

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

Chapter 1

Introduction

The housing market is a dynamic and complex sector influenced by a wide range of factors, including location, property features, economic conditions, and buyer demand.

Understanding trends in sale prices and the characteristics that drive property values is essential for home buyers, sellers, investors, and real estate professionals alike.

This project, “Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau,” focuses on exploring how different property attributes—such as square footage, number of bedrooms and bathrooms, lot size, year built, and neighbourhood—impact housing prices. By leveraging Tableau’s powerful data visualization capabilities, the study transforms raw housing data into interactive dashboards and insightful visual representations.

Through visual analysis, patterns and relationships within the data become easier to identify, enabling stakeholders to make informed decisions based on market trends. The project aims to uncover key drivers of sale prices, highlight price variations across locations and property types, and provide a comprehensive overview of current housing market dynamics.

Ultimately, this analysis demonstrates how data visualization tools like Tableau can enhance understanding of real estate trends and support data-driven decision-making in the housing market.

This project analyses housing market trends by visualizing the relationship between sale prices and property features (size, location, amenities) using interactive Tableau dashboards. It involves data cleaning, exploratory data analysis, and creating visual insights—such as, mapping price variations and correlating square footage with price—to support data-driven investment decisions

This project visualizes housing market trends to analyse how factors like location, square footage, amenities, and age affect property sale prices using Tableau. It transforms raw real estate data into interactive dashboards, enabling stakeholders to identify key value drivers, such as waterfront access or renovation quality, and understand seasonal trends in property prices.

Gayathri Educational Society
ESTD-2001

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Project Overview

Project Overview and Key Objectives

- **Goal:** To convert complex housing datasets into actionable, visual insights using [Tableau](#).
- **Key Metrics:** Analysis of average house prices, price per square foot, and price trends over time.
- **Core Features Analysed:** Number of bedrooms/bathrooms, living area size (sift), property condition, and number of floors.
- **Geographical Analysis:** Using map visualizations to identify price hotspots by zip code or location.
- **Target Audience:** Real estate professionals, investors, and potential buyers looking to understand market trends.

1.2 Purpose

The purpose of the "[Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau](#)" project is to analyse, visualize, and interpret real estate data to uncover trends in property prices, identify key drivers of value (e.g., location, size, amenities), and provide actionable insights for stakeholders. By creating interactive dashboards, the project enables users to explore spatial patterns, time-series trends, and the impact of features like waterfront views or property condition on market demand.

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Indentation Phase

Chapter 2

2.1 Problem Statement

The project “Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau” aims to explore and analyse housing market data to identify key factors that influence property sale prices. By using Tableau as the primary data visualization tool, the project converts raw housing data into interactive dashboards and meaningful visual insights.

The analysis examines how various property characteristics—such as size, structure, age, amenities, and location—contribute to variations in sale prices. By organizing and visualizing this data, the project provides a comprehensive understanding of how the housing market behaves across different segments.

This project focuses on analysing housing market trends by exploring how property features influence sale prices. Using Tableau, interactive dashboards are created to uncover patterns, correlations, and geographic trends in housing data. The goal is to provide actionable insights for buyers, sellers, real estate professionals, and investors.

The analysis is based on a structured housing dataset (e.g., transaction records including sale price, location, size, and property characteristics), transformed and visualized through Tableau to support data-driven decision-making.

This project analyses housing market data using Tableau to identify key price drivers—such as location, size, and amenities—and visualize trends over time. The goal is to develop interactive dashboards that uncover insights into property value fluctuations, assisting stakeholders in making data-driven investment and pricing decisions.

- **Predictive Analysis:** Exploring how historical data can suggest future price trends.

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- **Inventory Optimization:** Helping real estate companies understand which types of houses are in high demand to improve listing strategies.
- **Problem Statement Details:**
- **Objective:** To analyse and visualize key factors influencing residential property sales prices to understand market trends using Tableau.
- **Key Questions:** How do features like square footage, number of bedrooms, and location affect prices? What are the seasonal trends in sales? Which areas are considered high-demand?
- **Methodology:** Cleaning, pre-processing, and exploring large datasets, followed by the creation of interactive, user-friendly dashboards to highlight correlations and trends.
- **Expected Output:** A comprehensive, interactive Tableau dashboard that allows users to filter by criteria (e.g., location, price, property features) to derive actionable insights.
- **Target Audience:** Real estate analysts, investors, and potential homebuyers looking to understand market dynamics.



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2.2 Empathy Map Canvas

An Empathy Map Canvas helps us deeply understand the end users of the housing market dashboard. For this Tableau project, the primary users may include home buyers, sellers, real estate agents, and property investors. The empathy map ensures the dashboard is designed to meet their real needs, challenges, and motivation.

An **Empathy Map** helps understand the needs of stakeholders interacting with housing data dashboards (buyers, sellers, real estate agents, investors).

○ Target Users

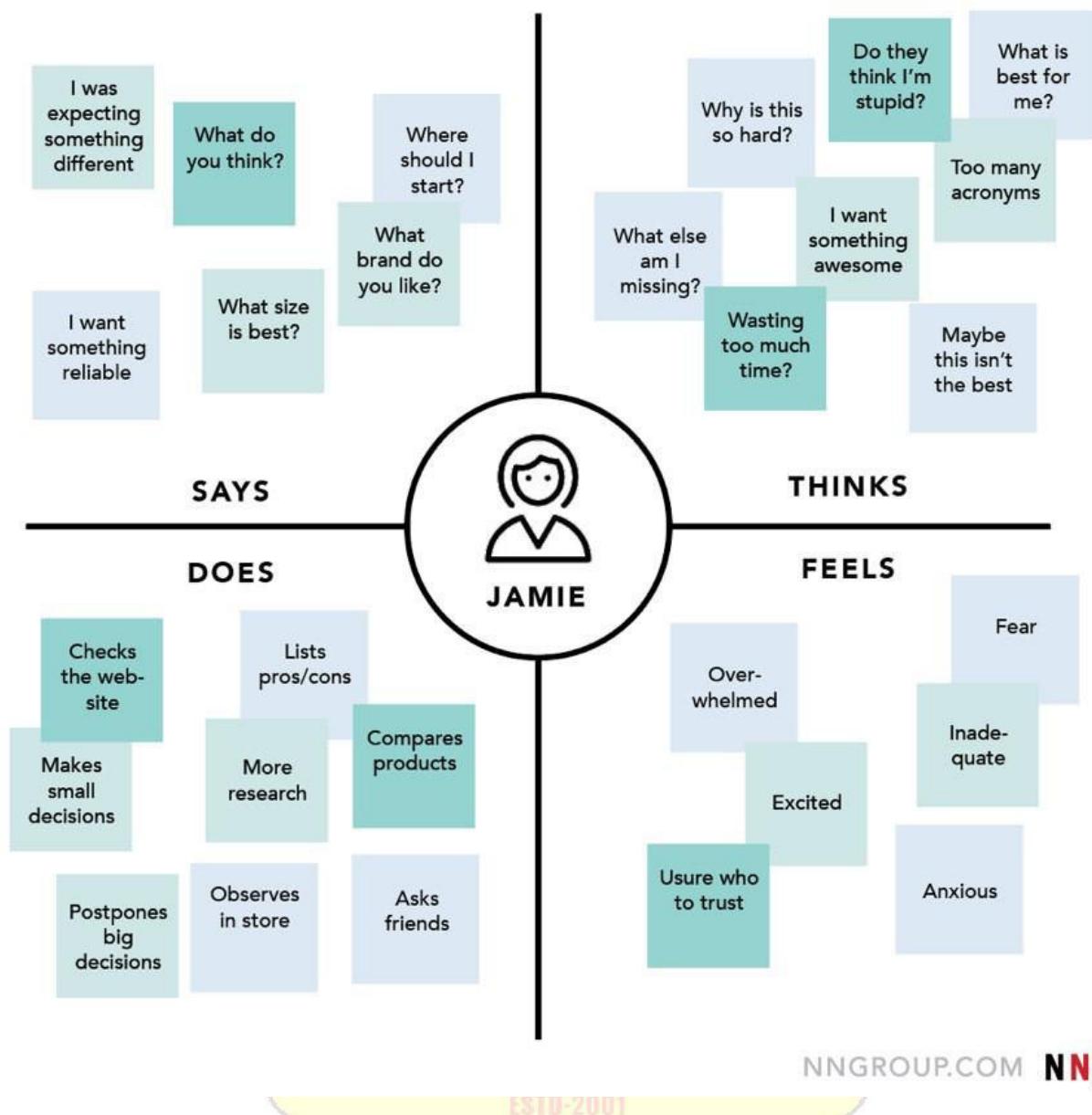
- Home Buyers
- Real Estate Agents
- Property Investors
- Market Analysts

○ Purpose of an Empathy Map

- Understand user behaviour deeply
- Identify pain points and unmet needs
- Align teams around user-centered decisions
- Improve products, services, or dashboards
- This project, "**Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau**," focuses on transforming raw, complex real estate data (Kaggle/internal datasets) into an interactive dashboard to help stakeholders (real estate investors, agents, or buyers) identify trends, price drivers, and geographical hotspots.

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EMPATHY MAP Example (*Buying a TV*)



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2.3 – Brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative yet thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative yet soul ones.

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.

Reference: <https://www.mural.co/templates/brainstorm-and-idea-prioritization>

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

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

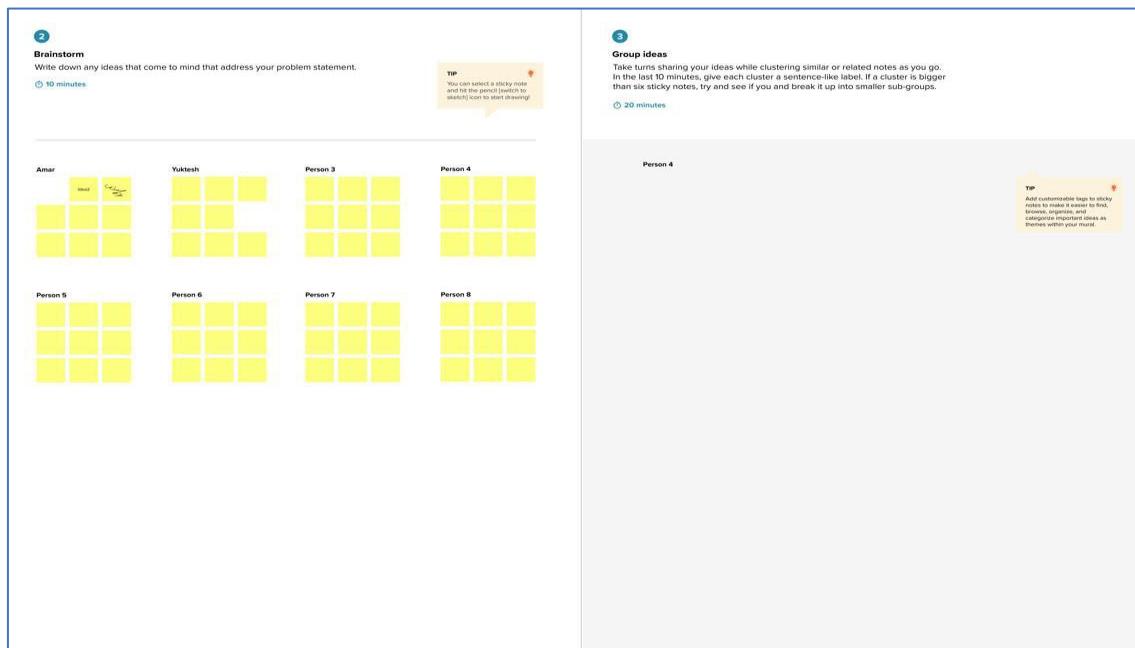
Key rules of brainstorming

To run a smooth and productive session

- Stay in topic.
- Defer judgment.
- Go for volume.
- Encourage wild ideas.
- Listen to others.
- If possible, be visual.

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Step-2: Brainstorm, Idea Ling and Grouping



Step-3: Idea Priorian



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Requirement Analysis

Chapter 3

3.1 Customer Journey Map

A Customer Journey Map visually represents:

- User stages
- Actions taken
- Thoughts & emotions
- Pain points
- Opportunities for improvement

It focuses on the **experience over time**.

It ensures your Tableau dashboards are designed around **real user experience**, not just data presentation.

○ Customer Journey Map for Housing Market Tableau Project

⌚ Target Users:

- Home Buyers
- Real Estate Investors
- Real Estate Agents
- Market Analysts

○ Stage 1: Awareness

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Situation

User realizes they need housing market insights.

Thoughts

- “Are prices rising?”
- “Is this a good time to buy?”
- “Which areas are affordable?”

Pain Points

- Confusing online listings
- Too much scattered information

Tableau Opportunity

- Clear Market Overview Dashboard
- Key KPIs: Average Price, Median Price, Total Sales
- Clean visual summary

○ Stage 2: Research

Actions

- Compare neighbourhoods • Check price trends
- Analyse property features

Thoughts

- “Which location gives better value?”
- “Do more bedrooms increase price?”

Pain Points

- Hard to compare multiple areas
- No clear feature-value connection

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Tableau Opportunity

- Interactive filters (Neighbourhood, Year, Property Type)
 - Line chart for price trends
 - Scatter plot for features vs price
 - Map visualization
- A customer journey map is a visual representation of the end-to-end experience a customer has with a company, covering every touchpoint from initial awareness to post-purchase, often including phases like research and buying. It helps businesses understand user emotions, identify pain points, and uncover opportunities for improvement.
1. **Define Scope:** Set clear goals for the map (e.g., overall experience or a specific product).
 2. **Research & Persona Creation:** Gather data to create detailed customer personas.
 3. **Outline Stages & Touchpoints:** Map out the chronological steps and interactions.
 4. **Identify Emotions & Pain Points:** Plot what the customer thinks and feels at each stage.
 5. **Identify Opportunities:** Analyse the map to find, prioritize, and fix pain points.
 6. **Visualize:** Create a user-friendly, shareable, and actionable document.

○ **Benefits of Customer Journey Mapping**

- **Customer-Centric Focus:** Shifts perspective from internal processes to the user's experience.
- **Improved Retention:** Helps identify and reduce friction, improving customer satisfaction and loyalty.
- **Unified Strategy:** Aligns marketing, sales, and service teams around the customer experience.

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3.2 Solution Requirement

The **Solution Requirements** section explains what the system must do and what is needed to successfully build and use the dashboards.

This section is very important for academic reports and project documentation.

A successful Tableau solution for analysing housing market trends requires aggregating sales price data against property features (size, bedrooms, location) to identify, visualize, and filter key market drivers. Requirements include integrating Tableau with clean data sources, using interactive filters (area, date, size), building dashboards with geographic maps/scatterplots, and enabling actionable insights on price trends.

