An internship in

Data Analytics with Tableau

by

SmartInternz

Project Name: Visualizing housing market trends: an analysis of sale prices and features
Project Id: LTVIP2026TMIDS25019

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. These dashboards were then embedded into a Flask web application, ensuring easy accessibility and deployment. 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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6.1 Performance Testing

7. RESULTS
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Source Code(if any)

Dataset Link

GitHub & Project Demo Link

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 data- driven decisions for buyers, sellers, and real estate professionals.

1.2. Objectives

- Identify key factors influencing house prices.
- Analyze 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.

# 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 Real Estate Analyst at ABC Company	analyze housing sale prices and trends based on renovation status, house age, and structural features.	I struggle with making sense of raw data and identifying key influencing factors.	the data is large, unstructured, and lacks visual storytelling.	frustrated and unsure about providing accurate, strategic insights to decisionmakers.
PS-2	a Company Executive at ABC Company	make data-driven decisions to optimize housing pricing strategies.	I cannot easily interpret detailed data or compare features like bathrooms, floors, and renovations.	traditional reports are too complex and not visually accessible.	disconnecte d from the real trends in the housing market and hesitant to make confident business decisions.

Problem Statement Template:

Customer Problem Statement Template

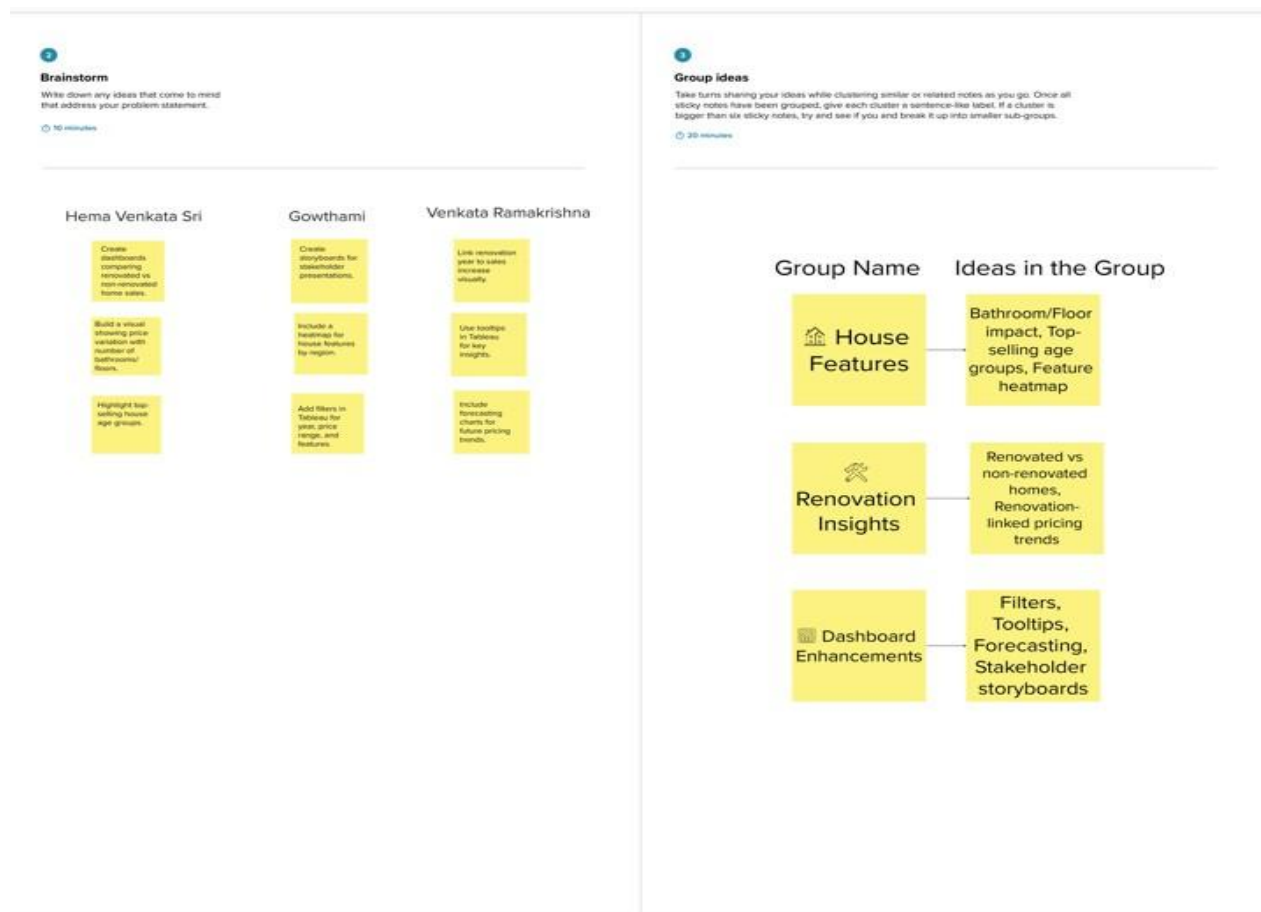| I am	I'm trying to	But	Because	Which makes me feel
a Real Estate Analyst at ABC Company.	analyze housing sale prices and trends based on renovation status, house age, and structural features.	I struggle with making sense of raw data and identifying key influencing factors.	the data is large, unstructured, and lacks visual storytelling.	frustrated and unsure about providing accurate, strategic insights to decision-makers.

2.2 Empathy Map Canvas
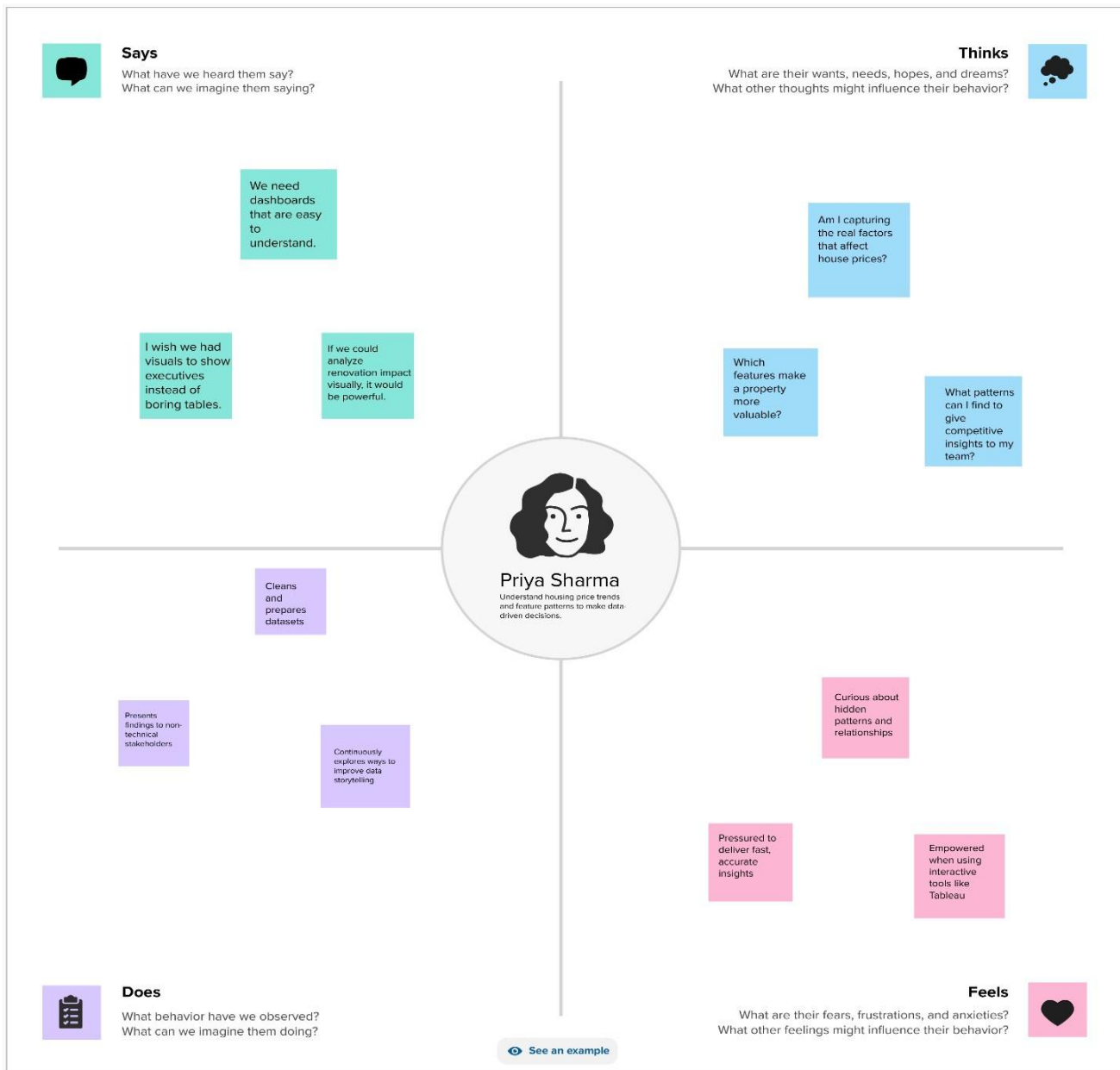
2.3 Brain Storming

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.

Brainstorm
Write down any ideas that come to mind that address your problem statement.

⏱ 10 minutes

Hema Venkata Sri	Gowthami	Venkata Ramakrishna
Create dashboards comparing renovated vs non-renovated home sales.	Create storyboards for stakeholder presentations.	Link renovation year to sales increase visually.
Build a visual showing price variation with number of bathrooms/floors.	Include a heatmap for house features by region.	Use tooltips in Tableau for key insights.
Highlight top-selling house age groups.	Add filters in Tableau for year, price range, and features.	Include forecasting charts for future pricing trends.

Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

⏱ 20 minutes

Group Name	Ideas in the Group
🏠 House Features	Bathroom/Floor impact, Top-selling age groups, Feature heatmap
⚒ Renovation Insights	Renovated vs non-renovated homes, Renovation-linked pricing trends
▦ Dashboard Enhancements	Filters, Tooltips, Forecasting, Stakeholder storyboards

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 Leader: Annamdevula Hema Venkata Sri
- Team Member: Dola Gowthami
- Team Member: Chillara Venkata Ramakrishna

Step 2: Brainstorming, Idea Listing and Grouping

S.No	Idea Description	Category
1	Visualize average sale price by SalePriceBin	Pricing Insights
2	Analyze impact of number of bedrooms on sale price	Property Features
3	Explore relationship between Total Area and Price (scatter plot)	Size-Based Pricing
4	Compare prices for renovated vs. non-renovated homes	Renovation Analysis
5	Group insights by Zipcode Clusters	Geographical Comparison
6	Analyze 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
11	Embed Dashboard in Web Application using Flask	Deployment & Integration
12	Add filters for Bedrooms, Condition, Renovation in Dashboard	Interactive Exploration

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 TotalArea vs Price (scatter plot)	High	Easy	High
4	Compare prices for renovated vs. non-renovated homes	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	Use Tableau dashboard to combine insights	High	Easy	High
10	Build a Story in Tableau	High	Medium	High

| 11 | Embed Dashboard in Web Application | High | Hard | Medium |
| 12 | Add filters for Bedrooms, Condition, Renovation | Medium | Easy | Medium |
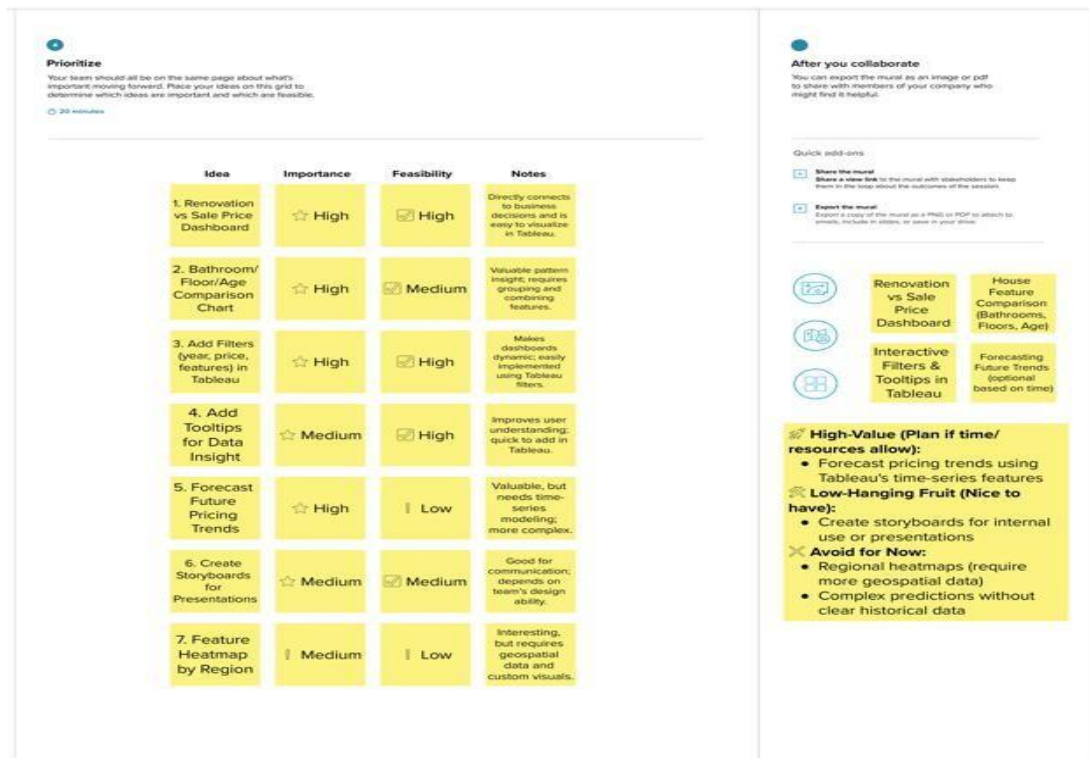
3. Requirement analysis

3.1 Customer Journey map

Customer Journey Map: Housing Market Trends Dashboard

Stage	Actions & Touchpoints	Experience & Emotions	Pain Points & Opportunities	User Goals
Awareness	- Sees dashboard via social media, newsletter, Tableau Public - Reads title/summary - Clicks dashboard link	Curious, Interested Engaged,	**Consideration** - Reads introduction, explores layout - Uses filters for location, price, features **Exploration** - Views charts (bar, scatter, pie, etc) - Exports visuals Shares dashboard	Cautious Excited, Inquisitive

Stage	Actions	Emotions	Pain Points	Opportunities	Goals
	-	Satisfied,			simplify navigation features
Decision	- Bookmarks or downloads insights	Confident	Filters not intuitive, charts slow to load	Add example queries, improve valuable speed	Discover insights
Retention	- Subscribes for updates - Revisits for new data - Leaves feedback	Loyal, Empowered	Limited export options or unclear formats	Enable easy download/share, offer export guides	Preserve and share findings
Unclear if dashboard is relevant	Use benefit-driven titles, visual thumbnails	Attract inte and clarify purpose			
Overwhelmed by layout, unsure where to start	Add guided walkthrough,	Understanc dashboard and its	No update notifications, feedback unacknowledged	Enable email updates, actively respond to feedback	Stay informed and engaged

3.2 Solution Requirement

Functional Requirements:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Upload	Upload dataset (CSV/Excel) Validate file type/format
FR-2	Data Cleaning & Preparation	Handle missing/null values Create calculated fields
FR-3	Visualization	Generate charts: house age, renovation, features

FR-4	Dashboard Interaction	Add filters (year, bedrooms) Allow download/export
FR-5	Dashboard Testing	Test load time and performance Verify filter responsiveness
FR-6	Dashboard Publishing	Publish on Tableau Public Enable embed/share features

Non- functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Dashboard must be user-friendly, with clear navigation and interactive filters
NFR-2	Security	Uploaded data must be protected from unauthorized access
NFR-3	Reliability	System should display accurate and consistent visualizations
NFR-4	Performance	Dashboards should load within 2 seconds with filters applied
NFR-5	Availability	Dashboard should be accessible online 24/7 via Tableau Public
NFR-6	Scalability	The system must support future data expansion or new visualization requirements

3.3 Data Flow Diagram

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.

Level 0 DFD (Context Diagram):

Housing Market Visualization using Tableau

DFD Level 0 – Context Diagram Flow
- User/Analyst uploads housing data (CSV/Excel) into the visualization system.
- System processes the data and creates meaningful visualizations.
- End users (executives, analysts) view insights via an interactive Tableau dashboard.

Level 1 DFD (Expanded):
Housing Market Visualization using Tableau

User / Analyst
uploads CSV

Data Source
kc_house_data.csv

Data Prep
Data Cleaning &
Calculations in
Tableau

Testing
Performance
Testing

Dashboard
Build Interactive
Dashboard

Visualization
Create Charts
(Sales, Renovation, Age)

Web Publish
Publish to Tableau
Public / Embed

End User
View Dashboard
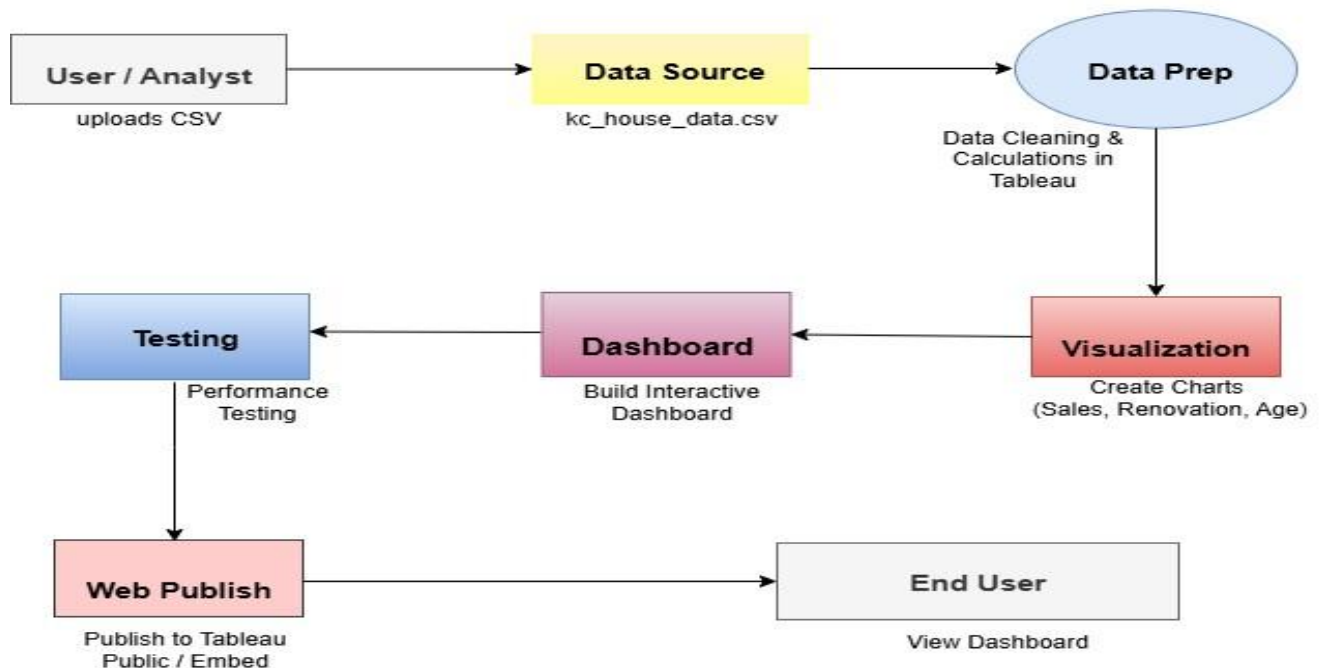
DFD Level 1 – Expanded Flow
- File upload and validation (check file type, structure).
- Handle missing/null values if present.
- Clean the data (e.g., format dates).
- Create calculated fields:
   e.g., House Age, Years Since Renovation, Price/Sqft.
- Create charts using Tableau: Total Sales, House Age, Bedrooms/Floors comparison, etc.
- Combine visuals into a filtered interactive dashboard (with dropdowns/sliders).
- Load performance, filter functionality, field calculation checks.
- Publish to Tableau Public
   Embed into a website / share with stakeholders

User Stories

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

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Data Analyst	Data Upload	USN-1	As a data analyst, I can upload the housing dataset to begin the visualization process.	Dataset is successfully uploaded and read by Tableau.	High	Sprint-1
Data Analyst	Data Preparation	USN-2	As a data analyst, I can clean and transform the dataset in Tableau.	Null values removed, calculated fields added (e.g., House Age).	High	Sprint-1
Data Analyst	Visualization Creation	USN-3	As a data analyst, I can create charts based on renovation, house age, and features.	Visuals like bar/pie charts are created and reflect accurate data.	High	Sprint-1
Viewer	View Dashboard	USN-4	As a viewer, I can interact with the dashboard using filters.	Filters (e.g., Year, Region, Bedrooms) function correctly.	High	Sprint-2
Executive	Dashboard Export	USN-5	As an executive, I can export dashboard visuals for reports.	PDF/image exports are generated from Tableau dashboard.	Medium	Sprint-2
Admin	Dashboard Sharing	USN-6	As an admin, I can publish or embed the dashboard on a website.	Dashboard appears embedded and accessible to stakeholders.	Medium	Sprint-2

