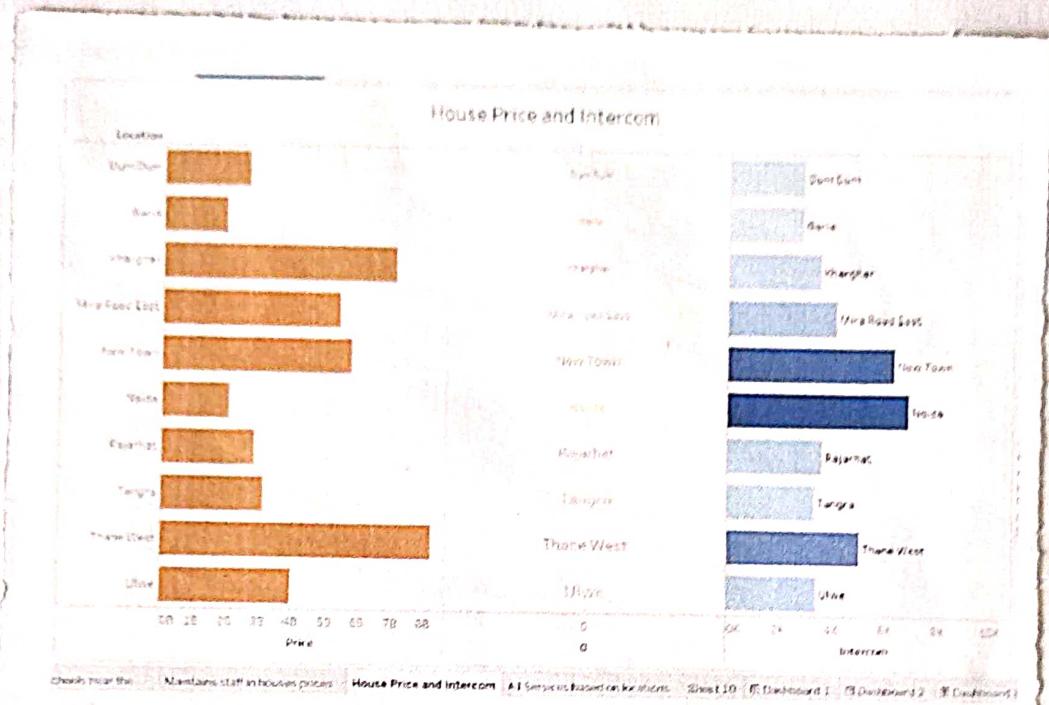
## Activity 1.4 :- House price based on rainwater harvest pits



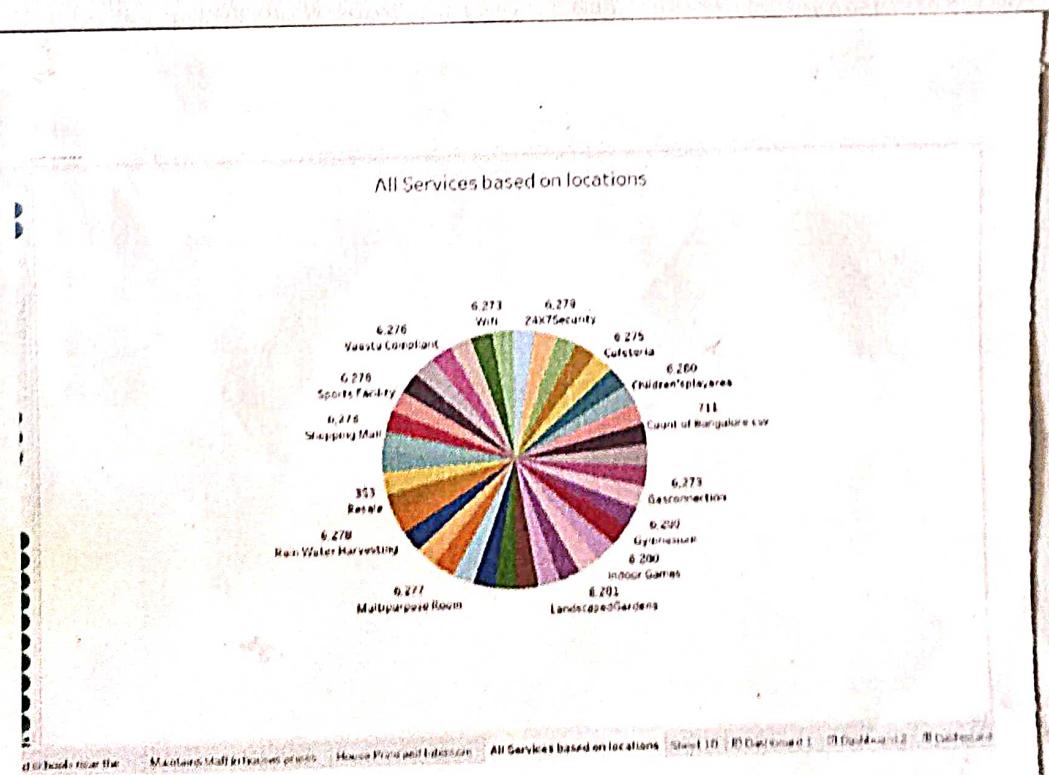
## Activity 1.5 :- Number of houses based on area in sqft



## Activity 1.6 :- House Price and Intercom



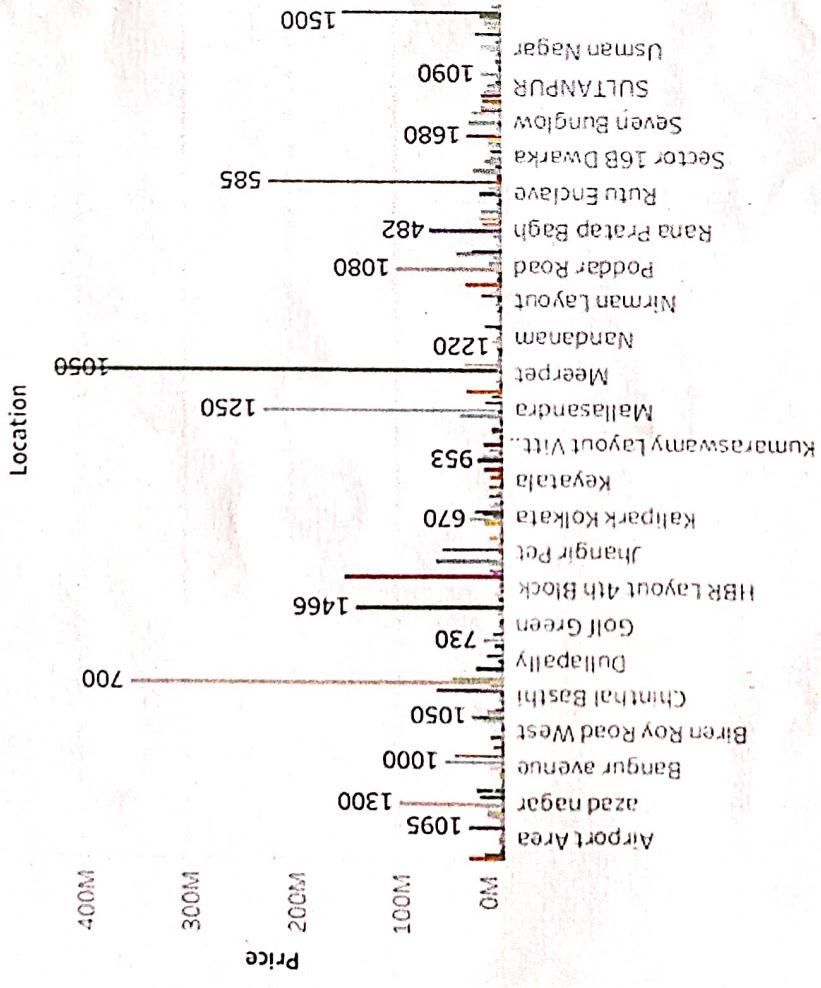
## Activity 1.7 :- All Services based on locations.



