

PROJECT REPORT

1. Introduction

1.1 Project Overview:

This Project analyzes housing market trends using Tableau. By leveraging data visualization, it aims to simplify complex data and promote better decision-making by utilities and policy-makers.

1.2 Purpose:

To Visualize housing market trends and analyzing the sale price and features.

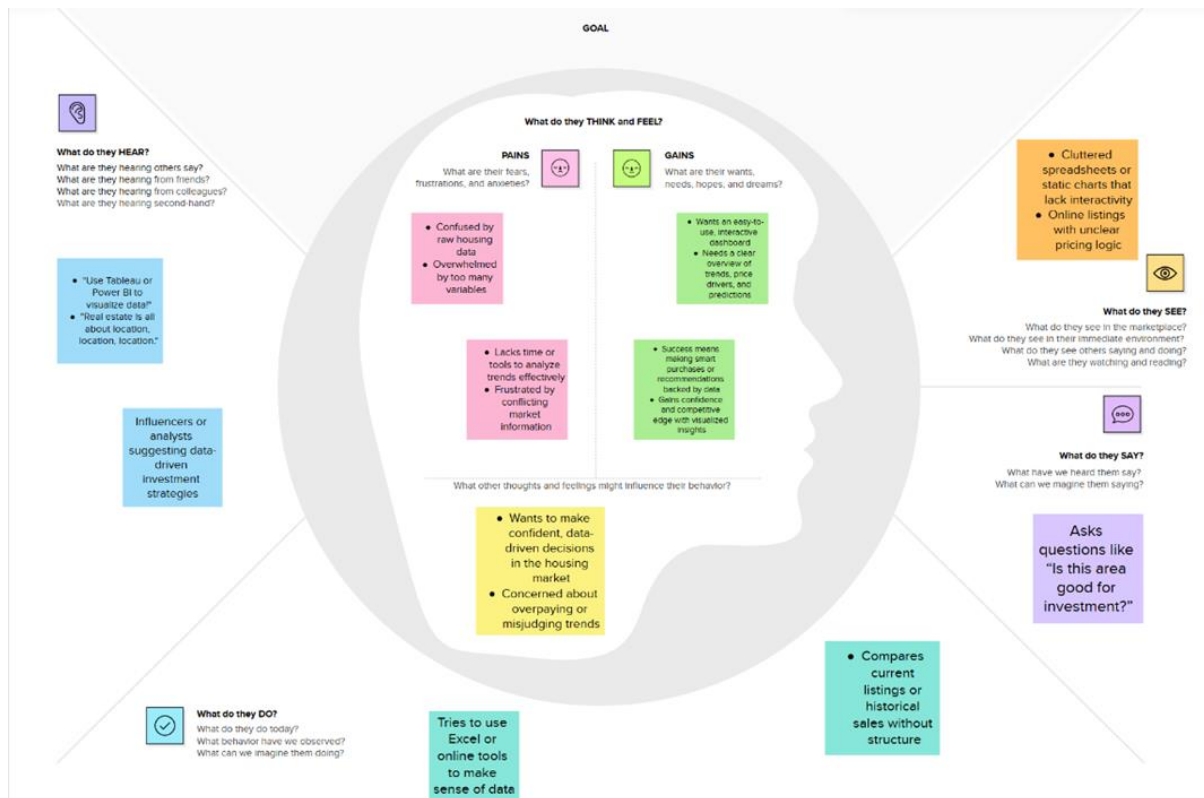
2. Ideation Phase

2.1 Problem Statement:

I am	I'm trying to	But	Because	Which makes me feel
"I am a customer who wants to understand the housing market trends and pricing patterns."	"I'm trying to explore historical home sale data to identify pricing trends, predict house values, and make informed decisions."	"But the raw data is complex, large-scale, and hard to interpret without proper visual tools."	"Because the data contains multiple variables (location, year built, size, etc.) that influence price, making it hard to identify patterns without visual context."	"Which makes me feel overwhelmed and uncertain about making accurate or confident decisions related to house buying or investment."

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A customer who wants to understand market trends before making a decision.	Explore and interpret housing sale data to identify patterns in pricing and sales trends over time.	The raw data is complex, unstructured, and difficult to visualize without technical skills.	It lacks interactive visual elements and is spread across many variables like location, year, and condition.	Frustrated and uncertain about relying on the data for making confident housing or investment decisions.
PS-2	A customer who is interested in predicting house prices accurately.	Use historical data and key features to build a reliable model for predicting house prices.	It's difficult to identify which factors have the most influence and to visualize their impact clearly.	The relationships between variables (like size, year built, neighborhood) are not obvious without deep analysis or visualization.	Overwhelmed by the data complexity and uncertain about the reliability of predictions without proper tools.

2.2 Empathy Map Canvas:



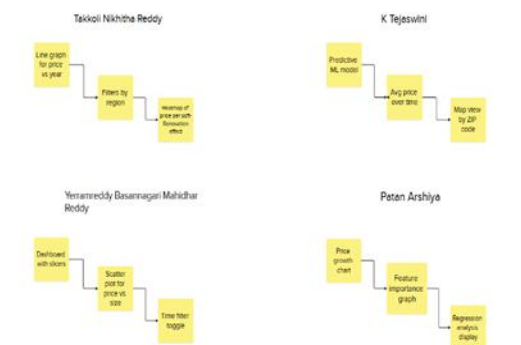
2.3 BrainStorming

2

Brainstorm

How might we help users understand housing price trends and make informed decisions using data visualizations and predictive analysis?

10 minutes

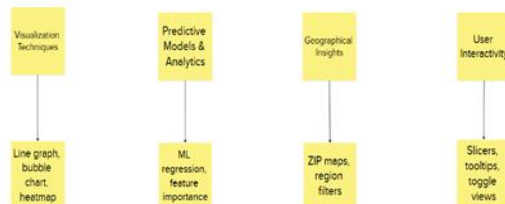


3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go.

