

**An internship in**  
**Data Analytics with Tableau**

by

**SmartInternz**

**Project Name:** iRevolution: A Data-driven Exploration of Apple's iPhone  
Impact in India

**Project Id:** LTVIP2026TMIDS74551

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# ABSTRACT

This project, titled “Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau,” focuses on transforming complex real estate data into clear, actionable insights through interactive data visualization. By cleaning and preparing a dataset containing various housing attributes—such as sale price, area, number of bedrooms, renovation status, and location—key trends were uncovered using Tableau’s powerful visual analytics. The project involved the creation of calculated fields (e.g., TotalAreaSqft, SalePriceBin), the use of filters (e.g., condition, renovation status, zipcode group), and the development of dashboards and stories that narrate insights across multiple dimensions. The resulting solution empowers users—including buyers, real estate agents, and policy makers—to make data-driven decisions. With its scalability and modular structure, the project lays a foundation for further enhancements like live data integration, predictive analytics, and expanded geographic coverage.

## ***Key Words:***

- Tableau Dashboard
- Housing Market Analysis
- Data Visualization
- Sale Price Prediction
- Property Features
- Renovation Insights

# **Project Report Format**

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# **1. Introduction**

The real estate market is influenced by various factors such as house age, renovation status, number of bedrooms and bathrooms, and overall size. This project aims to analyze housing market trends and visualize key insights using Tableau to better understand how different features impact sale prices.

## **1.1. Project overviews**

The dataset contains Transformed housing data and 21,609 house sale records, including Property features such as Sales price, area, bedrooms, bathrooms, floors and location. There are a total of 31 columns, out of which Sale Price can be supposedly taken as a dependent variable. The other variables are different features, locations and date, etc. regarding the houses. This project, "Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau," aims to explore and analyze housing market trends using the Transformed Housing Data 2 dataset from Kaggle. The objective is to identify key factors influencing house prices, such as location, size, number of bedrooms, bathrooms, floors and basement area.

By leveraging Tableau, the project will create interactive dashboards, story, bar chart, histogram, summary dashboard to visualize patterns, compare regional price variations, and gain insights into how different features impact house sale prices. The analysis will help in making datadriven decisions for buyers, sellers, and real estate professionals.

## **1.2. Objectives**

- Identify key factors influencing house prices.
- Analyse the effect of renovations on property value.
- Explore the distribution of house sales across different price ranges.
- Create interactive Tableau dashboards to present findings effectively.

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# **2. Project Initialization and Planning Phase**

## **2.1. Define Problem Statement**

Problem Statement (PS)	I am (Customer)	I'm trying to	But Because	Which makes me feel
PS-1	A first-time homebuyer who wants to make an informed decision	Find a home within my budget that meets my needs	The available market data is difficult to interpret and scattered across multiple sources There is no centralized, easy to-use tool that visualizes housing trends based on historical sales data	Confused and overwhelmed, making me hesitant to proceed

PS-2 A real estate investor looking for high-return properties Identify	A real estate agent aiming to assist clients efficiently	Provide accurate and insightful recommendations based on market data	The data is time consuming to analyse and spread across various reports There is no comprehensive tool to aggregate and visualize pricing trends for quick insights	Less efficient, unable to provide quick, data-backed advice to clients
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PS-3	A real estate agent aiming to assist clients efficiently	Provide accurate and insightful recommendations based on market data	The data is time consuming to analyse and spread across various reports There is no comprehensive tool to aggregate and visualize pricing trends for quick insights	Less efficient, unable to provide quick, data-backed advice to clients
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## 2.2 Empathy Map Canvas



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## 2.3 Brain Storming

**Step 1:** Team Gathering, Collaboration and Problem Statement

Our team collaborated to identify pressing challenges in the real estate market, particularly in understanding how various property features influence housing sale prices. After exploring themes like housing affordability, real estate investment planning, urban development, and smart property insights, we narrowed down our focus to uncover actionable insights hidden in housing data. The objective was to visually explore trends using Tableau that would help buyers, sellers, investors, and policy makers understand patterns of sale prices based on features like area, bedrooms, renovation status, condition, location (zipcode groups), and more.

### **Problem Statement:**

How can housing sale price trends and property characteristics be visualized and analyzed using Tableau to identify patterns, improve buyer/seller decision-making, and uncover insights that support strategic real estate planning?

