

Project Report

Team ID	LTVIP2026TMIDS47436
Project Name	visualizing housing market trends: an analysis of sale prices and features using tableau

1. INTRODUCTION

1.1 Project Overview

The project titled “**Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau**” aims to transform raw housing data into meaningful visual insights. It focuses on analyzing factors such as **years since renovation, house age, number of bathrooms, bedrooms, and floors**, and how these impact **house sale prices**.

Using **Tableau** and **Tableau Prep Builder**, this project cleans, processes, and visualizes the data through interactive dashboards and storytelling features. The result is a powerful tool that helps users **understand pricing trends**, observe **buyer behavior**, and **explore property feature patterns** through engaging, data-driven visuals.

1.2 Purpose

The purpose of this project is to:

- Provide an **interactive platform** to explore housing market data.
- Identify and visualize how **specific features and renovations** influence house sale prices.
- Help users understand **sales distribution trends** based on age and renovations.
- Deliver **clear, visual narratives** for analytical insights using Tableau's storytelling capability.

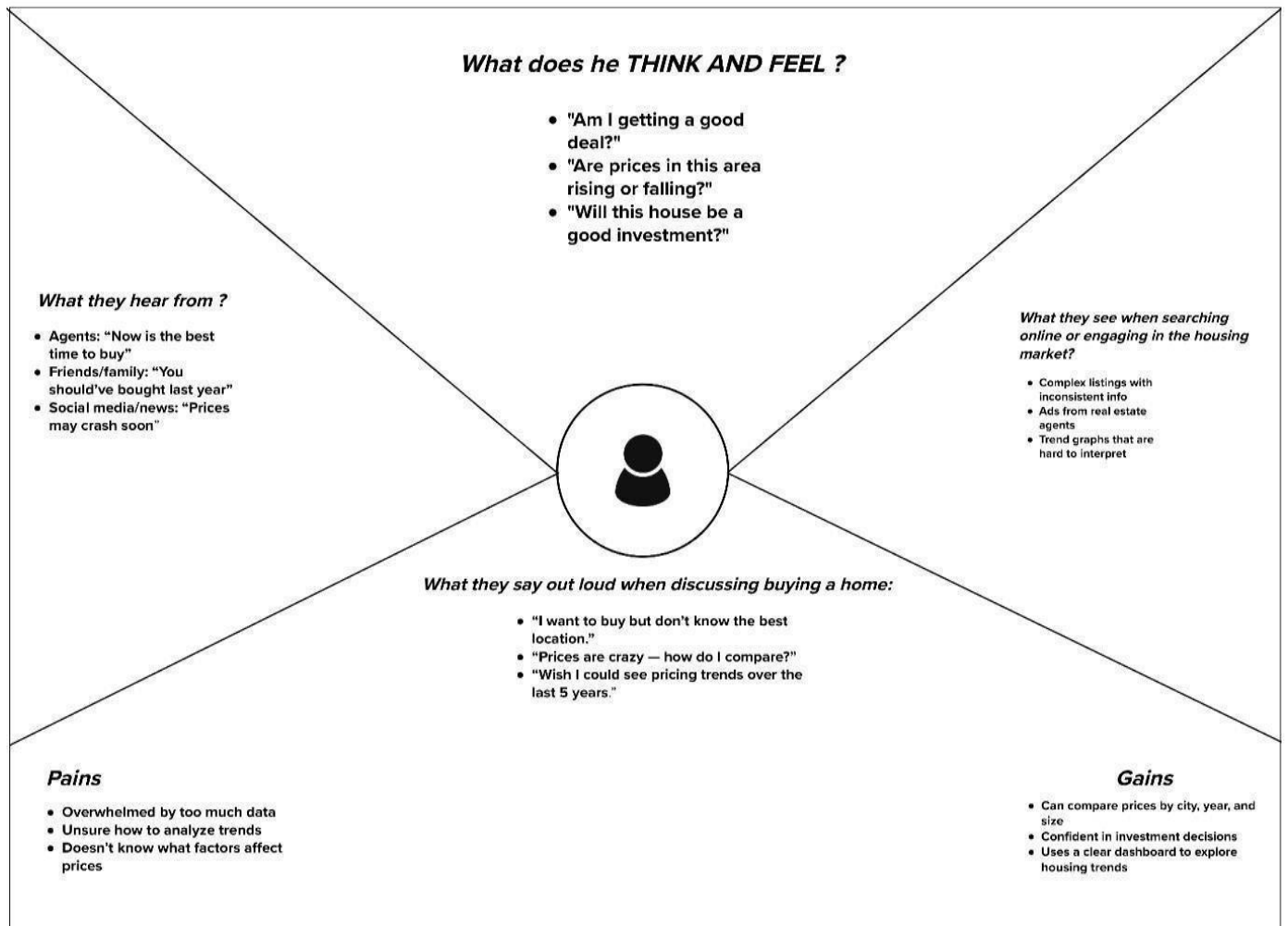
2. IDEATION PHASE

2.1 Problem Statement

Problem Statement(PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A real estate analyst	understand what features affect house prices	the data is too complex and scattered	I don't have a single dashboard that shows clear trends	frustrated and unsure about my decisions
PS-2	A marketing strategist	target the right segment of buyers	I don't know what trends are	I can't link buyer behavior to house characteristics	ineffective and misaligned
			influencing sales		
PS-3	A company executive	make strategic investment decisions	I can't clearly see performance patterns	current reports lack visual clarity and interactivity	hesitant and data-blind

I am (Customer)	→	A first-time homebuyer who wants to make an informed decision	A real estate investor looking for high-return properties	A real estate agent aiming to assist clients efficiently
I'm trying to	→	Find a home within my budget that meets my needs	Identify profitable properties based on price trends and key influencing factors	Provide accurate and insightful recommendations based on market data
But	→	The available market data is difficult to interpret and scattered across multiple sources	Existing datasets require extensive manual analysis and lack clear insights	The data is time-consuming to analyze and spread across various reports
Because	→	There is no centralized, easy-to-use tool that visualizes housing trends based on historical sales data	No interactive visualization tool allows me to compare property appreciation trends effectively	There is no comprehensive tool to aggregate and visualize pricing trends for quick insights
Which makes me feel	→	Confused and overwhelmed, making me hesitant to proceed	Frustrated and uncertain about making investment decisions	Less efficient, unable to provide quick, data-backed advice to clients

2.2 Empathy Map Canvas



2.3 Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 10 minutes to prepare
- 1 hour to collaborate
- 2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

- Team gathering**
No team members – this is a solo project. Pre-research will be done using online datasets and Tableau.
- Set the goal**
The goal is to analyze real estate data to uncover how features like location, square footage, and year built affect house sale prices.
- Learn how to use the facilitation tools**
I will use Tableau to build dashboards and visualize trends.

[Open article](#) →

Define your problem statement

Understanding housing market trends is challenging due to the volume and complexity of real estate data. This project aims to analyze how housing features—such as location, square footage, number of bedrooms, and year built—influence sale prices. Using Tableau, we will develop interactive dashboards and charts to visualize key patterns, trends, and anomalies.

5 minutes

PROBLEM
How might we analyze how housing features influence sale prices?



Key rules of brainstorming

Brainstorming is a solo activity, not a group activity. It's about generating ideas, not evaluating them.

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Document insights.
- Go for volume.
- If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

2

Brainstorm

Write down any ideas that come to mind that could address the problem statement.

10 minutes

TIP
You can start a story with a single idea and build on it.