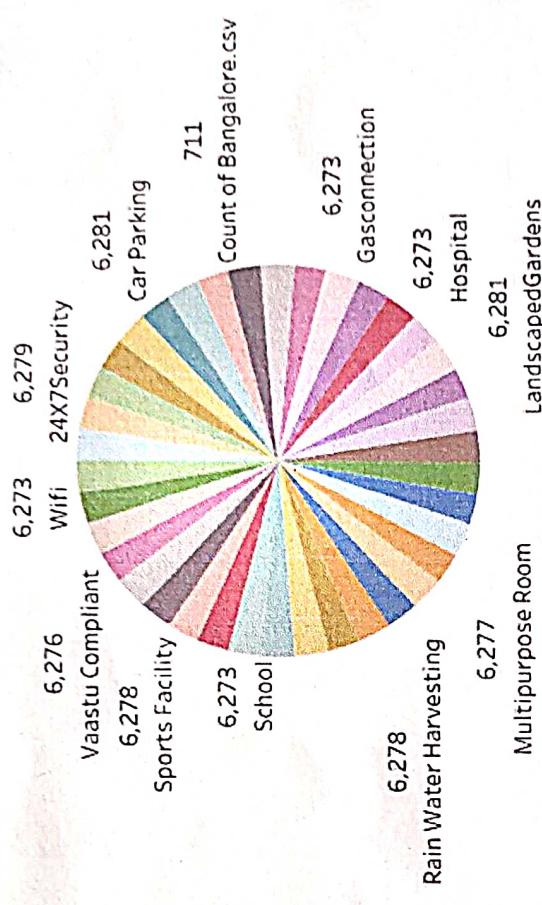
## Milestone :- Dashboard :-

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, health care, 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.

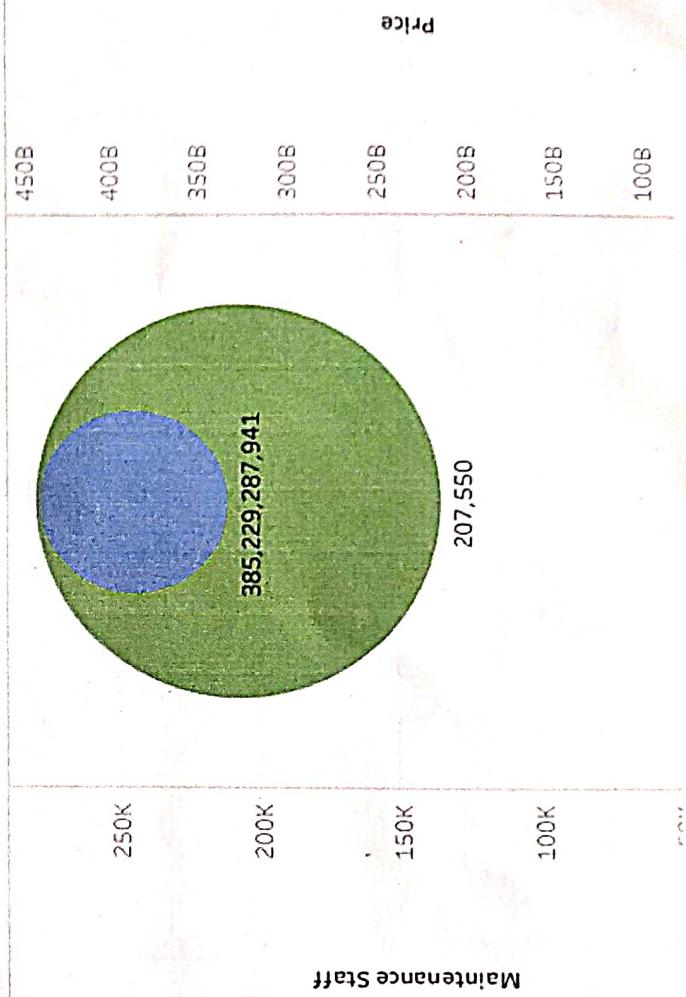
## House price based on Number of Bedrooms