Core Solution Requirements:

- **Data Preparation (Input):**
 - **Data Sources:** Housing transaction records, property listings, MLS data.
 - **Data Cleaning:** Handling missing data (e.g., in sq. ft. or price), creating calculated fields for price per square foot using Tableau Prep Builder.
 - **Geographic Data:** Assigning latitude/longitude for mapping, or organizing by city/zip code.
- **Visualization & Analysis (Tableau Desktop/Cloud):**
 - **Trend Analysis:** Line charts or area charts showing median sale prices over time (e.g., monthly/yearly).
 - **Feature Comparison:** Scatter plots to analyse price vs. square footage, or bar charts comparing prices by bedroom/bathroom count.
 - **Geospatial Analysis:** Filled maps or symbol maps to visualize price density and identify high/low-cost neighbourhoods.

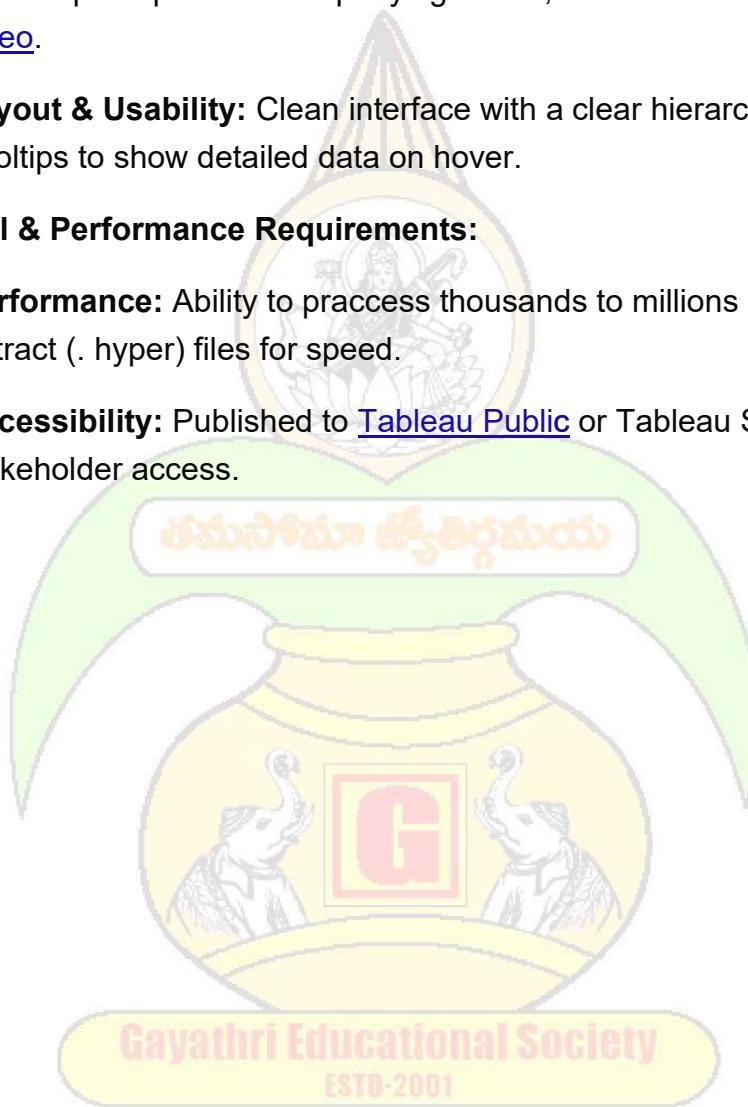
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. Interactive Dashboard Design (Output):

- **Filtering:** Includes filters for Location, Price Range, Date of Sale, Property Type, and Features (e.g., swimming pool, parking).
- **Dashboard Interactivity:** "Action" filters enabling users to click a region on a map to update accompanying charts, as discussed in this [YouTube video](#).
- **Layout & Usability:** Clean interface with a clear hierarchy, utilizing Tooltips to show detailed data on hover.

. Technical & Performance Requirements:

- **Performance:** Ability to process thousands to millions of rows, utilizing Extract (.hyper) files for speed.
- **Accessibility:** Published to [Tableau Public](#) or Tableau Server/Online for stakeholder access.



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➤ 3.3 Data Flow Diagram

Visualizing housing market trends in Tableau involves transforming raw property data into actionable insights, such as identifying price drivers (bedrooms, location, amenities) and geographic trends. A typical data flow includes importing, cleaning, analysing, and visualizing data to create interactive, stakeholder-focused dashboards that highlight market velocity and valuation.

Data Flow Diagram Components

- **Data Source:** Raw, unstructured, or semi-structured data (e.g., CSV, SQL databases) containing, for example, property type, price, bedrooms, bathrooms, location, and sales date.
- **Data Cleaning (ETL):** Processing data to handle missing values, formatting, and filtering (e.g., in Python/SQL or Tableau Prep) to ensure accuracy.
- **Data Loading:** Importing the cleaned dataset into Tableau.
- **Data Analysis & Visualization:** Using Tableau to create, for example, bar charts for price distribution, maps for location analysis, and scatter plots to analyse relationships between features (e.g., size vs. price).
- **Interactive Dashboard:** A single view combining multiple charts with filters (e.g., year, city, property type) to allow users to drill down into specific, detailed insights.
- **Actionable Insights:** Providing, for example, investors or agents with data-driven, actionable recommendations regarding, for example, pricing strategies and market demand.

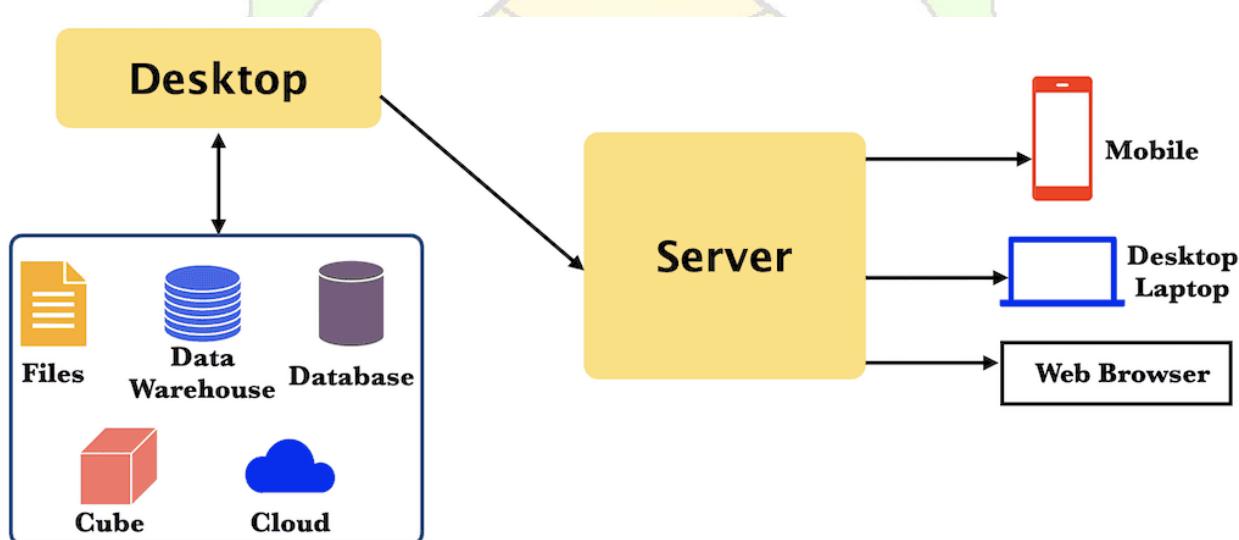
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➤ Key Data Features and Visualizations

- **Geographic Analysis:** Mapping, for example, property locations, for example, using latitude/longitude data to identify, for example, high-value areas.
- **Price Trends:** Line charts showing, for example, average price changes over time.
- **Property Features:** Bar charts, for example, comparing, for example, average prices based on, for example, the number of bedrooms, bathrooms, or amenities.
- **Market Segmentation:** Tree maps or pie charts, for example, visualizing, for example, the distribution of, for example, property types or sales volume by region.

Typical Data Flow Visualization Steps

1. **Preparation:** Cleaning, for example, and structuring, for example, data in, for example, Excel/SQL.
2. **Mapping:** Plotting, for example, geospatial data, for example, in Tableau.
3. **Metrics:** Calculating, for example, key performance indicators (KPIs), for example, (e.g., median price, average days on market).
4. **Dashboarding:** Organizing, for example, charts, for example, for, for example, actionable interpretation.



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3.4 Technology Stack

This project analyses housing market trends using a Tableau-centric technology stack to visualize, map, and filter sales data based on location, price, and property features. Key tools include **Tableau Desktop/Public** for interactive dashboards, **Python (Pandas, NumPy)** for data pre-processing, and **Excel/SQL** for data storage. It enables stakeholders to identify key value drivers—such as location (zip codes), size, and amenities—to facilitate informed real estate decisions.

† Core Components of the Analysis & Tableau Stack

- **Data Preparation:** Raw housing data is cleaned and structured using Python (Pandas) and Microsoft Excel.
- **Visualization & Mapping:** Tableau creates interactive maps (e.g., geospatial visualization by zip code), scatter plots (for price vs. square footage), and heatmaps.
- **Interactive Dashboards:** Features include filters for price range, date range, location, and property type to allow users to drill down into specific market segments.
- **Key Metrics:** Dashboards highlight average price per square foot, sales volume, and trends over time.

Key Insights Derived

- **Location Impact:** High-density areas show higher prices and faster turnover.
- **Feature Analysis:** Items like waterfront access, multiple bathrooms, and proximity to amenities (roads/ac) significantly drive-up value.

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- **Seasonal Trends:** The highest volume of sales typically occurs during spring and summer months.

○ Technology Stack

Visualizing Housing Market Trends: An Analysis of Sale Prices and Features Using Tableau

The **Technology Stack** explains the tools, software, platforms, and technologies used to build and deploy your housing market analysis dashboard.

1. Front-End (Visualization Layer)

Tableau Desktop

Purpose:

- Create interactive dashboards
- Build charts (line, bar, scatter, maps)
- Create calculated fields (Price per Sq Ft, Growth Rate)
- Design filters and parameters

Why Used:

- Drag-and-drop interface
- Strong geographic visualization
- Built-in analytics features

Tableau Public (Optional)

Purpose:

- Publish dashboards online
- Share project publicly

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Tableau

- Embed dashboards in reports or websites



2. Data Layer



Data Sources

- Excel files (.xlsx)
 - CSV files (.csv)
 - Real estate datasets
-



Microsoft Excel

Purpose:

- Initial data storage
 - Data cleaning
 - Formatting columns
 - Removing duplicates
-



Google Sheets (Optional)

Purpose:

- Cloud-based data storage
 - Collaborative editing
-



3. Data Processing Layer

Data Preparation Tasks

- Data cleaning

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- Handling missing values
- Creating calculated fields
- Converting date formats
- Standardizing location names

Tools Used:

- Tableau Data Pane
- Excel formulas
- Tableau Calculated Fields

4. Analytics Layer

Tableau provides built-in analytical features:

- Trend lines
- Forecasting
- Aggregation (SUM, AVG, MEDIAN)
- Geographic mapping
- Filtering and drill-down

No additional programming language is mandatory.

5. System Requirements

Hardware

- Computer with minimum 8GB RAM
- Windows / macOS

Software

- Tableau Desktop

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- Web browser (Chrome, Edge, Safari)

6. Deployment Layer

If publishing online:

- Tableau Public (Cloud-based)
- Tableau Server (Enterprise level)

7. Optional Advanced Stack (If Extended Project)

If your project includes advanced analytics:

- Python (for predictive modeling)
- SQL (for database querying)
- MySQL / PostgreSQL (for large datasets)

But for a standard academic Tableau project, this is optional.

Technology Stack Summary Table

Layer	Technology
Visualization	Tableau Desktop
Publishing	Tableau Public
Data Storage	Excel / CSV
Data Cleaning	Excel / Tableau

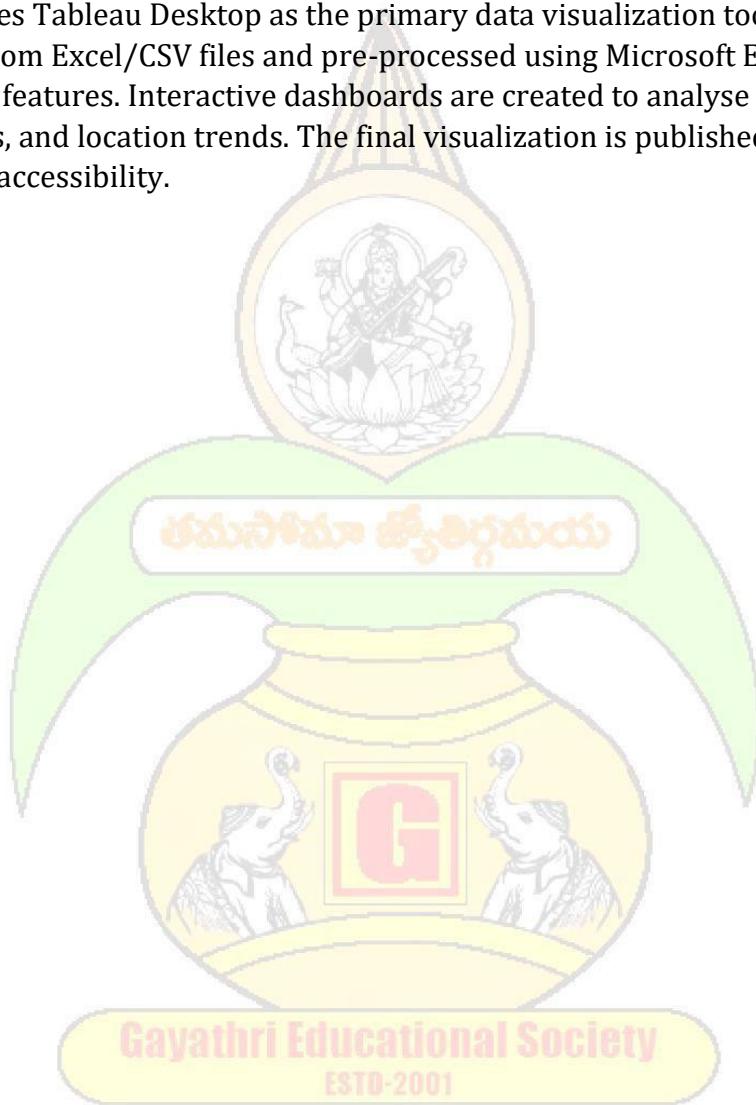
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Analytics	Tableau Built-in Functions
Deployment	Tableau Public / Server

Example

The project utilizes Tableau Desktop as the primary data visualization tool. Housing market data is sourced from Excel/CSV files and pre-processed using Microsoft Excel and Tableau's data preparation features. Interactive dashboards are created to analyse sale prices, property features, and location trends. The final visualization is published using Tableau Public for online accessibility.



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Project Design Chapter 4

4.1 Problem Solution Fit

Visualizing housing market trends in Tableau provides a direct problem-solution fit by transforming raw property data into actionable insights for buyers, sellers, and agents. It solves the challenge of analysing complex, multi-dimensional real estate data (price, location, features) by using interactive dashboards to instantly identify trends, outliers, and key value drivers like square footage, grade, and location.