Idea 1

- Use Zillow or Kaggle real estate datasets
- Include features: location, size, year built, no. of bedrooms
- Clean data using Excel or Python if needed

Idea 2

- Create a heatmap of average sale prices by location
- Use scatter plot for square footage vs. price
- Map view to show regional trends

Idea 4

- Top section: KPIs (avg. price, total listings)
- Map: Interactive map & filters
- Bottom: Trend line + scatter chart side by side

Idea 3

- Add filters for year built, number of bedrooms
- Enable selection by color or size
- Add tooltips to show detailed info on hover

Idea 5

- Highlight anomalies or surprising trends
- Suggest insights for buyers/investors
- Create tabs: Story points to walk through analysis

3

Group ideas

Organize similar ideas into clear groups such as data sources, key features, visualizations, and dashboard design. Label each group with a short phrase describing its focus. If a group has too many ideas, split it into smaller, more specific categories for better clarity.

20 minutes

TIP
Add a reference link to help others understand the data source or the context of the ideas.

Data Preparation	- Use Zillow/Kaggle dataset Clean data using Excel/Python Handle missing values
Key Features to Analyze	- Square footage, Bedrooms, bathrooms, Year built, Location, ZIP code
Visualization Techniques	- Map view of prices- Scatter plot (sq ft vs price)- Trend line (over years)
Dashboard Design	- Top KPIs section- Filters for year, bedrooms- Tooltip interactivity
Insights & Outcomes	- Compare old vs new homes- Highlight anomalies- Investment recommendations

Step-3: Idea Prioritization

4

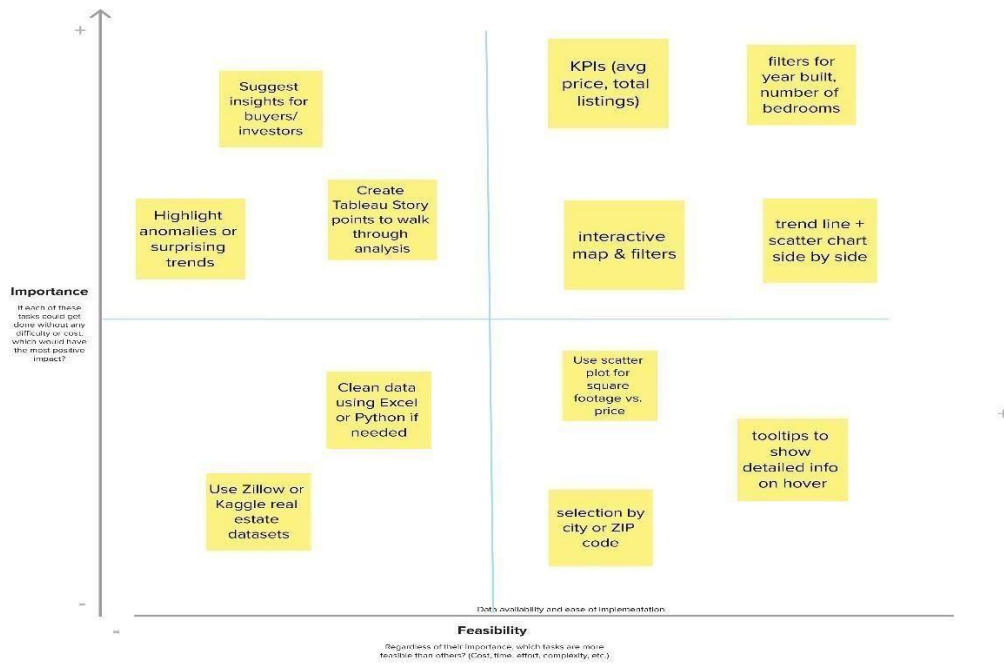
Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕒 20 minutes

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

CUSTOMER JOURNEY MAP | LAXMI ESTATE: VISUALIZING HOUSING MARKET TRENDS

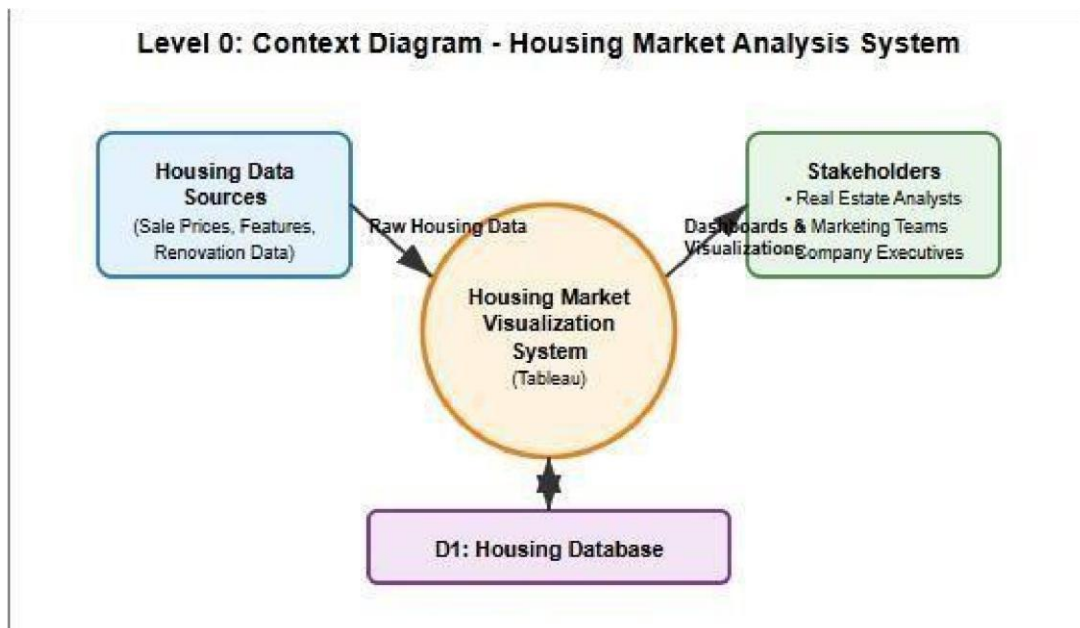
ENTER	ENTICE	ENGAGE	IDENTIFY	EXTEND
Access Dashboard Initial access to the Tableau housing market dashboard	Overview Data Reviewing key housing market metrics	Explore Renovation Impact Analyzing a histogram of price distribution by years	Identify Trends Explore line charts tracking median price changes over time	Apply Findings Use insights to guide sales, pricing, and forecasting
Steps	View summary statistics, average prices and key figures	Use filters, hover tooltips, and interactive controls	Use time filters to spot-market strategic planning	Export reports or present findings to stakeholders
Goals	Understand scope and scale of available housing data	Identify how renovations affect property prices	Recognize long-term price trends for strategic planning	Turn data into actionable business strategies
Positive Experiences	Clear and concise overview builds confidence in the data	Visualization reveals unexpected insights about renovation ROI	Clear timeline charts make trends easy to understand	Data-driven decisions improve competitiveness
Negative	Complex charts may be harder for new users to interpret	Detailed visual analysis supports pricing strategies	Conflicting trends between charts may cause uncertainty	Translating insights into actions may face operational challenges

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Import and Processing	Import housing dataset into Tableau
		Data transformation and cleaning
		Validate data quality and completeness
FR-2	Interactive Dashboard Creation	Create overall data overview dashboard
		Develop sales by renovation years histogram
		Build house age distribution pie chart
		Design grouped bar chart for house features
FR-3	Data Visualization and Analytics	Generate average sales price calculations
		Calculate total area metrics
		Analyze renovation impact on pricing
		Create age-based distribution analytics
FR-4	Reporting and Export Functionality	Export visualizations as images/PDFs
		Generate summary reports
		Create stakeholder presentation materials

Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Dashboard should be intuitive and easy to navigate for real estate analysts, marketing teams, and executives with minimal training required
NFR-2	Security	Ensure data privacy and secure access to housing market data with appropriate user authentication and authorization controls
NFR-3	Reliability	System should provide consistent and accurate visualizations with 99.5% uptime and reliable data processing capabilities
NFR-4	Performance	Dashboard should load within 3 seconds and handle interactive filtering smoothly even with large datasets containing thousands of housing records
NFR-5	Availability	Tableau dashboard should be accessible 24/7 to stakeholders across different time zones with minimal scheduled maintenance downtime
NFR-6	Scalability	Solution should accommodate growing datasets and additional visualization requirements as ABC Company expands its housing market analysis