Priority	Release
High	Sprint-1
High	Sprint-1
High	Sprint-1
High	Sprint-2

Medium	Sprint-2
Medium	Sprint-2

Technology Stack
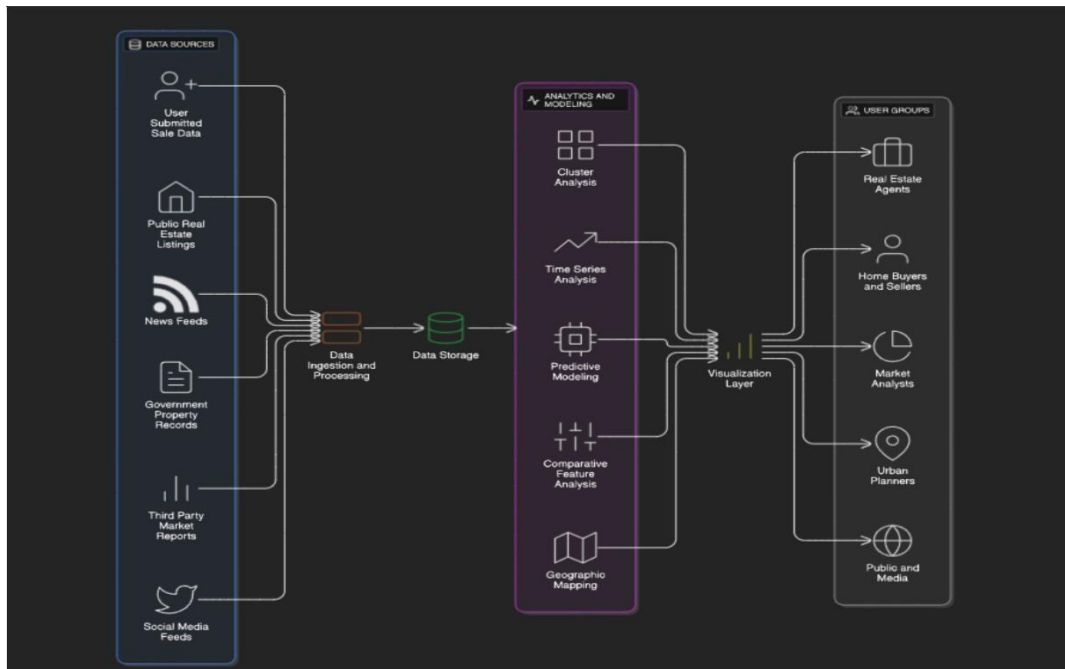
Components & Technologies S.No Component   Description   Technology

S.No	Component	Description	Technology
1	User Interface	Web access to visual dashboards	Web UI using Tableau Public
2	Application Logic-1	Data pre-cleaning and transformation	Python (Pandas, NumPy)
3	Application Logic-2	Dashboard logic, filters, calculated fields	Tableau Desktop
4	Application Logic-3	Interactive story design	Tableau Story Builder
5	Database	Structured data in tabular format	CSV file (Transformed Housing Data)
6	Cloud Database	Optional sync with Google Sheets or Tableau Online	Google Sheets / Tableau Cloud

7	File Storage	Storing housing datasets	Google Drive / Local File System
8	External API-1	(Not used in current scope)	N/A
9	External API-2	(Not used in current scope)	N/A
10	Machine Learning Model	Future enhancement for price prediction	Python Regression Model (optional)
11	Infrastructure	Deployment & Hosting	Local System, Tableau Public (Cloud)

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 behavior.

❏ 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.
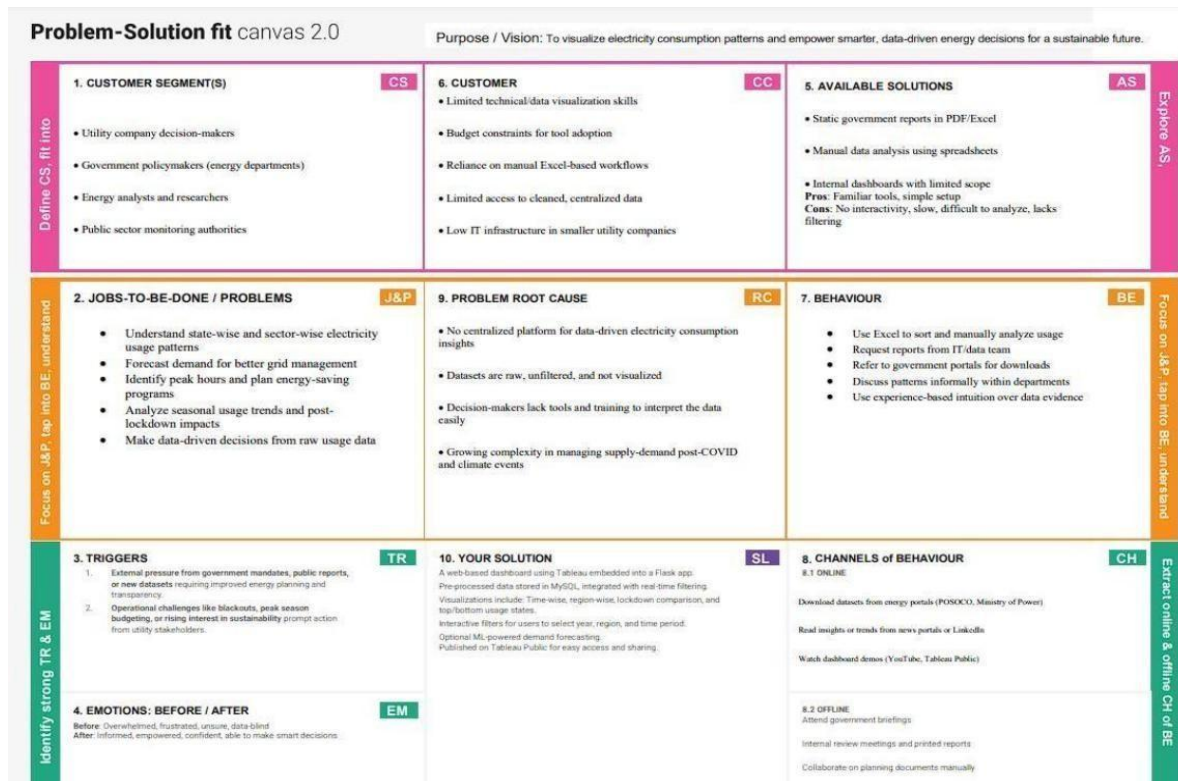
4.2 Proposed Solution Template

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Identifying the housing features—such as renovation age, total area, and house condition—that significantly influence sale prices is difficult due to unstructured, raw real estate data. Most users lack tools or skills to interpret this data effectively.
2.	Idea / Solution description	An interactive Tableau dashboard that analyzes housing data and visualizes trends based on key features like sale price, number of bedrooms, renovations, and floor area. Users can filter, compare, and explore insights in real-time.
3.	Novelty / Uniqueness	Unlike static listings or Excel reports, this solution offers interactive, visual exploration of housing market trends using Tableau. It combines spatial, temporal, and feature-based analysis for deeper insight.

4.	Social Impact / Customer Satisfaction	Helps homebuyers and investors make informed decisions. Enhances data transparency in the housing market, reduces agent dependency, and supports digital literacy in real estate analysis.
5.	Business Model (Revenue Model)	Can be monetized by offering it to real estate companies, property consultants, or data platforms as a SaaS tool or subscription-based dashboard service.
6.	Scalability of the Solution	Highly scalable to multiple cities or countries by plugging in local housing datasets or APIs. The model is reusable across various geographies and data sources.

4.2 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.

• 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.

Solution Architecture: Visualizing Housing Market Trends using Tableau
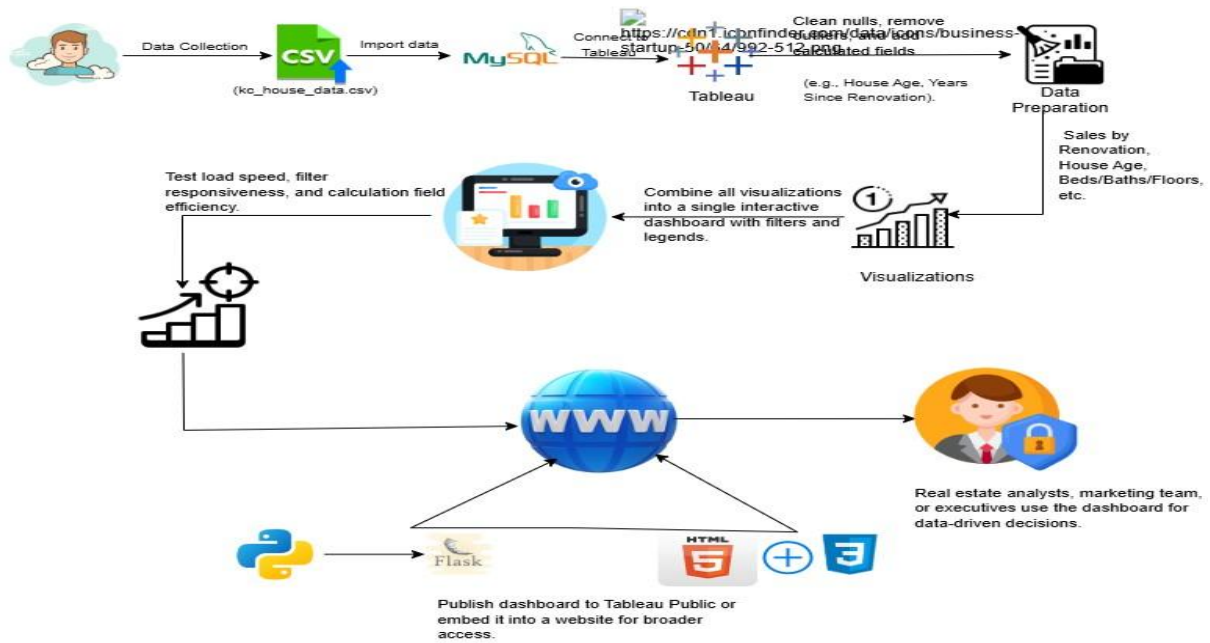
5. Project planning & scheduling

5.1 Project Planning

User Story / Task Sprin 1	Poin	Priority	Assigned To
Data Setup – USN-1	3	High	Dola Gowthami
Data Cleaning – USN-2	4	High	Annamdevula Hema
Field Creation – USN-3	2	Medium	Dola Gowthami
Price Binning – USN-4	2	Medium	Annamdevula Hema