20 minutes



3. Requirement Analysis

3.1 Customer Journey Map:

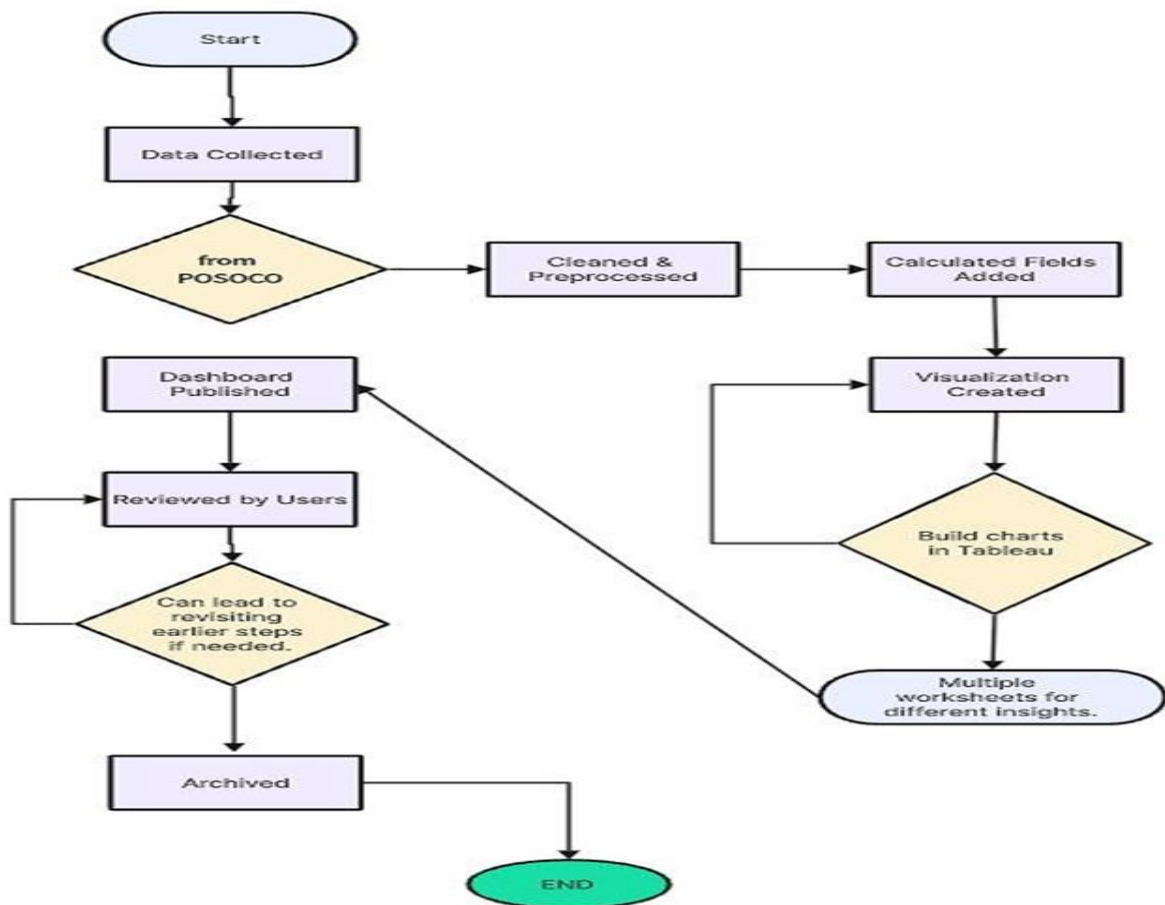
Visualizing Housing Market Trends : An Analysis of sale and price prediction using Tableau	Steps	Interactions	Things: Touchpoints/Objects)	Places	People	Positive Moments	Negative Moments	Areas of Opportunity	Goals & Motivations
Enter	Customer or real estate agent is informed about the dashboard via email or through company portal.	Click on email, link in article, or through company portal.	Email, Tableau Public page, shared dashboard link.	Office, home, mobile.	Colleague, analyst team, supervisor.	Curiosity about data trends.	Not sure what the dashboard covers.	Add a clear title and purpose description.	Help me see useful data quickly.
Enter	They open the dashboard and view the report, new data on some filters or tables.	Mouseover, click dropdowns, explore view.	Filters, dropdowns, buttons on dashboard.	Office desk, phone screen.	None directly, make technical support.	Clear layout with regional map catches interest.	Overwhelmed by too many filters at once.	Group filters by category, add guided tour.	Help me know where to look first.
Engage	They learn filtering logic, drill down, and comparing data.	Scroll, drill down, hover over data details.	Interactive graphs, bar charts, maps, etc.	Same as above.	Possibly discussing with a teammate.	Seeing patterns that are useful or hidden truths.	Slow loading or unresponsive dashboard.	Optimize data sources or reduce chart load.	Help me find insights without delays.
Exit	User decides to download insights or close the dashboard after viewing.	User report/download or simply close browser tab.	Download as image, PDF, or share link.	Office/home computer.	None directly.	Easy Export of Charts.	Unclear how to save into their system.	Add "Save current view" feature or guide.	Help me take this data into my report.
Extend	User interacts or communicates via a channel, subscribing or email to reach a feedback.	Bookmarking, sharing links, withdrawing previous filters.	Email reminders, dashboard history (if saved).	Anywhere with internet.	Supervisor, project team.	Sharing meaningful insights with others.	Loses the link or forgets how to reach key views.	Enable login-based custom views or history.	Help me come back to what mattered before.