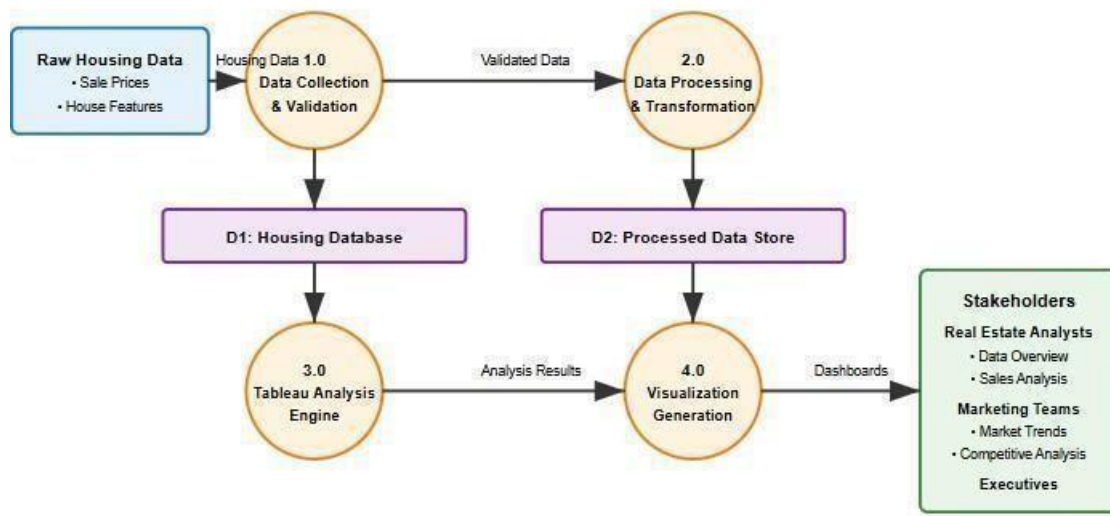
3.3 Data Flow Diagram



User Stories

Use the below template to list all the user stories for the product.

Level 1: Detailed Data Flow Diagram - Housing Market Analysis



Scenarios Supported:

1. Overall Data Overview - Summary statistics and key metrics
2. Total Sales by Years Since Renovation - Histogram analysis
3. House Age Distribution by Renovation Status - Pie chart visualization
4. House Age by Bathrooms, Bedrooms, Floors - Grouped bar charts

Data Flows: Raw Data → Validation → Processing → Analysis → Visualization → Stakeholders

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Real Estate Analyst	Data analysis & Visualization	USN-1	As a real estate analyst, I can view the overall data overview dashboard to understand the dataset scale and key metrics	I can see count of housing records, average sales price, and total basement area	High	Sprint-1
Real Estate Analyst	Renovation Impact analysis	USN-2	As a real estate analyst, I can analyze total sales by years since renovation through histogram visualization	I can identify correlation between renovation timing and price ranges	High	Sprint-1

Real Estate Analyst	House Age Distribution	USN-3	As a real estate analyst, I can view house age distribution by renovation status through pie chart	I can assess age characteristics and renovation prevalence	High	Sprint-1
Real Estate Analyst	Feature analysis	USN-4	As a real estate analyst, I can analyze house age distribution by number of bathrooms, bedrooms, and floors	I can identify patterns in housing characteristics over time	High	Sprint-2
Real Estate Analyst	Interactive dashboard	USN-5	As a real estate analyst, I can access an interactive dashboard combining all visualizations	I can navigate between different views and filter data dynamically	Medium	Sprint-2

3.4

Technology Stack

Table-1 : Components & Technologies:

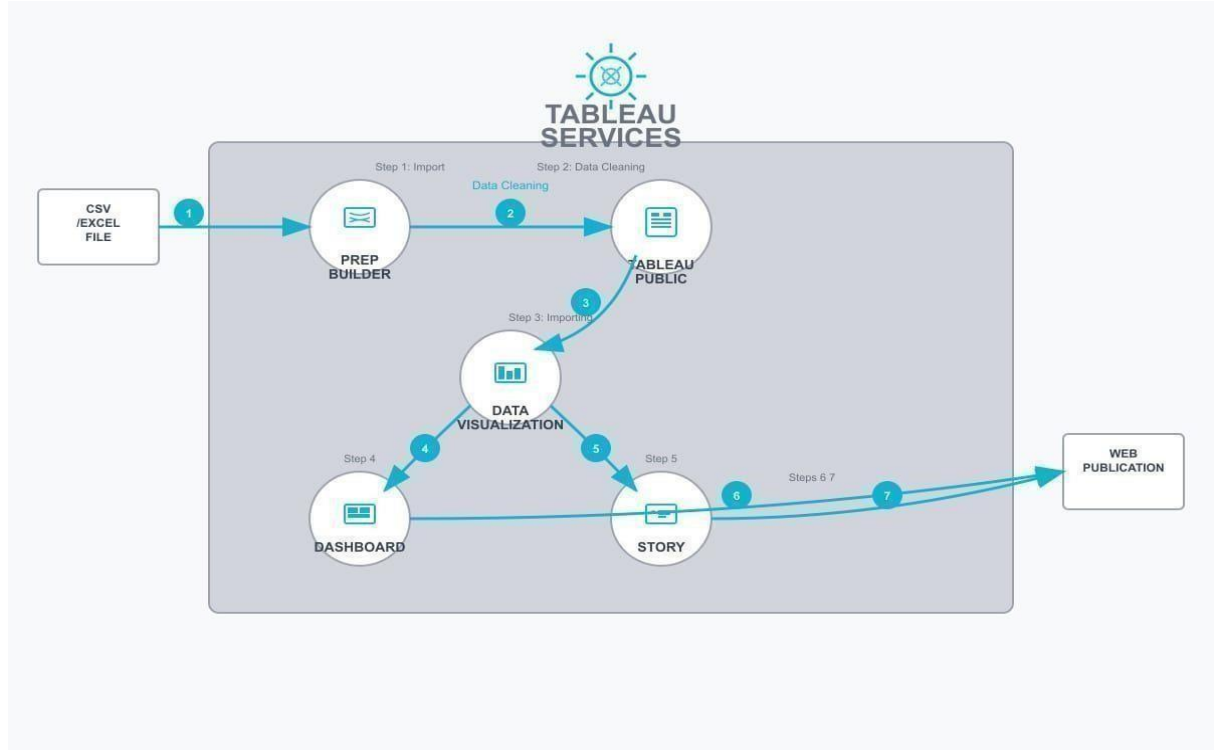
S.No	Component	Description	Technology
1.	User Interface	Web-based dashboards for viewing and interaction	Tableau Public
2.	Application Logic-1	Data preprocessing and transformation workflows	Tableau Prep Builder
3.	Application Logic-2	Interactivity using filters, parameters, and actions	Tableau Filters, Parameters, Actions
4.	Dashboard/Story Logic	Logical flow of insights using story features	Tableau Story Feature
5.	Data Source	Flat files used as housing market datasets	CSV

6.	File Storage	Housing datasets stored locally	Local File System / Google Drive
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Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	yes	Tableau Public
2.	Security Implementations	N/A	N/A
3.	Scalable Architecture	Can scale by publishing to Tableau Cloud for wider access	Tableau Public
4.	Availability	Dashboards available online 24/7	Tableau Public
5	Performance	Good \ Better performance	Tableau Public

Technical Architecture:



4. PROJECT DESIGN

4.1 Problem Solution Fit

Problem-Solution fit canvas

1. CUSTOMER SEOMENT(S) First time home buyers, real estate investors, urban professionals (ages 25-48), brokers and real estate an-	2. CUSTOMER CONSTRAINTS Limited knowledge of data tools Budget constraints Overload of conflicting information Distruct in brokers Limited time to explore options	8. PROBLEM ROOT CAUSE Housing market data is scattered and unorganized Lack of visualization makes pan hard to detect
2. JOBS TO BE-DONE / PROBLEMS Understand housing price frends Compare property features and sale Identify good investment zones Make data-driven decisions abou buying properties	7. BEHAVIOUR Browse listings on real estate Compare prices manually Ask friends/family for opinions Use EMI calculators	6. BEHAVIOUR Browse listings on real estate sites Compare prices manually Ask friends/family for opinions Watch property review videos
3. TRIGGERS Rising rental prices Ads or deals on prooporties Peerifamily recommendations Using clear charts as plice charts	YOUR SOLUTION An Interactive Tableau dashboard that visualizes housing data (sale price, size, type, local, trends)	8. CHANNELS OF BEHAVIOUR 6.1 ONLINE Real estate websites (MagicBricks, 99- Tableau dashboards Keggel datasets Youtube reviews 6.2 OFFLINE Property site visits Broker consultations
EMOTIONS. BEFORE / AFTER Before, Confused, unsure, over whelm, skepti-		
EMOTIONS. BEFORE / AFTER		

Problem statement	1. Problem Statement (Problem to be Solved): The housing market often lacks clarity regarding how property renovations impact sales prices over time. Buyers and sellers struggle to assess the return on investment for renovations due to the absence of clear data analytics. This limits effective decision-making and market efficiency.	2. Idea/solution description: Our project addresses this issue by visualizing total sales in relation to the number of years since a house was renovated. Using Tableau, we created a histogram that displays how recently renovated properties correlate with various sales price ranges. This visualization enables stakeholders to identify patterns and trends in buyer preferences and renovation impact.	3. Novelty/Uniqueness: This solution stands out by offering an interactive, visual data analysis centered around the renovation timeline—a variable rarely explored in depth in traditional market reports. It brings actionable insights to the forefront using clear, user-friendly dashboards, making the data more accessible to both experts and laypeople.
	4. Social Impact / Customer Satisfaction: The solution empowers homebuyers with valuable insights into how renovation age affects home value, leading to more informed purchasing decisions. It also helps sellers and agents time renovations effectively to increase profits. Overall, it supports transparency, enhances consumer trust, and contributes to better housing policy and urban planning.	5. Business Model (Revenue Model): The solution can be monetized through a subscription-based model targeting real estate agencies, property investors, and developers. Additional income streams include custom dashboard development, real-time market reporting, and integration services with existing property listing platforms or CRMs.	6. Scalability of the solution: This model can be extended to include multiple variables such as location, square footage, number of bedrooms, or neighborhood crime rates. It can also scale geographically to analyze real estate markets across different cities or countries. With integration into national real estate databases, it can provide ongoing, large-scale market intelligence.

4.2 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	People struggle to understand how housing prices vary by location, room count, or size, making it hard to compare data and make informed decisions.
2.	Idea / Solution description	The solution is an interactive Tableau dashboard that visualizes housing data using charts, maps, and filters, making complex trends easy to understand.
3.	Novelty / Uniqueness	Unlike static reports, this solution offers dynamic, filterable visuals that users can interact with, giving personalized insights in real time.
4.	Social Impact / Customer Satisfaction	It empowers homebuyers, sellers, and agents with clear, accessible data, leading to confident decisions and greater market transparency.
5.	Business Model (Revenue Model)	Proposes a tiered subscription model with additional revenue streams.
6.	Scalability of the Solution	Describes how the solution can grow with increased data, users, and market expansion.

4.3 Solution Architecture

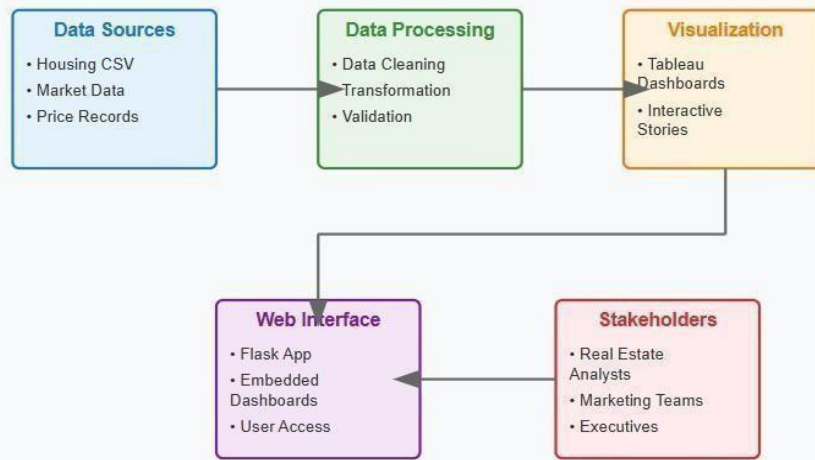


Figure 1: Architecture and data flow of the Housing Market Trends Analysis application

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Collection & Extraction	USN-1	As a user, I can collect housing market data from reliable sources, including prices, property types, and trend.	2	High	1
Sprint-1	Data Preprocessing	USN-2	As a user, I can preprocess data to clean and filter out unnecessary information, such as outliers, duplicates, or missing values	3	High	1
Sprint-2	Data Visualization	USN-3	As a user, I can visualize housing trends using charts, graphs, and heatmaps to understand the current market dynamics and pricing fluctuations	3	High	1
Sprint-2	Interactive Dashboard	USN-4	As a user, I can interact with a dashboard that displays live market trends, data filters, and performance insights for better decision-making	2	High	1

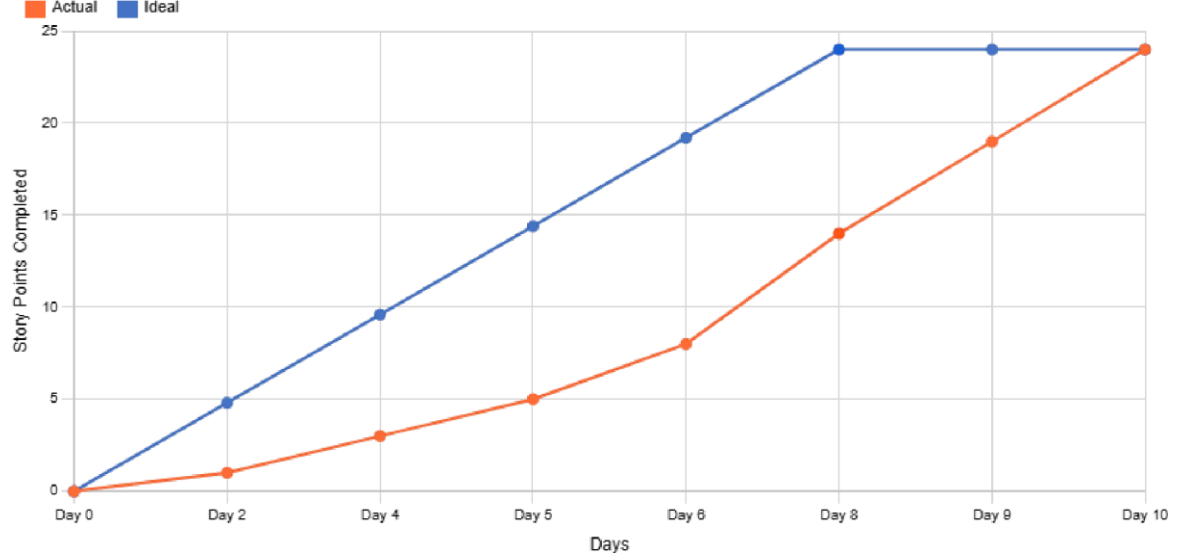
Sprint-3	User Stories (Dashboard Views)	USN-5	As a user, I can set custom views of the dashboard to save preferences for quick future reference (e.g., specific locations, budget, etc.)	3	Medium	1
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Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Web Integration	USN-6	As a user, I can integrate the dashboard and data visualizations into a website for online accessibility and usability	2	Medium	1