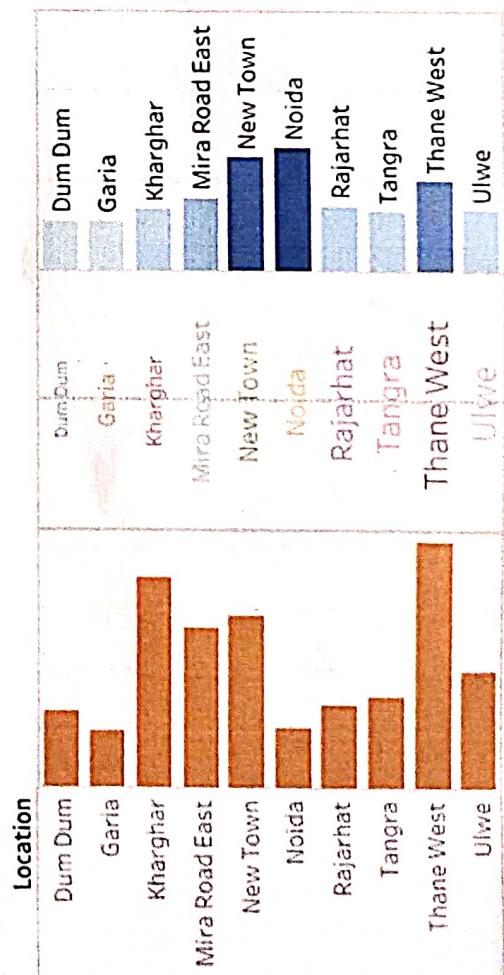
## All Services based on locations



## Maintains staff in houses prices



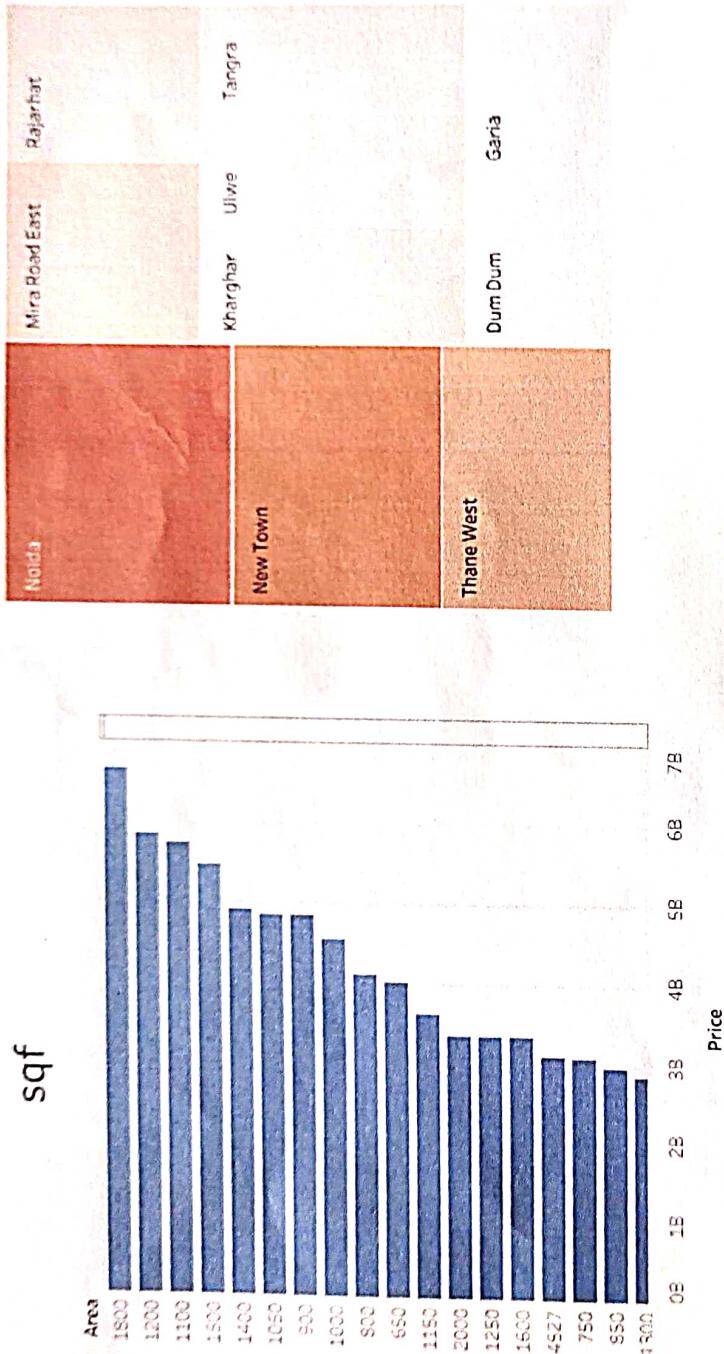
## House Price and Intercom



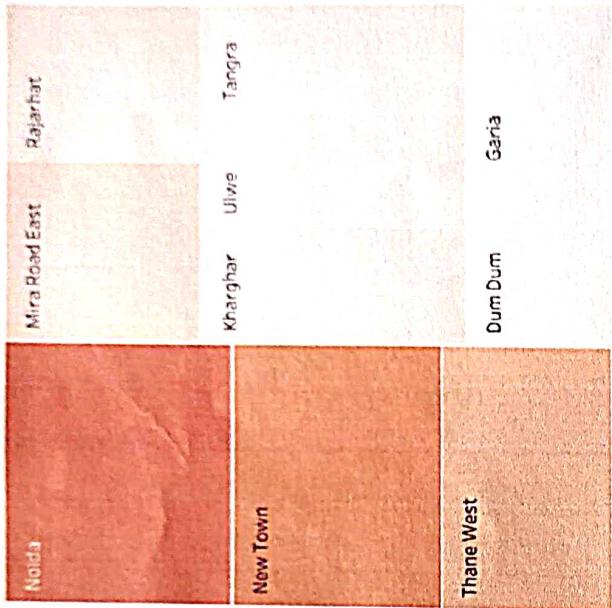
Price

Intercom

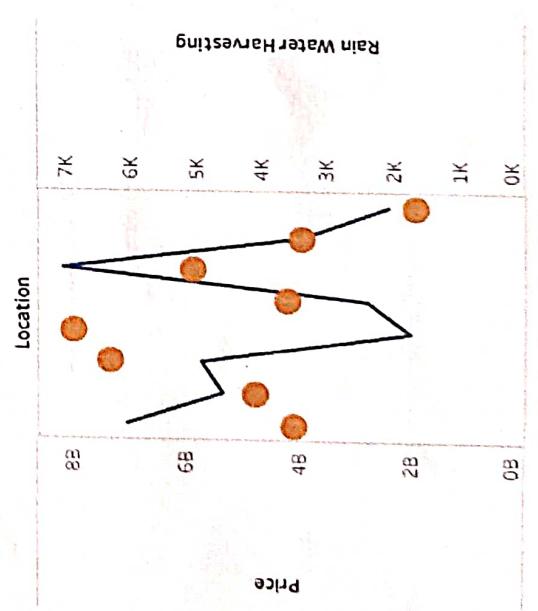
## Number of houses based on area in sqf



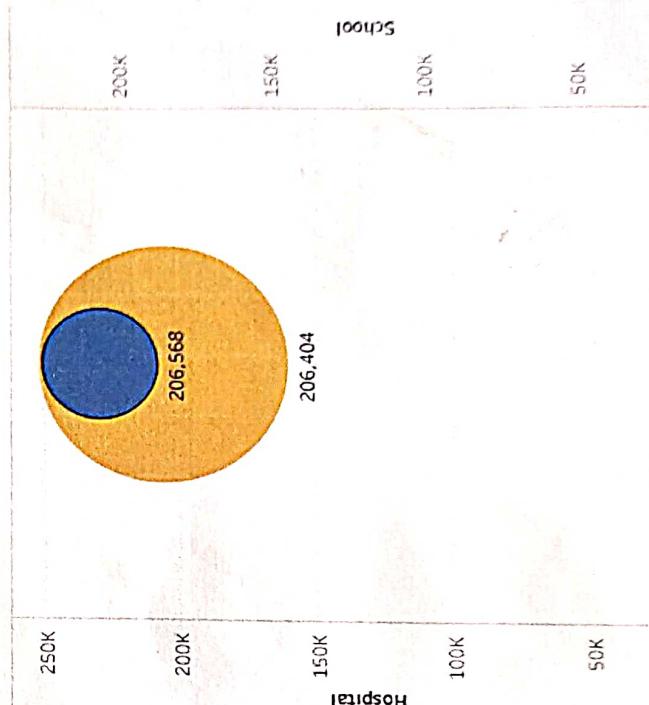
## Vastu-complaints based on location



## Houses price based on rainwater harvest pits



## Hospitals and schools near the Houses



## Milestone Story :-

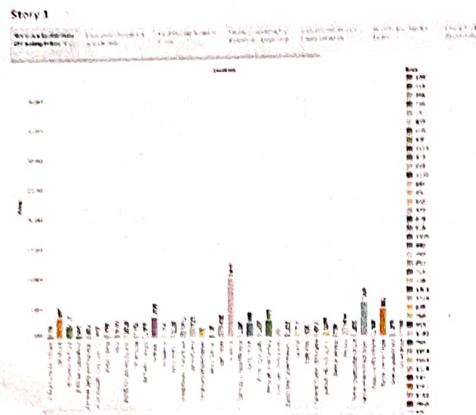
A data story is a way of presenting data and analysis in a narrative form, intending to make the information more engaging and easier to understand.

A data story typically includes a clear introduction that sets the stage and explain the context for the data, a body that presents the data and analyses logically and systematically and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of medium, such as reports, presentations, interaction visualization and videos.

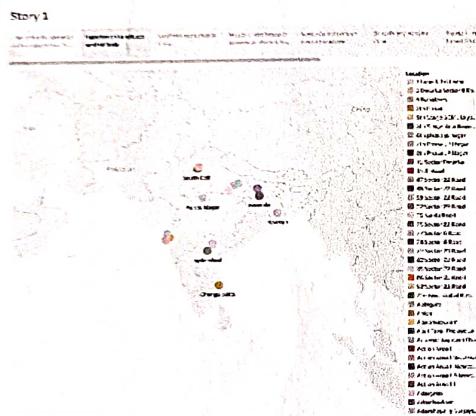
## Activity Number of scenes of story :-

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

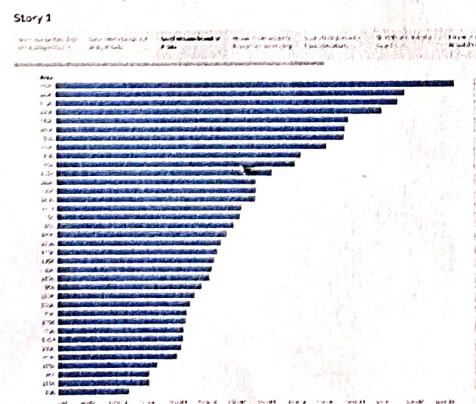
# HOUSING PRICES IN METROPOLITAN AREAS OF INDIA



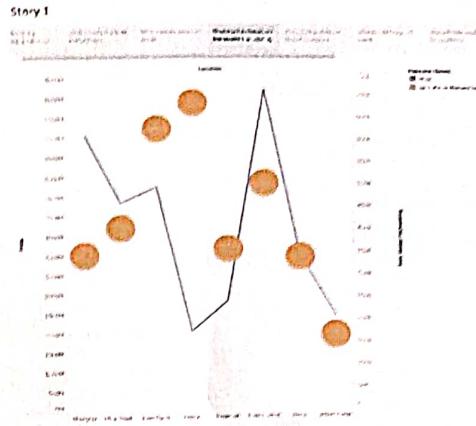
\* Narrative Explanation of housing prices in the Metropolitan Areas of India.



\* Location based on longitude and latitude.



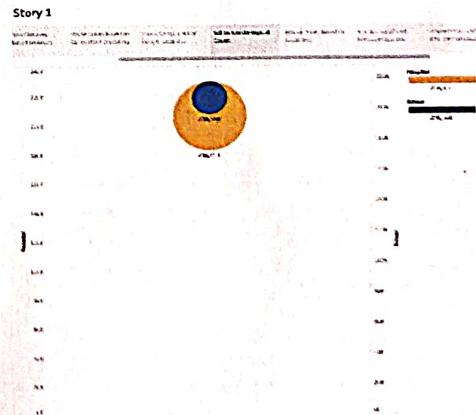
\* No. of houses based on areas



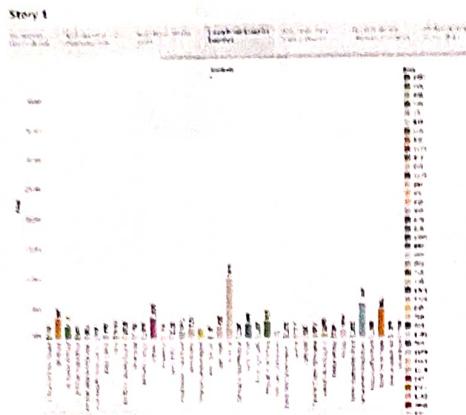
\* House prices based on Rainwater Harvesting



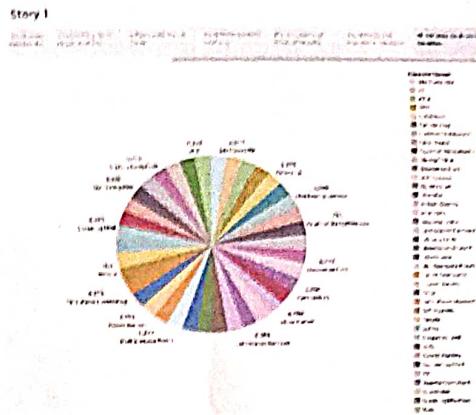
\* Water complaints based on house locations.



