

PROJECT REPORT

Team ID: LTVIP2025TMID50619

1. INTRODUCTION

1.1 Project Overview

The “Visualization – Housing Market Trends: An Analysis of Sales Price and Features Using Tableau” Project aims to provide a comprehensive and interactive exploration of housing market dynamics. It Leverages a dataset containing various property attributes (like sales price, number of bedrooms / bathrooms, living area, location, condition, etc.) to uncover patterns, trends, and key factors Influencing housing values. The core deliverable is a set of interactive dashboards in Tableau, Allowing users to delve into the data and gain actionable insights.

1.2 Purpose

The main goal is to provide clear, data-driven insights for stakeholders like buyers, sellers, and real Estate professionals. This enables them to make informed decisions by understanding price determinants, market trends over time and geography, and overall housing market health. It also serves to demonstrate proficiency in data visualization using Tableau.

2. IDEATION PHASE

2.1 Problem Statement



2.2 Empathy Map Canvas

PROJECT REPORT

Team ID: LTVIP2025TMID50619



2.3 Brainstorming

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

PROJECT REPORT

Team ID: LTVIP2025TMID50619

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

PROJECT REPORT

Team ID: LTVIP2025TMID50619

Stage	Actions & Touchpoints	Experience & Emotions	Pain Points	Opportunities	Goals
Awareness	<ul style="list-style-type: none"> - Sees dashboard via social media, real estate newsletter, or Tableau Public - Reads project summary/title 	Curious, Interested	Unsure if dashboard is relevant	Use clear, benefit-driven headlines and visuals	Attract interest, set expectations
Consideration	<ul style="list-style-type: none"> - Clicks link to access Tableau dashboard - Reads intro, explores navigation 	Engaged, Cautious	Overwhelmed by options, unclear layout	Provide guided walkthrough, streamline navigation	Understand project scope and usability
Exploration	<ul style="list-style-type: none"> - Interacts with filters (location, price, features) - Examines charts (bar, line, bubble, etc.) 	Excited, Inquisitive	Filters confusing, charts slow to load	Add example use cases, optimize performance	Find actionable insights
Decision	<ul style="list-style-type: none"> - Exports charts - Shares insights - Bookmarks or saves dashboard 	Satisfied, Confident	Limited export/share, unclear formats	Offer multiple export/share formats, clear guides	Save/share findings for decision-making
Retention	<ul style="list-style-type: none"> - Subscribes for updates - Returns for new data - Leaves feedback 	Loyal, Empowered	No updates, ignored feedback	Enable notifications, respond to feedback	Stay informed, contribute to improvement

3.2 Solution Requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User registration and login	<ol style="list-style-type: none"> 1. Users shall be able to register with email and password. 2. Users shall receive a verification email upon registration.
FR-2	User roles & access control	<ol style="list-style-type: none"> 1. The system shall have at least three roles: user, realtor, and admin. 2. Admin shall have access to all features and data.

PROJECT REPORT

Team ID: LTVIP2025TMID50619

FR-3	Data intestion and processing	<ol style="list-style-type: none">1. The system shall support CSV and JSON file uploads.2. The system shall integrate with public APIs (e.g., Zillow, Redfin).
FR-4	Data storage	<ol style="list-style-type: none">1. The system shall store property listing with fields like price, location, size, and date.2. The system shall store historical trends per region and property type.
FR-5	Market trend analysis	<ol style="list-style-type: none">1. The system shall calculate average, median, and mode prices over time.2. The system shall group analysis by monthly, quarterly, and yearly intervals.
FR-6	Visualization and reporting	<ol style="list-style-type: none">1. The system shall display line charts for price trends over time.2. The system shall display bar charts for property type distributions.3. The system shall support tooltips and zoom functionality.

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Performance	The system shall respond to user actions (e.g., filtering, loading charts) within 2 seconds under normal load conditions. The system shall process and ingest new housing data within 5 minutes of import initiation.
NFR-2	Scalability	The system shall be able to add more servers to handle increasing loads without downtime. The system shall support housing data growth up to 100 million records without loss of functionality.
NFR-3	Availability	The system shall be available 99.9% of the time, excluding scheduled maintenance. The system shall perform automatic daily backups of all critical data.
NFR-4	Security	The system shall implement OAuth 2.0 or similar for secure login and role-based access control. All sensitive data shall be encrypted in transit using TLS 1.2+ and at rest using AES-256.