User Story / Task	Poin	Priority	Assigned To
USN-5 – Create charts: price vs features	5	High	Dola Gowthami

User Story / Task	Poin	Priority	Assigned To
USN-6 – Build interactive Tableau dashboard with filters	3	High	Annamdevula Hema
USN-7 – Style the dashboard for readability	2	Medium	Dola Gowthami

Sprin 3: Styling & Integration

User Story / Task	Poin	Priority	Assigned To

User Story / Task	Poin	Priority	Assigned To
USN-8 – Tableau Storytelling (step-by-step insights)	2	Medium	Annamdevula Hema
USN-9 – Embed Tableau dashboard into Flask	4	High	Dola Gowthami
USN-10 – UI Testing for embedded dashboard	2	Medium	Annamdevula Hema
USN-11 – Final project documentation	3	High	Dola Gowthami
USN-12 – Demo preparation and rehearsal	2	Medium	Both
USN-13 – Bug fixing and QA	2	Medium	Both

Project Tracker, Velocity & Burndown Chart

Sprint	Total Story Points	Duration	Start Date	End Date	Points Completed	Release Date
Sprint 1	11	4 Days	20 June 2025	23 June 2025	11	27 June 2025
Sprint 2	8	4 Days	24 June 2025	27 June 2025	10	1 July 2025
Sprint 3	10	4 Days	28 June 2025	01 July 2025	7	5 July 2025
Sprint 4	6	4 Days	02 July 2025	05 July 2025	7	9 July 2025

Velocity Chart Summary

- **Velocity (Completed Points / Sprint)**:
  - Sprint 1: 9 o
  - Sprint 2: 6 o
  - Sprint 3: 7
- **Average Velocity** (first 3 sprints): **AV =28/9≈3.11story points/day**

Burndown Chart Data
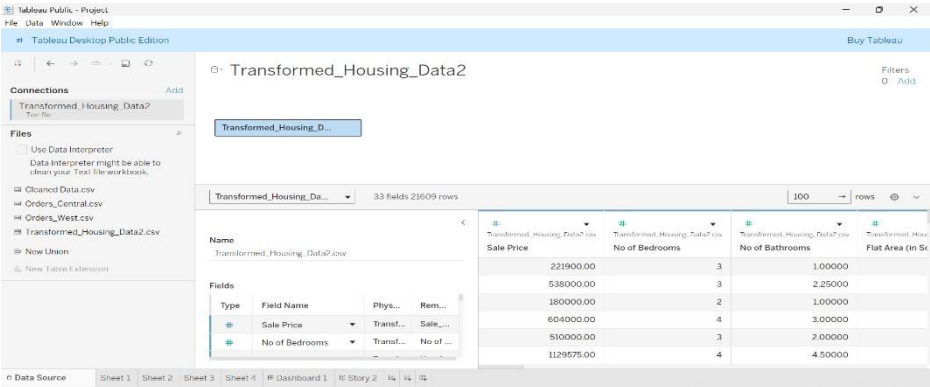
Assume total backlog = **35 Story Points**

Sprint	Remaining Points (Start)	Completed	Remaining Points (End)
Sprint 1	35	9	26
Sprint 2	26	6	20
Sprint 3	20	7	13
Sprint 4	13	TBD	TBD

Burndown Chart for All Sprints
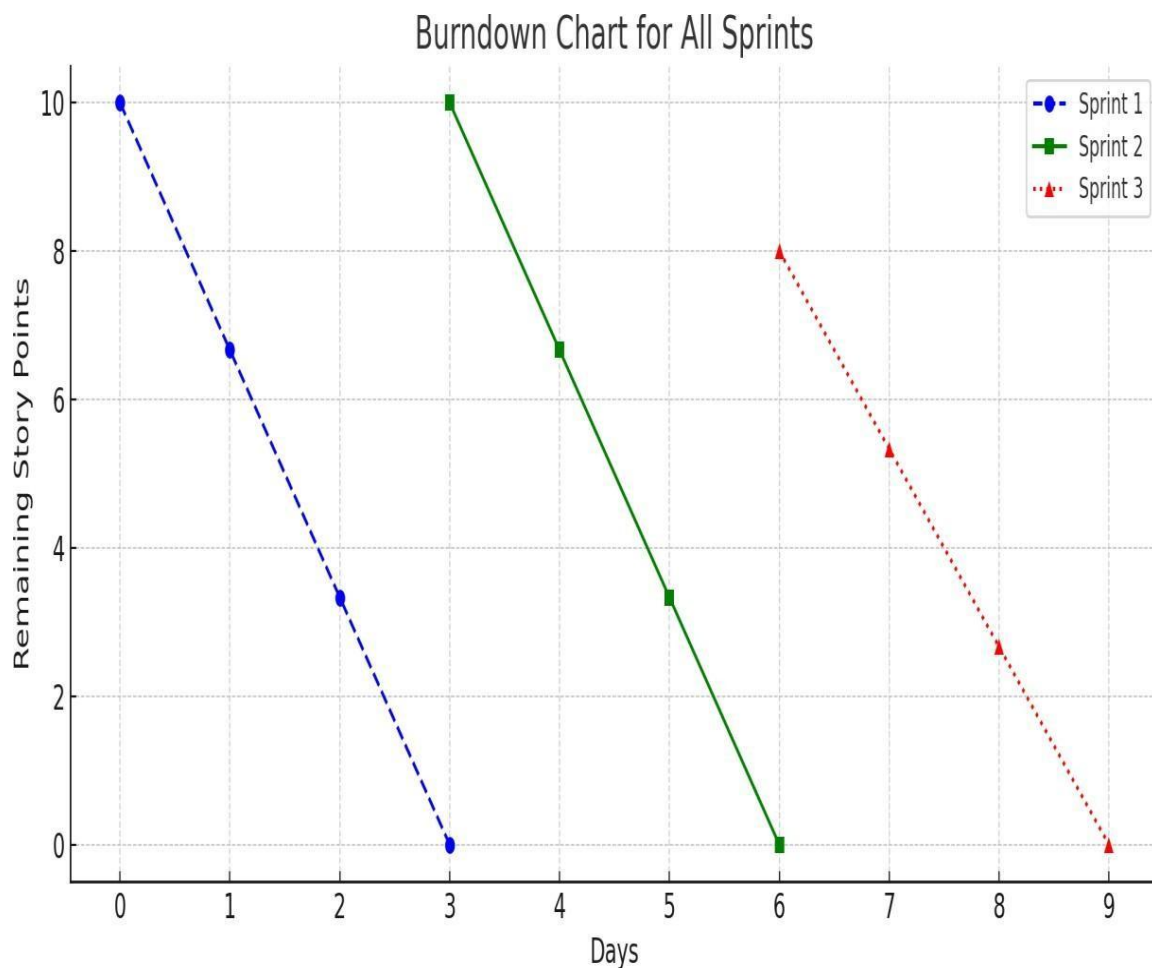
6. Functional and performance testing

6.1 Performance Testing

S.No	Parameter	Screenshot / Values
1.	Data Rendered	Housing data with 21 columns and 2000+ records loaded from CSV into Tableau.

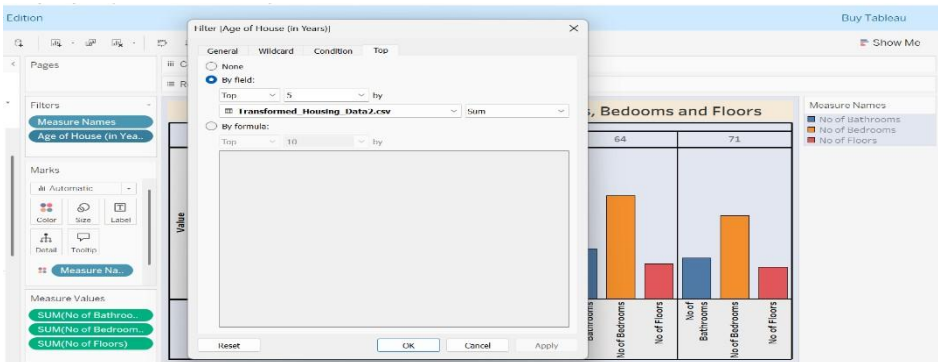| 2.	Data Preprocessing	
		- Removed null values from 'price' and 'renovation date'
3.	Utilization of Filters	Filters applied on: Sales Price Age of House (in years)
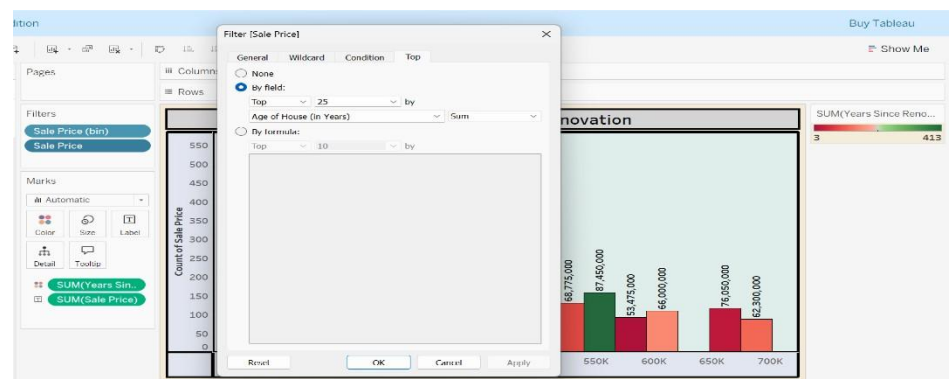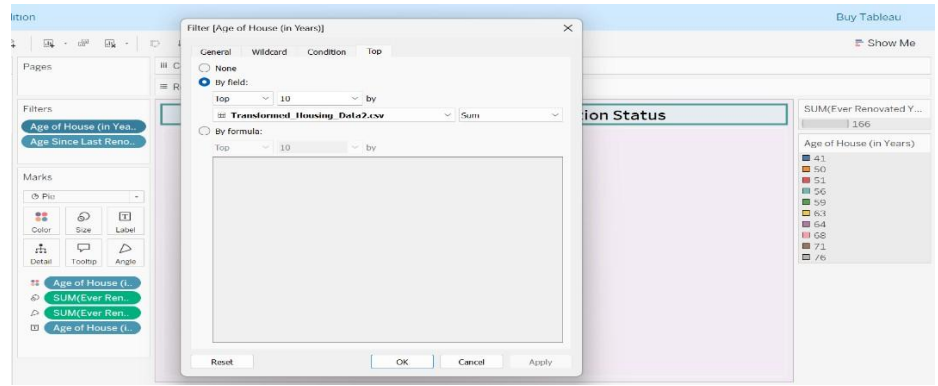
4.	Calculation fields Used	
		Age Since Last Renovation = IF [Ever Renovated Yes] > 0 THEN 'YES' ELSE 'NO' END
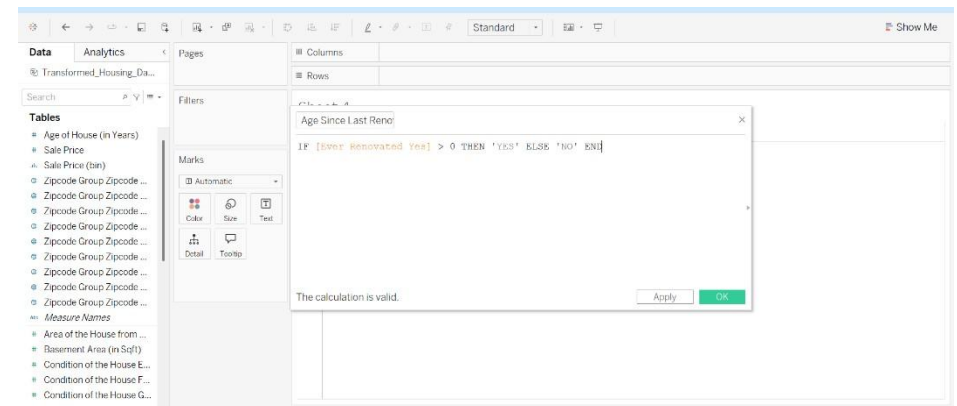
5.	Dashboard design	No of Visualizations / Graphs – Total
		Sales By Year Since Renovation
		Distribution of House Age by Renovation Status
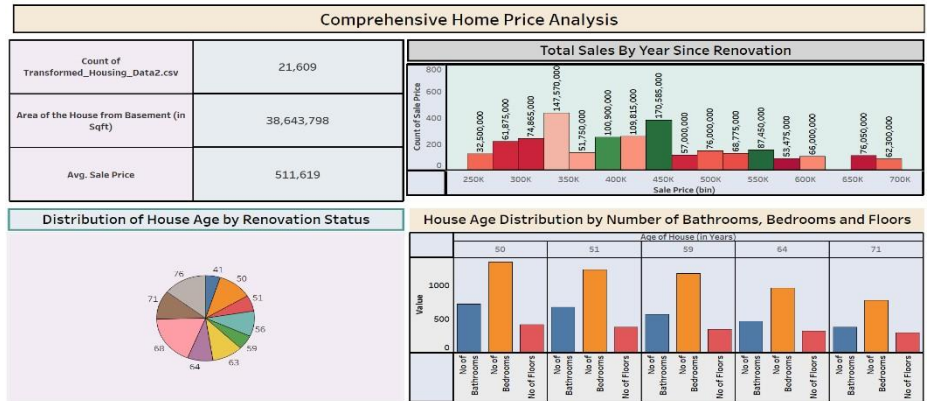
House Age Distribution by Number of Bathrooms, Bedrooms and Floors