Key Problem-Solution Fit Components:

- **Problem:** Difficulty in identifying true property value and trends among vast, chaotic data.
- **Tableau Solution:** Interactive dashboards with scatter plots and heatmaps, allowing users to analyse price per square foot by zip code and visualize price trends.
- **Problem:** Understanding which specific features (e.g., bedrooms, bathrooms, AC) drive higher sales prices.
- **Tableau Solution:** Visualization of feature relationships, showing that more bathrooms, better overall quality, and specific amenities (waterfront) significantly boost sale prices.
- **Problem:** Inefficient decision-making for stakeholders due to lack of timely market trends.

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- **Tableau Solution:** Real-time, shareable, and filterable dashboards (filtering by date, location, price) that provide instant, data-driven insights to optimize pricing strategies.
- **Problem:** Data skewness and complexity hindering analysis.
- **Tableau Solution:** Use of data transformation and calculated fields (e.g., Log transformations) to normalize data, improving the accuracy of price predictions.

Key Analytical Findings for Visualization:

- **Seasonality:** Most home sales occur during spring and summer months.
- **Feature Importance:** High-quality, renovated homes with more bathrooms show stronger price growth.
- **Market Segmentation:** Different areas show varying price behaviours, requiring localized analysis.

1. Lack of Clear Market Trends

- Hard to understand price movement over time
- No easy way to track yearly growth

2. Feature Impact Uncertainty

- Unsure how bedrooms, bathrooms, or size affect price
- Difficult to compare property features

3. Location-Based Confusion

- Which neighbourhood is expensive?
- Which area is growing fastest?

4. Information Overload

- Too many listings
- Scattered data across platforms

5. Investment Risk

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Uncertainty about ROI

No forecasting insight

○ Project Relevance

The **Project Relevance** section explains why this project is important, timely, and valuable in real-world and academic contexts.

○ Real-World Relevance

The housing market is one of the most significant economic sectors globally. Buyers, investors, and agents constantly need:

- Accurate price trends
- Feature-based comparisons
- Location insights
- Investment risk analysis

However, raw housing data is often:

- Complex
- Scattered
- Difficult to interpret

This project transforms raw data into **clear, interactive insights**, making it highly relevant to real-world decision-making.

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4.2 Proposed Solution

The proposed solution for visualizing housing market trends involves creating interactive Tableau dashboards to analyse sale prices, location, and features (e.g., bedrooms, sq. ft.). It uses data cleaning, exploratory analysis, and interactive visualizations (maps, heatmaps) to identify price drivers, market hotspots, and trends, supporting data driven decisions.

Key Components of the Proposed Tableau Solution:

- **Interactive Dashboards:** Develop at least five distinct dashboards (e.g., summary, geographic, feature-based) to provide a comprehensive view of the market.
- **Data Analysis & Visualization:**
- **Geospatial Analysis:** Use Tableau map features to identify price variations across locations.
- **Trend Analysis:** Visualize temporal trends of average house sale prices to identify market fluctuations.
- **Feature Influence:** Analyse the impact of property features (e.g., bedrooms, bathrooms, square footage, condition) on sale price.
- **Heat Maps:** Utilize heat maps to show the correlation between property conditions and price.
- **Interactivity Features:**
- **Filters:** Implement filters for zip code, date range, and home features.
- **Tooltips:** Utilize hover tooltips for detailed, contextual information without cluttering the view.

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- **Insight Generation & Reporting:**
- **Summary Dashboard:** Create a high-level summary for stakeholders to easily grasp key findings and trends.
- **Data Cleaning:** Pre-process data to ensure accuracy and remove anomalies.
- **Tools:** The project utilizes Tableau for visualization, supported by Python for data cleaning and pre-processing.

Benefits:

- Provides actionable insights for investors, agents, and buyers.
- Identifies high-demand areas and pricing trends.
- Enables [interactive data exploration](#) to uncover hidden patterns.

○ Overview of the Proposed Solution

The project proposes the development of an **interactive Tableau dashboard system** that:

- Analyses housing sale prices
- Evaluates property features
- Compares neighbourhoods
- Identifies market trends
- Supports investment decisions

The solution transforms raw housing data into **clear, actionable insights** for buyers, investors, and agents.

Built using:

- Tableau Desktop
- Optional publishing via Tableau Public

○ Core Components of the Proposed Solution

◆ A. Market Overview Dashboard

Purpose: Provide a quick summary of the housing market.

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Includes:

- Average Sale Price (KPI)
- Median Price
- Total Number of Sales
- Price Trend Line (Year-wise)
- Map showing price distribution by location

○ Value Delivered by the Proposed Solution

1. For Home Buyers

- Clear comparison of neighbourhoods
- Understanding of price trends
- Feature-based price insights

2. For Investors

- Identification of high-growth areas
- ROI analysis
- Market forecasting

3. For Real Estate Agents

- Professional dashboards for client presentation
- Data-backed pricing strategy

3. Advanced Analytics & Segmentation

- **Market Segmentation:** Use filters and parameters to compare markets by income level, urban vs. suburban areas, or new vs. old constructions.

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Example

The proposed solution involves the development of an interactive Tableau-based dashboard system to analyse housing market trends and property features. The system integrates data cleaning, calculated metrics, and advanced visualization techniques to provide trend analysis, feature impact evaluation, and location-based comparison. By incorporating interactive filters and geographic mapping, the solution enables stakeholders to make data driven decisions efficiently.

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4.3 Solution Architecture

Visualizing housing market trends in Tableau involves a robust solution architecture comprising data ingestion (CSV/SQL), cleaning (Python/Pandas or Tableau Prep), and interactive dashboard creation to analyse price drivers like location, square footage, and amenities. This approach delivers actionable insights, enabling stakeholders to explore trends, filter by, property features, and forecast market movements.

Solution Architecture for Housing Data Analysis

- **Data Sources:** Raw data typically includes listing price, sale price, square footage, location (zip code/district), number of bedrooms/bathrooms, and, for example, pool availability.
- **Data Processing (ETL):** Missing values and inconsistencies are handled using Python, Excel, or Tableau Prep to ensure data quality before analysis.
- **Data Analysis & Modelling:** Exploratory Data Analysis (EDA) identifies correlations between features and price. Advanced analysis may include linear regression or machine learning models (e.g., Random Forest) to predict future prices.
- **Visualization (Tableau):**
- **Interactive Dashboards:** Create comprehensive views with filters for location, size, and price.
- **Geographic Mapping:** Visualize price variations by district or suburb.
- **Trend Analysis:** Use line charts to track price changes over time.
- **Feature Comparison:** Use bar charts and scatter plots to compare features like, for example, number of bathrooms and, for example, house age.

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

- **Insights Generation:** Identify key market drivers, such as location and size, to help buyers or agents make informed decisions.

Key Features of the Tableau Solution

- **Real-time Interaction:** Users can filter data on-the-fly to find comparable homes, as shown in [this example](#).
- **Dynamic Dashboards:** Combine multiple views to show, for example, price trends alongside property features, like, for example, in [this Scribd report](#).
- **Predictive Analytics:** Incorporate forecasting to determine, for example, the best time to buy or sell.

○ Architecture Overview

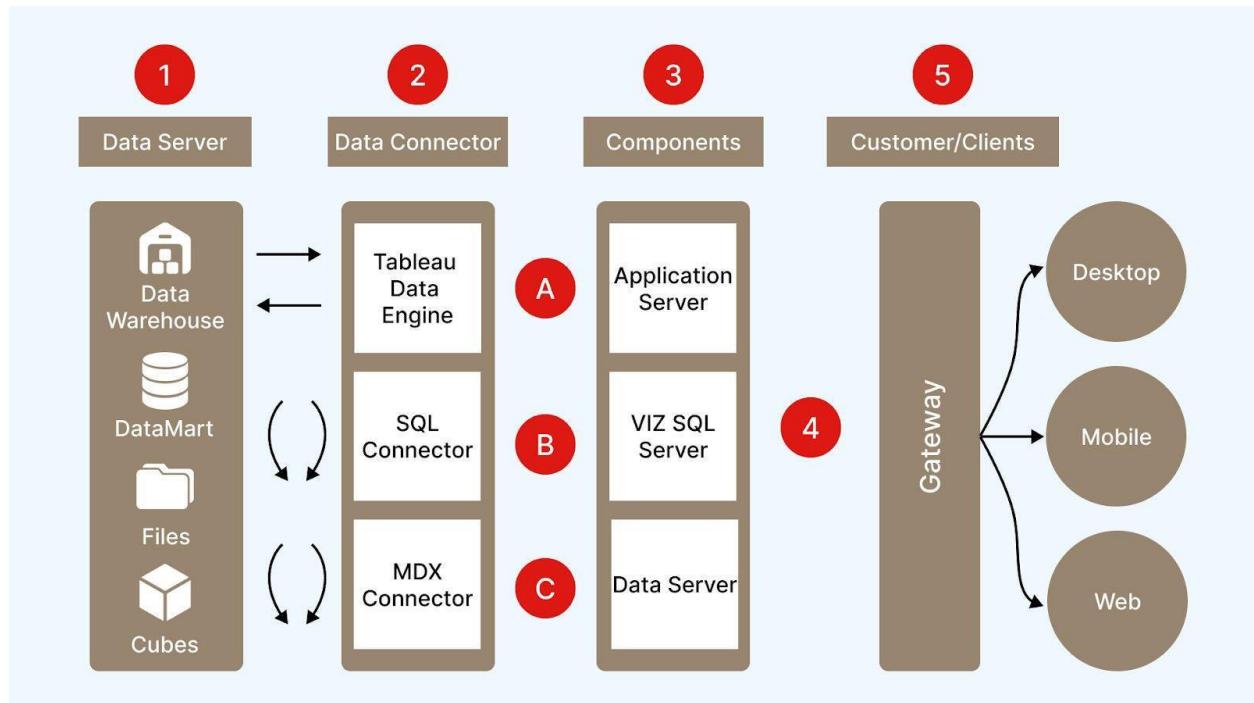
The solution follows a **3-layer architecture**:

1. **Data Layer** – Data collection & storage
2. **Processing Layer** – Data cleaning & analysis
3. **Visualization Layer** – Interactive dashboards

Built primarily using:

- Tableau Desktop
- Optional publishing via Tableau Public

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



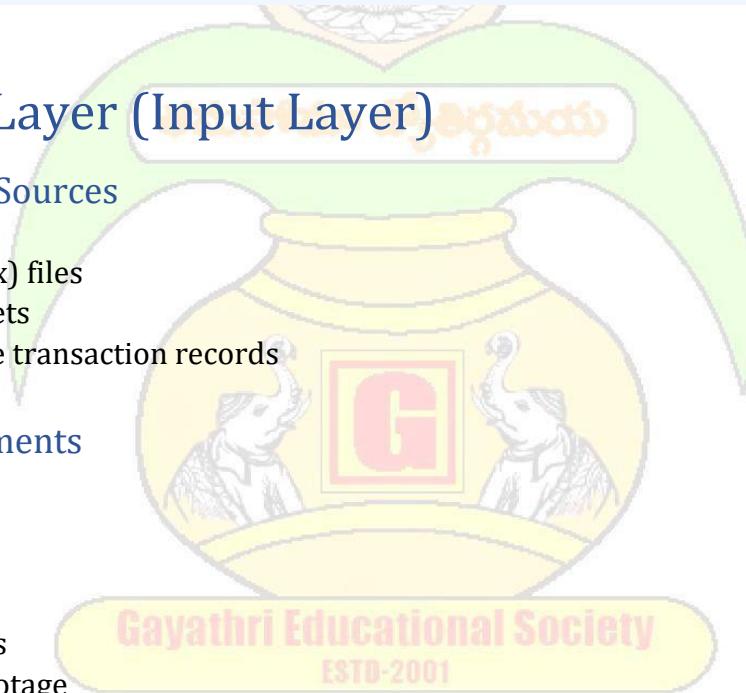
○ Data Layer (Input Layer)

○ Data Sources

- Excel (.xlsx) files
- CSV datasets
- Real estate transaction records

○ Data Elements

- Sale Price
- Sale Date
- Bedrooms
- Bathrooms
- Square Footage
- Property Type
- Location / Neighbourhood



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Responsibilities

- Store raw housing data
 - Provide structured input to Tableau
-

○ Data Processing Layer (Business Logic Layer)

This layer handles transformation and analysis.

○ Key Processes

- Data cleaning
- Missing value handling
- Duplicate removal
- Date formatting
- Creating calculated fields:
 - Price per Sq. Ft
 - Yearly Growth
 - Rate of ROI metrics

○ Analytical Features

- Aggregations (AVG, SUM, MEDIAN)
- Trend analysis
- Correlation analysis
- Forecasting (optional)

This logic is handled inside Tableau's data engine.

○ Visualization Layer (Presentation Layer)

This layer presents processed data through dashboards.

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○ Dashboards Included

A. Market Overview

- KPI indicators
- Price trend line
- Sales count
- Geographic map

B. Feature Analysis

- Scatter plots
- Bar charts
- Comparative feature charts

C. Location & Investment Insights

- Neighbourhood comparison
- Growth trends
- ROI charts

Interactive Features

- Filters (Year, Location, Property Type)
- Drill-down analysis
- Parameter controls

○ 🌐 Deployment Architecture

Option 1: Local Deployment

- Tableau Desktop for development
- Dashboard shared as packaged workbook (.tab)

Option 2: Cloud Publishing

- Publish on Tableau Public

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- Accessible via web browser
- Embedded in reports or presentations

○ Security & Data Considerations

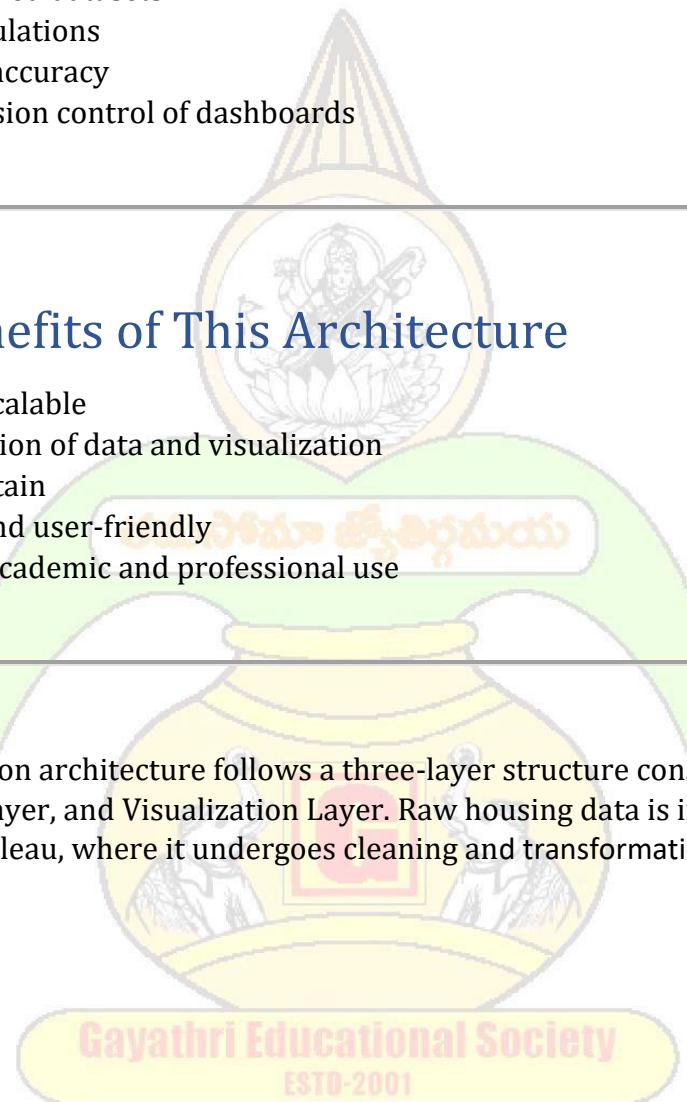
- Use anonymized datasets
- Validate calculations
- Ensure data accuracy
- Maintain version control of dashboards

○ Benefits of This Architecture

- Simple and scalable
- Clear separation of data and visualization
- Easy to maintain
- Interactive and user-friendly
- Suitable for academic and professional use

Example

The proposed solution architecture follows a three-layer structure consisting of the Data Layer, Processing Layer, and Visualization Layer. Raw housing data is imported from Excel or CSV files into Tableau, where it undergoes cleaning and transformation.