PROJECT REPORT

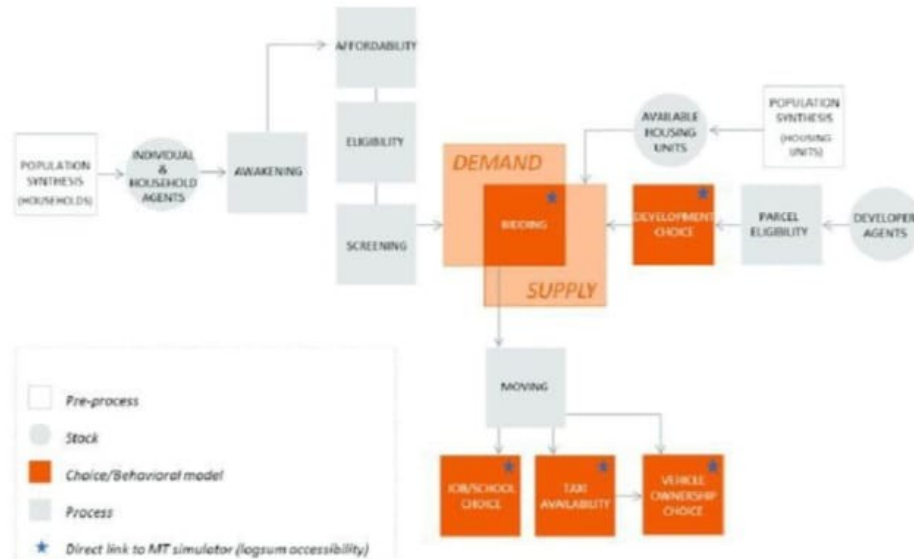
Team ID: LTVIP2025TMID50619

NFR-5	Usability	The user interface shall be intuitive and follow common design standards (e.g., consistent navigation, accessible forms). A new user should be able to complete a basic trend query within 5 minutes of first use without external help.
NFR-6	Reliability	The system shall gracefully recover from hardware or software failures without data loss.