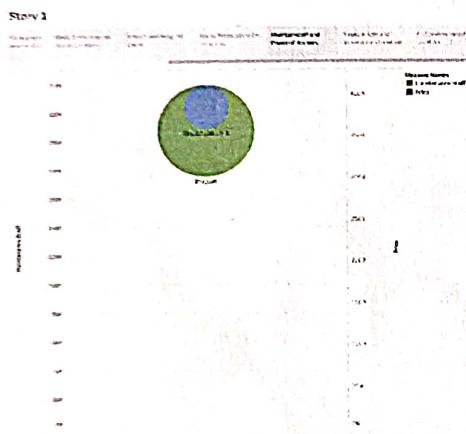
\* No of schools and Hospitals Count near the area.



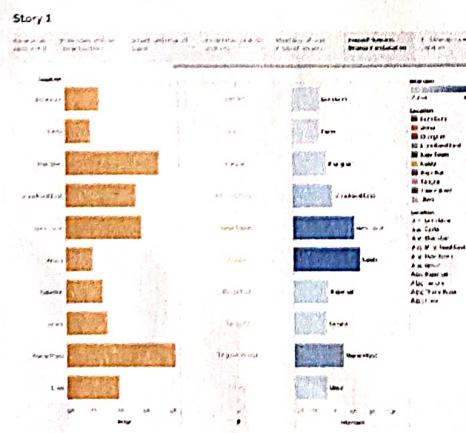
\* Housing Price based  
on Locations.



\* All Services based on  
a location



\* Maintain staff and  
Prices of House

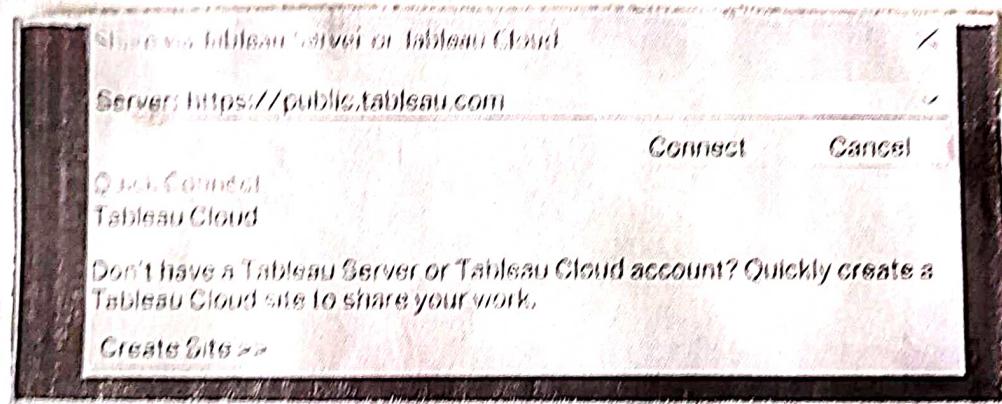


\* House Prices and Intercom  
on Location

## Milestone What is Segregation?

Publishing helps us to track and monitor, keep performance within and to communicate the results and programs. Help to publish the story information, make best decisions and communicate their performance to others.

Step 1: Publishing dashboard and reports to Tableau public, Open Dashboard / Story. Click on the Share button on the top ribbon.

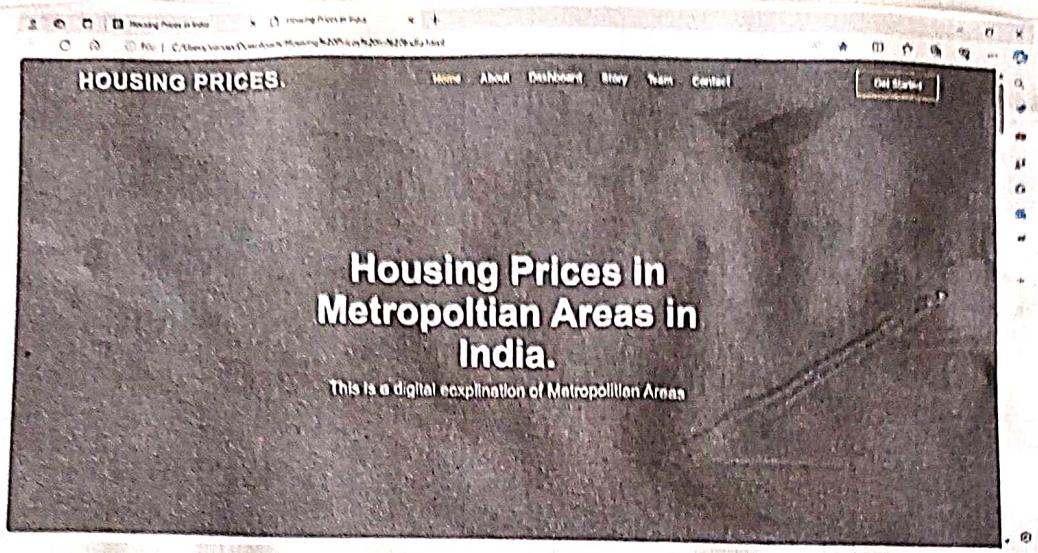


Step 2: Once you click it will ask you for the Tableau public username and password.

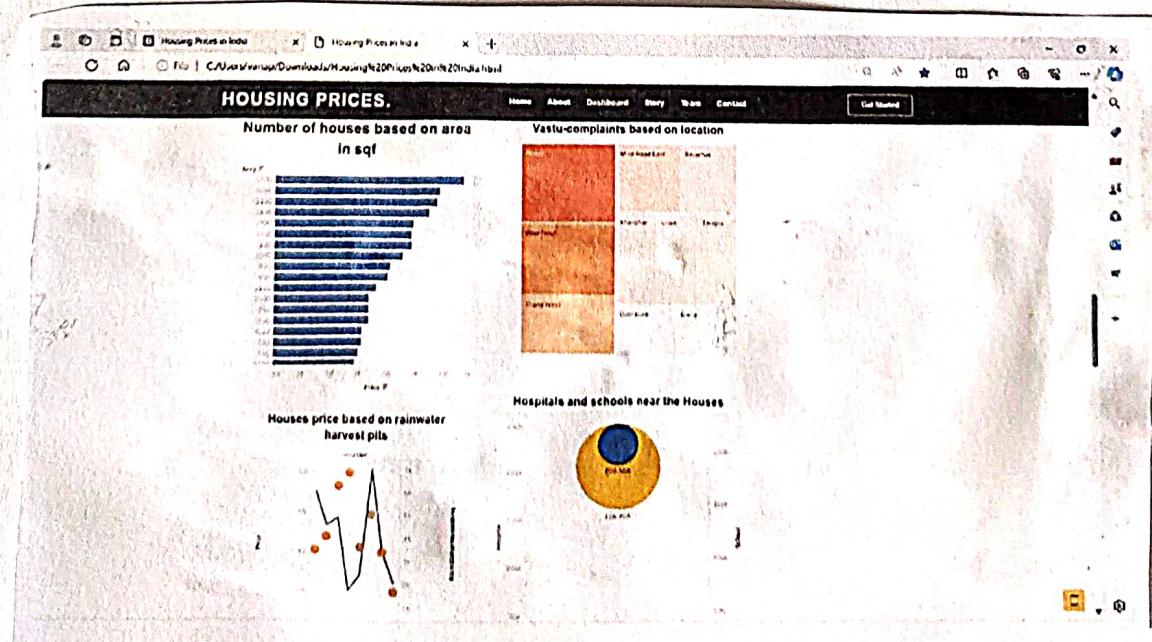
## Fork code:

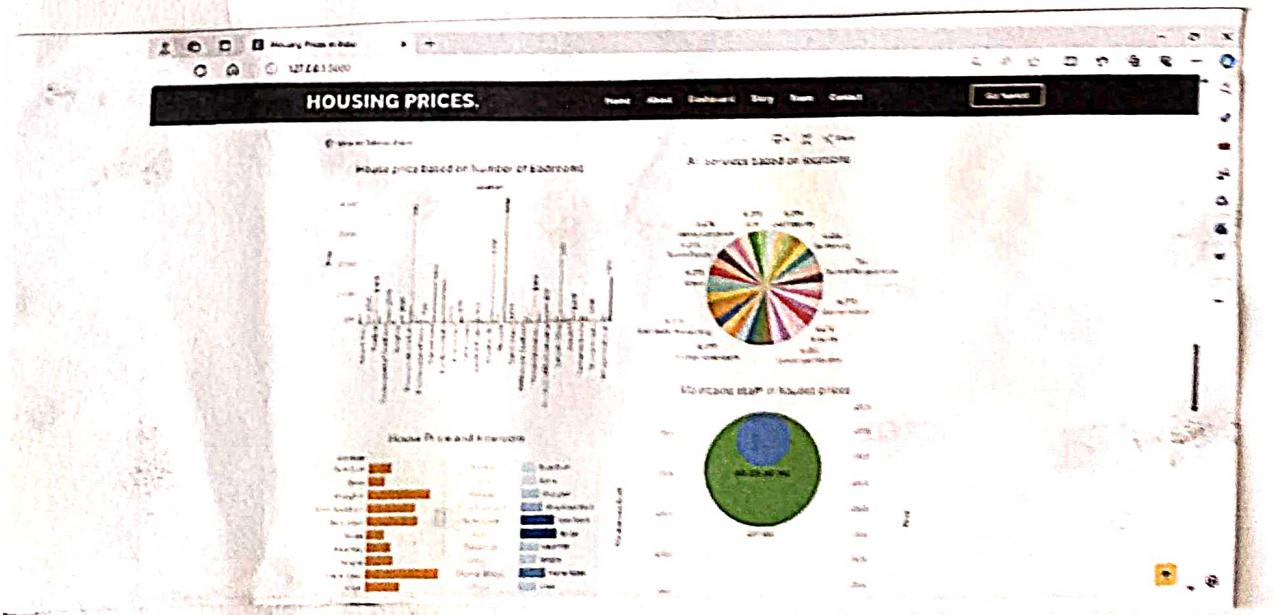
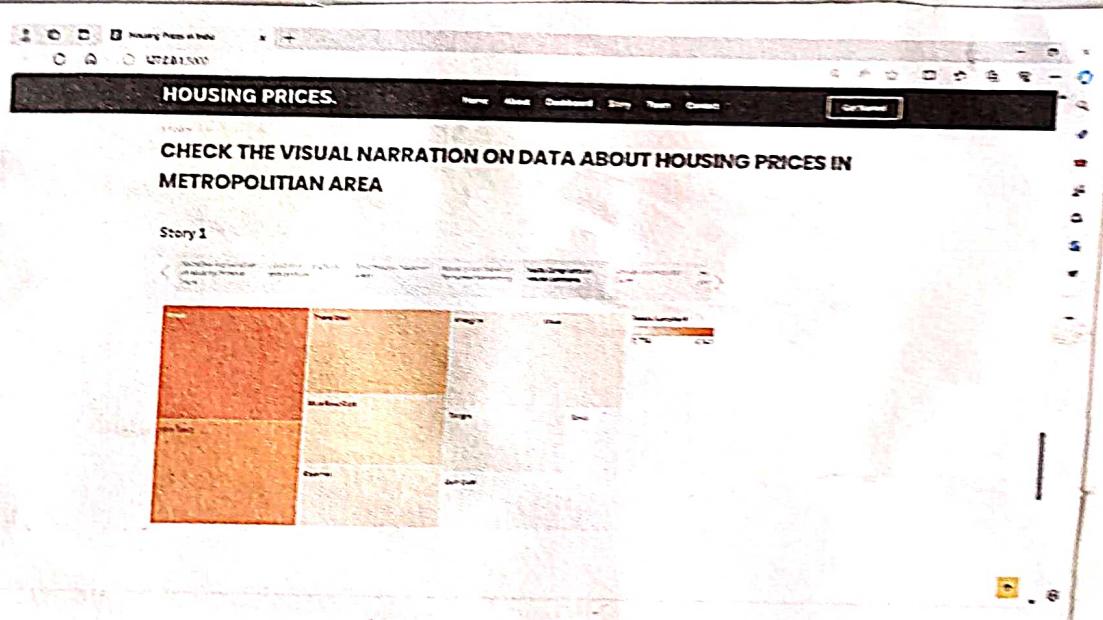
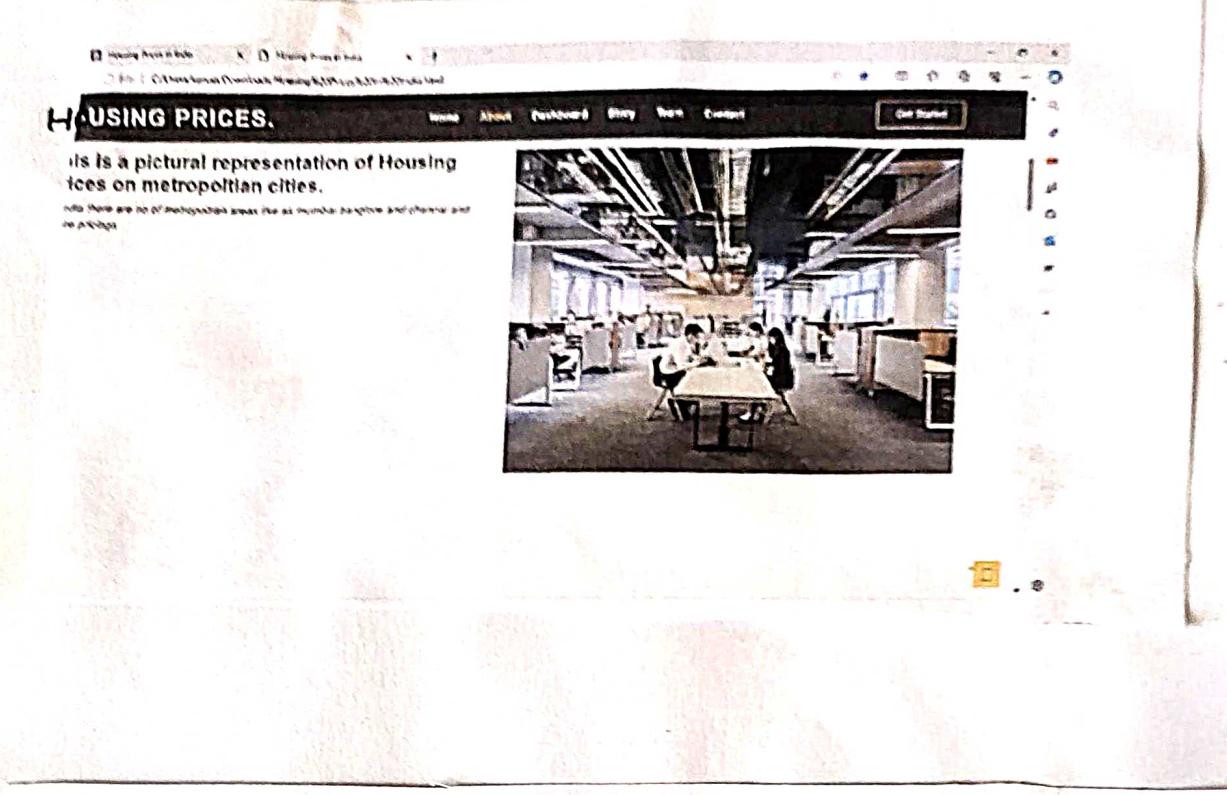
A screenshot of a terminal window on a Mac OS X desktop. The title bar says "Terminal" and the status bar shows "0.44 TB 0 2018-08-10 16:19:00-07:00". The terminal window contains Python code for a Flask application. The code includes imports for Flask, render\_template, and jsonify. It defines a route for '/index' that returns a rendered template and a JSON object. It also defines a route for '/' that returns a JSON object. The code ends with a call to app.run().

```
Terminal - Python - https://www.tableau.com/applications/flask - El Capitan
$ python
> import flask
> from flask import Flask,render_template
> app = Flask(__name__)
> @app.route('/')
> def index():
>     return render_template('index.html')
>
> @app.route('/')
> def hello():
>     return jsonify({'text': 'Hello World!'})
>
> if __name__ == '__main__':
>     app.run()
>
```



The screenshot shows the "DASHBOARD" section of the website. The main heading is "CHECK THE VISUAL REPRESENTATION OF HOUSING PRICES IN INDIA". Below it, there are two sections: "Housing Prices in Metropolitan Areas in India" and "Latitude and Longitude based on Location".





## ACTIVITY LOG FOR THE FIRST WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day - 1	Introduction to Business Intelligence • Data Integration • Data processing & presentation • ETC Architecture	We have learned data integration fundamentals	
Day - 2	Introduction to tableau Introduction To Tableau overview/features connecting Tableau to data source	Develop skills in using Tableau to various data source.	
Day - 3	Data Extraction Introduction to database Creating database & table CRUD operations on DB tables	Develop proficiency in data	
Day - 4	Basic Sql operations	Learn basic SQL operations	
Day - 5	Basic Sql operations	Acquire skills in filtering, sorting etc.	
Day - 6	Architecture of Tableau Architecture of Tableau Interface of tableau field Itypes lines & script connection		

## WEEKLY REPORT

WEEK - 1 (From Dt..... to Dt.....)