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Chapter 5

Project Planning Scheduling

5.1 Project Milestones and Tasks

The **Project Milestones and Tasks** section outlines the structured timeline and major deliverables required to successfully complete the housing market visualization project.

It ensures proper planning, tracking, and timely completion.

Milestone 1: Project Planning & Requirement Analysis

 Duration: Week 1

 Tasks:

- Define project objectives
- Identify stakeholders (buyers, investors, agents)
- Conduct brainstorming
- Create Empathy Map & Customer Journey Map
- Define functional and non-functional requirements
- Prepare problem-solution fit analysis

 Deliverables: 

- Project proposal
- Requirement document
- Design thinking documentation

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○ Milestone 2: Data Collection

 Duration: Week 2

 Tasks:

- Collect housing dataset (CSV/Excel)
- Verify data completeness
- Identify required fields (Sale Price, Bedrooms, Location, etc.)
- Understand data structure

○ Milestone 3: Data Cleaning & Preparation

 Duration: Week 3

 Tasks:

- Remove duplicates
- Handle missing values
- Standardize location names
- Convert date formats
- Create calculated fields:
 - Price per Sq. Ft.
 - Growth Rate
 - ROI (if applicable)

Tools used:

- Microsoft Excel
- Tableau Desktop

○ Milestone 4: Dashboard Development

 Duration: Week 4–5

 Tasks:

- Create Market Overview dashboard
- Build Feature Impact visualizations
- Develop Location & Investment insights

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- Add interactive filters
- Design KPI indicators
- Apply consistent formatting and layout

○ Milestone 5: Testing & Validation

 Duration: Week 6

 Tasks:

- Verify data accuracy
- Test filter functionality
- Validate calculations
- Ensure dashboard performance
- Collect feedback and refine design

○ Milestone 6: Deployment & Documentation

 Duration: Week 7

 Tasks:

- Publish dashboard using Tableau Public (optional)
- Prepare final report
- Create presentation slides
- Document methodology and architecture

Milestone	Key Focus	Deliverable
Planning	Requirements & Design	Proposal & Documentation
Data Collection	Dataset preparation	Raw dataset
Data Cleaning	Data pre-processing	Clean dataset
Development	Dashboard creation	Tableau workbook
Testing	Validation & refinement	Final dashboard
Deployment	Publishing & reporting	Final report

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Example

The project was executed in six structured milestones, beginning with requirement analysis and ending with deployment and documentation. Each phase included specific tasks such as data collection, preprocessing, dashboard development, testing, and publishing. This structured milestone approach ensured systematic progress, quality control, and timely project completion.

○ Project Initiation Tasks

- Define project title and objectives
- Identify target users (buyers, investors, agents)
- Define project scope
- Conduct brainstorming session
- Prepare problem statement
- Define success criteria

○ Requirement Analysis Tasks

- Identify functional requirements (trend analysis, feature comparison, filters)
- Identify non-functional requirements (performance, usability)
- Create Empathy Map
- Create Customer Journey Map
- Define problem-solution fit
- Document solution requirements

○ Data Collection Tasks

- Collect housing dataset (CSV/Excel)
- Verify data accuracy
- Identify required data fields:
- Sale Price

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- Sale Date
- Bedrooms
- Bathrooms
- Square Footage
- Property Type
- Location
- Review dataset structure

○ Data Cleaning & Preparation Tasks

Tools used:

- Microsoft Excel
- Tableau Desktop

Tasks:

- Remove duplicate records
- Handle missing values
- Standardize location names
- Convert date formats
- Create calculated fields:
 - Price per Sq. Ft
 - Yearly Growth Rate
 - ROI (if applicable)
- Validate cleaned dataset

○ Data Analysis Tasks

- Perform trend analysis (year-wise price changes)
- Analyse feature impact (Bedrooms, Bathrooms, Sq. Ft)
- Conduct location comparison
- Identify high-growth areas
- Calculate summary statistics (AVG, MEDIAN, COUNT)

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- Identify correlations

○ Final Deliverables

↳ Deliverables

- Tableau Workbook (.tab)
- PDF Report
- Presentation Slides (PowerPoint)
- Executive Summary



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5.2 Sprint Delivery Plan

Visualizing housing market trends using [Tableau](#) involves converting raw real estate data—such as sale prices, square footage, location, and property features—into interactive, actionable dashboards. This analysis typically identifies key drivers of price variations, such as location and property size, helping stakeholders make informed decisions. A structured sprint delivery plan for this type of data project generally follows an Agile, 5stage methodology (similar to CRISP-DM):

1. Sprint 1: Project Initiation & Data Preparation (Week 1)

- **Objective:** Define scope, gather data, and clean the dataset.
- **Tasks:**
 - **Requirements Gathering:** Identify key performance indicators (KPIs) like median sale price, price per sq. ft., and average days on market.
 - **Data Collection:** Acquire housing data (e.g., from public datasets or MLS).
 - **Data Cleaning:** Use Excel or Python (Pandas) to handle missing values, inconsistent formatting, and anomalies.
- **Deliverable:** A cleaned dataset ready for visualization.

2. Sprint 2: Exploratory Data Analysis & Viz Creation (Week 2)

- **Objective:** Develop individual visualizations and analyse correlations.
- **Tasks:**
 - **Feature Analysis:** Analyse correlations between features (e.g., number of bedrooms, bathrooms) and price.

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- **Create Charts:** Develop individual sheets in Tableau:
 - **Spatial Analysis:** Filled maps showing price by zip code.
 - **Trend Analysis:** Line charts showing price trends over time.
 - **Feature Comparison:** Scatter plots or bar charts comparing price vs. square footage or property condition.
- **Deliverable:** A set of functional, individual visualizations.

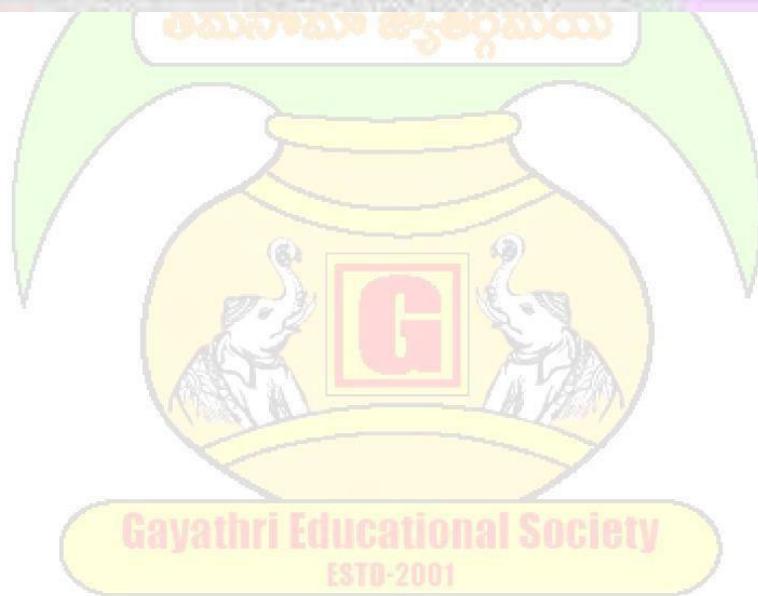
3. Sprint 3: Dashboard Development & Interactivity (Week 3)

- **Objective:** Assemble the final interactive dashboard.
- **Tasks:**
- **Dashboard Layout:** Design a cohesive dashboard using containers to structure the view.
- **Interactivity:** Add filters (e.g., by zip code, price range) and actions (e.g., highlight, filter).
- **Formatting:** Apply consistent colour schemes and remove clutter for better readability.
- **Deliverable:** An interactive, user-friendly Tableau Dashboard.

4. Sprint 4: Insights, Testing & Deployment (Week 4)

- **Objective:** Finalize insights and publish.
- **Tasks:**
 - **Validation:** Review dashboards with stakeholders to ensure accuracy.
 - **Final Report:** Summarize key findings, such as which areas or features drive the highest prices.
 - **Deployment:** Publish the finalized workbook to Tableau Public or Tableau Server.
- **Deliverable:** Final presentation and deployed dashboard.

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5.3 Project Progress Tracking

❖ Project Progress Tracking in Tableau

- **Gantt Charts:** Used to visualize project timelines, including milestones for data collection, cleaning, and dashboard development.
- **Performance Metrics:** Bullet charts evaluate performance against goals, such as tracking project deadlines or sales quotas.
- **Data Governance:** Tableau offers tools to track who accesses data over time, crucial for managing the security and integrity of housing data.
- **Interactive Dashboards:** Dashboards (e.g., on [Tableau Public](#)) allow for real-time tracking of project KPIs, providing insights into both market trends and, if integrated, development progress.

Project Progress Tracking ensures that the housing market dashboard project is completed on time, within scope, and with quality deliverables. It helps monitor milestones, tasks, risks, and overall performance.

1. Purpose of Progress Tracking

Progress tracking helps to:

- Monitor completion of milestones
- Identify delays early
- Ensure dashboard quality
- Maintain project scope
- Track documentation progress

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○ Task Completion Tracking

Track detailed tasks such as:

- Dataset verification
- Calculated field creation
- Trend analysis creation
- Feature impact visualization
- Filter testing.

○ Milestone Tracking

Milestone	Status	Completion %
Planning & Requirements	Completed	100%
Data Collection	Completed	100%
Data Cleaning	In Progress	75%
Dashboard Development	In Progress	50%
Testing & Validation	Not Started	0%
Deployment & Documentation	Not Started	0%

○ Risk Monitoring During Progress Tracking

Common risks:

- Incomplete dataset
- Calculation errors
- Dashboard performance issues
- Time management delays

Mitigation strategy:

- Regular validation
- Backup copies of dataset
- Weekly milestone review

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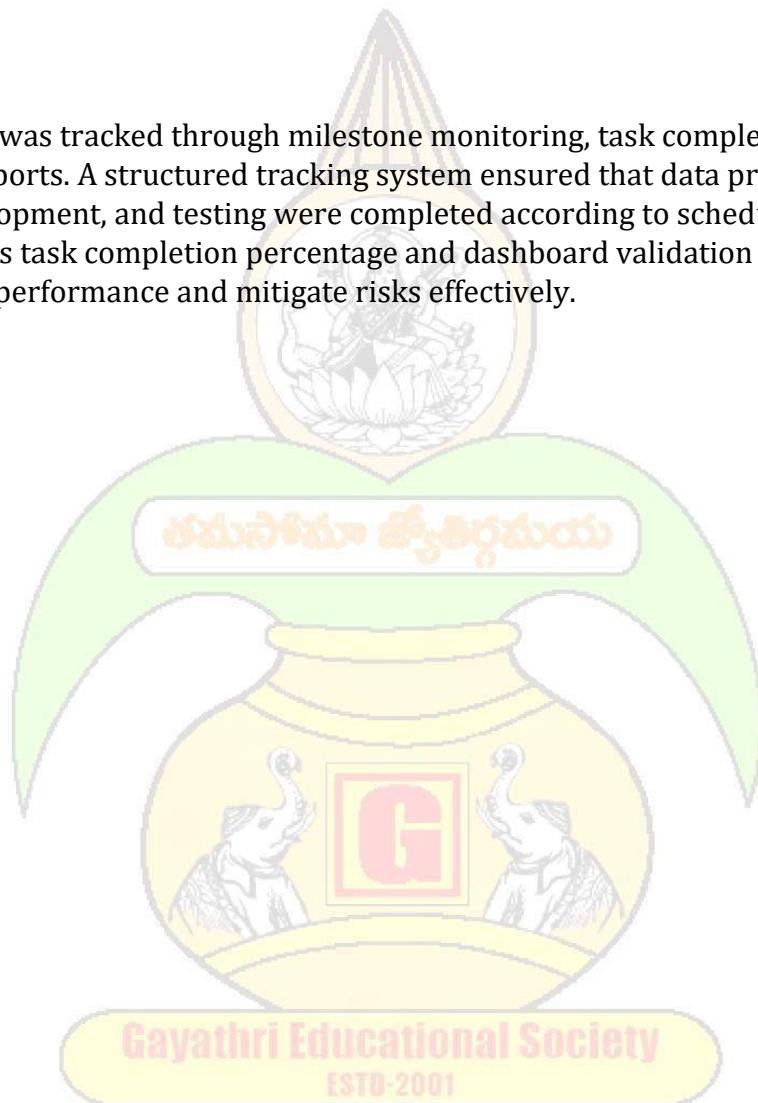
○ Gantt Chart Tracking

A Gantt chart visually shows:

- Start and end dates
- Task dependencies
- Progress timeline
- Delays

Example

Project progress was tracked through milestone monitoring, task completion logs, and weekly status reports. A structured tracking system ensured that data preparation, dashboard development, and testing were completed according to schedule. Progress indicators such as task completion percentage and dashboard validation checklists were used to monitor performance and mitigate risks effectively.



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5.4 Team management Tools for Agile Planning (Jira)

To manage this project efficiently using Agile methodology, a team management tool like **Jira** can be used for sprint planning, task tracking, and collaboration.

○ Why Use Agile for This Project?

Agile is suitable because:

- Dashboard development is iterative
- Requirements may evolve after data exploration
- Visualizations improve through feedback
- Testing and refinement happen continuously

○ Role of Jira in This Project

Jira helps manage:

- Backlog creation
- Task assignment
- Progress tracking
- Bug tracking
- Reporting

Sprint planning

† Aspects of Jira for Agile Planning:

- **Agile Framework Support:** Jira is highly versatile, supporting both Scrum (sprints, story points) and Kanban (WIP limits, continuous flow) methodologies.
- **Visual Tracking:** Teams can use interactive boards and roadmaps to gain visibility into work progress, from individual tasks to large-scale initiatives.