Project Tracker, Velocity & Burndown Chart

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	2 Days	18 July 2025	19 July 2025	5	18 July 2025
Sprint-2	5	3 Days	21 July 2025	23 July 2025	5	22 July 2025
Sprint-3	5	2 Days	24 July 2025	25 July 2025	5	26 July 2025

Burndown Chart



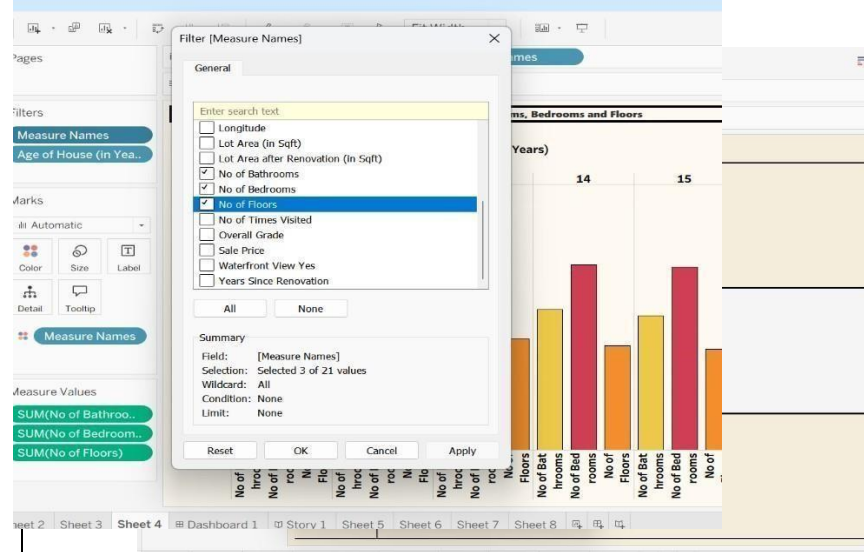
6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

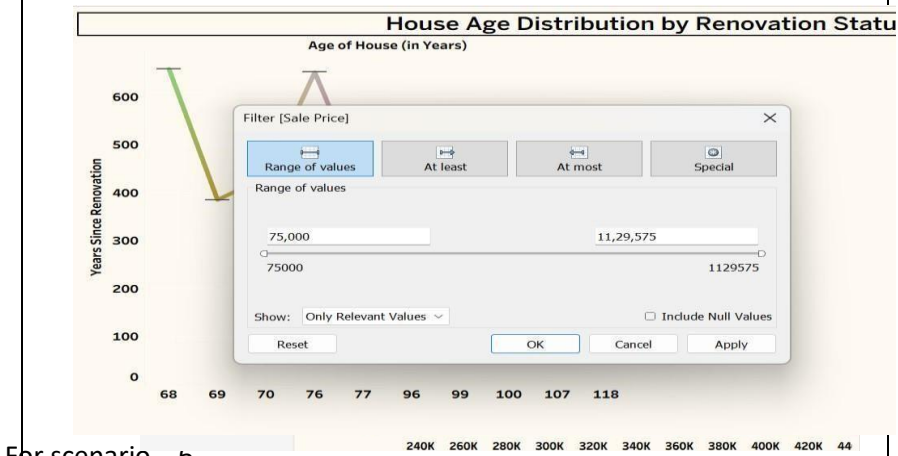
Project team shall fill the following information in model performance testing template.

3. Utilization of Filters

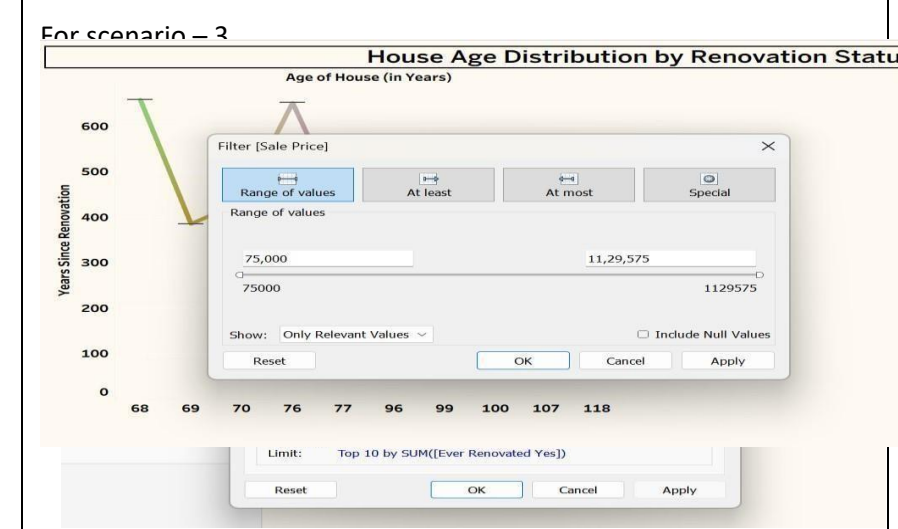
For scenario – 1



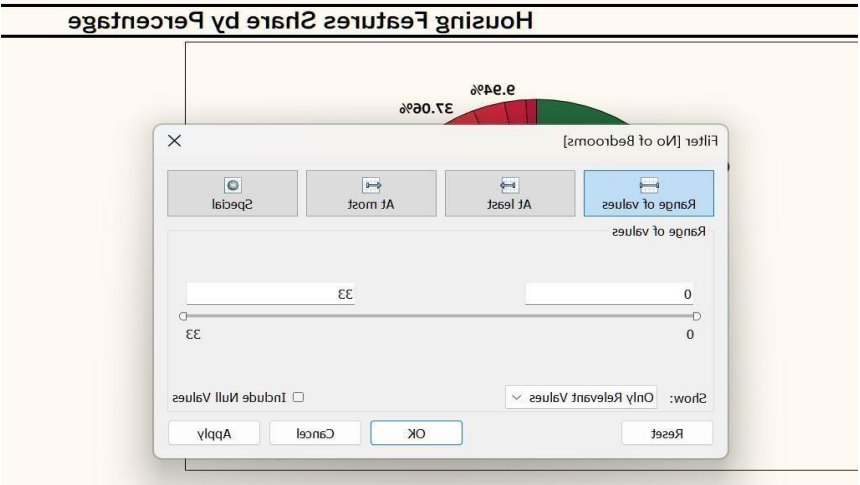
For scenario – 2



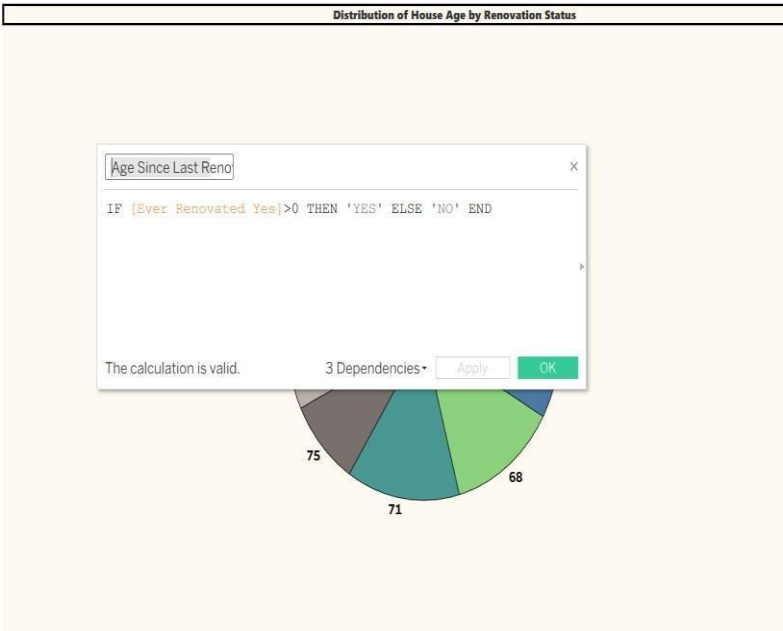
For scenario – b



For scenario – 7



4. Calculation fields Used



5.