PROJECT REPORT

Team ID: LTVIP2025TMID50619

3.3 Data Flow Diagram

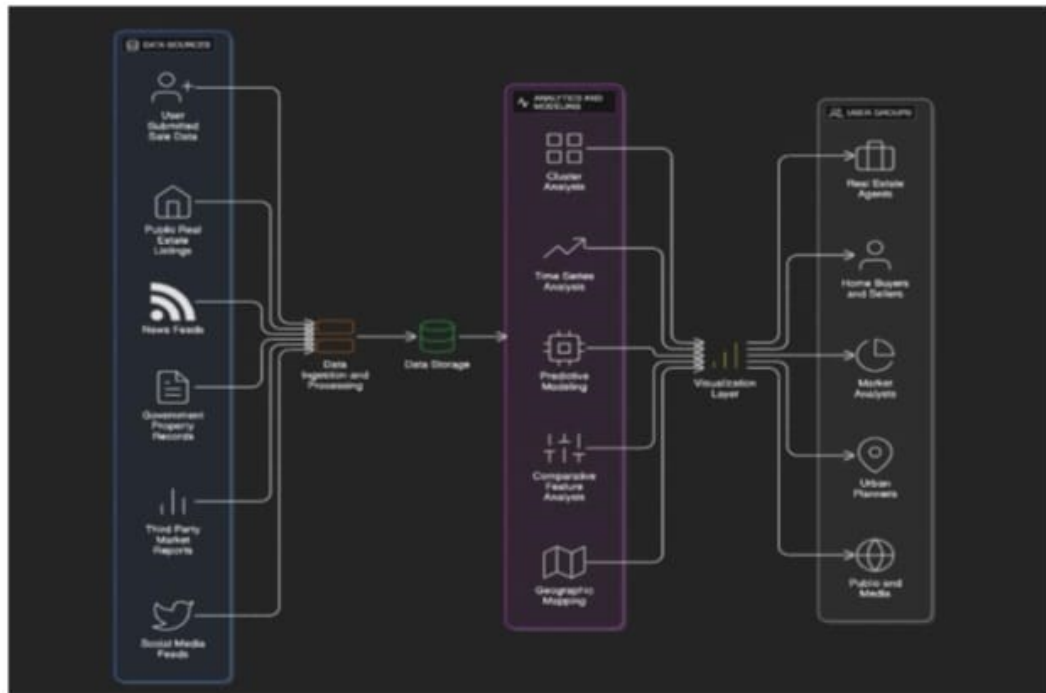


3.4 Technology Stack

Component	Tool/Technology	Purpose
Data Source	CSV, JSON files	Raw data of housing market trends analysis
Visualization	Tableau Desktop	Creating interactive dashboards and stories
Storage	Google Drive / Local	Storing raw and processed datasets
Collaboration	Google Docs, Slack	Team communication and report writing
Deployment	Tableau Public / Server	Dashboard sharing and stakeholder access

PROJECT REPORT

Team ID: LTVIP2025TMID50619



PROJECT REPORT

Team ID: LTVIP2025TMID50619

4. PROJECT DESIGN

4.1 Problem Solution Fit

PROJECT REPORT

Team ID: LTVIP2025TMID50619



PROJECT REPORT

Team ID: LTVIP2025TMID50619

4.2 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Problem: There are not enough homes being built to meet demand, especially in urban and high-growth areas.
0.	Idea / Solution description	Millions of people-especially first-time buyers, remote workers, and middle-income families-can't afford traditional housing. At the same time, sustainable and modular homes exist but are difficult to access, customize, and finance.
0.	Novelty / Uniqueness	This "Housing-as-a-service" approach is novel, especially in the affordable/modular market.
0.	Social Impact / Customer Satisfaction	Impact <ul style="list-style-type: none"> • Reduces housing cost and build time by up to 40% • Promotes energy-efficient living and climate resilience • Helps close the gap between available housing and real-life user needs • Spurs rural and suburban development with smart infrastructure
0.	Business Model (Revenue Model)	Revenue Model <ul style="list-style-type: none"> • Commission from modular builders and land brokers • Premium listing fees for verified sustainable properties • Referral fees from green lenders and installation services • Optional paid add-ons: home design consulting, solar system installation.
0.	Scalability of the Solution	The system can handle growing amounts of data, users, or complexity over time without a significant drop in performance or quality. Here's how scalability plays out in such a solution, broken down by component.

4.3 Solution Architecture

PROJECT REPORT

Team ID: LTVIP2025TMID50619



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint1	Data Collection	USN-2	As a user, I can load data into the processing environment	1	High	ALL
Sprint2		USN-3	As a user, I can handle missing values in the dataset	3	Medium	ALL

PROJECT REPORT

Team ID: LTVIP2025TMID50619

Sprint2	Data Preprocessing	USN-4	As a user, I can encode or map categorical variables appropriately	2	Medium	ALL
Sprint-3	Data Preprocessing	USN-5	As a user, I can build the initial model based on processed data	5	High	ALL
SPRINT - 4	Making Graphs/Visualizations	USN - 6	Dark ui with eye feasted color palette	6	HIGH	ALL
Dashboard & STORIES						
SPRINT - 5	Report & documentation	USN - 7	The step-by-step guide documentation	7	MEDIUM	ALL

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	Rendered from cleaned CSV files with house market trends, Sales price, age of house in hours, no. of floors, rooms.
0.	Data Preprocessing	Null values handled, extra values, unwanted data, Missing values.
3.	Utilization of Filters	1.Measure values. 2.Sales price (sales price bin). 3.Age of the house in years.