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- **Real-time Reporting:** Built-in reports like Velocity Charts and Cumulative Flow Diagrams allow teams to measure performance and identify bottlenecks immediately.
- **Customization and Integration:** Jira allows for highly customized workflows to match specific team needs and integrates with tools like Confluence and Slack for enhanced collaboration.
- **Advanced Planning:** Jira Premium features include advanced roadmaps for crossproject planning, capacity management, and dependency mapping.

○ Project Structure in Jira

◆ A. Create a Project

Project Name:

Housing Market Visualization Dashboard

Project Type:

- Scrum (recommended for Agile)

○ Sprint Planning Example

• Sprint 1 (Week 1-2)

- Requirement analysis
- Data collection
- Initial data cleaning

• Sprint 2 (Week 3-4)

- Feature impact analysis
- Build Market Overview dashboard

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- Sprint 3 (Week 5–6)

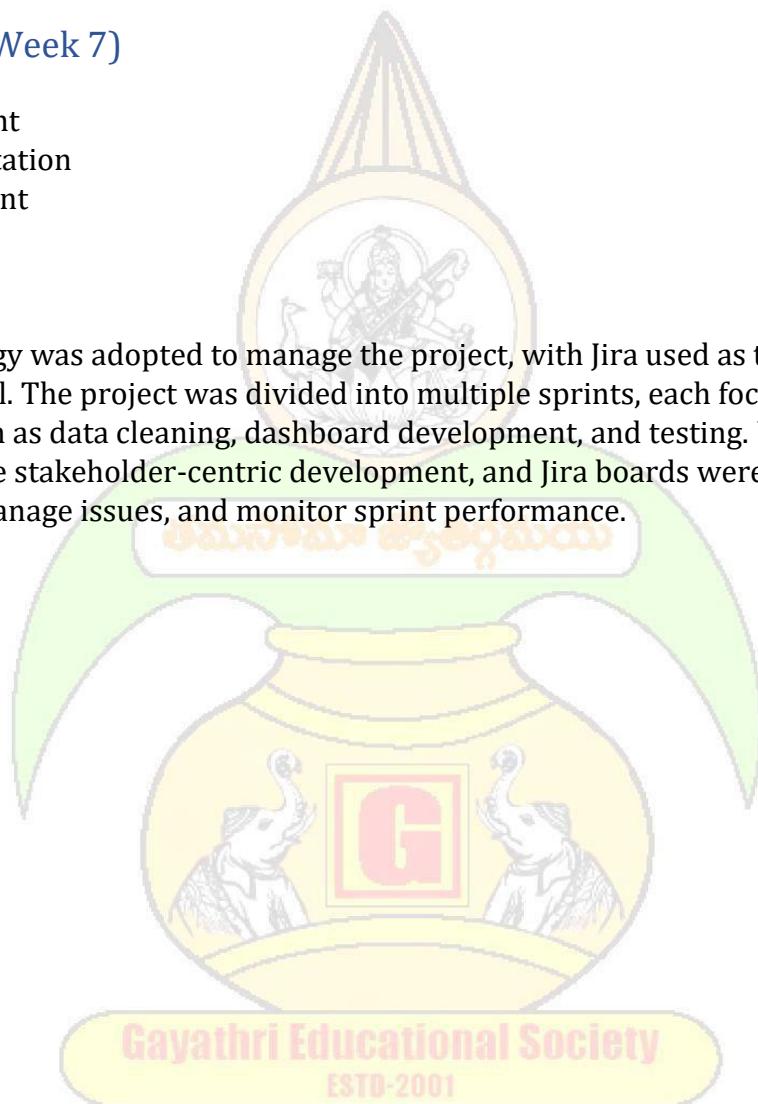
- Location insights
- ROI analysis
- Testing

- Sprint 4 (Week 7)

- Refinement
- Documentation
- Deployment

Example

Agile methodology was adopted to manage the project, with Jira used as the primary team management tool. The project was divided into multiple sprints, each focusing on specific deliverables such as data cleaning, dashboard development, and testing. User stories were defined to ensure stakeholder-centric development, and Jira boards were used to track task progress, manage issues, and monitor sprint performance.



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Chapter 6

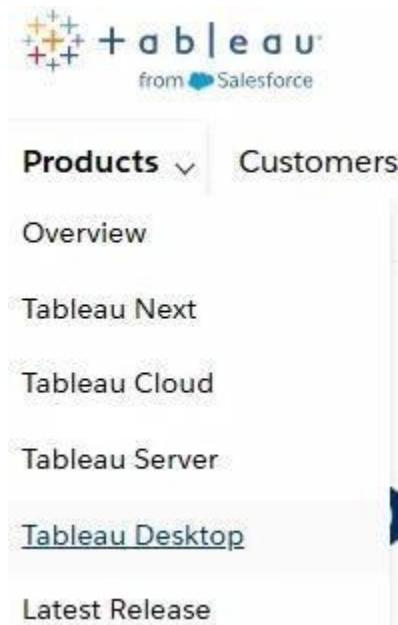
Project Development

6.1 Pre-Requisites

Process of Download Tableau Desktop:

Step 1: Tableau Website

Go to the official website of Tableau and find the "Products" menu.



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Step 2: Tableau Products

- **Tableau Cloud:** Cloud-based analytics platform, fully hosted without server management, for data analysis and secure sharing.
- **Tableau Server:** Self-hosted platform for on-premises or cloud deployment, giving full control over data and analytics environment.
- **Tableau Desktop:** Authoring tool used to create visualizations and dashboards, supporting offline and deep data exploration.
- **Tableau Next:** Future-focused AI and modular analytics platform integrating smart workflows and quicker insights.
- **Other Products:** Tableau Prep (data cleaning), Tableau Public (free public visualizations), Tableau Mobile (mobile access).

We will download the desktop version.

Step 3: Select the Tableau Desktop

We will select the Tableau Desktop option and then there we can have two option:

- Start Free Trial
 - Buy Now
-
- **Start Trial/Download:** Click on "Start Free Trial" to get the professional version, or select Tableau Public for the free, public-facing version.
 - **Register:** Enter the required details (email, name, organization) to initiate the download.

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Products ▾ Customers ▾ Solutions ▾ Resources ▾ Pricing ▾

Tableau Desktop

Explore, model, and visualize data anytime – even offline.

[Start a free trial](#)

[Buy now](#)



[WATCH NOW →](#)

Select the one which suits you.

Step 4: Installation

After selecting the option, the setup will get downloaded. After downloading the setup, we need to install it. Open the setup file and proceed with the setup.

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Tableau Desktop

Welcome to Tableau

Before you install the product, you must read and accept the licence agreement.

Tableau 2025.2.2 [licence terms](#).

I have read and accept the terms of the licence agreement.

To help improve our product, Tableau collects information about your feature usage. All usage data is handled according to our [Privacy Policy](#).

Tick the box to opt out. [Learn more](#)

Don't send product usage data.



Customise

Install

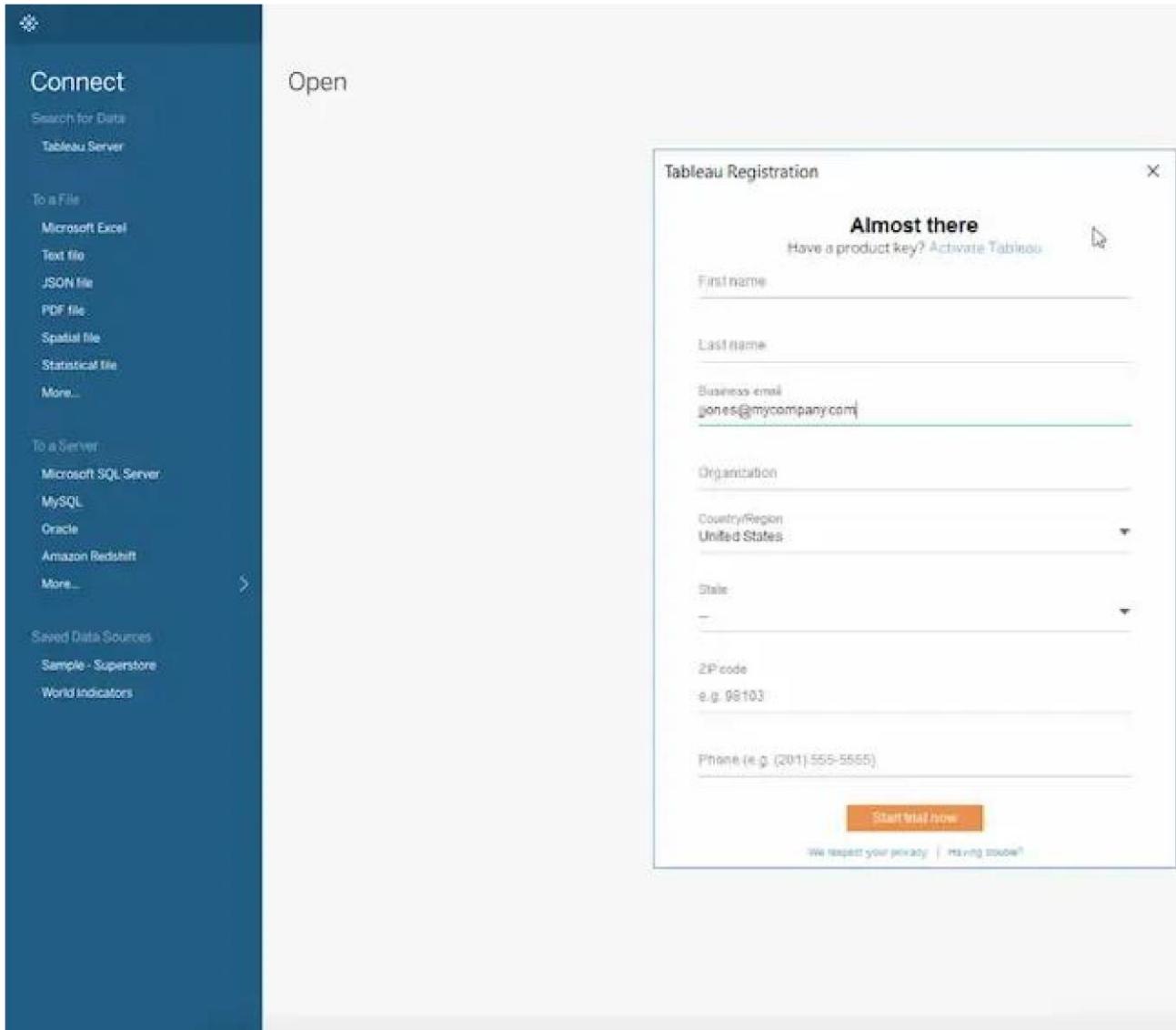
Step 5: Setup

After successful installation, open the Tableau Desktop application and complete the registration.

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Step 6: Tableau Desktop

After completing the registration, Tableau is ready to be used.

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6.2 Data Connectivity

Visualizing housing market trends in Tableau involves connecting to data sources like Excel, CSV, or SQL databases containing property listings (e.g., MLS, Zillow) to analyse sale prices', location, and structural features. Key visualizations include scatter plots for price vs. square footage, geographic maps for regional trends, and bar charts for price trends over time, often enhanced with interactive filters and calculated fields for detailed analysis.

Date Connectivity Dataset [Caggle.com](#)

➤ Downloading the dataset

[Transformed Housing Data 2 | Kaggle.](#)

Data regarding Sale Prices of several houses and their respective features.

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

Understand the data

Data contains all the meta information regarding the columns described in the CSV files

Data Connectivity and Preparation in Tableau

- **Sources:** Data is typically sourced from [Flex MLS](#), Zillow, the U.S. Census Bureau, and [local property listings](#).
- **Connecting:** Tableau connects directly to these files, creating an extract for faster performance, especially with large datasets
- **Cleaning:** Before visualization, data is cleaned by handling missing values (e.g., [Pool](#), [Alley](#)) and removing unnecessary columns to focus on relevant variables like price, beds, baths, and square footage.

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Data Connectivity explains how Tableau connects to housing datasets, retrieves data, and maintains updates for analysis and visualization.

Types of Data Connections Used in This Project

◆ A. File-Based Connection (Most Common for Academic Projects)

Supported Formats:

- Excel (.xlsx)
 - CSV (.csv)
 - Text files
- How It Works:
1. Open Tableau Desktop
 2. Select “Connect to Data”
 3. Choose Excel or Text File
 4. Load housing dataset
 5. Preview and clean data

• Cloud-Based Connection

Tableau can connect to:

- Google Sheets
- Cloud databases
- Tableau Server

○ Data Connectivity Workflow

1. Collect housing dataset
2. Connect to Tableau Desktop
3. Preview and clean data
4. Create relationships/joins
5. Create extract (optional)

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6. Build dashboards
7. Publish to Tab

Example

The project utilizes Tableau Desktop to establish connectivity with housing datasets stored in Excel/CSV format. Data is imported through file-based connections and processed within Tableau's data engine. Extract connections are used to enhance performance and ensure smooth dashboard interaction. Proper data validation and transformation are performed before visualization to maintain accuracy and integrity.



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6.3 Data Preparation

Visualizing housing market trends in Tableau involves transforming raw real estate data into actionable insights by cleaning data (handling missing values, formatting dates, removing irrelevant columns), then mapping, filtering by property features (location, size, rooms), and analysing trends over time. Common visualizations include maps for location trends, scatter plots for price-feature correlations, and line graphs for price changes.

Data Preparation Steps for Tableau Housing Analysis

- **Data Collection:** Gather data from sources like MLS, CSVs, or databases, focusing on key fields: Sale Price, Date, Location (Zip Code/City), Property Type, Square Footage, and number of Bedrooms/Bathrooms.
- **Cleaning & Formatting:**
- **Handle Missing Values:** Remove or impute missing data in critical fields like sale price or square footage.
- **Date Conversion:** Ensure date fields are in a date format recognized by Tableau to enable time-series analysis.
- **Data Type Assignment:** Ensure numerical fields (price, area) are measures and categorical fields (zip code, property type) are dimensions.
- **Data Transformation:**
- **Calculate Metrics:** Create calculated fields for, for example, "Price per Square Foot".

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- **Filtering:** Filter out irrelevant data points, such as outliers or non-residential properties.
- **Geocoding:** Ensure location data (zip codes, city) is correctly recognized for mapping.

Data Preparation is one of the most critical stages of the project. Before building dashboards in **Tableau Desktop**, the housing dataset must be cleaned, transformed, and structured properly to ensure accurate analysis.

Prepare the Data for Visualization

This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency. Since the data is already cleaned, we can move to visualization.