Team Members:

- Team Member: Greeshma Kolli
- Team Member: Pravallika Nekkanti
- Team Member: Velala Venkata Saketh
- Team Leader: Sunkara Bhagya Sree Varalakshmi

### **Step 2: Brainstorming, Idea Listing and Grouping**

**S.No Idea Description Category** 1 Visualize average sale price by SalePriceBin

Pricing Insights 2 Analyse impact of number of bedrooms on sale price Property

Features 3Explore relationship between Total Area and Price (scatter

plot) Size-Based Pricing 9

**S.No Idea Description Category** 4 Compare prices for renovated vs. non-renovated

homes Renovation Analysis

5 Group insights by Zip code Clusters Geographical Comparison

6 Analyse house condition vs. price using dummy variables Quality-Based Pricing 7 Add



calculated field: TotalAreaSqft Data Preparation 8 Create SalePriceBin with 100k intervals  
 Binning / Categorization 9 Use Tableau dashboard to combine insights Dashboard Design 10  
 Build a Story in Tableau for narrative Storytelling & Reporting

### Step 3: Idea Prioritization Table

S.No	Idea	Description	Impact	Feasibility	Priority
1	Visualize average sale price by SalePriceBin	High	Easy	High	
2	Analyze impact of number of bedrooms on sale price	High	Easy	High	
3	Explore Total Area vs Price (scatter plot)	High	Easy	High	
4	Compare renovated vs. non-renovated home prices	High	Medium	High	
5	Group insights by Zipcode Clusters	Medium	Medium	Medium	
6	Analyze house condition vs. price	High	Medium	High	
7	Add calculated field: TotalAreaSqft	Medium	Easy	High	
8	Create SalePriceBin with ₹100k intervals	Medium	Easy	High	
9	Combine insights using Tableau dashboard	High	Easy	High	
10	Build a Tableau Story for business narrative	High	Medium	High	

### 3. Requirement analysis

#### 3.1 Customer Journey map

Stage	Actions & Touchpoints	Emotions	User Goals
		Pain Points	Opportunities
Experience & Awareness	- Sees dashboard via		
	Decision social media, newsletter, Tableau Public- Reads title/summary	- Exports visuals Shares dashboard Bookmarks or downloads insights	by layout, unsure where to start 11
Consideration	- Clicks dashboard link- Reads introduction, explores layout	Curious, Interested	Excited, Inquisitive Filters not intuitive, charts slow to load Use benefit-driven titles, visual thumbnails
Exploration	- Uses filters for location, price, features Views charts (bar, scatter, pie, etc.)	Engaged, Cautious	Satisfied, Confident Unclear if dashboard is relevant Limited export options or unclear formats Add guided walkthrough, simplify navigation
		Overwhelmed	Add example

queries, improve performance/speed		guides interest and clarify purpose	Understand the dashboard and its features	Discover valuable insights	Preserve and share findings
	Enable easy download/share, offer export				
<b>Stage</b>	<b>Actions &amp; Touchpoints</b>	<b>- Subscribes Experience &amp; Emotions</b>	<b>Pain Points Opportunities User Goals</b>		
	for updates Revisits for new data Leaves feedback	Loyal, Empowered No update notifications,	feedback unacknowledged Enable email updates,	actively respond to feedback Stay informed and	engaged
<b>Retention</b>					

## 3.2 Solution Requirement

### Functional Requirements (FRs) FR

#### No. Functional Requirement (Epic) Sub Requirement (Story / Sub-Task) FR-1

**Data Import-** Import data from CSV - Enable live database integration (MySQL)

**FR-2 Data Cleaning & Transformation** - Add calculated fields like Year, Lockdown  
- Handle missing values

**FR-3 Data Visualization-** Create Tableau worksheets - Build multiple dashboards

**FR-4 User Interaction FR-5 User Access** - Enable filtering by region, year  
- Analyze pre/post-lockdown trends - Role-based views for Analyst, Policy Maker, Developer  
- View comparative bar charts - Download/export options

**FR-6 Feedback Loop** - Allow stakeholder feedback and change requests - Implement

revision cycles

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## Non-Functional Requirements (NFRs)

### NFR Non-Functional

No.	Requirement	Description
NFR-1	Usability	Dashboard must be intuitive with clear filters, legends, and guided walkthroughs
NFR-2	Security	Implement role-based access and secure backend/database connectivity
NFR-3	Reliability	System must handle unexpected data formats and maintain high accuracy
NFR-4	Performance	Ensure fast loading and responsive interaction across all dashboard elements
NFR-5	Availability	Dashboard should be accessible across browsers/devices with minimal downtime
NFR-6	Scalability	Should scale for large datasets and support additional features/modules

### 3.3 Data Flow

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right

amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

1. Data collected from POSOCO in CSV format.

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User Type Requirement		Story		Acceptance Criteria	
		Number User Story / Task Priority	(Epic)		
Analyst / View Housing			As a user, I want to filter and view average		I can use filters to view charts
Buyer Trends	sale prices by region and year. USN-1		As a user, I want to	High Sprint-1 for specific locations and	timeframes. I can view bar
Analyst	Compare Locations	USN-2	Analyze		compare top and bottom performing zip

codes based on price.	Medium Sprint-1	charts with top N and sale price.
As a user, I want to		bottom N zip codes by I can view
Policy Maker		
Seasonal Trends		
USN-3		
identify property price trends over time		
(monthly/quarterly). 14		