3.2 Solution Requirements:

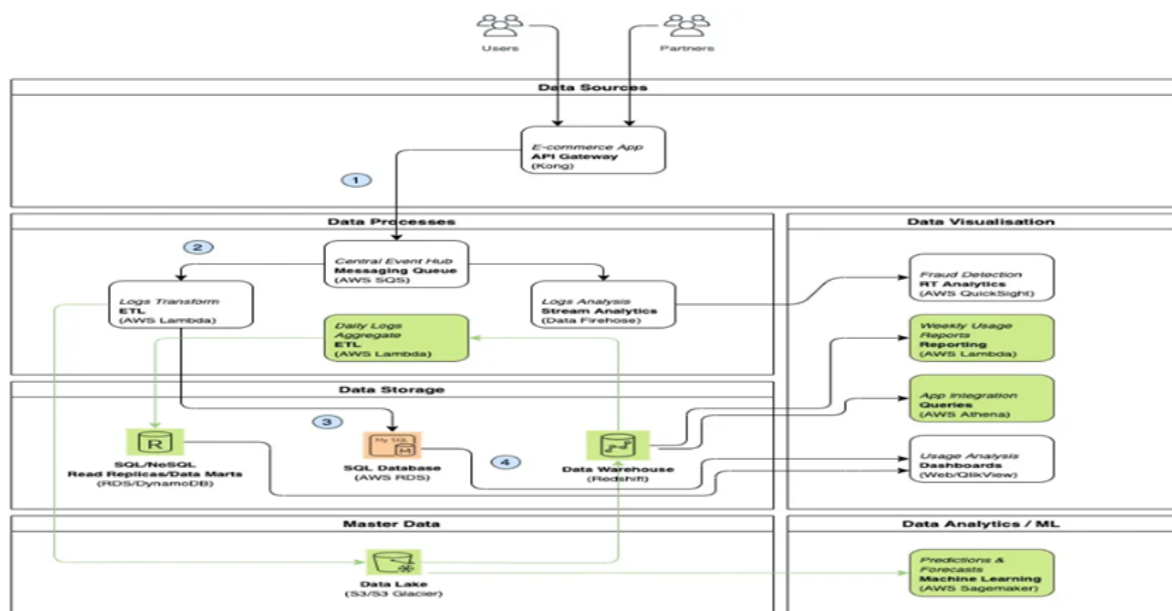
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through <u>LinkedIN</u>
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Data Ingestion	Import property data via API Upload CSV datasets for offline analysis
FR-4	Data Preprocessing	Remove the unwanted or unnecessary data
FR-5	Visualization Dashboard	Display time-series price trends by region/type Filter and compare data by zip code, year, property type
FR-6	User Interaction & Alerts	Let users set preferences for location/type Notify users when price changes exceed threshold (via email/SNS)

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The platform will have an intuitive UI with interactive charts and filters
NFR-2	Security	Secure user preferences and data with IAM roles and encrypted storage (KMS)
NFR-3	Reliability	The system must provide consistent predictions and dashboards without failure
NFR-4	Performance	Dashboards should load and update in under 3 seconds
NFR-5	Availability	System will be available 99.9% of the time via AWS-managed services
NFR-6	Scalability	Solution should scale to accommodate new cities, property types, or regions

3.3 Data Flow Diagram:



3.4 Technology Stack:



4. Project Design

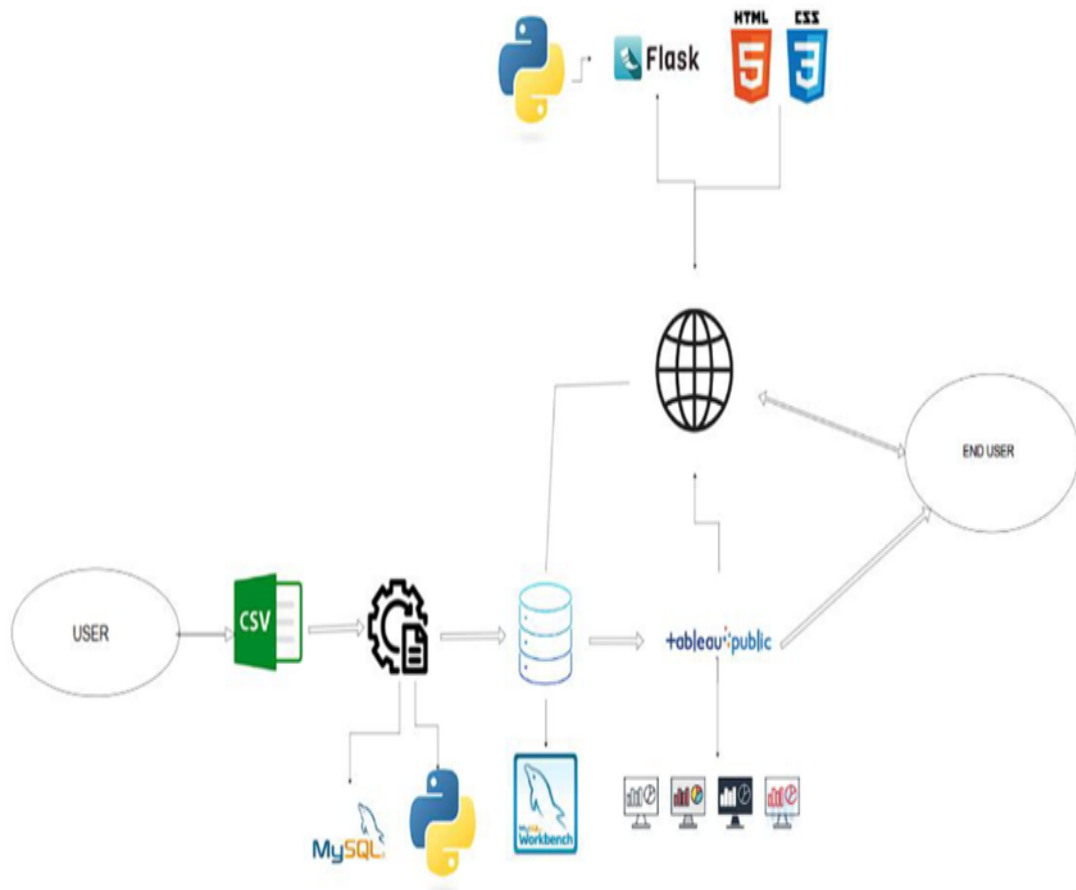
4.1 Problem Solution Fit:



4.2 Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The real estate market is complex and often difficult to understand for buyers, investors, and agents due to fragmented, outdated, or hard-to-interpret data.
2.	Idea / Solution description	<p>The project aims to develop an intuitive platform that visualizes housing market trends using historical data and predictive analytics. It will allow users to:</p> <ul style="list-style-type: none">• Track property sale patterns over time• Predict future price trends using machine learning models
3.	Novelty / Uniqueness	<p>Unlike existing static reports or property websites, this solution combines:</p> <ul style="list-style-type: none">• Dynamic, real-time visualizations• Predictive pricing powered by machine learning
4.	Social Impact / Customer Satisfaction	<p>Empowers buyers and investors with data-driven insights, reducing risk and stress.</p> <p>Increases transparency in real estate transactions.</p>
5.	Business Model (Revenue Model)	<p>Freemium Model: Basic visualizations free; advanced analytics and predictions behind a subscription.</p>
6.	Scalability of the Solution	<ul style="list-style-type: none">• Technically scalable: Can integrate more cities, countries, or property types over time.