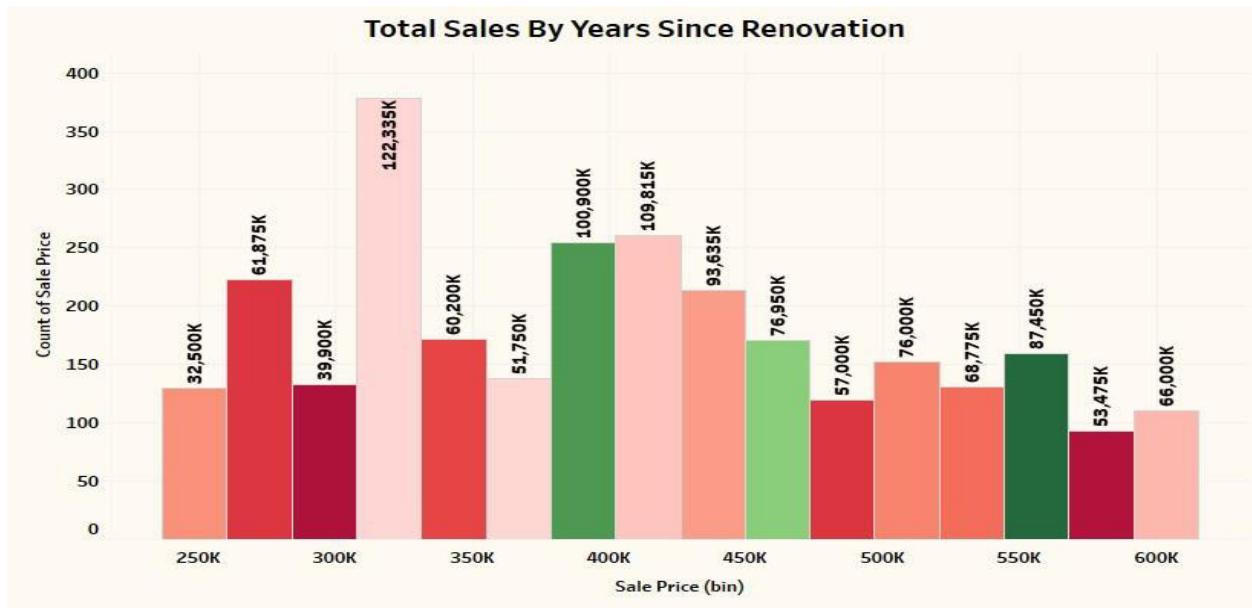
No. of Unique Visualizations

Activity 1



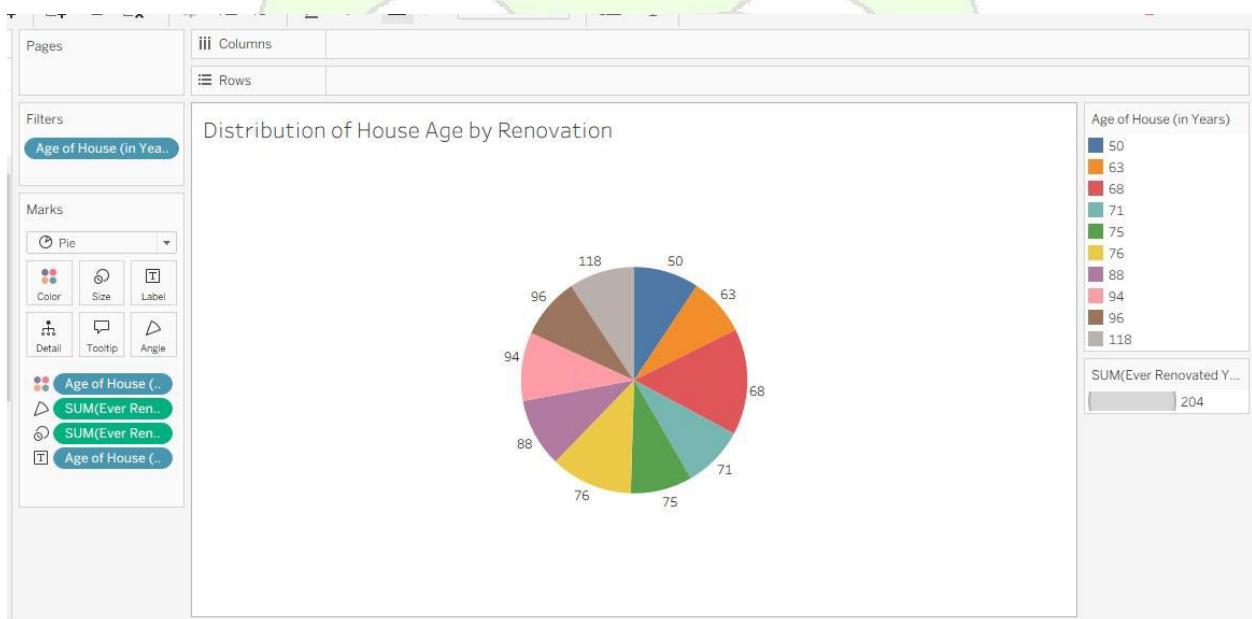
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Total Sales by Years Since Renovation Activity 2



Distribution of House Age by Renovation Status

Activity 3



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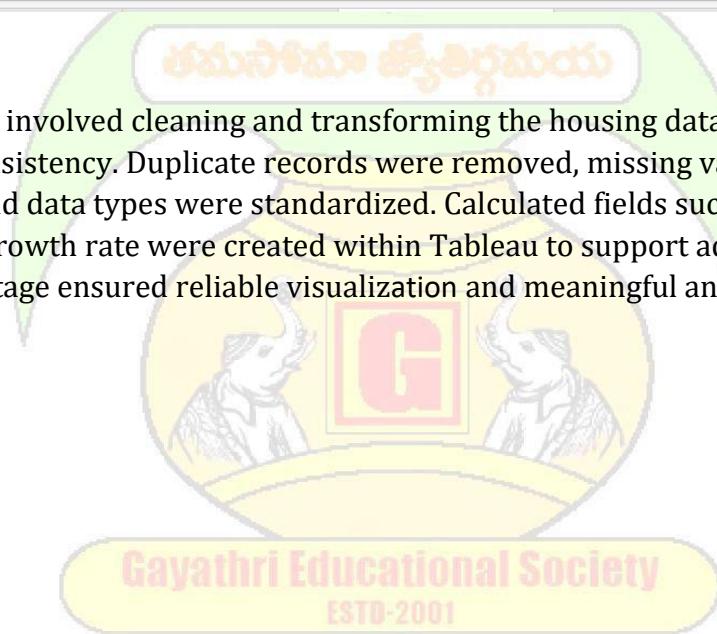
House Age Distribution by Number of Bathrooms, Bedrooms, and Floors

Activity 4



Example

Data preparation involved cleaning and transforming the housing dataset to ensure accuracy and consistency. Duplicate records were removed, missing values were handled appropriately, and data types were standardized. Calculated fields such as price per square foot and yearly growth rate were created within Tableau to support advanced analysis. This pre-processing stage ensured reliable visualization and meaningful analytical insights.



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➤ **6.4 Dashboard**

A Tableau housing market dashboard visualizes property sale prices, location, and structural features (e.g., square footage, bedrooms, bathrooms) to identify trends. Key components often include geographic maps, scatter plots for price correlations, and interactive filters for deep analysis. These tools facilitate informed, data-driven decisions.

➤ **Key Components and Insights of the Dashboard:**

- **Geographic Analysis:** Maps, often using latitude/longitude, display sales by region, zip code, or specific neighbourhoods to show price distribution.
- **Price Drivers & Correlations:** Scatter plots analyse the relationship between price and features, such as living area (sq. ft), with trend lines showing price growth potential.

➤ **Typical Workflow for Creating the Dashboard:**

1. **Data Collection & Cleaning:** Gathering data (e.g., from Redfin, MLS) and preparing it, often using Excel, Python, or Tableau Prep.
2. **Visualization:** Creating worksheets for specific metrics (e.g., Average Sale Price).
3. **Dashboard Assembly:** Combining charts, maps, and filters onto a single, interactive, and user-friendly interface.

The **Dashboard** is the final output of the project. It combines multiple visualizations into a single interactive interface that allows users to explore housing market trends, property features, and location insights. Built using **Tableau Desktop**, the dashboard transforms raw housing data into meaningful, interactive insights.

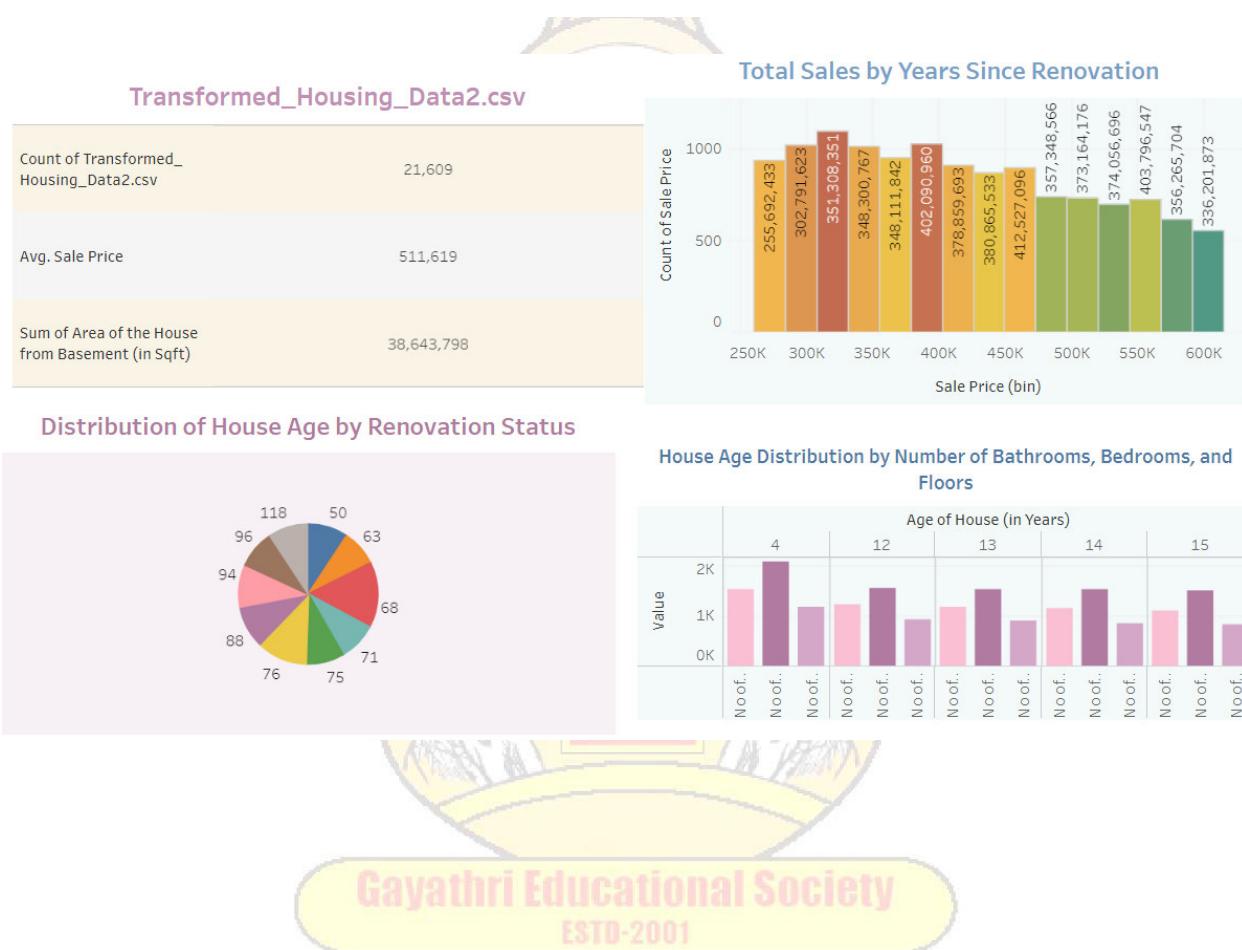
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Example

The final solution consists of three interactive Tableau dashboards: Market Overview, Feature Impact Analysis, and Location & Investment Insights. These dashboards integrate key performance indicators, trend analysis, geographic mapping, and feature-based comparisons.

Comprehensive House Price Analysis

Dashboard



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6.5 Story

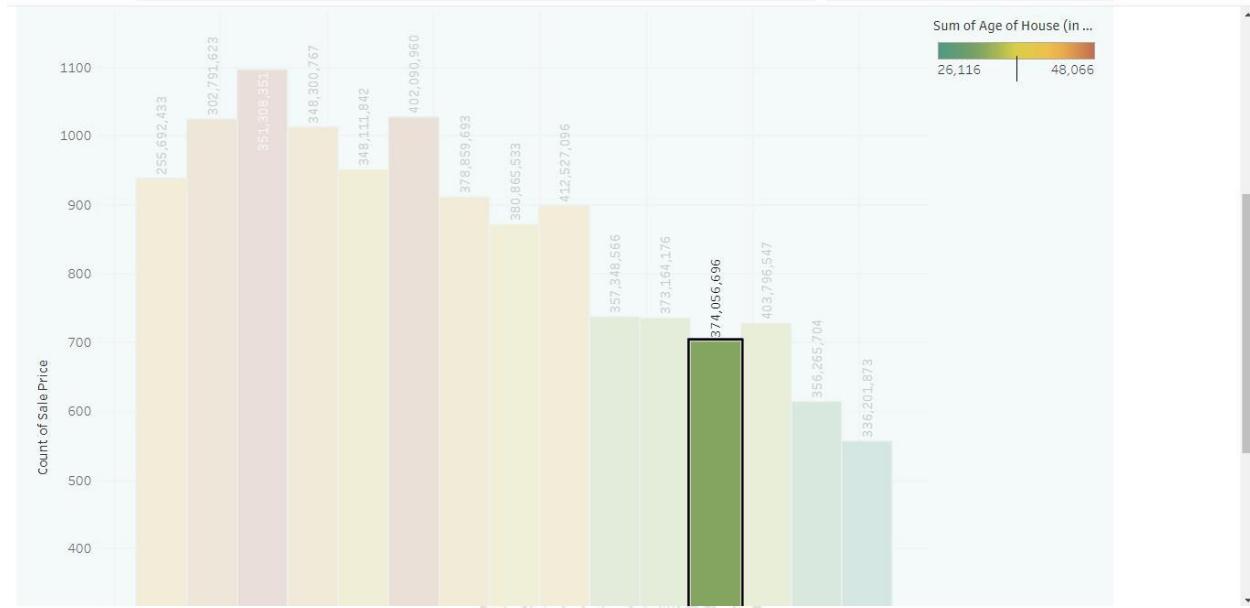
A storyboard is a visual representation of a sequence of events, typically used in multimedia projects such as films, animations, advertisements, or presentations. It consists of a series of drawings or images arranged in a sequence, often accompanied by annotations or descriptions, to outline the flow of the story or concept.

Visualizing housing market trends in Tableau allows for an interactive, data-driven analysis of sale prices', location, and property features to identify market drivers. Utilizing tools like Tableau Public and Desktop, analysts can create interactive dashboards featuring maps, histograms, and scatter plots to reveal trends such as the impact of square footages, bedrooms, and location on price, offering actionable insights for investors and homebuyers.