High Sprint-2  
time-series charts to analyze

**User Type Requirement Story**

**Acceptance Criteria**

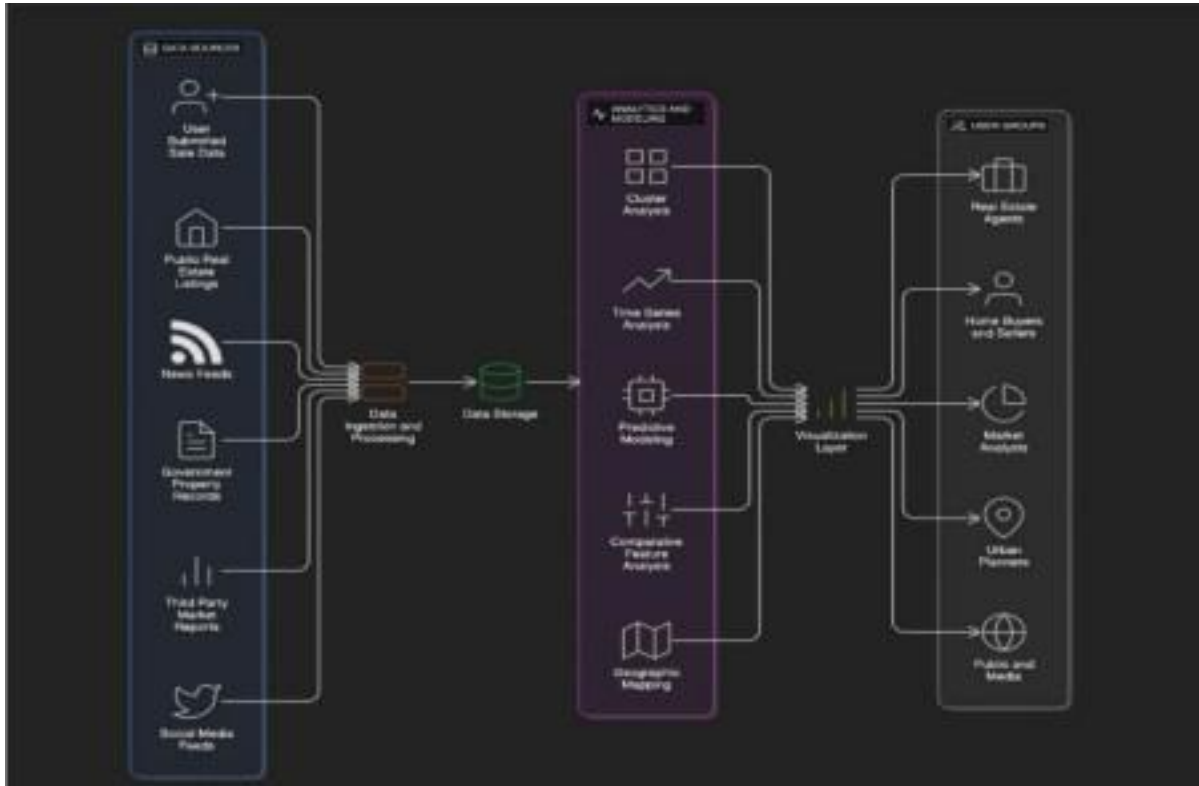
seasonal pricing trends.

**Number User Story / Task Priority Release** A

**(Epic)**

As a user, I want to					
Real Estate Agent	Impact	of renovated	As a user, I	High Sprint-2	price chart is
View	USN-4	vs. non-renovated	want the	before-and-after	available for
Renovation	compare prices	properties.		r renovation	comparison.
Developer Connect			housing database		Data refreshes
Housing Data	USN-5	Export dashboard to be	(MySQL).		automatically from
		connected to a live	As a user, I want to		MySQL to Tableau.
				I can download	
Developer Dashboard	Insights	export dashboard	Medium Sprint-2		
	USN-6		views for presentations.	Low Sprint-3	as images or
				visualizations	PDFs.

### 3.4 Technology Stack



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## 4. Project design

### 4.1 Problem Solution Fit

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why.

#### Purpose:

- ☐ Solve complex problems in a way that fits the state of your customers. ☐ Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behaviour.
- ☐ Sharpen your communication and marketing strategy with the right triggers and messaging.
- ☐ Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems. ☐

Understand the existing situation in order to improve it for your target group.

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## 4.2 Proposed Solution

### Proposed Solution Template

#### S.No. Parameter Description



**1 Problem Statement**

The real estate market involves vast and complex datasets on housing location-based analyses. The solution is deployed via a Flask web app.

**2 Idea / Solution Description**

This project leverages Tableau's powerful visual capabilities to go beyond basic data analytics. By combining calculated fields, condition segmentation, and geographic mapping, the dashboard

**3 Novelty / Uniqueness**

features and sale prices. These datasets are often underutilized due to lack of effective visualization, making it difficult for buyers, sellers, and analysts to draw insights or forecast trends.

Our solution transforms static housing datasets into interactive, insightful visualizations using Tableau. The project involves cleaning and transforming the data, creating calculated fields and KPIs, and developing a dashboard that highlights key trends, comparisons, and

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**S.No. Parameter Description**

offers a dynamic exploration of how features like bedrooms, area, renovation, and location influence housing prices. visuals and actionable insights.