4.3 Solution Architecture:



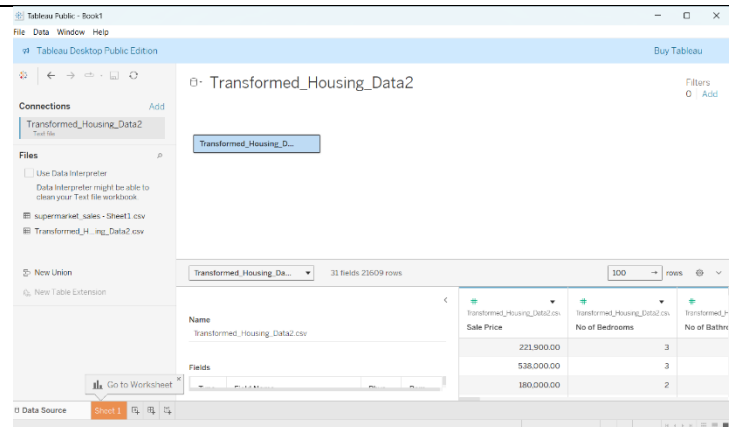
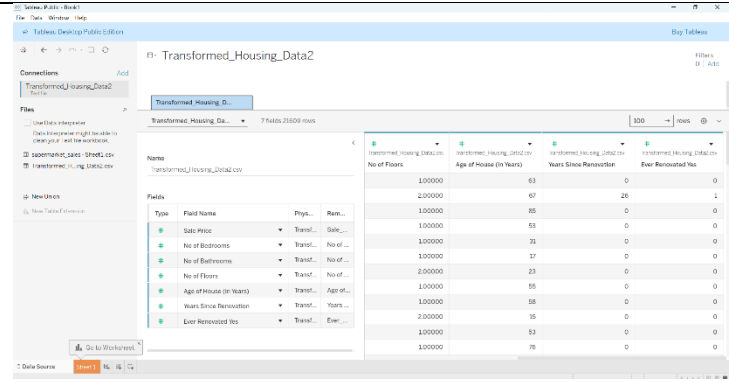
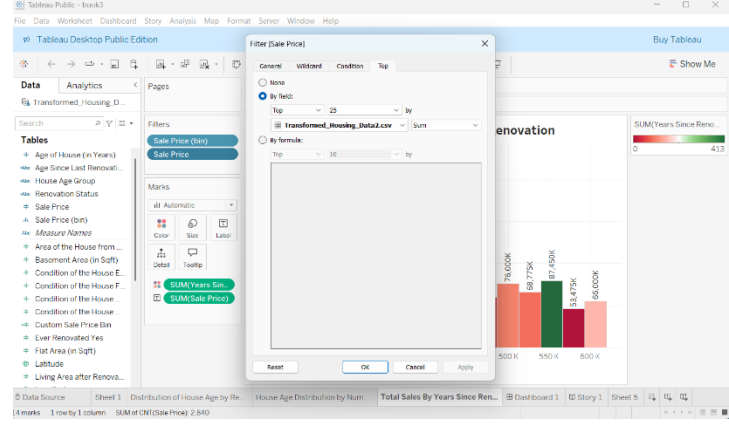
5. Project Planning and Scheduling

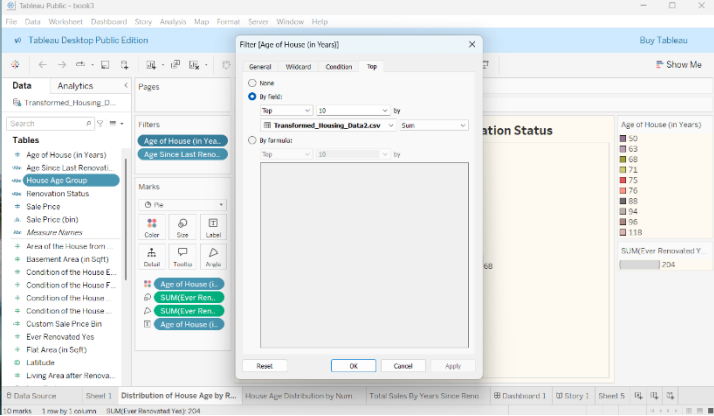
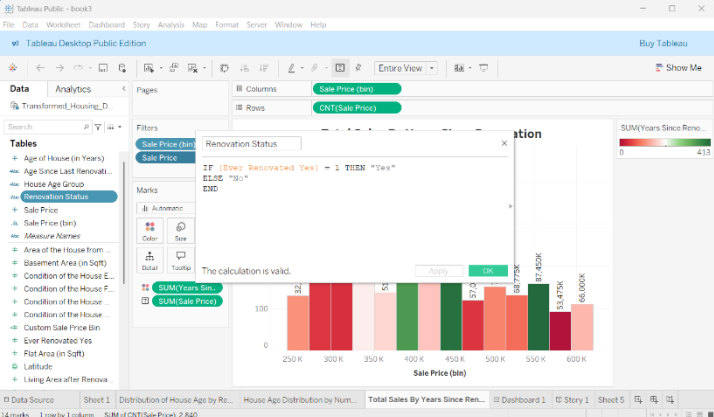
5.1 Project Planning:

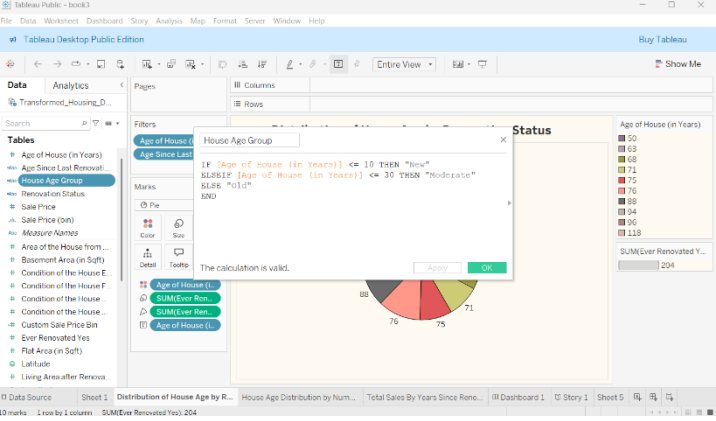
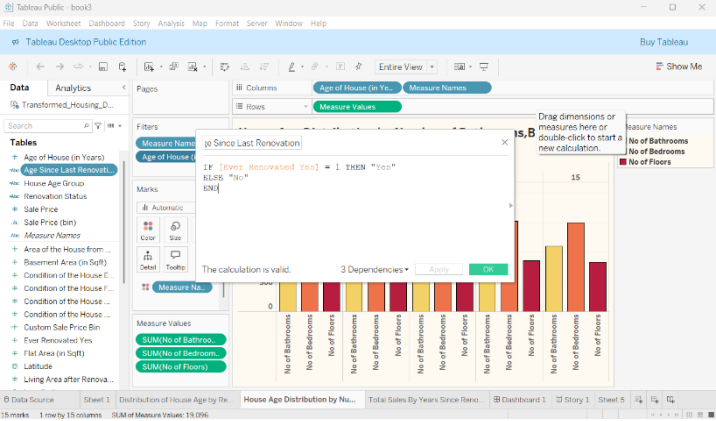
Sprint	Epic	User Story No.	User Story / Task	Points	Priority	Assigned To
Sprint -1	Registration	USN-1	As a user, I can register with my name and email	2	High	T. Nikhitha Reddy
Sprint -1	Upload CSV	USN-2	As a user, I can upload housing market trends data in CSV format	3	High	K. Tejaswini
Sprint -1	Data Cleaning	USN-3	As a developer, I can clean and preprocess uploaded data using Python	4	High	Y. Mahidhar Reddy
Sprint -1	Database Storage	USN-4	As a developer, I can store cleaned data into MySQL	2	Low	P. Arshiya
Sprint -2	Tableau Dashboard	USN-5	As a user, I can view dashboards generated using Tableau	5	High	T. Nikhitha Reddy
Sprint -2	Web Integration	USN-6	As a user, I can access the dashboard via Flask UI	3	High	K. Tejaswini
Sprint -2	Add Filters	USN-7	As a user, I can filter the data by region, year, and quarter	2	Medium	Y. Mahidhar Reddy
Sprint -3	Data Story	USN-8	As a user, I can view a Tableau Story with key market trends insights	2	Low	P. Arshiya
Sprint -3	Forecasting	USN-9	As a developer, I can forecast usage using Prophet	3	Low	T. Nikhitha Reddy
Sprint -3	Documentation	USN-10	As a team, we can prepare final project documentation	2	Medium	K. Tejaswini
Sprint -4	Deployment	USN-11	As a developer, I can deploy the Flask app and publish the Tableau dashboard online	3	High	Y. Mahidhar Reddy
Sprint -4	Demo Prep	USN-12	As a team, we can prepare a live demo walkthrough for stakeholders	2	Medium	P. Arshiya
Sprint -4	Bug Fixing	USN-13	As a developer, I can test and fix UI/visual bugs from user feedback	2	Medium	T. Nikhitha Reddy