Dashboard design

No of Visualizations / Graphs – 4

Comprehensive House Data Analysis

Average Sale Price of Houses

Count of Transformed_Housing_Data2.csv	21,609
Avg. Sale_Price	511,619
Sum of Area of the House from Basement (in Sqft)	38,643,798

Property Age Analysis

No of Floors	Red Bar	Yellow Bar	Green Bar
4	4	4	4
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15

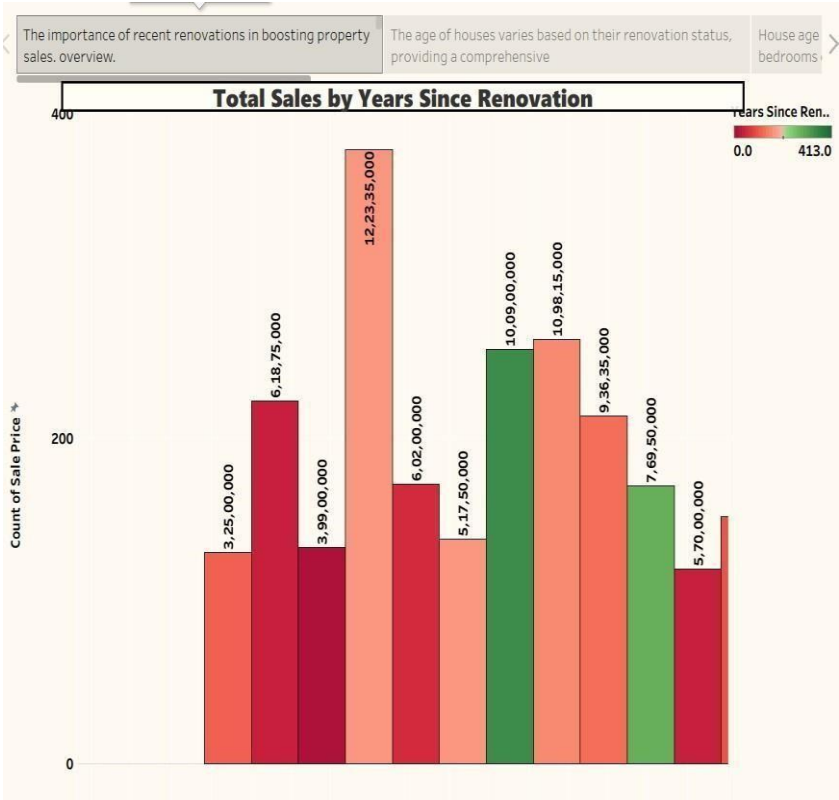
DISTRIBUTION OF HOUSE AGE BY RENOVATION STATUS

Segment	Value
1	118
2	50
3	63
4	68
5	71
6	75
7	76
8	88
9	94
10	96

Average Sale Price by Basement Size Category

Basement Size Category	Yellow Bar	Green Bar	Red Bar	Blue Bar
1340	4	4	4	4
1400	10	10	10	10
1400	11	11	11	11
1300	12	12	12	12
1400	13	13	13	13
1340	14	14	14	14
1300	15	15	15	15
1400	41	41	41	41

No of Visualizations / Graphs – 4



7.