6	Story Design	No of Visualizations / Graphs – Stort
		include 4 Sheets.

	House age distribution is more influenced by the number of bedrooms compared tp bathrooms and floors.	The importance of recent renovations in boosting property sales.	The age of houses varies based on their renovation status, providing a comprehensive overview.	Total Count of Transformed Housing data and Area of the House from Basement and Average Sales priice

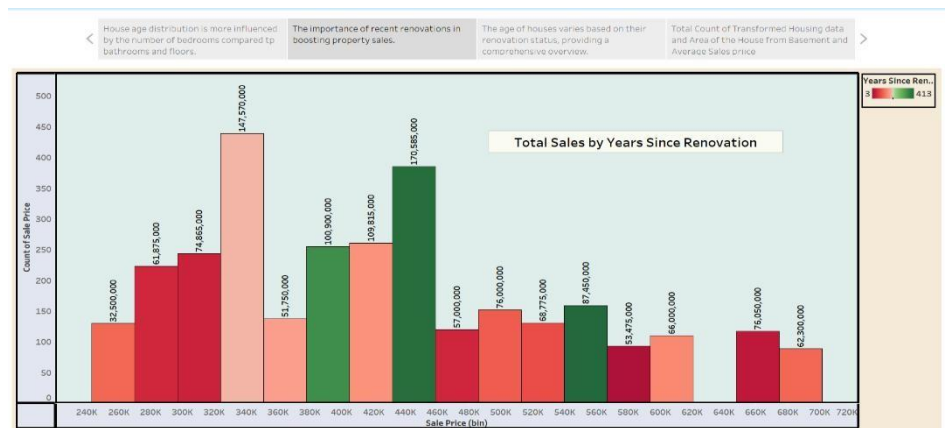| Count of Transformed_Housing_Data2.csv	21,609
Area of the House from Basement (in Sqft)	38,643,798
Avg. Sale Price	511,619

	House age distribution is more influenced by the number of bedrooms compared tp bathrooms and floors.	The importance of recent renovations in boosting property sales.	The age of houses varies based on their renovation status, providing a comprehensive overview.	Total Count of Transformed Housing data and Area of the House from Basement and Average Sales price