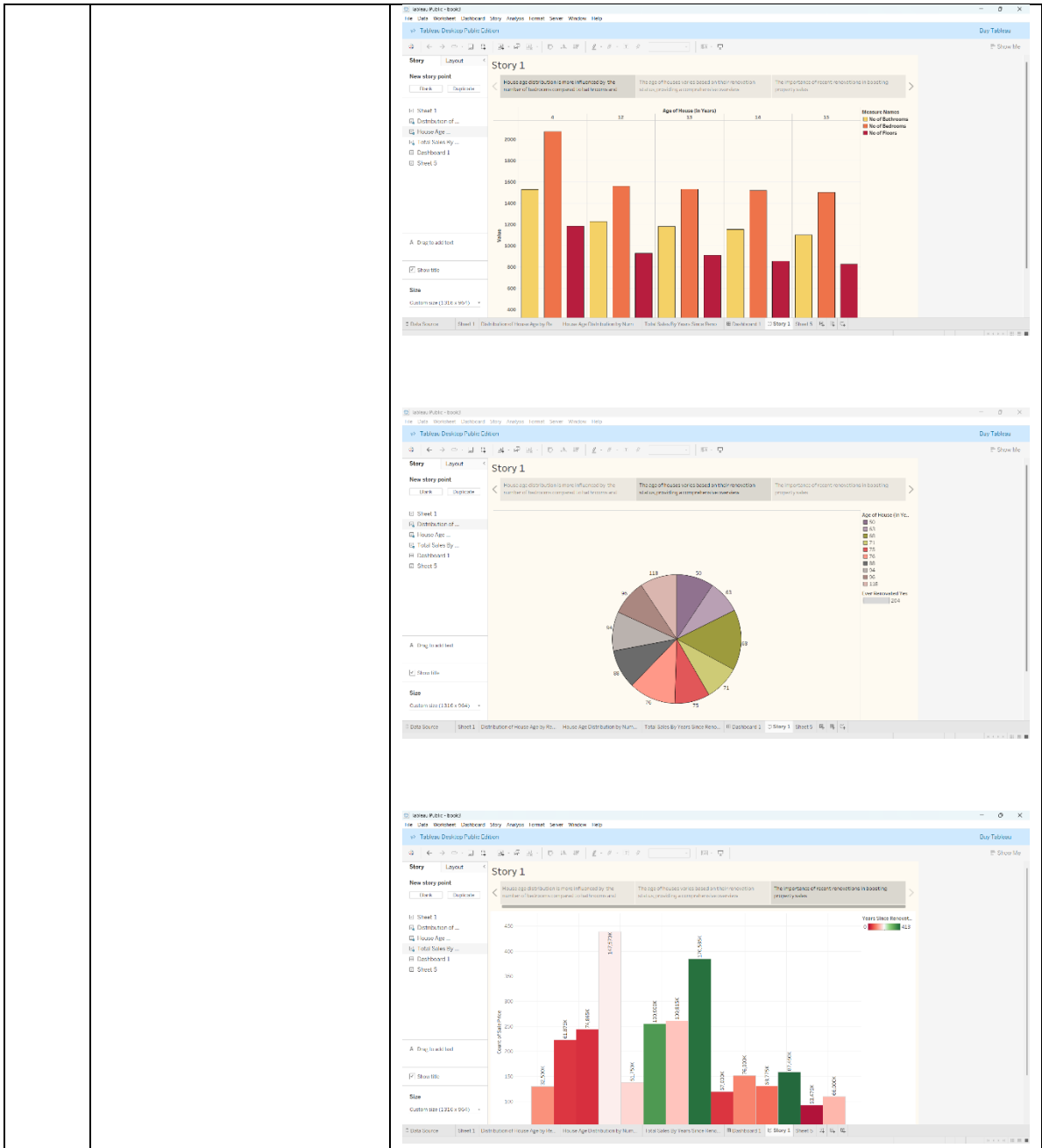
6. Performance Testing

6.1 Tableau:

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	 <p>Tableau Desktop Public Edition - Book1</p> <p>Transformed_Housing_Data2</p> <p>Transformed_Housing_Data2.csv</p> <p>31 fields 23609 rows</p> <p>100 rows</p> <p>Fields: Name, Sale Price, No of Bedrooms, No of Bathrooms</p> <p>Data Source: Transform_Housing_Data2.csv</p>
2.	Data Preprocessing	 <p>Tableau Desktop Public Edition - Book1</p> <p>Transformed_Housing_Data2</p> <p>Transformed_Housing_Data2.csv</p> <p>31 fields 23609 rows</p> <p>100 rows</p> <p>Fields: Name, Sale Price, No of Bedrooms, No of Floors, Age of House (in Years), Years Since Renovation, Ever Renovated Yes</p> <p>Data Source: Transform_Housing_Data2.csv</p>
3.	Utilization of Filters	 <p>Tableau Desktop Public Edition - Book1</p> <p>renovation</p> <p>Filter (Sale Price)</p> <p>Sale Price (bin)</p> <p>500 K, 550 K, 600 K</p> <p>76,000K, 68,775K, 63,475K</p> <p>SUM(Years Since Renovation)</p> <p>0 to 413</p>