4 5

**Social Impact / Customer Satisfaction**

**Business Model (Revenue Model)**

This solution enables real estate buyers, sellers, agents, and market researchers to make informed decisions. It improves housing transparency, supports better urban planning, and enhances user engagement with clear

This dashboard can be scaled and offered as a subscription-based SaaS tool to real estate companies, market research firms, or housing consultancies. Advanced forecasting modules, API integrations, and custom dashboards can be monetized as premium

features.

scalable and adaptable. It can

The system is designed to be

## 6 Scalability of the Solution

incorporate new datasets (like rental trends or economic indicators), extend to new regions

or cities, and integrate with ML models for price predictions, thereby offering long-term

growth potential.

## 4.3 Solution Architecture

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

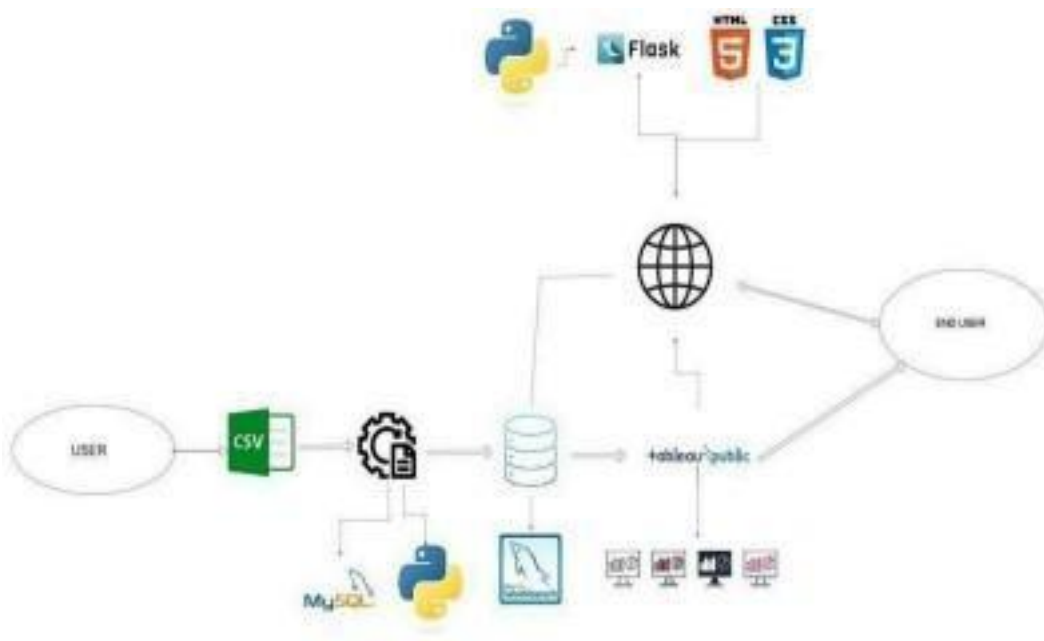
- The architecture separates data preprocessing, storage, visualization, and UI layers—making it easy to maintain, scale, and enhance.

- Cleaned data from MySQL is visualized using Tableau dashboards, offering region-wise, year-wise, and seasonal insights with filtering capabilities.

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- Dashboards are embedded into a Flask-based web interface, allowing end users to interact with visual data through a user-friendly portal.

- The solution supports future extensions like forecasting models and can be deployed locally or on cloud platforms like Heroku or AWS.



## 5. Project planning & scheduling

### 5.1 Project Planning

Sprint Epic Sprint	User Story No. User Story / Task Points	Priority Assigned To
1Data Setup USN-1	As a user, I can upload housing data in CSV format TotalAreaSqft	3 High Bhagya
Sprint		Sprint Epic Sprint
1Data Cleaning USN-2	19	
Sprint	4 High Bhagya 2 Medium	User Story No. User Story / Task Points
1Field Creation USN-3	As a developer, I can clean and preprocess housing data in Tableau Pravallika	Priority Assigned To
As a user, I can create calculated fields like		As a user, I can create
		1Price Binning USN-4 SalePriceBin for grouping

houses	2	Medium	Greeshma			
Sprint 2	Visualization USN-5	As a user, I can create sheets			High	Pravallika As a user, I can build an
Sprint Data	Dashboard					
		with charts: price vs features	5			
2	Creation USN-6	As a user, I can style the dashboard for better readability and navigation		3	High	Saketh 2
Sprint 2	Dashboard					Medium Greeshma
Sprint	Styling USN-7	As a user, I can create a				
	interactive Tableau Dashboard with filters					
3	Storytelling USN-8	Tableau Story showing insights step by step			As a developer, I can embed	2 Medium Saketh
	Embed	on	USN-11	prepare final project documentati	High	Bhagya
3			tableau on		Medium	Bhagya
Sprint 3	Testing	USN-9	Dashboard into a Flask web app	As a team, we can prepare		
Sprint 4			As a user, I can test and review the embedded dashboard UI	4 2	High	Pravallika
	Documentati	USN-10				
Sprint Flask						
Integration			As a team, we can	3		
4	Demo Preparation USN-12					
	and rehearse a full demo walkthrough					