Distribution of House Age by Renovation Status

Ever Renovated ..
166

Age of House (in..
- 41
- 50
- 51
- 56
- 59
- 63
- 64
- 68
- 71
- 76

7. Results

7.1 Output Screenshots

Output of Sheet 1

Output of Sheet 2

Output of Sheet 3
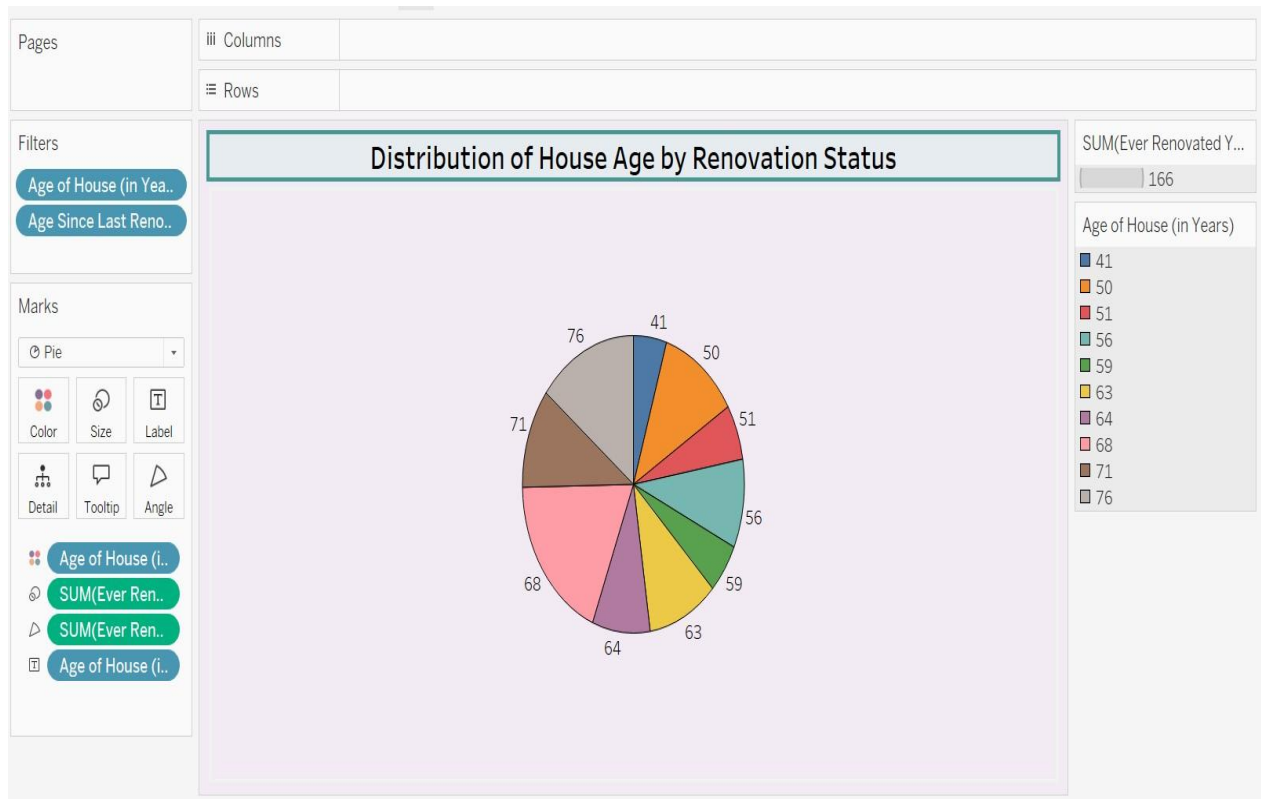
Output of Sheet 4

Output of Dashboard

Output of Story
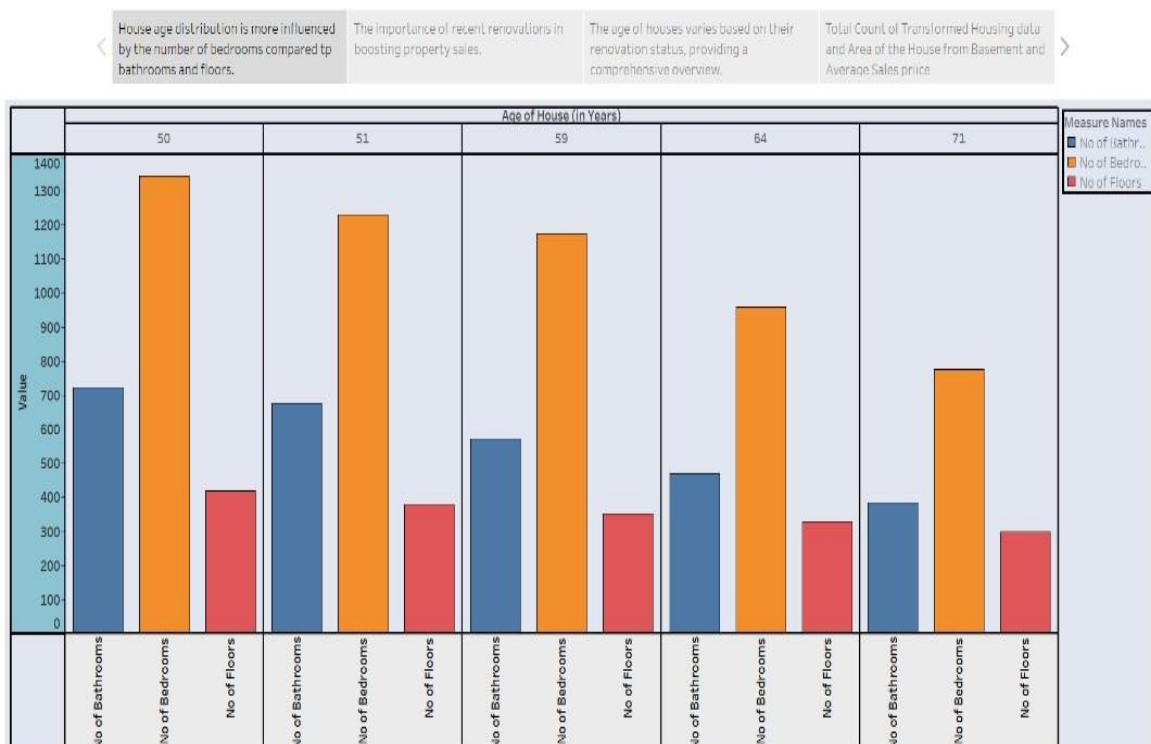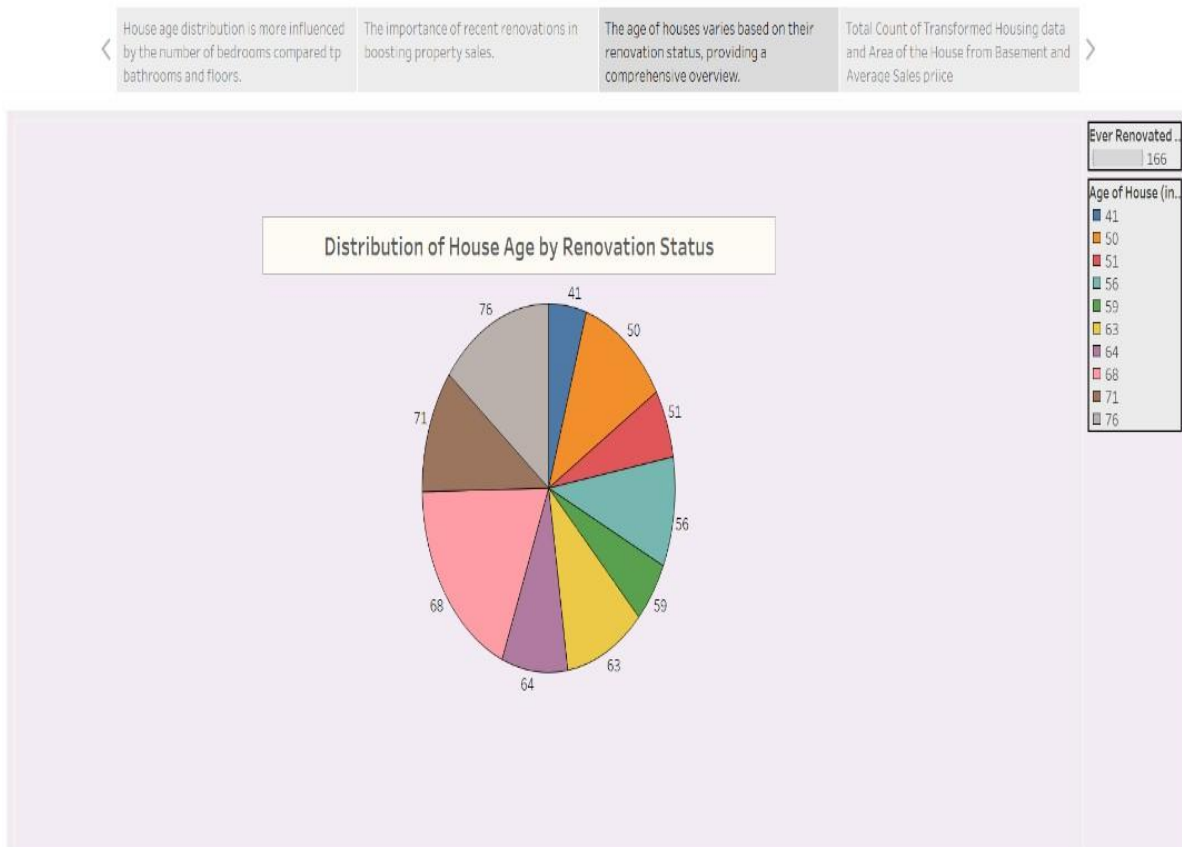
Years Since Ren..
3 — 413

Total Sales by Years Since Renovation

Bar chart labels (left to right):
- 32,500,000
- 61,875,000
- 74,865,000
- 147,570,000
- 51,750,000
- 100,900,000
- 109,815,000
- 170,585,000
- 57,000,000
- 76,000,000
- 68,775,000
- 87,450,000
- 53,475,000
- 66,000,000
- 76,050,000
- 62,300,000

Y-axis: Count of Sale Price (0 to 500)

X-axis: Sale Price (bin) — 240K, 260K, 280K, 300K, 320K, 340K, 360K, 380K, 400K, 420K, 440K, 460K, 480K, 500K, 520K, 540K, 560K, 580K, 600K, 620K, 640K, 660K, 680K, 700K, 720K

Ever Renovated ..
166

Age of House (in..
- 41
- 50
- 51
- 56
- 59
- 63
- 64
- 68
- 71
- 76

Distribution of House Age by Renovation Status

Pie chart segments labeled: 41, 50, 51, 56, 59, 63, 64, 68, 71, 76

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

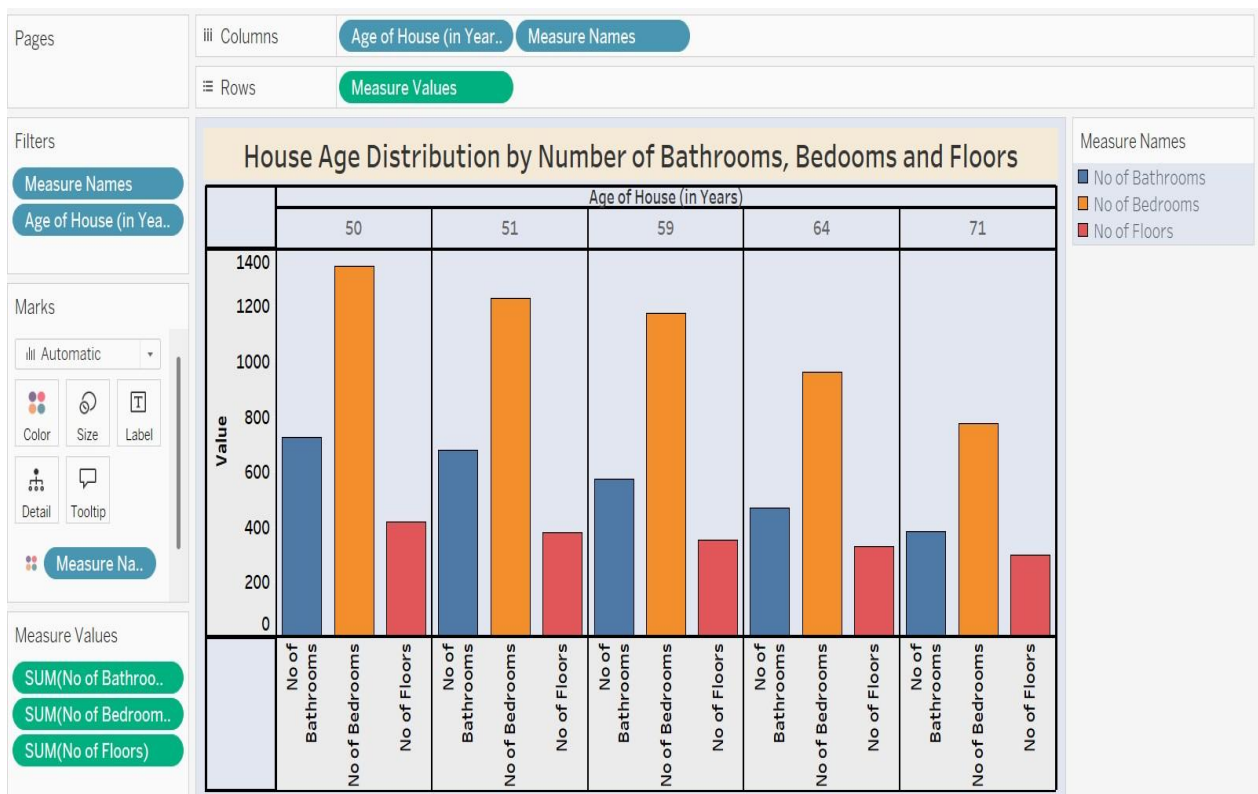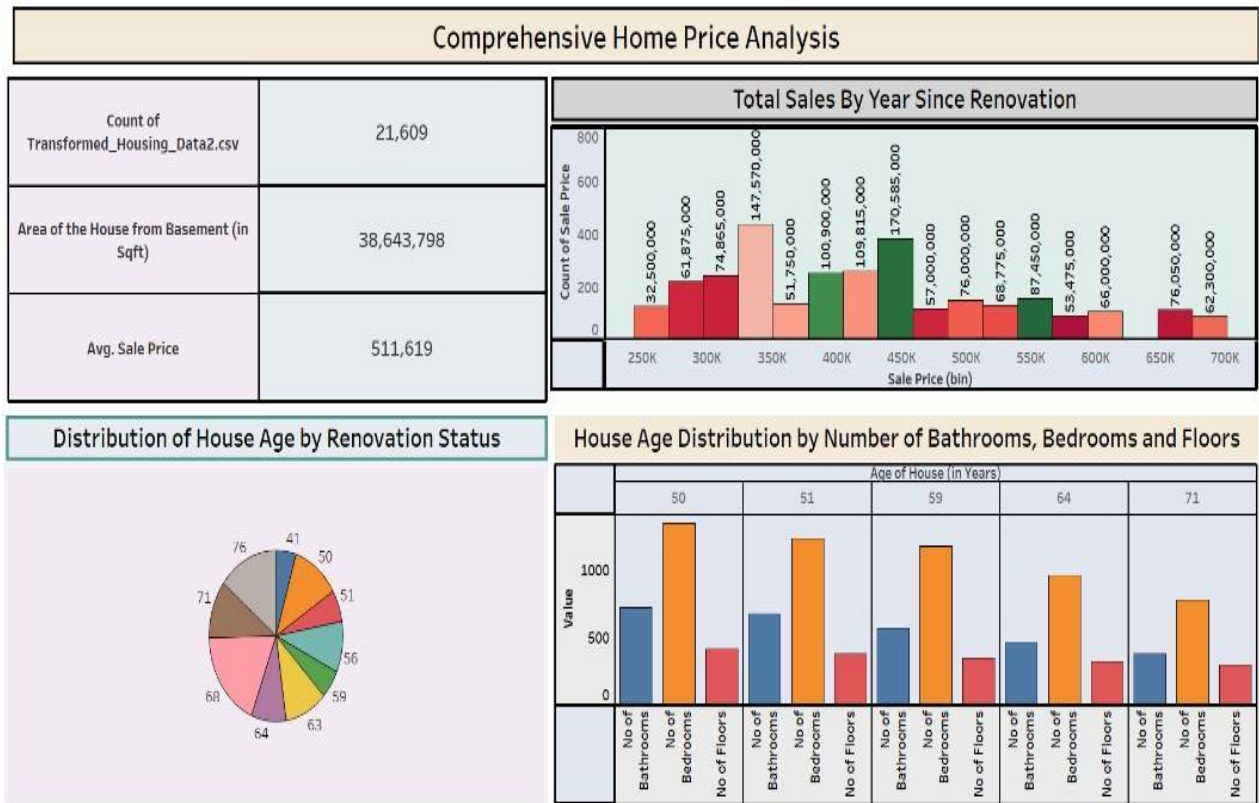**Tableau public Dashboard link:**

https://public.tableau.com/app/profile/gowthami.dola/viz/Project_17512069507510/Dashboard1?publish=yes

Tableau public Story link:

https://public.tableau.com/app/profile/gowthami.dola/viz/HousetrendsStory/HouseStory?publish=yes

Output of Web Site:

Home   About   Dashboard   Story

Welcome to the Housing Market Visualization App

Explore housing price trends, uncover insights, and understand how features like location, size, and year built impact the cost of homes. Powered by Tableau visualizations and a user-friendly Flask interface.