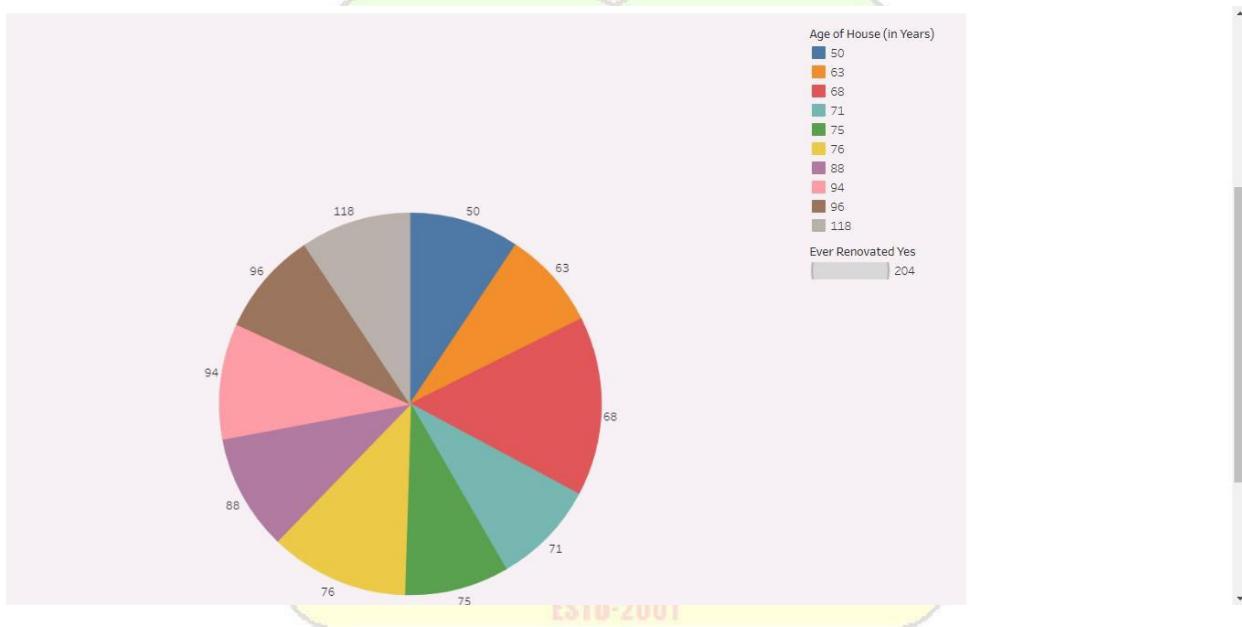
- **Key Components of a Housing Market Tableau Story**
- **Geospatial Analysis:** Map-based visualizations showing average sale prices by zip code, highlighting market hotspots.
- **Temporal Trends:** Line charts mapping daily/monthly average house prices to show marked volatility and demand over time.
- **Property Feature Drivers:** Visualizations correlating price with attributes like the number of bedrooms, bathrooms, overall quality, and proximity to amenities.
- **Distribution Metrics:** Histograms used to analyse the distribution of house prices and identify outliers.
- **Tableau Tools Used**
- **Tableau Public/Desktop:** For building, dashboards and, interactive.
- **Data Prep:** Obtemper to handle, missing and, clean.
- **Visualization Types:** Head, scatter, and, maps to show complex relationships

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

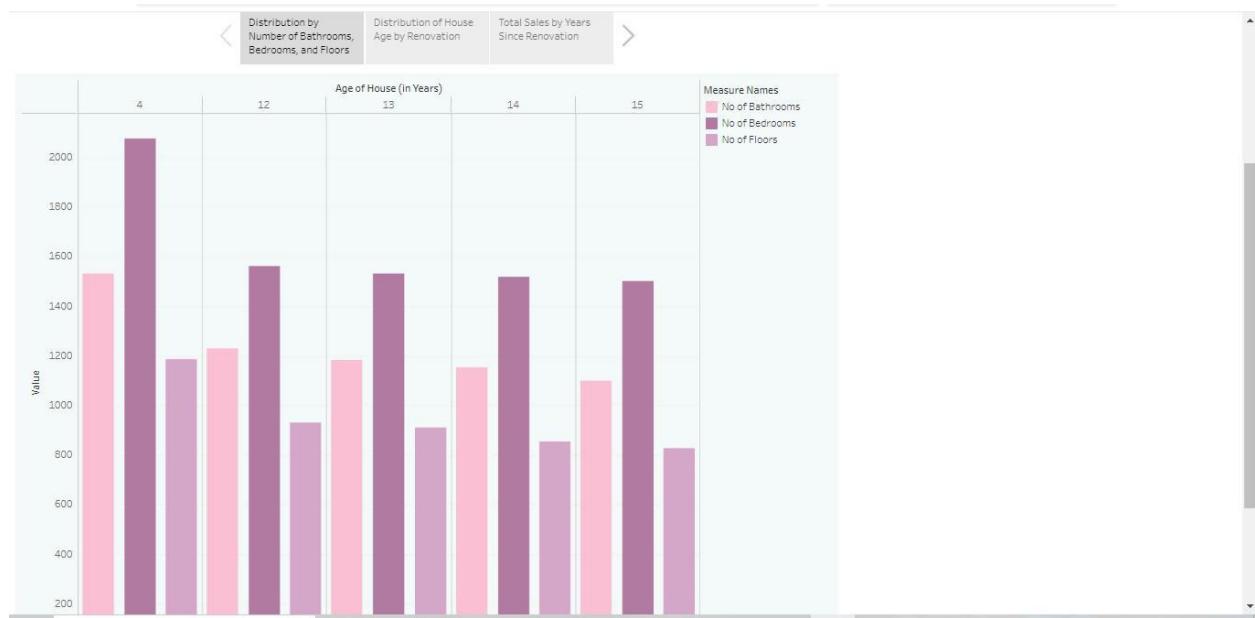
House Age Distribution by Number of Bathrooms, Bedrooms, and Floors



Distribution of House Age by Renovation Status



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



In **Tableau**, a *Story* is a sequence of visualizations (called story points) that work together to explain insights. Instead of just dashboards, a story:

- Shows step-by-step findings
- Highlights key patterns
- Explains trends in context
- Allows interactive exploration

➤ Recommended Story Structure for Housing Market Analysis

Below is a logical structure for analysing **sale prices and housing features**.

When creating a **Tableau Story** about housing market trends, your goal is to guide viewers through a clear, data-driven narrative. Below is a structured breakdown of how to build and present your story effectively.

Visualizing Housing Market Trends: An Analysis of Sale Prices and Feature using Tableau

DATE	28-02-2026
TEAM ID	LTVIP2026TMIDS90693
PROJECT NAME	Visualizing Housing market Trends: An Analysis of Sale Prices and Features Using Tableau
MAXIMUM MARKS	4 MARKS

➤ **6.6 Creativity (Font and Style)**

Visualizing housing market trends in [Tableau](#) requires balancing analytical rigor—such as identifying factors like square footage, location, and amenities—with creative design to make the data engaging and actionable. A creative and effective Tableau dashboard for housing data should follow a consistent style, maintain a logical, uncluttered layout, and use intuitive colour schemes.

➤ **Creative Font and Style Guidelines in Tableau**

- **Typography:** Use sans-serif fonts for readability, such as **Late**, **Open Sans**, or **Tableau Regular**. These fonts are generally preferred for charts and tables because they are clean and usually contain tabular, lining figures, which are easier to read.
- **Font Hierarchy:**
 - **Titles & KPIs:** Use bold, larger fonts (e.g., 24pt-36pt) to make them "pop".
 - **Labels & Axis:** Use normal, smaller fonts (e.g., 10pt-12pt).
 - **Annotation:** Use regular or medium weights.
- **Colour Palette:**
 - Use a neutral, professional base (grayscale) for the overall dashboard.
 - Use colour sparingly to accent or highlight key messages.
 - For geographical maps, consider using diverging or sequential colour palettes to show price ranges.
 - Ensure colours are intuitive (e.g., blue for cool, red for hot market areas).

Visualizing Housing Market Trends: An Analysis of Sale Prices and Feature using Tableau

1. Font Selection Strategy

Your font choice should reflect **clarity, professionalism, and hierarchy**.

2. Color Style & Theme

Since the project is about housing market trends, your color theme should reflect **trust, stability, and growth**.

3. Layout & Design Style

Your dashboard/story layout should follow a clean visual hierarchy.

Example

"The dashboard utilizes a minimalist design approach with a blue-green color palette symbolizing growth and stability. Typography hierarchy was maintained using Tableau Book font, with bold formatting applied to key performance indicators. Consistent spacing, subtle shading, and interactive tooltips enhance readability while maintaining a professional real estate aesthetic."

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

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MAXIMUM MARKS	4 MARKS

Chapter 7

7.1 - Functional and Performance Testing

Visualizing housing market trends in Tableau involves cleaning data, calculating metrics like price-per-square-foot, and creating interactive dashboards to analyse, map, and forecast property values based on features like location and size. Key visualizations include geographical maps of sales, scatter plots for regression analysis, and trend lines, often using CRISP-DM methodology for insights.

- **Feature Analysis:** Including factors such as the number of bedrooms, bathrooms, and, in some cases, incorporating machine learning for better prediction accuracy.
- **Performance Metrics:** Analysing KPIs such as "Days on Market" and year-over-year (YoY) price trends.

Functional & Performance Testing of Dashboards:

- **Functional Testing:** Ensures filters, interactive maps, and calculated fields (e.g., price per square foot) produce accurate, expected results.
- **Performance Testing:** Ensures the Tableau workbook efficiently handles large, complex datasets, providing fast rendering for user interactions, which is crucial for identifying market volatility.

Tools & Techniques:

- **Tableau Public:** Used for creating and sharing interactive dashboards.
- **Data Sources:** Real estate data, Zillow, or scraped data, often involving cleaning to ensure accuracy.
- **Analytics:** Employing linear regression and clustering to understand property value drivers.

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

⊕ Focus: Functional & Performance Testing

When developing a Tableau project titled “**Visualizing Housing Market Trends: An Analysis of Sale Prices and Features**”, testing ensures that your dashboards and story points are:

- Accurate
- Interactive
- Reliable
- Efficient
- Scalable

Below is a structured explanation you can use for documentation or academic submission.

1. Functional Testing in Tableau

Functional testing verifies that every component of the dashboard works correctly according to requirements.

2. Performance Testing in Tableau

Performance testing ensures dashboards load quickly and run smoothly, especially with large datasets.

Performance and Functional Testing of Dashboards

- **Functional Testing:** Ensuring that filters, interactive actions, and tooltips function correctly and display accurate data.
- **Performance Testing:** Ensuring that dashboards, especially those using large datasets or live connections, load efficiently and interact seamlessly, with options to create data extracts to improve speed.

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

Example

"Comprehensive functional and performance testing was conducted to ensure accuracy, responsiveness, and scalability of the Tableau dashboard. Filters, calculated fields, and parameters were validated against the source dataset. Performance optimization techniques such as data extracts, aggregation, and context filters were implemented to maintain load times under five seconds. The dashboard demonstrated stable performance and accurate dynamic interactions across all story points."