2 Medium Saketh

**Sprint Epic**  
**User Story No.**

**User Story / Task**  
**Points**

**Priority Assigned To**

20

Sprint 4

Bug Fixing / Final  
QA USN-13

As a team, we can test  
the full system and fix 2 Medium Greeshma  
visual/logic bugs

**Project Tracker, Velocity & Burndown Chart**

Sprint	Total Story Points	Duration Start Date	End Date Points	Complete Release	Base Date
print-1114 S	11			June 2021 11 14 14	
print-1004 S	Days 15		June 2021	June 2021	June 2021 01 18 18
print-774 S	Days 19		June 2021	June 2021	June 2022 7 22 22
print-7B 74 S	Days Days		June 2022	June 2022	June 2022

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June 2022 7 26 26

**Velocity Calculation**  
June 2022

Total Points Completed:  $11 + 10 + 7 + 7 = 35$

Total Duration:  $4 + 4 + 4 + 4 = 16$  days

Average Velocity = Total Points Completed / Total Days =  $35 / 16 = 2.19$  points/day

### Burndown Chart Insight

- Initial Total Story Points: 35
- Sprint-wise burn (Remaining Points):

- After

- Sprint-1: 24 ◦

- After Sprint-2: 14 ◦

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- After Sprint-3:

- 7 ◦ After

- Sprint-4: 0



## **6. Functional and performance testing**

### **6.1 Performance Testing**

#### **S.No Parameter Screenshot / Values**

##### **1 Data Rendered**

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#### **S.No Parameter Screenshot / Values**

The dataset used contains housing sales data with fields such as: -  
Sale Price, Number of Bedrooms, Bathrooms, Flat Area, Lot Area,  
Basement Area, House Age, Condition, Renovation Status, Zipcode  
Group, and others.

The data was provided in .csv format and includes derived and  
transformed columns for analytics and Tableau visualizations.

Preprocessing was done using Python (Pandas) before importing  
into Tableau. Steps:

##### **2 Data Preprocessing**

These filters allow users to drill down and compare trends across different property types and locations.

### 3 Utilization of Filters

Calculated fields created in Tableau include:

- TotalAreaSqft → [FlatAreaSqft] + [LotAreaSqft] + [BasementAreaSqft]
- SalePriceBin → Binning sale price into ₹100,000 intervals
- Condition\_Excellent, Condition\_Good, etc. → Dummy fields
- Ever\_Renovated\_Yes → Dummy field for renovated homes

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#### **Calculated Fields Used**

Removed null/missing values

- Renamed columns for clarity (e.g., "No of Bedrooms" → "Bedrooms")
- Created calculated fields like TotalAreaSqft
- Generated dummy variables for house conditions and renovation status
- Transformed categorical fields for better Tableau usability.

Multiple filters were implemented in Tableau to improve interactivity:

- Number of Bedrooms
- Number of Bathrooms
- House Condition
- Renovation Status (Yes/No)
- Zipcode Group
- Sale Price Bins



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**S.No Parameter Screenshot / Values**

- AvgPrice → Average sale price for group insights
- HouseAge → Difference from year built and sale year

**5 Dashboard**

## VISUALISING HOUSING MARKET TRENDS

### AVG of Sale Price

Area of the House  
from Basement  
(in Sqft)

38,443,799

Count of  
Transactions,  
Housing\_Dataset  
data

21,609

Avg. Sale Price

\$21,619

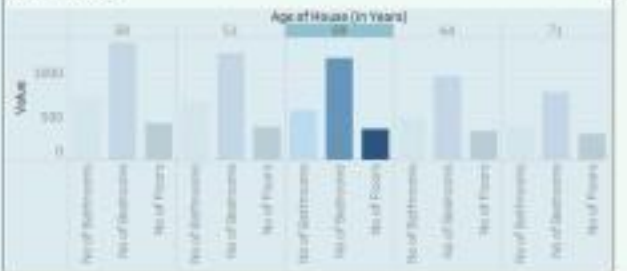
### Distribution of House Age by Renovation Status