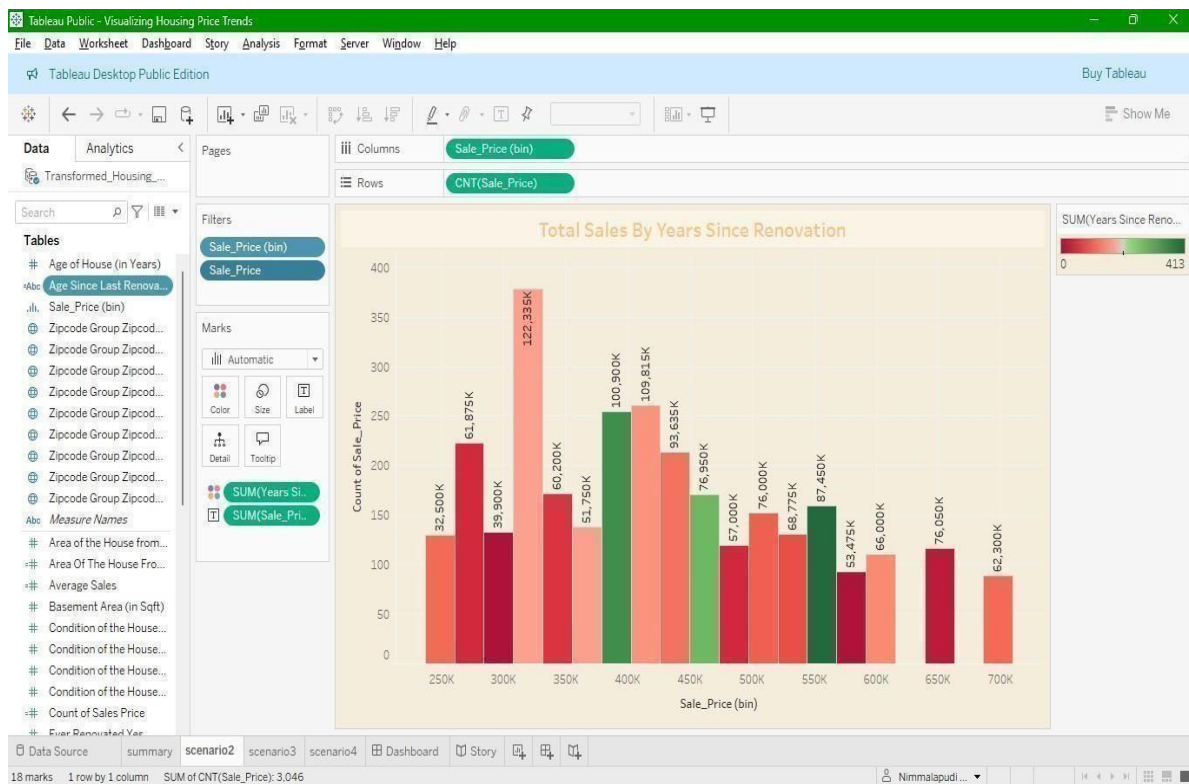
RESULTS

7.1 Output Screenshots

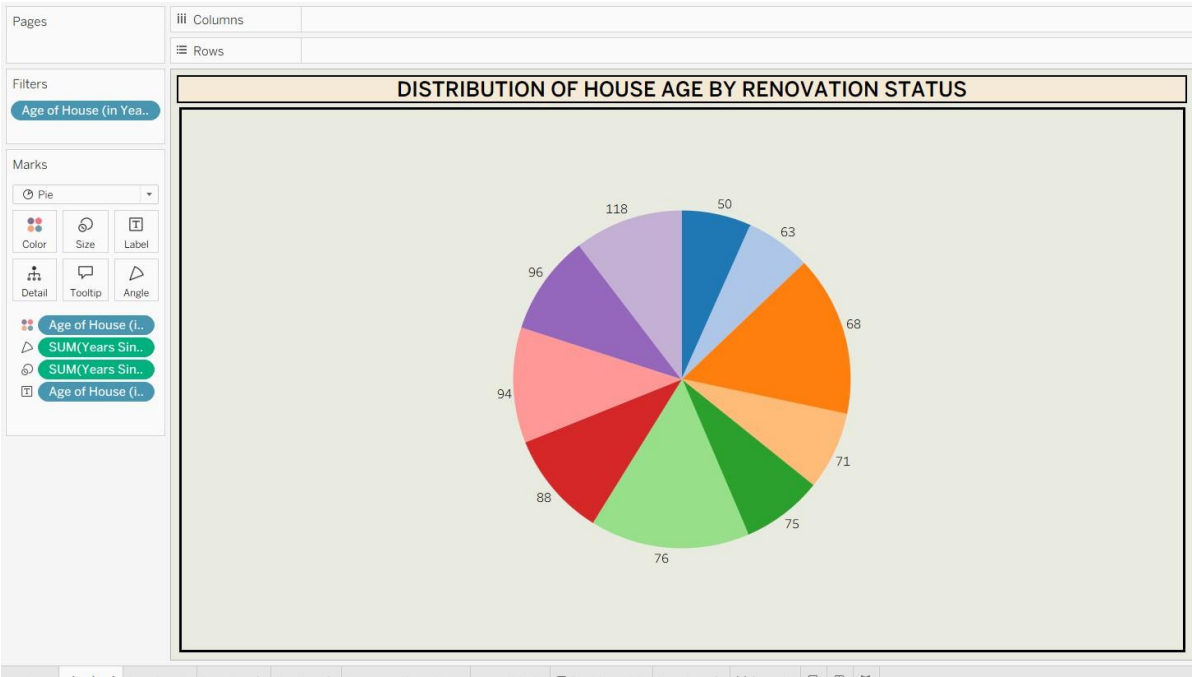
Scenario-1

Pages	Columns	Measure Names
Filters	Average Sale Price of Houses	
Measure Names Marks Automatic Color Size Text Detail Tooltip Measure Na... Measure Values Measure Values CNT(Transformed_Ho... AVG(Sale_Price) SUM(Area of the Ho...	Count of Transformed_Housing_Data2.csv Avg. Sale_Price Sum of Area of the House from Basement (in Sqft)	21,609 511,619 38,643,798