**Objective of the Activity Done:** To provide an intensive into business intelligence

**Detailed Report:**

**Day 1:** Introduction to business intelligence  
Covered various aspects of BI including data integration processing, presentation etc. architecture explored different types of data analytics descriptive, diagnostic predictive & prescriptive along with their applications.

**Day 2:** Introduction to tableau.

Introduced participants to tableau's features and capabilities, demonstrated how to connect tableau to different data source and work.

**Day 3:** Data Extraction

Provided an overview of database and its role in data management, conducted sessions on creating data base and performing crud operations.

**Day 4 & 5:** Basic Sql operations

Covered fundamental concepts of Structured Query language (SQL) and its importance in database management. Taught basic sql operations including querying, filtering, sorting and aggregating data.

## ACTIVITY LOG FOR THE SECOND WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day -1	Architecture of Tableau Interface of Tableau, Tableau field types like its extract connection various filters	Understand Tableau's Architecture components	
Day -2	Histograms Box plot Motion, Bar Line, Bubble	Understanding all visualisation and learning principles	
Day -3	Bullet, Scatter, Treee, heat maps Maps	Develop proficiency in creating the most suitable chart type	
Day -4	Custom Charts	Acquire skills in creating, customizing charts etc effectively	
Day -5	Connecting to data source Tableau data types Connection to enetcubes and Pdf's Data preparation	better effective management for meta data to optimization	
Day -6			

## WEEKLY REPORT

WEEK - 2 (From 14.....to 18.....)

Objective of the Activity Done: To develop into advance data analyst.

Detailed Report:

Day 1: Introduction of Tableau

Explored the architecture of Tableau, including its components and interface elements. Discussed Tableau field types using publishing scenarios.

Day 2: Charts

Participants gained an understanding of principle and applications of each chart type in visualization.

Day 3: Advanced Chart Types

Acquired skills in creating, visualizing, interpreting advanced chart types for comprehensive data analysis.

Develop proficiency in selecting the most suitable chart types for specific data analysis.

Day 4: Custom Charts

Participants acquired skills in creating, visualizing and interpreting custom charts to effectively communicate complex data insights.

Day 5: Working with Metadata & Data Blending

Understand Tableau data types and their implications in data visualization & analysis. Acquired skills proficiency in data preparation.

### ACTIVITY LOG FOR THE THIRD WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day -1	Joints and Union * Dealing with null values errors, database join, data extraction, data blending	Gain comprehensive understanding & skills in joins.	
Day -2	Advanced Data Manipulation * Previews * Groupups * Sets * computed sets	Advanced data manipulation including preview masking.	
Day -3	* Bins * Hierarchies * Sorting and Types * Editing areas & annotation	Learned how to utilize bins for grouping data.	
Day -4	Working with filters, data * Filters * Working with filters * Filtering data dimensions	Removal of filters to refine before data sets.	
Day -5	* Filtering in Tableau * Types of filters * Filtering the order of operation	Master Tableau's filtering tools for data manipulation	
Day -6			

## WEEKLY REPORT

WEEK - 3 (From Dt..... to Dt.....)

**Objective of the Activity Done:** To deepen participants' understanding.

**Detailed Report:**

Day 1: Joins, Unions and Data Blending.  
Gained comprehensive understanding and practical skills in various types of joins including left, right, inner, outer joins.

Day 2: Advanced Data Manipulations.  
Mastered advanced data manipulation techniques including pivoting, masking & highlighting to enhance data exploration & analysis. Learned how to utilize sets for filtering and segmenting data dynamically.

Day 3: Bins, Hierarchies, Sorting and Data Organisation.  
Participants learned to use bins for grouping continuous data into discrete intervals and creating hierarchies for data organization.

Day 4: Working with filters and data organization.  
Learned to effectively filter continuous data, dimensions and measures to extract relevant insights from data.

Day 5: Advanced filtering in Tableau.  
Explored advanced filtering tools in Tableau to perform data manipulation and analysis.

## ACTIVITY LOG FOR THE FORTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day - 1	<ul style="list-style-type: none"> <li>→ Working on coordinate points</li> <li>→ plotting longitude latitude</li> <li>* Editing unrecognized location</li> <li>→ WMS: Web Mapping Services.</li> </ul>	Explore the versatility of quick table calculations,	
Day - 2	Calculated fields in Tableau	Apply quick table calculations dynamically to values.	
Day - 3	Quick table Calculations	Utilize for instant data analysis	
Day - 4	LDP expressions in Tableau	Co-ordinate Point manipulation	
Day - 5	<ul style="list-style-type: none"> <li>→ Working on the background image, including add image.</li> <li>→ map visualizations, custom territories</li> </ul>	How to incorporate images & add images in Tableau	
Day - 6			

## WEEKLY REPORT

WEEK - 4 (From Dt..... to Dt.....)

Objective of the Activity Done: To deliver into advanced Tableau function

Detailed Report:

Day 1: Calculated fields, quick table calculations, KLOD  
participants learned how to create calculated fields  
in Tableau for custom data analysis and visualization.

Day 2: Quick table calculations,

Utilized Tableau's Quick Table Calculations for  
instant data analysis & visualization enhancement.  
Applied LOD expressions.

Day 3: LOD expression in Tableau.

Participants delved deeper into the use of LOD expressions  
for advanced analytical and precise control over aggregation  
in Tableau. Applied LOD expression dynamically to compute.

Day 4: Mapping, Calculations and Expressions.

Participants mastered mapping skills, including co-ordinate  
point manipulation & longitude. Developed proficiency  
in Advanced Calculations & Expression in Tableau.

Day 5: Advanced Mapping Techniques.

Participants learned to incorporate background images  
and add images in Tableau for enhanced visualization.  
Gained proficiency in map visualization and  
Creating custom stereotypes.

## ACTIVITY LOG FOR THE FIFTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In Charge Signature
Day - 1	Creating parameters Parameter in dashboard Using parameters in UI Chart selection parameters	Creation of parameters in dashboards.	
Day - 2	K-means clustering analysis, Trend analysis and simulations Virtual reality, interaction programming & web design	Learned - means Cluster analysis, 3D patterns	
Day - 3	<ul style="list-style-type: none"> <li>Building an app using a dashboard (using size, object, views etc.)</li> <li>Basic parameters for creating interactive dashboards</li> </ul>	Understand the principles of story telling.	
Day - 4	Creating multiple dashboard Creating stories, Including the intro of story of adding category variables.	Gained proficiency in creating dashboards.	
Day - 5	Adding annotation with descriptions Selecting and choosing values, highlights, actions etc	Updates story points to peers insights.	
Day - 6			

## WEEKLY REPORT

WEEK - 5 (From Dt..... to Dt.....)

Objective of the Activity Done: Focus on advanced tableau functions.

Detailed Report:

Day 1: Working with parameters.

Participants mastered the creation of parameters in tableau to enhance dynamic analysis and visualizations.

Gained proficiency in integrating parameters into calculations for flexible.

Day 2: Visual Analysis pane.

Explored the visual analysis pane in tableau for advanced data exploration and techniques learned

k-means cluster analysis to identify patterns and grouping within datasets.

Day 3: Dashboards and stories.

Acquired skills in building & formatting dashboards in tableau using various elements such as size,

objects view filters & legends for effective visualization.

Day 4: Creating Multiple Dashboards

Gained proficiency in creating multiple dashboards within tableau for comprehensive data presentation.

Be analysis:

Day 5: Creating Stories.

Mastered the creation and updating of stories in tableau.

## ACTIVITY LOG FOR THE SIXTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day - 1	<ul style="list-style-type: none"> <li>• Adding annotations with descriptions</li> <li>• Highlights action, URL actions, selecting &amp; clearing</li> </ul>	Master the skill of adding annotation	
Day - 2	<ul style="list-style-type: none"> <li>• Introduction to flask</li> <li>• Working with flask framework.</li> <li>• Introduction to bootstrap</li> </ul>	Acquaintance with flask in python	
Day - 3	Working with The bootstrap	Utilize bootstrap components like as grid,	
Day - 4	Building applications with flask framework	Gain proficiency in developing full stack with flask	
Day - 5	Embedding dashboard & story with web applications' Cyl and Assessment	Methods for integrating tableau visuals.	
Day - 6			

## WEEKLY REPORT

WEEK - 6 (From Dt..... to Dt.....)