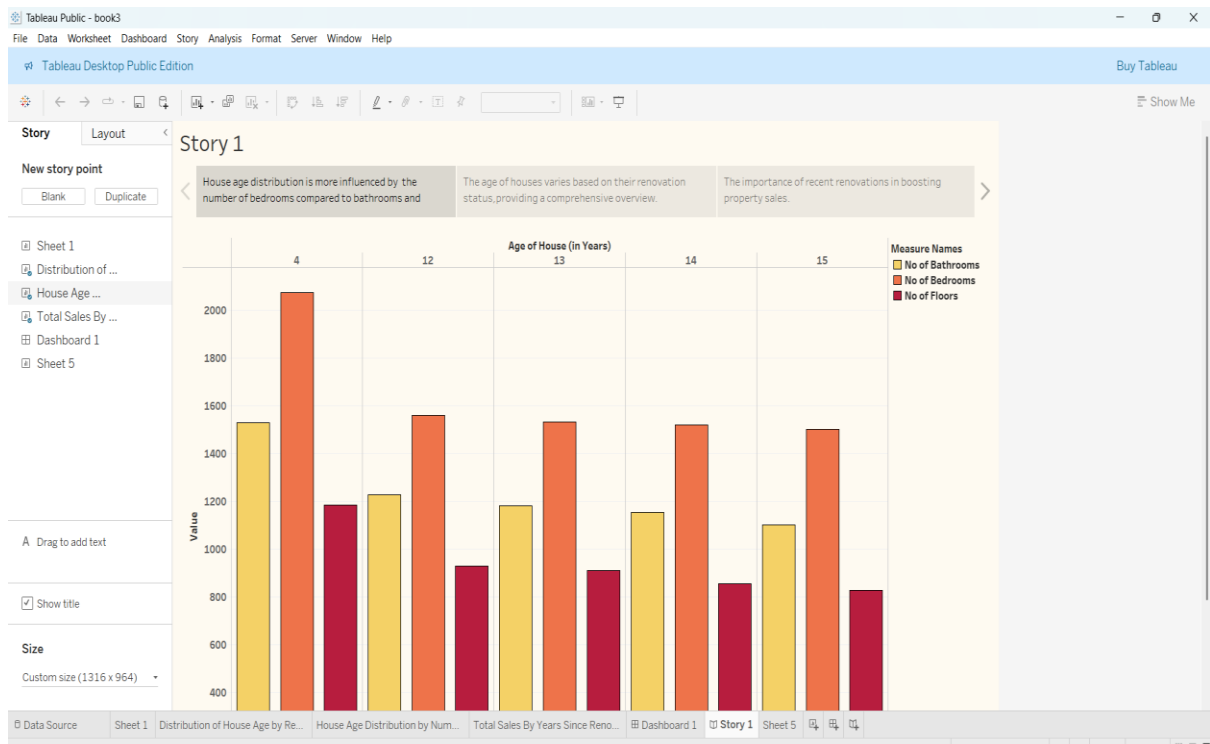
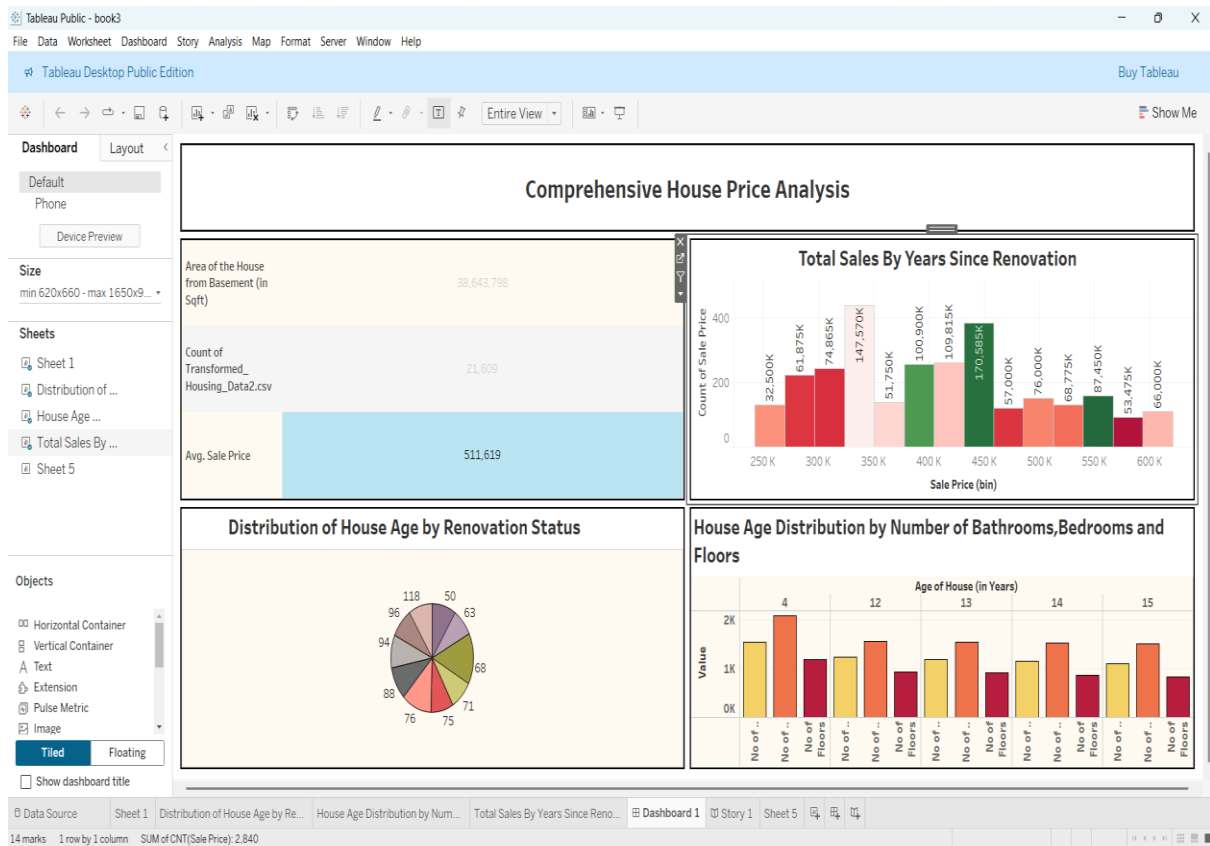
		