Scenario-2



Scenario-3



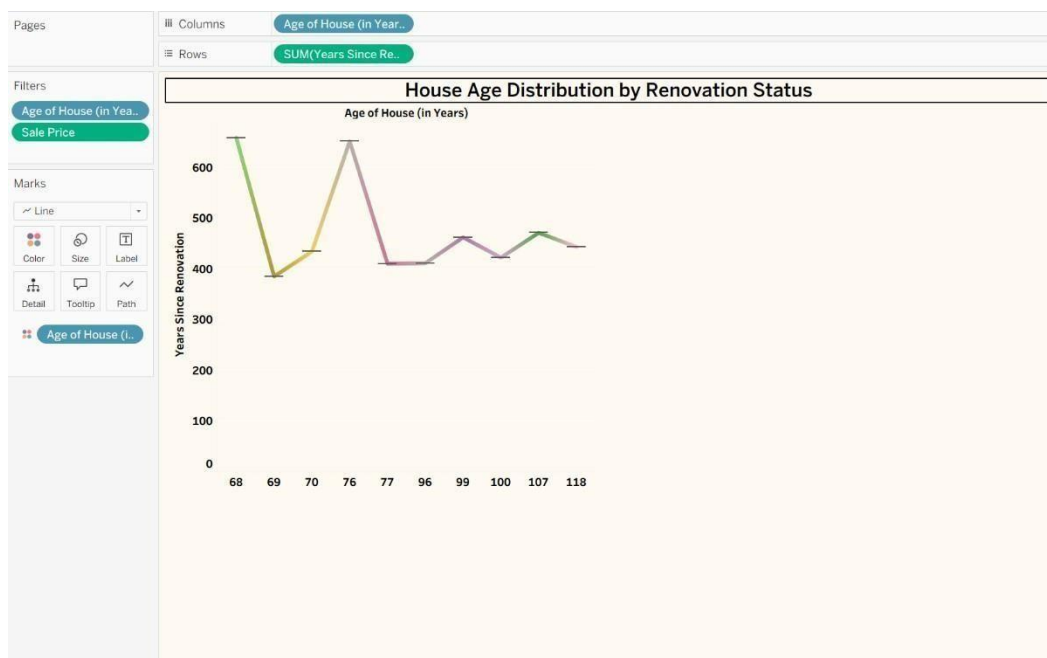
Scenario-4



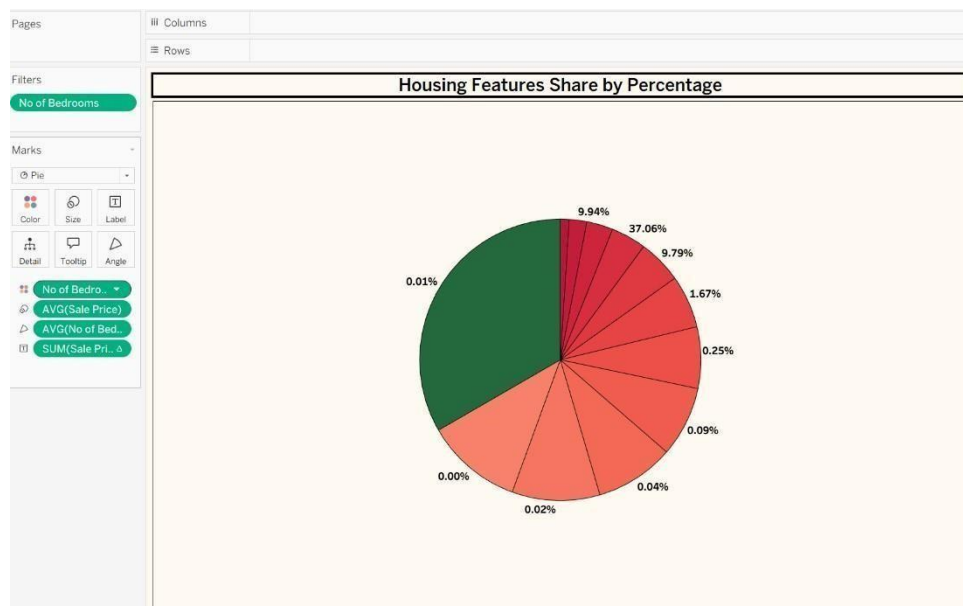
Scenario - 5



Scenario - 6



Scenario - 7



Scenario - 8



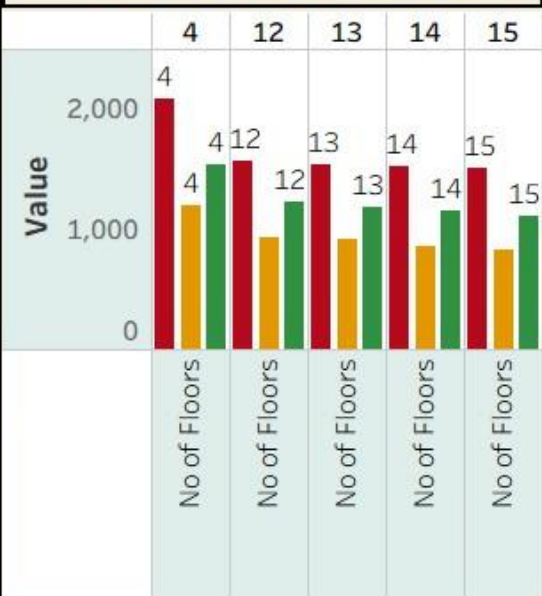
Dashboard

Comprehensive House Data Analysis

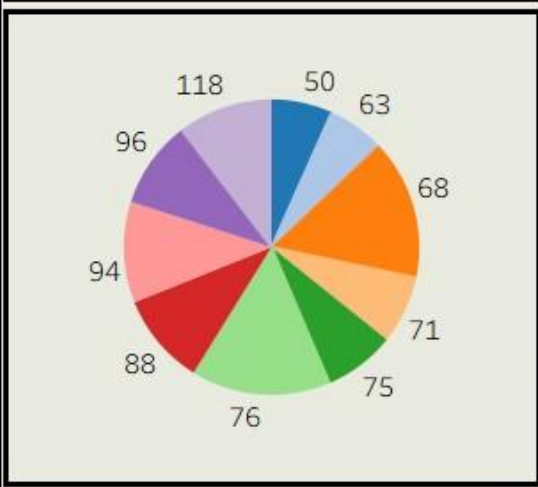
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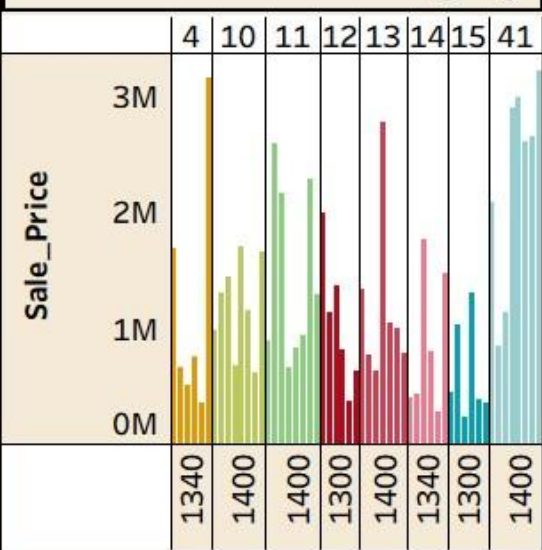
Property Age Analysis

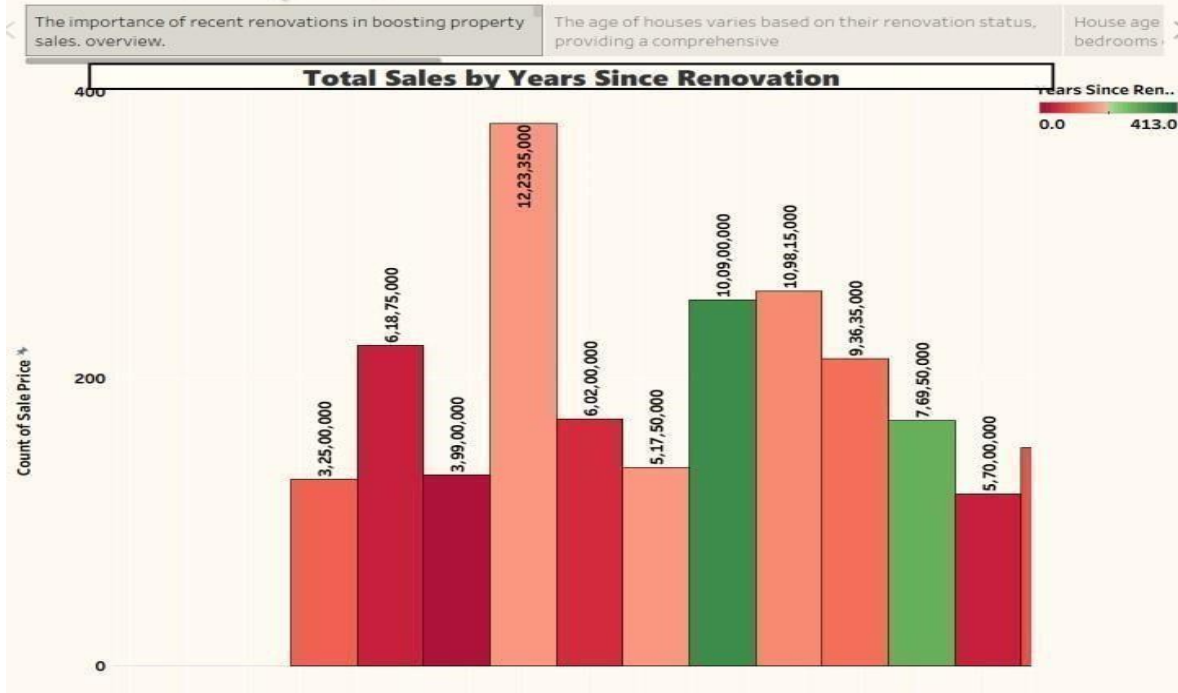


DISTRIBUTION OF HOUSE AGE BY RENOVATION STATUS



Average Sale Price by Basement Size Category





8. ADVANTAGES & DISADVANTAGES

8.1 ADVANTAGES

1. **Visual Clarity:** Tableau enables intuitive, easy-to-understand visualizations for complex housing datasets.
2. **Interactive Dashboards:** Users can filter data dynamically based on features like renovations, age, or number of rooms.
3. **Business Insights:** Helps stakeholders identify trends and patterns that influence pricing strategies and buyer behavior.
4. **Time-Efficient:** Reduces manual analysis through automated and visual insights.
5. **Storytelling Capability:** Tableau's story feature allows presenting data as step-by-step narratives.
6. **Non-technical Accessibility:** Designed for business users with minimal technical skills.
7. **Improves Decision Making:** Enhances strategic planning through data-driven recommendations.
8. **Flexible Data Sources:** Supports a wide range of formats like Excel, CSV, and cloud-based data.

8.1 DISADVANTAGES

1. **No Predictive Modeling:** Tableau lacks built-in machine learning or forecasting capabilities.
2. **Dependence on Data Quality:** Inaccurate or unclean data can lead to misleading visualizations.
3. **Limited Data Cleaning:** Complex data transformations require external tools like Tableau Prep.
4. **Performance Issues:** Can slow down with very large datasets if not optimized properly.
5. **Story Limitations:** Tableau's story feature is static and not as flexible as interactive dashboards.
6. **Cost (for full version):** Tableau Creator licenses and cloud solutions may be expensive.
7. **No Native Real-Time Streaming:** Tableau is not ideal for real-time dynamic updates.
8. **Requires Training:** Users need time to become proficient in designing meaningful dashboards.

9. CONCLUSION

This project demonstrates the effective use of **Tableau** and **Tableau Prep Builder** to analyze and visualize housing market data in a meaningful and interactive way. By examining patterns related to **sale prices, renovations, house age, and structural features**, the project reveals key insights that support a deeper understanding of real estate trends.

Through a combination of **interactive dashboards** and **story-driven visualizations**, the project transforms raw datasets into easily interpretable insights. It proves how data visualization can **enhance clarity, support decision-making**, and provide a **structured narrative** around complex datasets. The approach used ensures the findings are accessible to both technical and non-technical users, making it a valuable asset for real estate data analysis.

10. FUTURE SCOPE

1. **Add Predictive Analytics:** Integrate machine learning to forecast housing prices.
2. **Use Real-Time APIs:** Connect to real estate APIs (like Zillow or Realtor.com) for live data updates.
3. **Enhance with Maps:** Use Tableau's map visualizations for geospatial housing trends.
4. **Deploy on Tableau Server:** Expand collaboration through server-hosted dashboards.
5. **Include External Data:** Add economic, demographic, or regional data to enrich insights.
6. **Mobile Dashboards:** Optimize dashboards for mobile accessibility.
7. **Automated Data Refresh:** Schedule regular updates from connected data sources.
8. **Multi-User Interaction:** Enable tailored views for different user types like analysts, buyers, or planners.

11. APPENDIX

Dataset Link :

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

Project GitHub Link : <https://github.com/purna737/Housing-Market-Trends-Analysis.git>

project Demo link

https://drive.google.com/file/d/1IBIO_QyEOyNXP7CBj6Rg-VWPCt6rLed9/view?usp=sharing