**Objective of the Activity Done:** To focus on advanced tableau functionalities

**Detailed Report:**

**Day 1: Adding Annotations and dashboard Interactions**

Participants mastered the skill of adding annotations with descriptions to provide contextual information with tableau dashboard and stories.

**Day 2: Building tableau web Application with flask**

Learned to work with flask framework and interactive web application and learning its features for routing, handling E6 requests.

**Day 3: Working with Bootstrap**

participants mastered the use of bootstrap, a front end framework for creating responsive and visually appealing web interfaces.

**Day 4: Building applications with flask framework.**

Acquired the skills necessary to build web applications using the flask framework, a light weight and flexible python web framework.

**Day 5: Embedding Dashboards and stories into webpages**

Gained proficiency in leveraging tableau's javascript API to embed and interact with dashboard and stories within custom web application

## ACTIVITY LOG FOR THE SEVEN WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day -1	Live hands-on sessions to project	Doubts clarified	
Day -2	Explained about uploading files in Github	Doubts clarified	
Day -3	Explained about Github account in detail	Created github account and learnt how to upload files.	
Day -4	live sessions for project	Doubts clarified	
Day -5	Holiday	-	
Day -6	Holiday-	-	

## WEEKLY REPORT

WEEK - 7 (From Dt..... to Dt.....)

**Objective of the Activity Done:**

**Detailed Report:**

Day 1:

Explained about github in details, how to create an account and how to upload files.

Explained us how to create a repository on the name of our project and told us to keep its public so that everyone can access our github link.

Day 2:

The live sessions were held and explained about the long term internship projects.

Day 3:

The sessions were held and our doubts were clarified.

And it continued for the last day of the week.

## ACTIVITY LOG FOR THE EIGHTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day -1	Held live session on the number of projects in long term internship	learnt about two projects	
Day -2	The sessions were held on for the project	Doubts were clarified	
Day -3	Grand Assessment was held	Attempted the grand assessment quiz.	
Day -4	Explained us to upload the assignment in the github	Uploaded the assignment and filled the google form.	
Day -5	live sessions about the project	learnt about the projects.	
Day -6	Holiday	1	

## WEEKLY REPORT

WEEK - 8 (From Dt..... to Dt: Dt.....)

**Objective of the Activity Done:**

**Detailed Report:**

The live sessions were held. The doubts about the projects were clarified, told us to upload the assignments in the git hub account by creating a repository on our hall ticket number being a public repository.

The Operand Assessment Quiz was held and we attempted the assessment.

The live on lessons were held and we attempted the assessment, we were given by a document which is having all the names of the long-term internship project.

The live sessions were held to clarify our doubts.

## ACTIVITY LOG FOR THE NINETH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day - 1	Detailed explanation of the remaining projects	learnt about the projects	
Day - 2	We were given by the datasets of the projects	Our dataset was received	
Day - 3	Clarified doubts about the remaining the datasets	Doubts were clarified	
Day - 4	Detailed explanation about creating a Tableau student	Already installed tableau student	
Day - 5	Detailed explanation of the projects	Doubts are clarified	
Day - 6	Holiday.		

## WEEKLY REPORT

WEEK - 9 (From Dt..... to Dt.....)

Objective of the Activity Done:

Detailed Report:

Detailed explanation of the remaining projects of long term internship. The datasets of the projects were given to some how who have their projects assigned.

We clarified our doubts about not assigning the project and the datasets.

Detailed explanation about installing the Tableau Student or the Tableau Public for those who have not installed it.

Explained about how to sign in into the Tableau public and how to use the tools for creating visualizations.

### ACTIVITY LOG FOR THE TENTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day -1	We were assigned by a project	Learned about the project	
Day -2	Live sessions on classification of doubts	Doubts were classified	
Day -3	They issued the remaining dataset of the projects	The data set was received	
Day -4	The live sessions were held	Studied about	
Day -5	Live sessions were held	Doubts were classified	
Day -6	Holiday		

## WEEKLY REPORT

WEEK - 10 (From Dt..... to Dt.....)

**Objective of the Activity Done:**

**Detailed Report:**

The project was assigned and we took the heart disease analysis project from all the other projects of the long term internship.

The dataset was given to us and we started studying about the data set. And the project was assigned. We checked out Smart, internship portal and the resources.

The project format was given in the assigned project. The project format having downloading the datasets, studying about the datasets and the no. of unique visualization to be created.

## ACTIVITY LOG FOR THE ELEVENTH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day -1	Live sessions was held and explained about the Visualizations	learnt about the visualizations and created .	
Day -2	The live sessions were held	Clarified our doubts about some visualization	
Day -3	The live sessions were held	learnt about the dashboard	
Day -4	The live sessions were held and doubt clarified	Created the required dashboard using visualization	
Day -5	The live sessions were held and doubt clarified	Created the required dashboard using visualization.	
Day -6	Holiday		

# WEEKLY REPORT

WEEK - 11 (From Dt..... to Dt.....)

Objective of the Activity Done:

Detailed Report:

The five sessions were held and explained about the visualizations. Created the unique no. of visualizations as per the project the was assigned in the Smart interz.

The doubts were clarified about some of the remaining visualizations.

After creating all the visualizations that are unique like bar chart, piechart, box and whisker plots, Scatter plot, Rectangular bars etc.

By combining these visualizations we have created the dashboards required.

We have created a three dashboards assigning these visualizations to each of the dashboard. The dashboard was created.

## ACTIVITY LOG FOR THE TWELVETH WEEK

Day & Date	Brief description of the daily activity	Learning Outcome	Person In-Charge Signature
Day - 1	Live hands-on sessions for project	Youbits Classified	
Day - 2	Explained about uploading files in GitHub.	Youbits Classified	
Day - 3	Explained about GitHub account detail	Created GitHub account and learned how to upload file.	
Day - 4	Live sessions for projects	Youbits Classified	
Day - 5	Holiday	—	
Day - 6	Holiday	—	

## WEEKLY REPORT

WEEK - 12 (From Dt..... to Dt.....)

### Objective of the Activity Done:

### Detailed Report:

We created story & we assigning the unique visualization side by side. By clicking on the name of the visualization we can see the visualization.

By clicking on the Share button we can proceed the next process of web integration and created tableau cloud and created flask and by clicking on the link we got we completed our web integration. It has home, dashboard, story, Team and contact details. We should change the code as per our project.

We did our demo link on demo video by using sniffing tool which records the screen and audio.

We created a repository on the name of our project and submitted our project.

# Housing Prices In METROPOLITAN AREAS OF INDIA.

Introduction:- This project aims to analyze and predict housing prices in metropolitan areas of India. With the rapid urbanization and growth of the Indian economy, the demand for housing has increased significantly, leading to a surge in housing prices. This project seeks to understand the factors that influence housing prices in major Indian cities including Kolkata, Delhi, Hyderabad, Pune, Ahmedabad, Bangalore and Chennai. By analyzing various datasets and using machine learning algorithms, this project aims to develop a predictive model that can forecast housing prices in these cities, providing valuable insight for potential home buyers, investors and policy makers.

Overview:- This project is a comprehensive analysis of housing prices in major metropolitan areas of India. This project aims to:-

- Develop a user friendly interface for users to

input parameters and will predict the housing prices.

- Provide insights into the current market trends and future predictions for housing prices in major Indian cities.
- Identify key factors influencing housing prices, such as location, size and amenities, and economic conditions.
- By leveraging data analysis and machine learning techniques, this project will provide a comprehensive overview of the housing market in India's Metropolitan Areas.

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Purpose: The purpose of this project is to develop a predictive model that can accurately forecast housing prices in major metropolitan areas of India. The project aims to:-

- Provide a data driven approach to understanding the complex factors that influence housing prices.
- Enable home buyers, investors, and policy makers to make informed decisions based on the predictive analysis.
- Identify areas of high growth potential and opportunities for investment.
- Inform policy decisions to address housing and affordability and supply demand imbalances.
- Contribute to the development of a more transparent and efficient housing market in India.

## Literature Survey: → The literature on

housing prices in India highlights the complexity of the market, with various factors influencing prices. Studies have identified location, size, amenities and economic conditions as key of the determination of housing prices.

Additionally, research has shown that machine learning algorithms can accurately predict housing prices, outperforming traditional regression models.

Recent studies have also emphasized the importance of considering regional and local factors, such as the urbanization, population growth and infrastructure development, when analyzing housing prices in India. Furthermore, the impact of government policies and regulations on housing prices has been explored, highlighting the need for data-driven decision making.

## Existing Problem: → The Indian housing market, particularly in metropolitan areas, faces several challenges including:

- 1.) Lack of Transparency: Housing prices are often opaque, making it difficult for buyers to make informed decisions.
- 2.) Unaffordability: Housing prices are sky rocketing, making it challenging for low and middle income families to purchase homes.