[Get Started]

Home   About   Dashboard   Story

About the Project

Project Title: *Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau*

This project focuses on uncovering key insights into the housing market by analyzing sale prices in relation to various features such as location, square footage, number of bedrooms/bathrooms, and year built.

Using **Tableau**, we have built interactive visualizations and dashboards that help users explore and understand trends in the housing market over time. The data is visually represented through charts, graphs, maps, and storytelling dashboards that make the analysis intuitive and insightful.

Objectives

- To identify the major factors influencing house prices.
- To visualize how house prices vary by region and over time.
- To enable users to interactively explore the data and draw conclusions.

Tools & Technologies Used

- **Flask** – Python framework used to build the web application.
- **Tableau Public** – Used to create and host the dashboards and storyboards.
- **HTML/CSS** – For building the front-end user interface.

Why Tableau?

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Comprehensive Home Price Analysis

Comprehensive Home Price Analysis

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

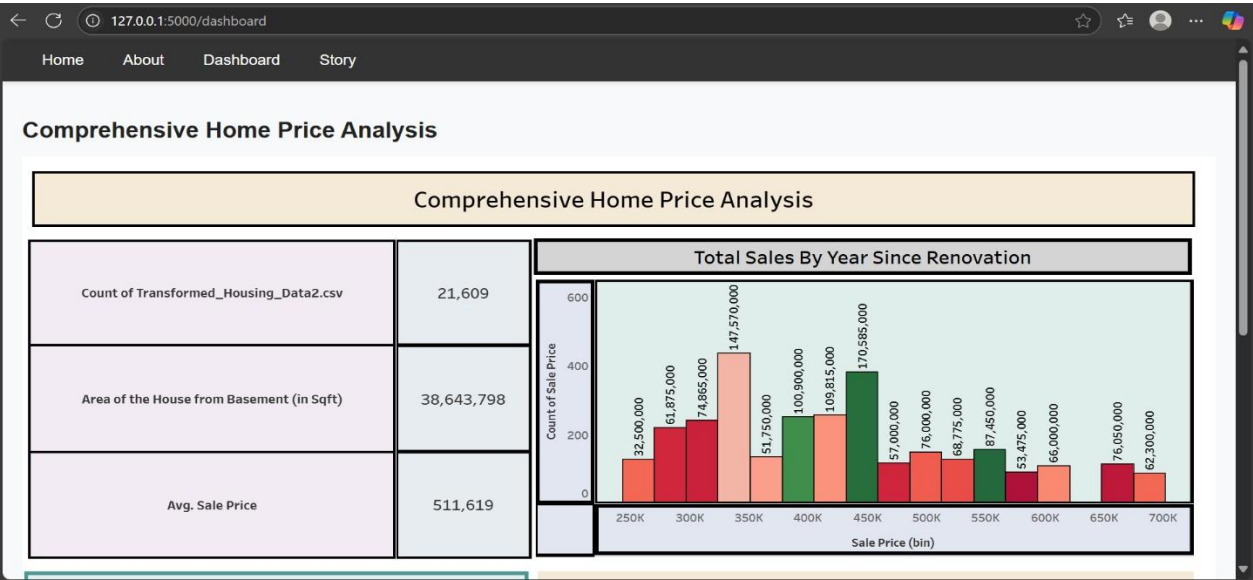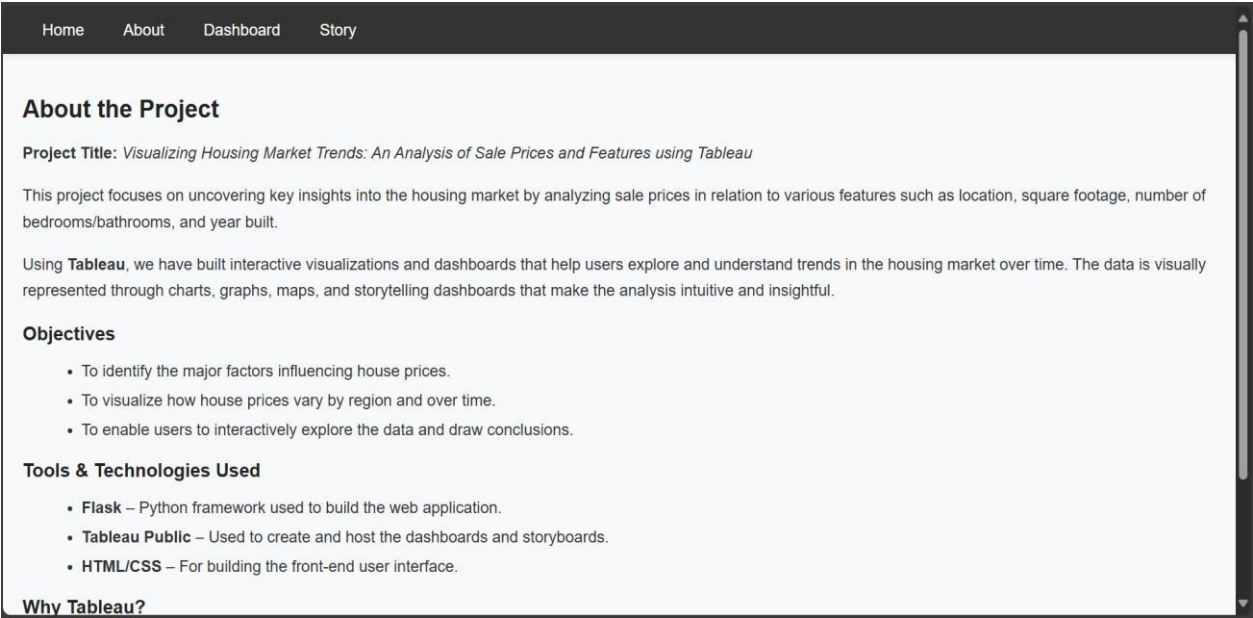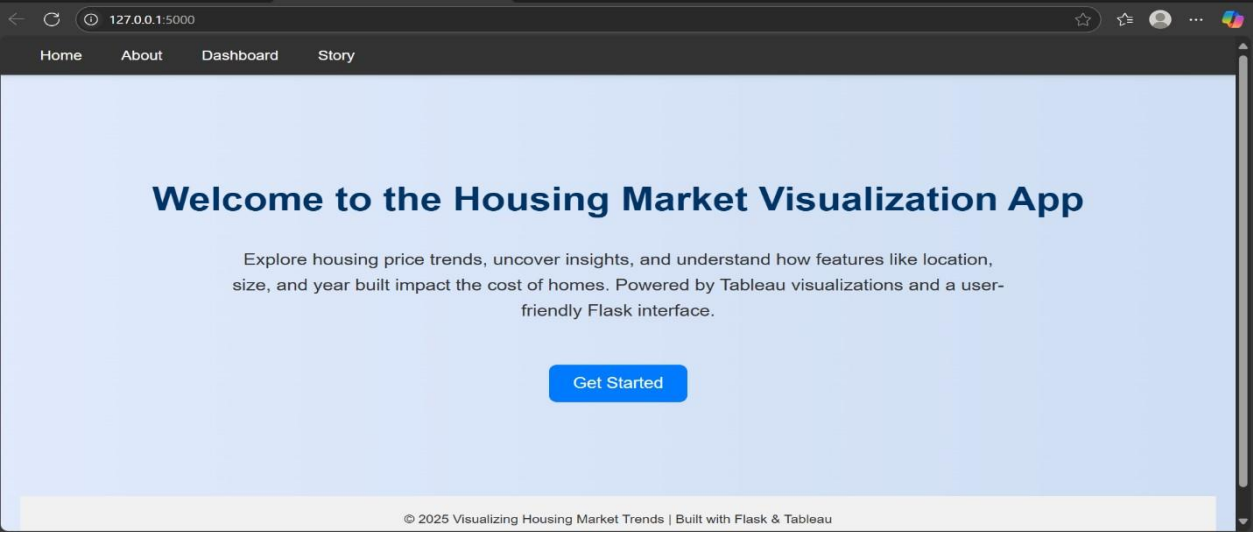Total Sales By Year Since Renovation

8. Advantages & disadvantages

Advantages of Customer Journey Mapping

1. **User-Centric Understanding**

   Helps you step into the customer's shoes and understand their needs, pain points, and expectations.

2. **Improved Experience Design**

   Enables you to design dashboards and insights that are intuitive and aligned with real user behaviour.

3. **Identifies Gaps & Opportunities**

   Clearly shows which steps in the journey are frustrating or inefficient, guiding improvement.

4. **Cross-Functional Alignment**

   Facilitates better communication between developers, analysts, marketing, and end-users.

5. **Data-Driven Decisions**

   Supports better prioritization of features or content that improve the overall user journey.

6. **Increased User Satisfaction**

   Helps ensure smoother and more satisfying interactions with the dashboard and insights.

Disadvantages of Customer Journey Mapping

1. **Time-Consuming to Create**

   Mapping each journey in detail (especially for multiple personas) takes time and resources.

2. **Requires Real User Research**

   Without real user interviews or observations, assumptions can lead to misleading conclusions.

3. **Complex for Multiple Journeys**

   Different user types may require separate maps, making management harder.

4. **May Oversimplify Reality**

   A CJM is a model — it might not capture every edge case or complex path.

5. **Not Always Actioned Upon**

   Insights from CJMs may be ignored if there's no follow-through by teams or decisionmakers.