4.	Calculation fields Used	

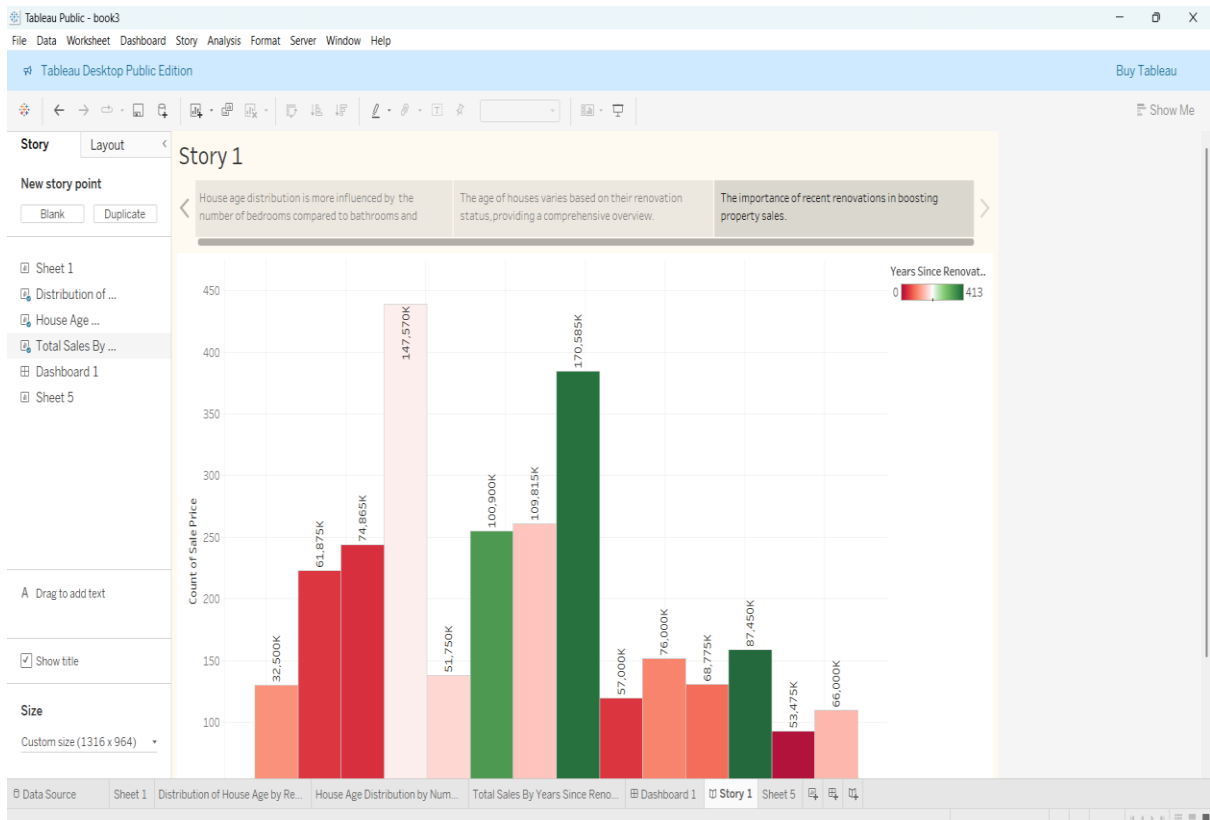
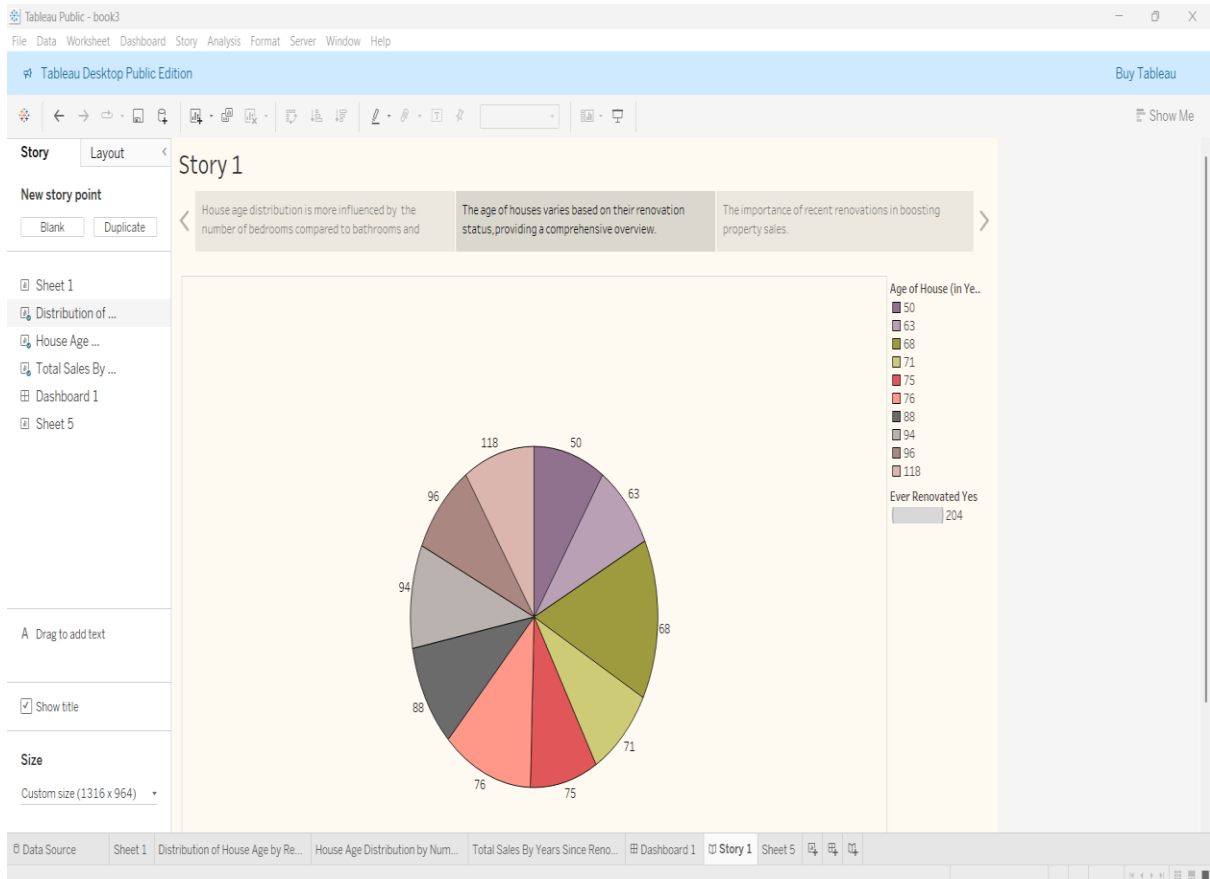
		
		
5.	Dashboard design	No of Visualizations / Graphs - 4 visualizations
6	Story Design	No of Visualizations / Graphs - 3 visualizations



7. Results

7.1 Output Screenshots:





Dashboard:

https://public.tableau.com/app/profile/takkoli.nikhitha.reddy/viz/dashboard_17508515361180/Dashboard1?publish=yes

Story:

https://public.tableau.com/app/profile/takkoli.nikhitha.reddy/viz/dashboard_17508515361180/Story1?publish=yes

8. Advantages and Disadvantages

Advantages	Disadvantages
Free, open-source technology stack	Depends on Tableau Public hosting
Visually rich dashboards with no coding	Manual data upload (not automated)
Easy to scale and reuse with other datasets	Limited customization in Tableau Public
Interactive filters and storytelling	Requires stable internet for live dashboards

9. Conclusion

The project successfully demonstrated how data visualization can transform housing market trends data into actionable insights.

10. Future Scope

- Extend the platform to cover more cities or countries, integrating diverse housing markets globally.
- Add support for rental price trends and predictions to attract tenants, landlords, and rental investors.
- Launch a mobile-friendly version for real-time, location-based insights and alerts on the go.
- Integrate deep learning models (e.g., LSTM, transformers) for more accurate and dynamic price predictions.

- Notify users of significant market changes and provide personalized recommendations based on their preferences.

11. Appendix

Source Code: NIL

Dataset Link:

<https://www.kaggle.com/datasets/rituparnaghosh18/transformed-housing-data-2>

Github Link:

<https://github.com/NikhithaReddy-2224/Visualizing-Housing-Market-Trends-An-Analysis-of-Sale-Prices-and-Features-using-Tableau.git>