- 3.) Supply demand imbalance:- The demand for housing far exceeds the supply, leading to shortage of affordable housing options.
- 4.) Inefficient pricing:- Housing prices are often influenced by speculative forces, leading to inefficient pricing and market volatility.
- 5.) Limited access to Financing:- Many buyers struggle to access financing options, further limiting their ability to purchase homes.

Proposed Solution:- To address the existing problems in the Indian housing market, this project proposes the following solutions:

- 1.) Development of a predictive model:- A machine learning based predictive model will be developed to forecast housing prices in metroopolitan areas, providing transparency and insights to buyers and investors.
- 2.) Data analytics platform:- A data analytics platform will be created to collect and analyze data on housing prices, demographics, economic indicators, and infrastructure development, enabling data-driven decision-making.
- 3.) Regional analysis and benchmarking:- The project will conduct regional analysis and benchmarking to identify best practices and areas for improvement, helping to address regional disparities.

Theoretical Analysis:- This project is grounded in the following theoretical frameworks:-

1) Supply and Demand Theory :- This theory explains how housing prices are determined by the intersection of supply and demand curves. Our analysis will consider the impact of supply and demand factors on housing prices.

2) Machine learning Theory :- Our predictive model will be based on machine learning algorithms, which are grounded in statistical learning theory and computational complexity theory.

3) Hedonic Pricing Model :- This model posits that housing prices are a function of attributes such as, location, size and amenities. Our predictive model will estimate the implicit prices of these attributes.

4) Data Analytics and Visualization :- Our data analytics platform will draw on theories of data visualization and human-computer interaction to provide insights and facilitate decision making.

By drawing on these theoretical framework, our project will provide a comprehensive understanding of the complex factors, influencing housing prices, in metropolitan areas of India, and develop a robust predictive model and data analytics platform to support informed decision making.

# Advantages & Disadvantages

## Advantages :-

- 1.) Improved accuracy:- The predictive model provides more accurate housing price predictions enabling home buyers and investors to make informed decisions.
- 2.) Data-driven insights:- The data analytics platform offers valuable insights into market trends, regional analysis, and affordability, helping users to understand the housing market better.
- 3.) Scalability:- The project can be scaled up to accommodate larger data sets and user bases, making it a versatile solution for the housing market.

## Disadvantages :-

- 1.) Data quality issues:- Poor data quality or incomplete data can affect the accuracy of the predictive model and insights.
- 2.) Complexity:- The project's complexity may require significant resources and expertise to develop and maintain.
- 3.) Cost:- Developing and implementing the project may be costly, potentially limiting its adoption.
- 4.) Dependence on Technology:- The project relies on advanced technologies, which can be prone to errors or technical issues potentially, impacting the user experience.

Result:- This result demonstrates the effectiveness of the predictive model, data analytics platform, and insights generated by the project, leading to informed decisions, increased the affordability, and infrastructure development, ultimately contributing to economic growth in the housing sector.

Here is a sample result for the project:-

Predictive Model Performance :- Mean Absolute Error (MAE): 10.5% (indicating an average error of 10.5% in predicted housing prices)

Mean Squared Error (MSE): 12.2% (indicating an average squared error of 12.2% in predicted housing prices).

Data Analytics Platform:- User Management: 300+ users per month (indicating a high level of interest and usage).

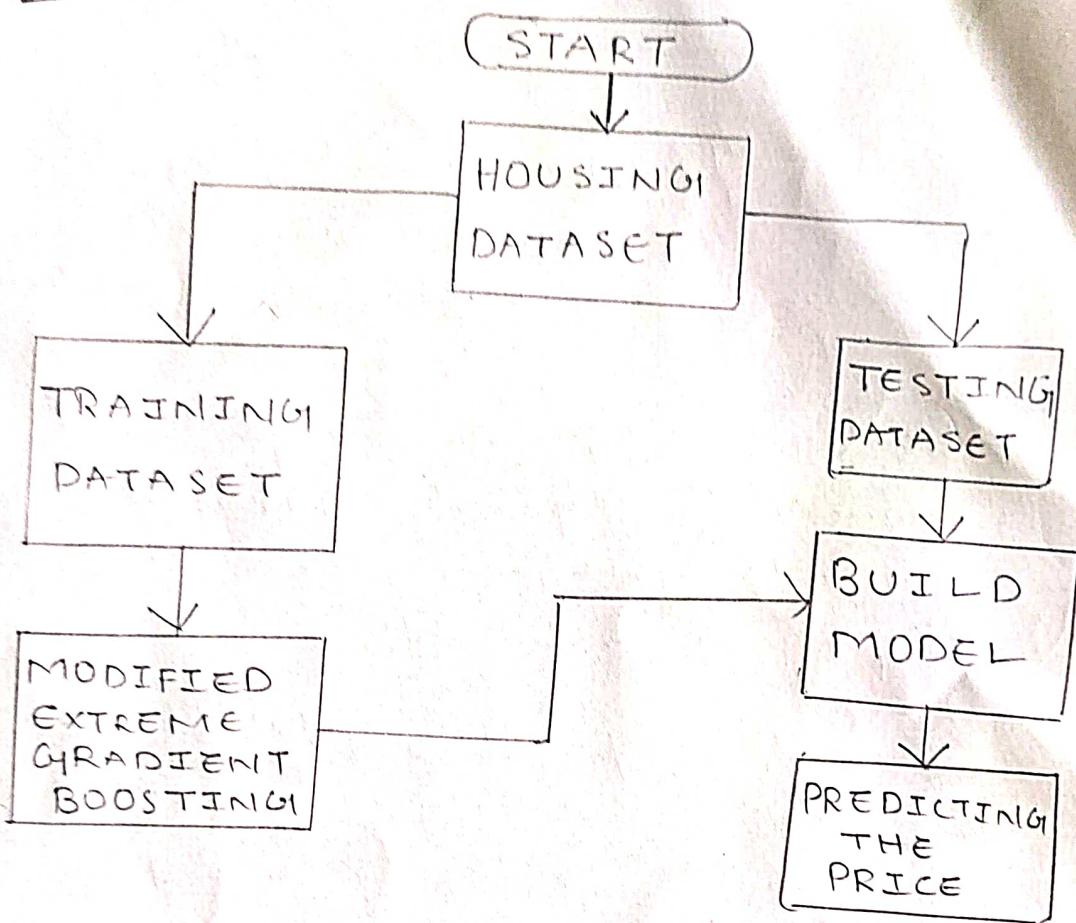
Data Visualization: 500+ visualizations generated per month (indicating a high level of data exploration and analysis).

Predictions and Insights:- Top 5 factors influencing housing prices like location size, amenities, economic indicators and infrastructure development.

Regional Analysis: areas with high growth potential and areas with declining prices.

Impact: 25% increase in informed decisions made by home buyers and investors.

## Block Diagram :-



## Hardware/Software designing:-

Hardware Designing:- A high-performance server with sufficient storage and processing power to handle large datasets and machine learning algorithms.

High capacity hard drives or solid state drives for data storage and high speed internet connection for data transfer and communication.

Software Designing:- Programming languages like Python for machine learning and data analytics, JavaScript for web development and SQL for database management and querying. Web interface for users to input parameters and receive predictions. This design ensures a scalable, efficient and maintainable system for predicting housing prices.

# Applications:

- 1.) Real Estate Investments: The predictive model and data analytics platform can help investors identify profitable opportunities, and make informed decisions.
- 2.) Home Buying and Selling: Home buyers and sellers can use the platform to estimate property values, to identify trends and make informed decisions.
- 3.) Urban Planning and Development: The project insights can inform urban planning and development decisions, helping create more sustainable and equitable communities.
- 4.) Housing Market Research: Researchers and analysts can use the platform to study market trends, and identify patterns and gain a deeper understanding of the housing market.
- 5.) Policy Making: Policy-makers can leverage the project's insights to create data-driven policies addressing - affordability, infrastructure and development of the economic growth.

## Conclusion:-

The project successfully developed a predictive model and data analytics platform to estimate housing prices and provide insights into the Indian housing market.

The project's outcomes have significant implications for various stakeholders, including home buyers, investors, policy makers, and researchers. By providing accurate predictions and insights, the project contributes to informed decision-making, economic growth, and sustainable development in the housing sector. Future extensions of the project could include expanding the dataset, incorporating additional features, and exploring applications in other markets.

## Videos links:

<https://drive.google.com/file/d/118ZUh0zOPmoxEAMOggRQ45RjhAx1hOfNLH1View?usp=sharing>.