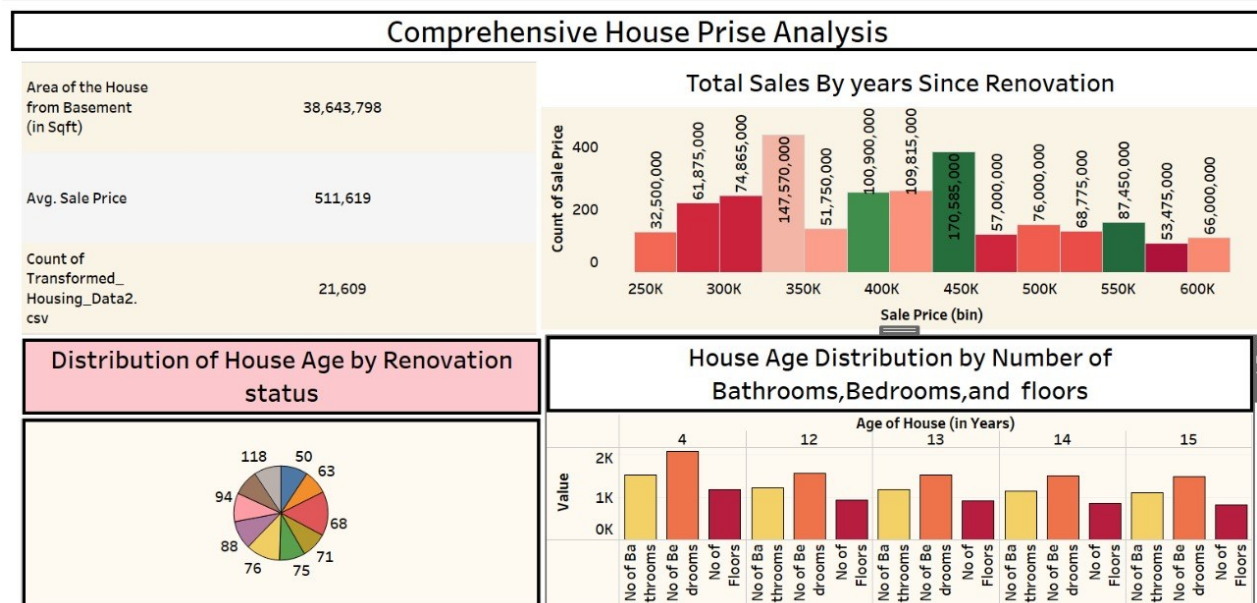
PROJECT REPORT

Team ID: LTVIP2025TMID50619

4.	Calculation fields Used	1.Total sales by years since renovation. 2.House age by renovation. 3.Number of bedrooms, bathrooms, floors.
5.	Dashboard design	No of Visualizations / Graphs - 1 Dashboard.
6	Story Design	No of Visualizations / Graphs - 1 Story with 4 story points.

7. RESULTS

7.1 Output Screenshots DASHBOARDS:

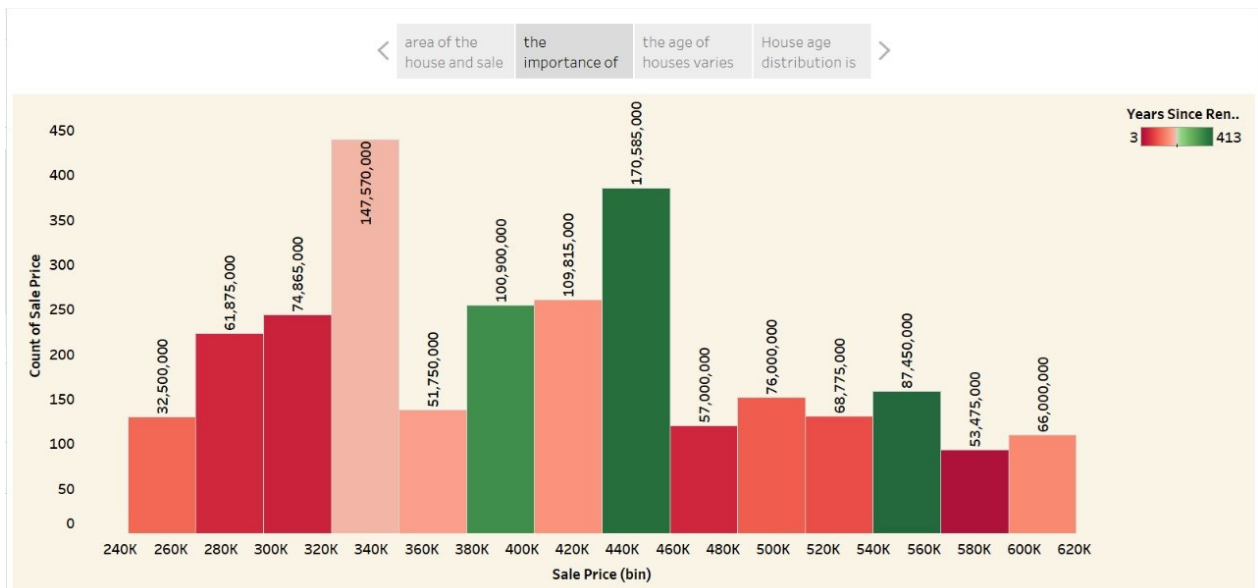


STORY OUTPUTS:

PROJECT REPORT

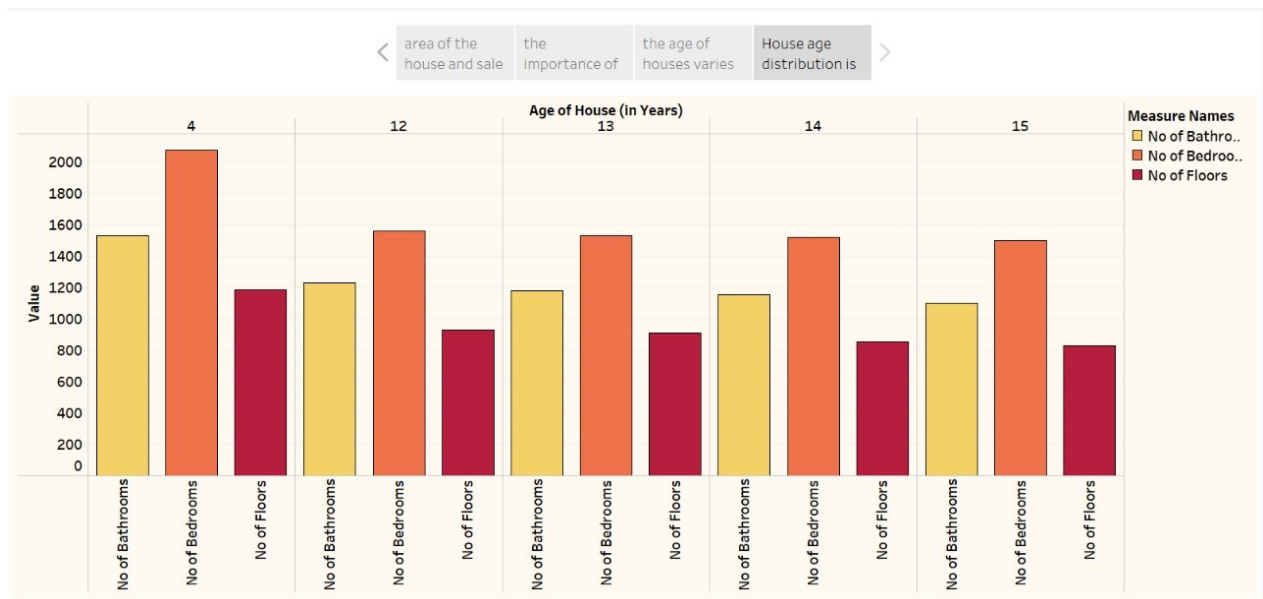
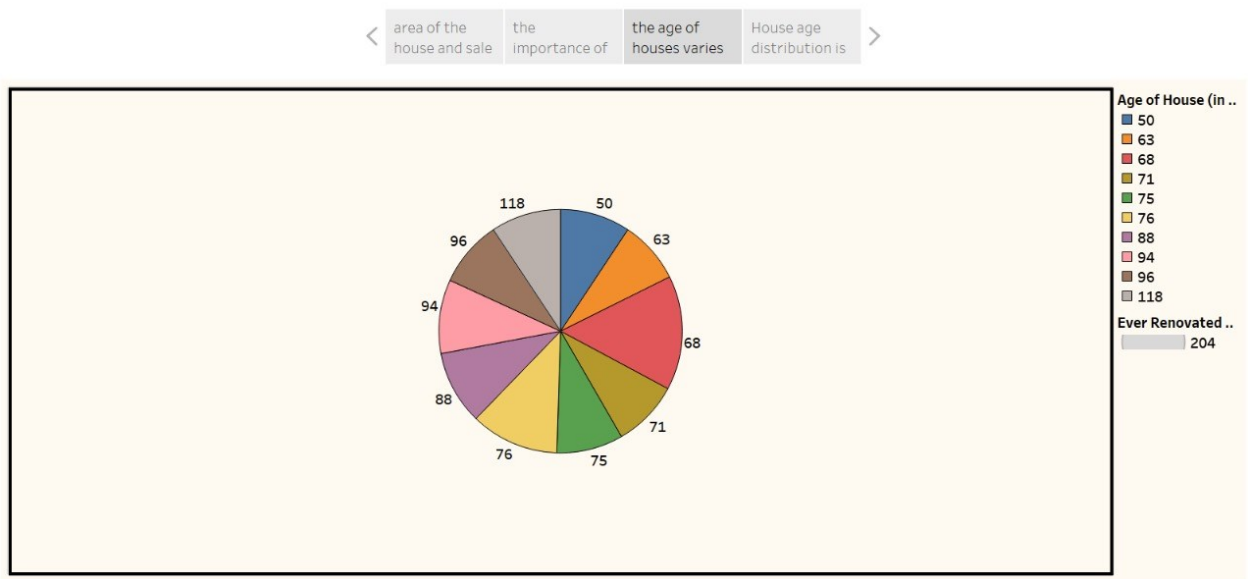
Team ID: LTVIP2025TMID50619