6. **Needs Regular Updating**

   Customer behaviours and technology evolve — your journey map can quickly become outdated.

9. Conclusion:

The project effectively utilized Tableau to visualize and analyze housing market data, focusing on key factors such as renovation history, house age, number of bedrooms/bathrooms, and sale prices. Through interactive dashboards, we uncovered trends and patterns that support strategic decision-making for stakeholders like real estate analysts and company executives.

The visualizations provided clear insights into:

- The impact of renovations on house prices
- Preferences based on house features like bathrooms and floors
- Distribution of house age and its relationship to sales trends
- Geographic segmentation through zip code groupings

By transforming raw data into intuitive dashboards, the project bridges the gap between complex housing data and actionable business intelligence.

Future Scope

While the current project offers meaningful insights, there is significant scope for future enhancements:

1. **Integration of Real-Time Data** ○ Connect dashboards to a live data source (e.g., via APIs or Google Sheets) to keep insights up-to-date.

2. **Predictive Analytics with Machine Learning** ○ Use regression or classification models to forecast house prices based on features.

3. **Enhanced Geographic Visualizations** ○ Incorporate heat maps or interactive maps based on latitude/longitude or zip codes.

4. **User Personalization** ○ Allow users to save filters or generate custom reports based on their use case.

5. **Mobile Dashboard Optimization** ○ Make visualizations more responsive and accessible on mobile devices for realtime field access.

6. **Integration with CRM/ERP Systems** ○ Embed Tableau dashboards into business systems to align insights with operations.

7. **Advanced Filtering & Drill-Down Capabilities** ○ Enable multi-layered filtering (e.g., filter by renovation, then by bathroom count)

10. Appendix

Source Code:

about.html

```
{% extends "base.html" %}
{% block title %}About{% endblock %}
{% block content %}
<h2>About the Project</h2>

<p>
    <strong>Project Title:</strong> <em>Visualizing Housing Market Trends: An Analysis of Sale
Prices and Features using Tableau</em>
</p>
<p>
    This project focuses on uncovering key insights into the housing market by analyzing sale
prices in relation to various features such as location, square footage, number of
bedrooms/bathrooms, and year built.
</p>
<p>
    Using <strong>Tableau</strong>, we have built interactive visualizations and dashboards that
help users explore and understand trends in the housing market over time. The data is visually
represented through charts, graphs, maps, and storytelling dashboards that make the analysis
intuitive and insightful.
</p>
<h3>Objectives</h3>
<ul>
    <li>To identify the major factors influencing house prices.</li>
    <li>To visualize how house prices vary by region and over time.</li>
    <li>To enable users to interactively explore the data and draw conclusions.</li> </ul>
<h3>Tools & Technologies Used</h3>
<ul>
```


Flask – Python framework used to build the web application.
Tableau Public – Used to create and host the dashboards and storyboards.
HTML/CSS – For building the front-end user interface.

<h3>Why Tableau?</h3>
<p>
    Tableau was chosen for its powerful data visualization capabilities and ease of use. It allows for the creation of dynamic dashboards and storylines that make the data not only more accessible but also more actionable for users and stakeholders.
</p>
<p>
    Through this project, we aim to demonstrate how visual analytics can simplify complex datasets and empower better decision-making in real estate and beyond.
</p>
{% endblock %}

Base.html:

```
<!DOCTYPE html>
<html>
<head>
    <title>{% block title %}My Tableau App{% endblock %}</title>
    <link rel="stylesheet" href="{{ url_for('static', filename='style.css') }}">
    <style>        body {          font-
family: Arial, sans-serif;
margin: 0;
        }
    .navbar
{          background-color:
#333;          overflow: hidden;
display: flex;
        }
    .navbar a {            color:
white;          padding: 14px
20px;          text-decoration:
none;
        display: block;
        }
    .navbar a:hover {
        background-color: #575757;
        }
    .container {
        padding: 20px;
        }          iframe
{          width:
100%;          height:
80vh;          border:
none;
```

```
        margin-top: 20px;
    }
  </style>
</head>
<body>
<div class="navbar">
   <a href="{{ url_for('home') }}">Home</a>
   <a href="{{ url_for('about') }}">About</a>
   <a href="{{ url_for('dashboard') }}">Dashboard</a>
   <a href="{{ url_for('story') }}">Story</a>
</div>
<div class="container">
   {% block content %}{% endblock %}
</div>
</body>
</html>
```

Dashboard.html:

```
{% extends "base.html" %}
{% block title %}Dashboard{% endblock %}
{% block content %}
<h2>Comprehensive Home Price Analysis</h2>
<!-- Tableau JavaScript Embed -->
<div class='tableauPlaceholder' id='viz1751207840512' style='position: relative'>
<noscript>
   <a href='#'>
     <img alt='Comprehensive Home Price Analysis '

src='https://public.tableau.com/static/images/Pr/Project_17512069507510/Dashboard1/1_r
ss.png'         style='border: none' />
   </a>
 </noscript>
  <object class='tableauViz' style='display:none;'>
   <param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
   <param name='embed_code_version' value='3' />
   <param name='site_root' value='' />
   <param name='name' value='Project_17512069507510/Dashboard1' />
   <param name='tabs' value='no' />
   <param name='toolbar' value='yes' />
<param name='static_image'
        value='https://public.tableau.com/static/images/Pr/Project_17512069507510/Dashboard1/
1.png' />
   <param name='animate_transition' value='yes' />
   <param name='display_static_image' value='yes' />
   <param name='display_spinner' value='yes' />
   <param name='display_overlay' value='yes' />
   <param name='display_count' value='yes' />
```

```
  <param name='language' value='en-US' />
  <param name='filter' value='publish=yes' />
 </object>
</div>
<script type='text/javascript'>
 var divElement = document.getElementById('viz1751207840512');
var vizElement = divElement.getElementsByTagName('object')[0];
if (divElement.offsetWidth > 800) {    vizElement.style.width =
'100%';    vizElement.style.height = (divElement.offsetWidth * 0.75)
+ 'px';
 } else if (divElement.offsetWidth > 500)
{    vizElement.style.width = '100%';
   vizElement.style.height = (divElement.offsetWidth * 0.75) + 'px';
 } else {
   vizElement.style.width = '100%';
vizElement.style.height = '1277px';
 } var scriptElement =

document.createElement('script'); scriptElement.src =

'https://public.tableau.com/javascripts/api/viz_v1.js';

vizElement.parentNode.insertBefore(scriptElement,

vizElement);

</script>

{% endblock %}
```

Home.html:

```
{% extends "base.html" %}
{% block title %}Home{% endblock %}
{% block content %}
<style>
  /* Optional background gradient */
  body {       background: linear-gradient(to right, #e0eafc,
#cfdef3);
  }
  .home-container
{       display: flex;
flex-direction: column;
align-items: center;
justify-content: center;
min-height: 75vh;        text-
align: center;
```

```css
    }
    .home-container h2
{        font-size: 2.5rem;
margin-bottom: 15px;
        color: #003366;
    }
    .home-container p {        max-
width: 800px;        font-size:
1.2rem;        line-height: 1.6;
margin-bottom: 30px;        color:
#333;
    }
    .get-started-btn
{        display: inline-block;
padding: 12px 24px;
font-size: 18px;
        color: white;        background-
color: #007BFF;        border-radius:
8px;
        text-decoration: none;        transition:
background-color 0.3s ease;
  }

  .get-started-btn:hover {
      background-color: #0056b3;
    }
    footer {
        text-align: center;
        padding: 20px;
background: #f1f1f1;
margin-top: 40px;        font-size:
14px;
    }
    @media (max-width: 600px) {        .home-
container h2 {
        font-size: 2rem;
      }
      .home-container p {
        font-size: 1rem;
      }
    }
</style>
<div class="home-container">
    <h2>Welcome to the Housing Market Visualization App</h2>
    <p>
        Explore housing price trends, uncover insights, and understand how features like location,
size, and year built impact the cost of homes.
        Powered by Tableau visualizations and a user-friendly Flask interface.
```

```
    </p>
    <a href="{{ url_for('dashboard') }}" class="get-started-btn">Get Started</a>
</div>
<footer>
    &copy; 2025 Visualizing Housing Market Trends | Built with Flask & Tableau </footer>
{% endblock %}
```

Story.html:

```
{% extends "base.html" %}
{% block title %}Story{% endblock %}
{% block content %}
<h2>House Trends Story</h2>
<!-- Tableau Story Embed -->
<div class='tableauPlaceholder' id='viz1751213022339' style='position: relative'>
<noscript>
    <a href='#'>
      <img alt='House Story'
        src='https://public.tableau.com/static/images/Ho/HousetrendsStory/HouseStory/1_rss.png'
style='border: none' />
    </a>
 </noscript>
 <object class='tableauViz' style='display:none;'>
  <param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
  <param name='embed_code_version' value='3' />
  <param name='site_root' value='' />
   <param name='name' value='HousetrendsStory/HouseStory' />
   <param name='tabs' value='no' />
   <param name='toolbar' value='yes' />
<param name='static_image'
        value='https://public.tableau.com/static/images/Ho/HousetrendsStory/HouseStory/1.png'
/>
    <param name='animate_transition' value='yes' />
    <param name='display_static_image' value='yes' />
    <param name='display_spinner' value='yes' />
    <param name='display_overlay' value='yes' />
    <param name='display_count' value='yes' />
    <param name='language' value='en-US' />
    <param name='filter' value='publish=yes' />
  </object>
</div>
<script type='text/javascript'>
  var divElement = document.getElementById('viz1751213022339');   var
vizElement = divElement.getElementsByTagName('object')[0];
vizElement.style.width = '100%';   vizElement.style.height =
(divElement.offsetWidth * 0.75) + 'px';   var scriptElement =
```

```
document.createElement('script');   scriptElement.src =
'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);
</script>
{% endblock %}
```

app.py

```
from flask import Flask, render_template

app = Flask(__name__) @app.route('/')

def home():

    return render_template('home.html')

@app.route('/about') def

about():

    return render_template('about.html')

@app.route('/dashboard') def dashboard():    return render_template('dashboard.html')

# Tableau JS embed is already in HTML

@app.route('/story') def

story():

    return render_template('story.html')    # Tableau JS embed is already in HTML if

__name__ == '__main__':

    app.run(debug=True)
```

Project Structure

```
flask_tableau_ui/
│
├── app.py # Flask application
├── static/
│   └── style.css # CSS styling
├── templates/
│   ├── base.html # Base layout with navbar
│   ├── home.html # Home page with Get Started
│   ├── about.html # Project description
│   ├── dashboard.html # Tableau dashboard embedded
│   └── story.html # Tableau story embedded
```

Dataset Link

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