### Sales by Renovation Year



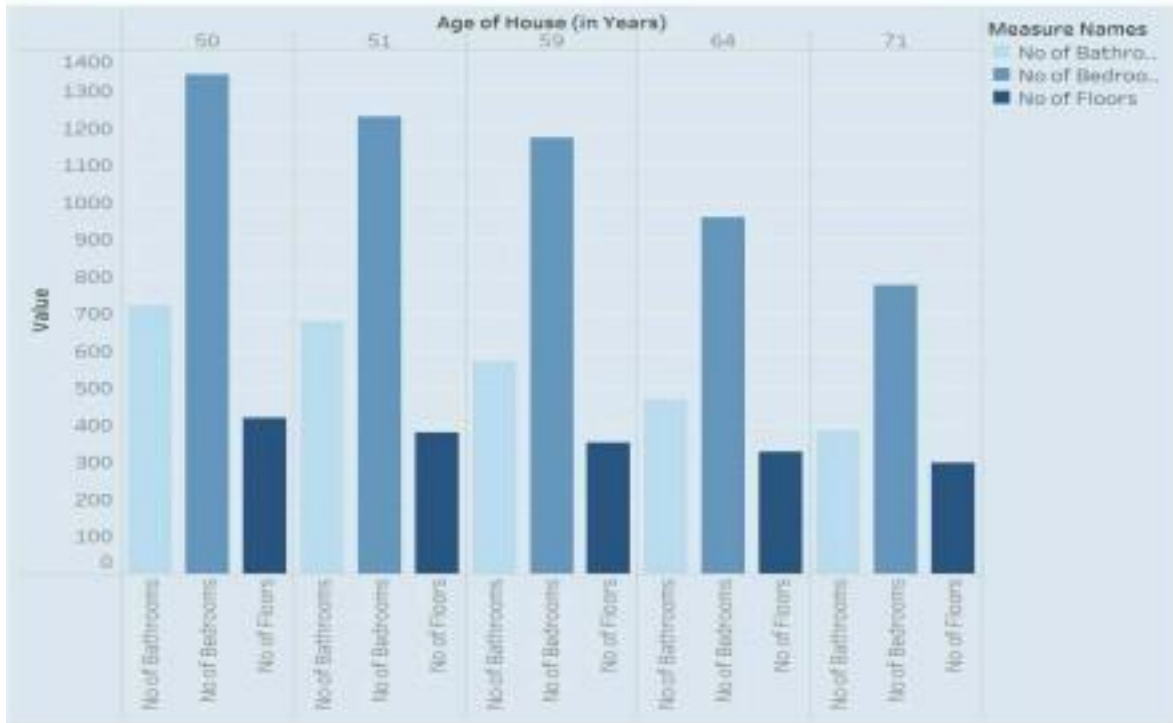
### House Age Distribution by Number of Bathrooms, Bedrooms and Floors



## 6 Story Design

## Visualising Housing Market Trends

< House Age distribution is more influenced by the the number of bedrooms compared to bathrooms The age of houses varies based on their renovation status, providing a comprehensive The bot >



## 7.1 Output Screenshots

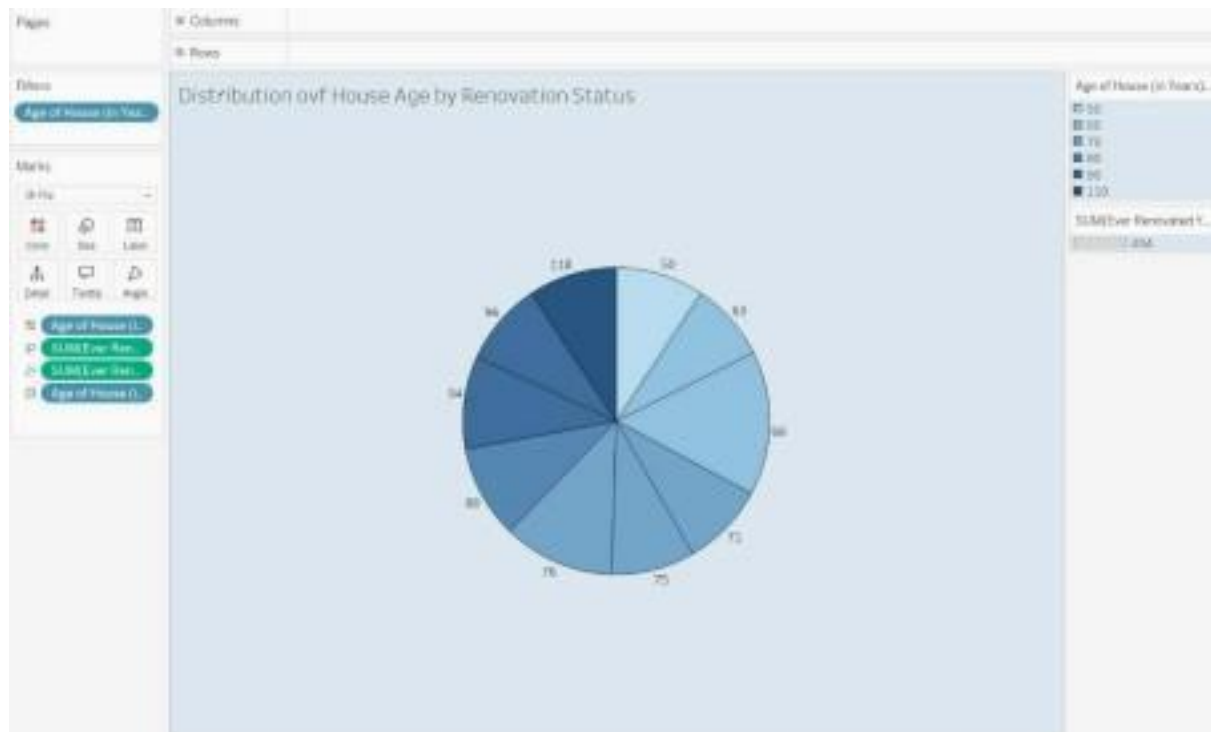
### Output of Sheet 1:



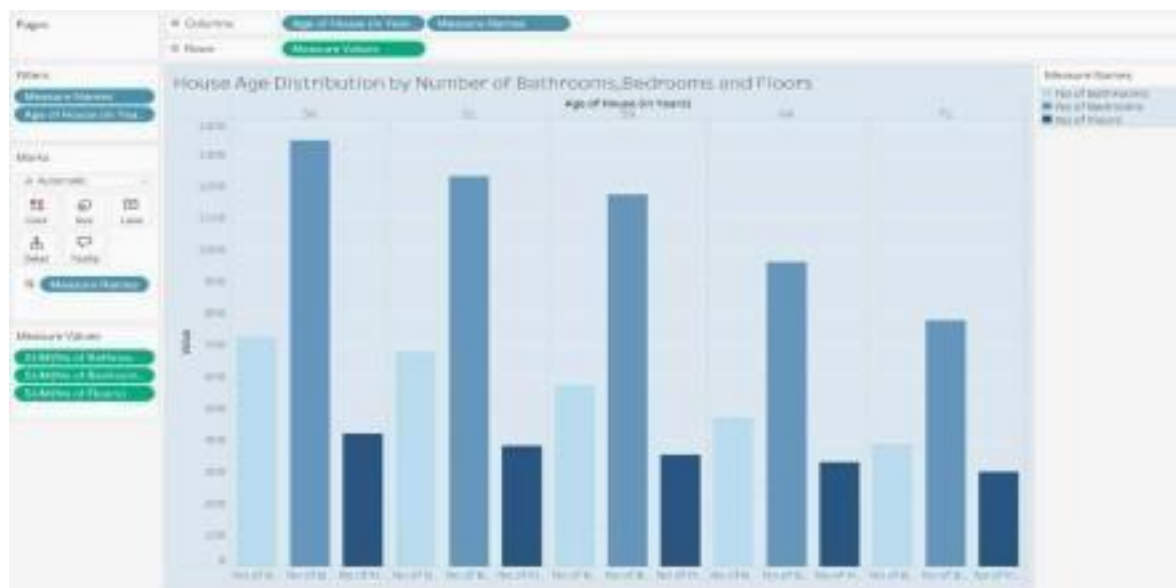
### Output of Sheet 2:



### Output of Sheet 3:



**Output of Sheet 4:**

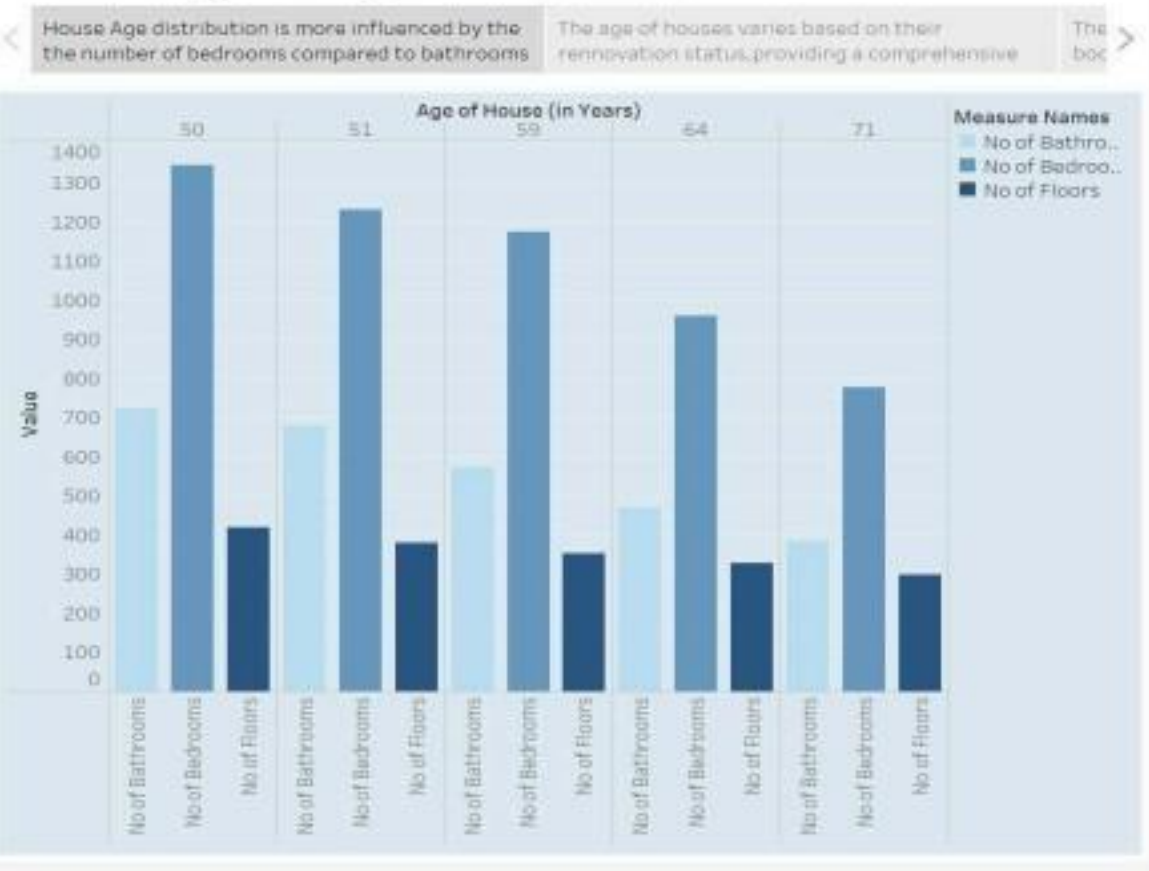


**Output of Dashboard:**



**Output of Story:**

## Visualising Housing Market Trends



**Tableau public link**

[https://public.tableau.com/app/profile/sunkara.varalakshmi/viz/VisualizingHousingMarketTrends\\_17514867056680/VISUALISINGHOUSINGMARKETTRENDS?publish=yes](https://public.tableau.com/app/profile/sunkara.varalakshmi/viz/VisualizingHousingMarketTrends_17514867056680/VISUALISINGHOUSINGMARKETTRENDS?publish=yes)

**Output of Published Dashboard:**



## 8. Advantages & disadvantages

### Advantages:

#### 1. Interactive Analysis:

The Tableau dashboard allows users to explore data with filters (e.g., bedrooms, renovation status, price bins), enhancing understanding through dynamic interactions.

#### 2. Informed Decision-Making:

Buyers, sellers, agents, and investors can make data-driven decisions by identifying which features (e.g., area, renovations, number of floors) impact property value.

#### 3. Data Storytelling:



business reports or stakeholder presentations.

#### **4. Geographic Visualization:**

Zipcode grouping allows regional comparison of price trends and property types, revealing market opportunities and local disparities.

#### **5. Calculated Metrics & KPIs:**

Metrics like Average Sale Price and Total Area improve business clarity and enable fast comparisons across categories.

#### **6. Web Accessibility:**

Embedding the dashboard into a Flask web app increases accessibility—users can view it from any browser without needing Tableau Desktop.

#### **7. Modular & Scalable Design:**

The project structure supports additional data (e.g., rental prices, future years), making it expandable to other regions or market conditions.

#### **8. Minimal Coding Required:**

Most of the visualizations are created using Tableau’s drag-and-drop interface—making it ideal for analysts without deep programming expertise.

### **Disadvantages:**

#### **1. Static Dataset Limitation:**

The analysis depends on a preloaded CSV file; it doesn’t support real-time updates unless integrated with live databases or APIs.

#### **2. Tool Dependency:**

The system relies on Tableau Public, which has limitations like no row-level security and requires dashboards to be public.

#### **3. Learning Curve for Tableau:**

While Tableau is user-friendly, new users may need time to understand calculated fields, filters, and advanced charting options.

#### **4. Limited Predictive Power:**

This is a descriptive and visual analytics project—it does not use machine learning or predictive modeling to forecast housing prices.

## **5. Browser Compatibility:**

Older browsers or low-resolution screens may not render complex dashboards optimally, especially if not designed responsively.

## **6. Manual Data Preprocessing:**

Initial data cleaning, renaming, and transformation were done manually using Python or within Tableau, which might be error-prone at scale.

## **9. Conclusion:**

The project "Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau" successfully demonstrates how complex real estate data can be transformed into meaningful, interactive visual insights. By leveraging Tableau's powerful visualization capabilities, we have made it easier for buyers, sellers, investors, and analysts to understand the key factors influencing house prices. Our dashboard enables quick comparisons based on features like number of bedrooms, renovations, house age. Overall, this project bridges the gap between raw housing data and strategic real estate decision-making, allowing users to gain actionable insights with minimal technical expertise.

## **10. Future scope:**

### **1. Live Data Integration:**

Future versions can integrate live property listings or transaction data via APIs or real-time databases to provide up-to-date market insights.

### **2. Machine Learning Forecasting:**

Incorporating regression models or time-series forecasting can help predict future housing prices based on historical trends and features.

### **3. Rental Market Visualization:**

Extend the dashboard to include rental data analysis, enabling a broader comparison between buying vs. renting decisions.

#### **4. Mobile Optimization:**

Responsive design enhancements can be implemented to ensure the dashboard performs well across tablets and smartphones.

#### **5. Advanced User Access Control:**

By using Tableau Server or Tableau Online, dashboards can be secured with role-based access for different stakeholders.

#### **6. Location Intelligence Enhancements:**

Integration of geospatial data, satellite maps, or demographic overlays can improve locationbased insights (e.g., school zones, crime rates).

#### **7. Recommendation Engine:**

Develop a recommendation system to suggest optimal property types using user-input filters.

## **11. Appendix**

### **Dataset Link:**

[iRevolution iPhone India | Tableau Public](#)

### **Project Demo Video Link:**

[https://drive.google.com/file/d/1\\_uo3hy5iVW3GFP7yAL6gRZDqOcOAOKuy/view?usp=drive link](https://drive.google.com/file/d/1_uo3hy5iVW3GFP7yAL6gRZDqOcOAOKuy/view?usp=drive_link)