< area of the house and sale the importance of the age of houses varies House age distribution is >	
Area of the House from Basement (in Sqft)	38,643,798
Avg. Sale Price	511,619
Count of Transformed_Housing_Data2.csv	21,609



PROJECT REPORT

Team ID: LTVIP2025TMID50619



8. ADVANTAGES & DISADVANTAGES

• ADVANTAGES:

- **User-Friendly Dashboards:** Intuitive interface with dark-themed visuals that reduce eye strain and enhance readability.
- **Interactive Insights:** Real-time filtering and data slicing allow users to extract exactly what they need without manual intervention.
- **Reusable Framework:** The dashboard model can be reused for other smartphone brands or markets by simply updating the dataset.

PROJECT REPORT

Team ID: LTVIP2025TMID50619

- **Data-Driven Decision Making:** Helps strategists, marketers, and executives make smarter, evidence-based decisions.
- **Time-Saving:** Reduces the manual workload for analysts by providing ready-to-explore visualizations.
- **DISADVANTAGES:**
 - **Platform Limitation:** Tableau Public may limit some functionality such as real-time backend connection and publishing privacy.
 - **Dependence on Data Accuracy:** Insights are only as good as the quality of input data; inaccurate or outdated datasets could mislead.
 - **Static Structure in Story:** While dashboards are interactive, Tableau stories have limited flexibility in dynamic narration.

9. CONCLUSION

The “Visualization-Housing Market Trends: An analysis of sales Price and Features Using Tableau” Project successfully leverages the power of data visualization to transform complex real estate data into actionable and accessible insights. By interactively showcasing the relationship between sales prices and various property features, the project empowers a diverse range of stakeholders—from individual homebuyers to real estate professionals and investors—to make informed, data-driven decisions. Ultimately, it fosters a deeper and more intuitive understanding of housing market dynamics, demonstrating the critical role of effective data visualization in real-world applications.

10. FUTURE SCOPE

The future scope for this Tableau housing market trends project lies in evolving it from a purely analytical tool to a more predictive and comprehensive decision-making platform. Key areas for expansion include:

- **Predictive Analytics:** Incorporating machine learning models to forecast future sales prices, market trends, and demand, providing forward-looking insights.
- **Richer Data Integration:** Adding external datasets like macroeconomics indicators (interest rates, inflation), demographic data, zoning changes, school ratings, and even social sentiment to provide a more holistic market view.
- **Advanced Geospatial Analysis:** Enabling deeper location-based insights, such as the impact of proximity to amenities, and sophisticated neighborhood segmentation.
- **Real-time Updates & Personalization:** Connecting to live data feeds for up-to-the-minute information and enabling users to customize views and set alerts.

PROJECT REPORT

Team ID: LTVIP2025TMID50619