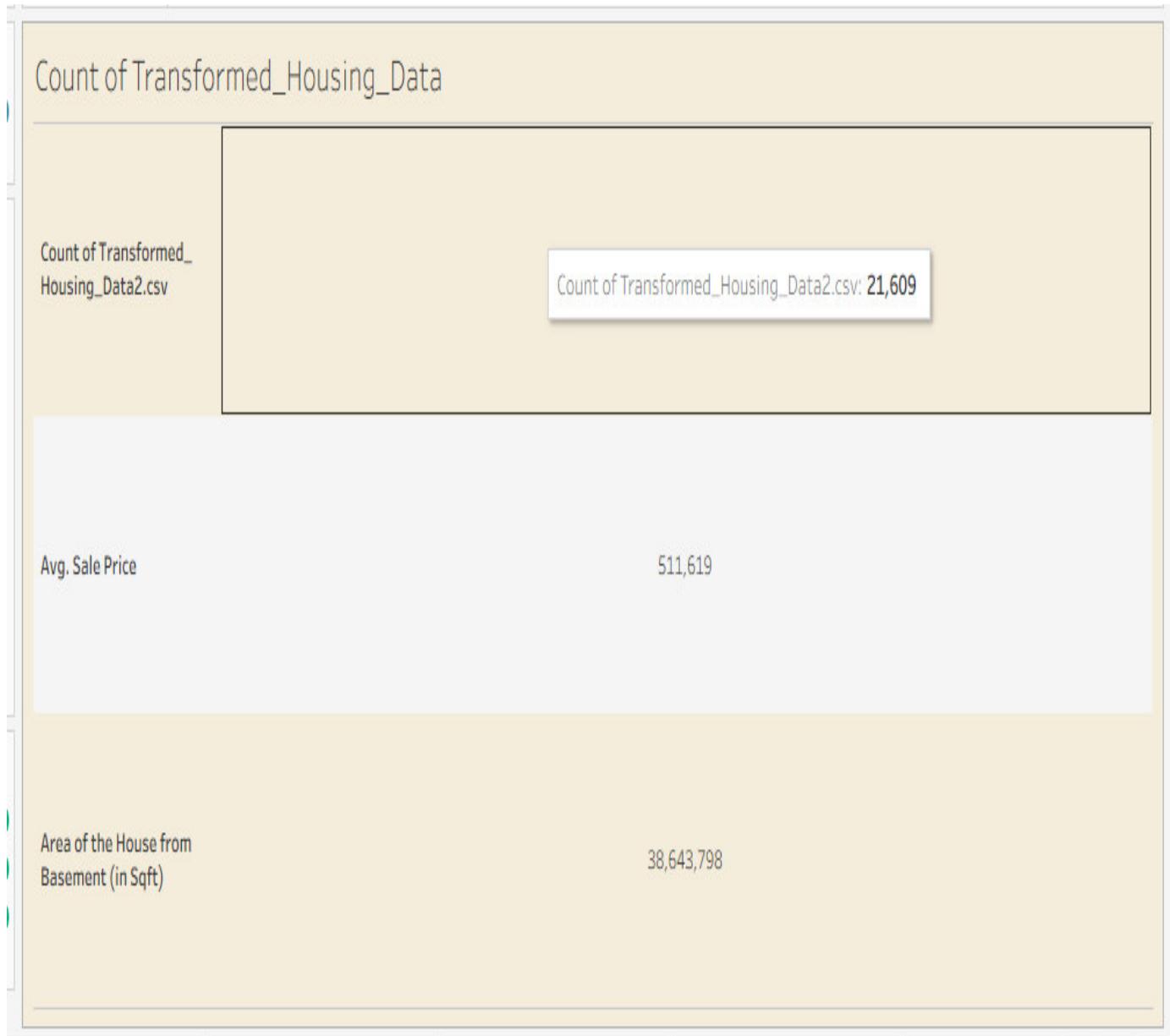


Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau

Chapter 8

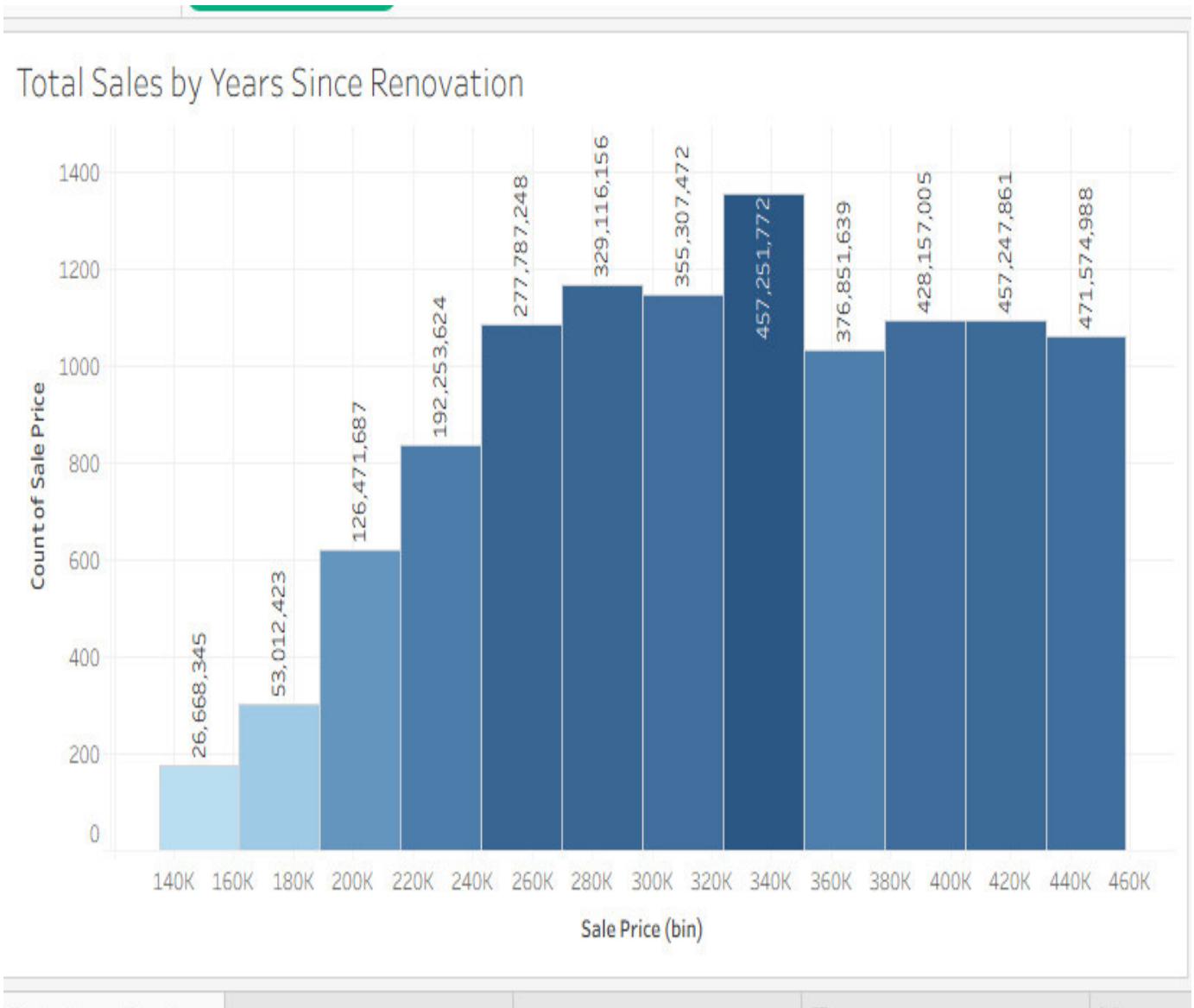
8.1 Output Screens Dashboard

Count of Transformed_Housing_Data



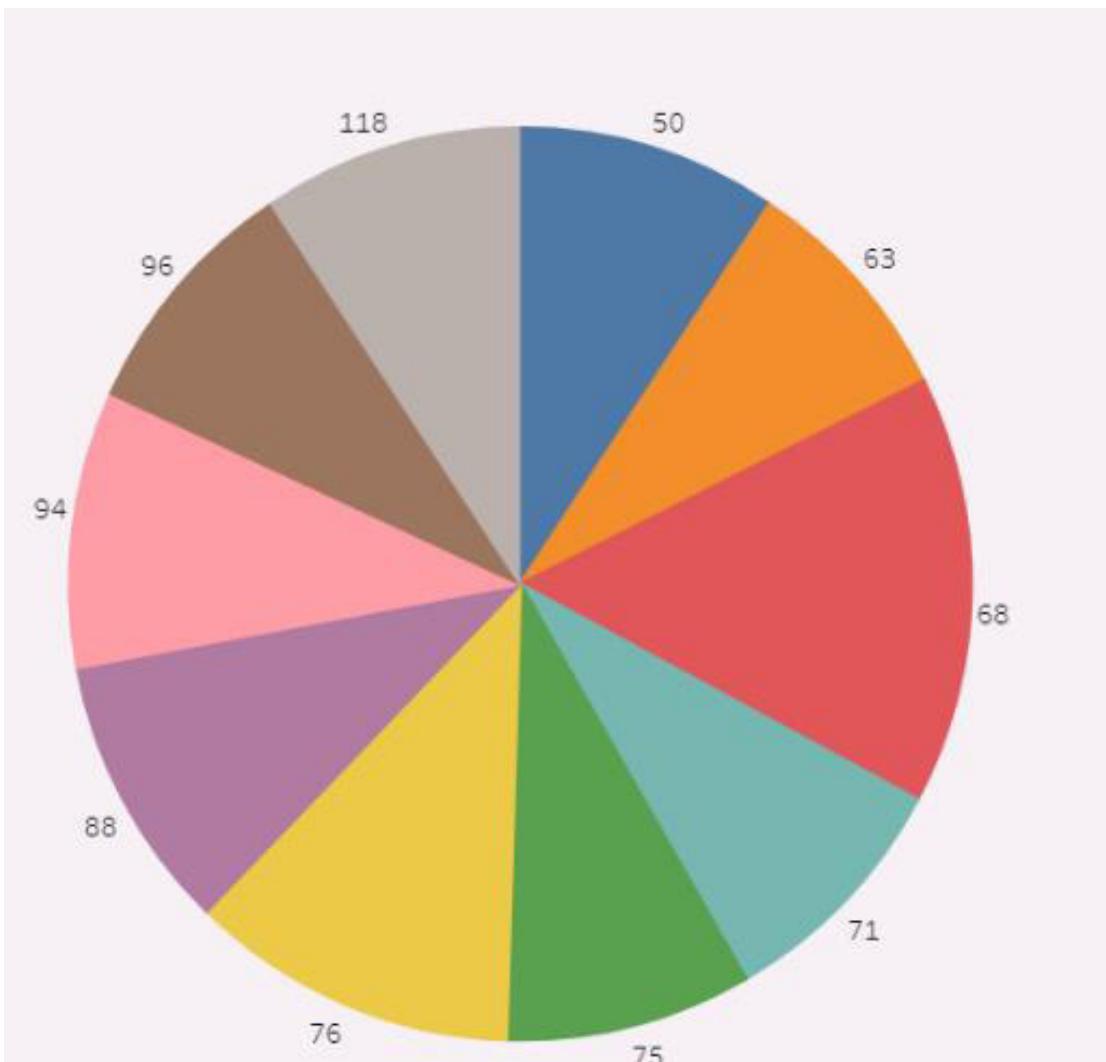
Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau

Total Sales by Years Since Renovation



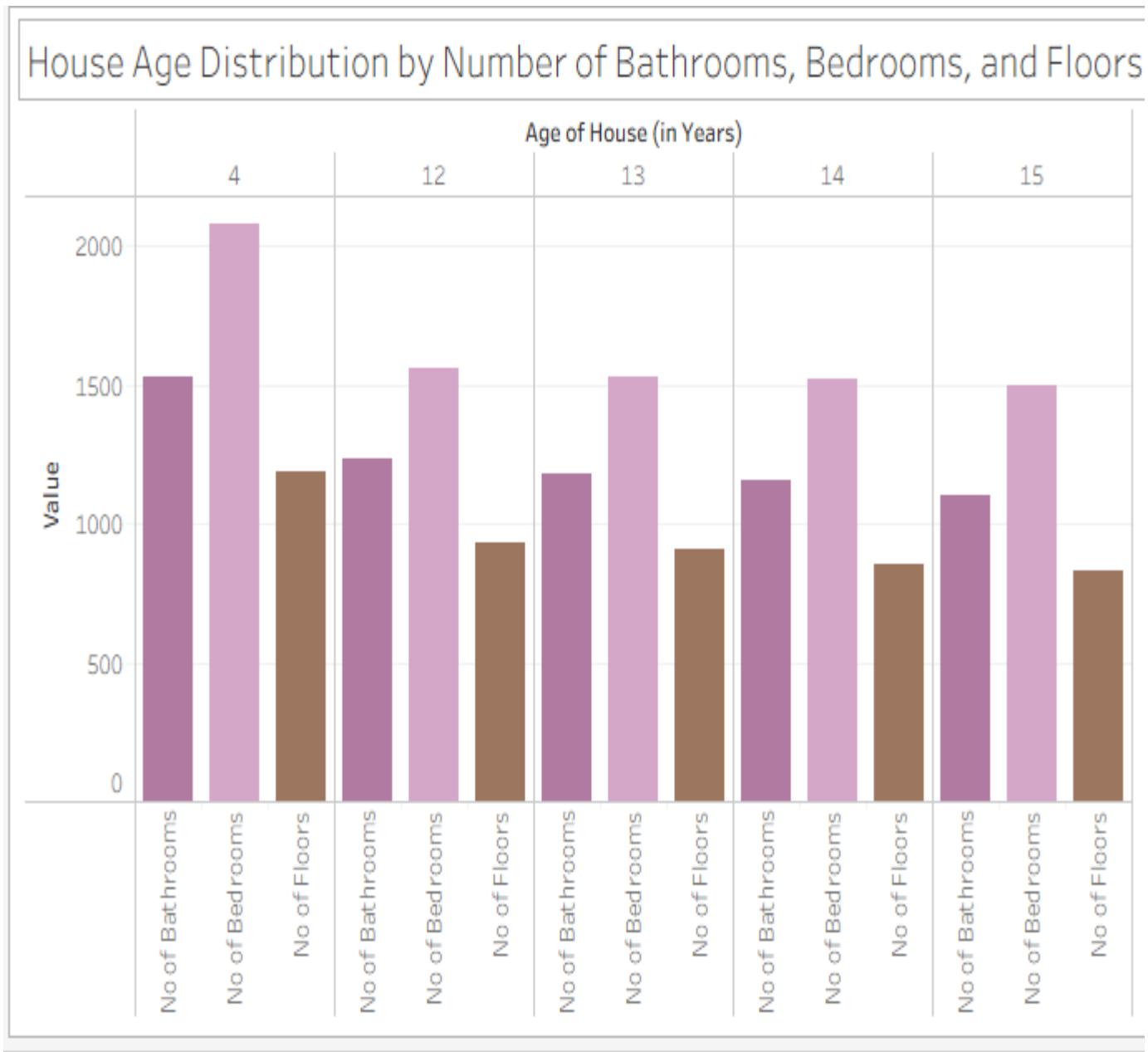
Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau

Distribution of House Age by Renovation Status



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

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



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

Dashboard



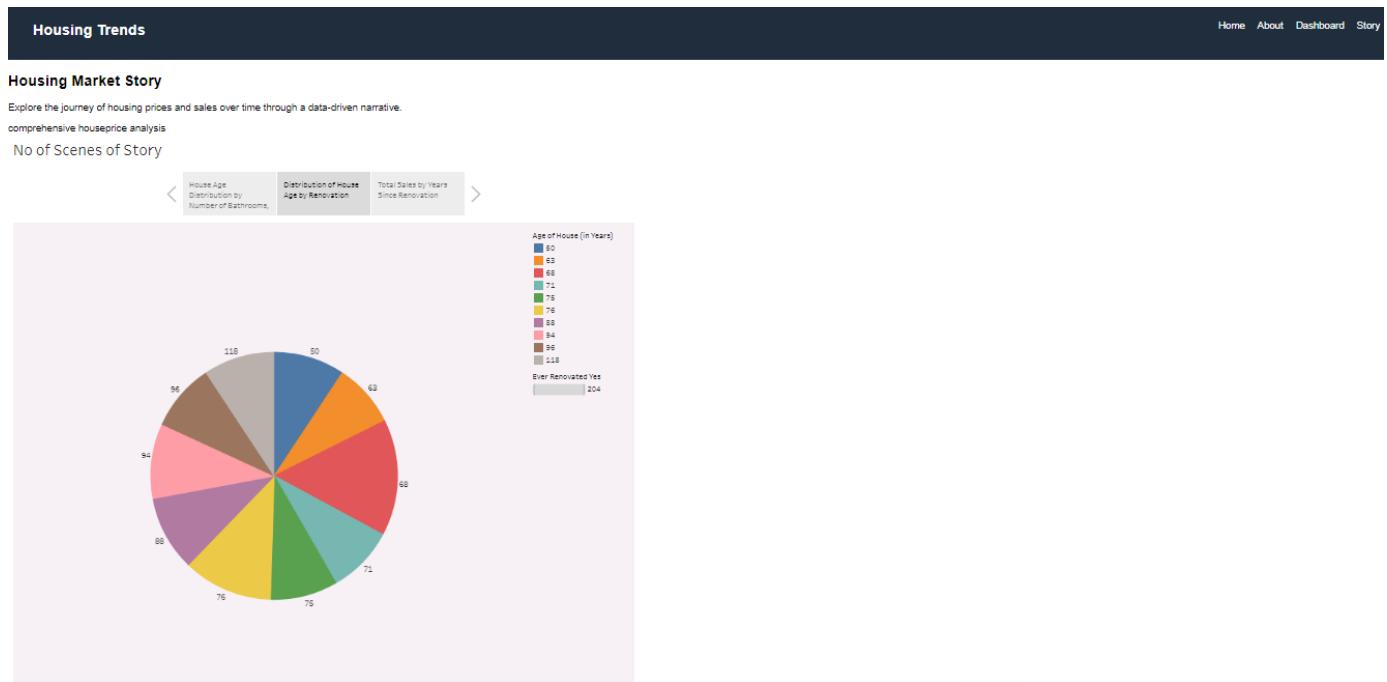
Story

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



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

Distribution of House Age by Renovation Status



Total Sales by Years Since Renovation



Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using

Tableau

Chapter 9

○ 9.1 Advantages

† Advantages of This Project

Developing a Tableau project focused on housing market trends offers significant advantages from **analytical, business, technical, and academic perspectives**. Below is a well-structured explanation you can use in a report or presentation.

1. Better Data Understanding

✓ Clear Trend Identification

- Visualizes long-term price growth or decline
- Identifies seasonal patterns
- Detects sudden market spikes or drops

✓ Feature Impact Analysis

- Shows how square footage affects price
- Compares bedrooms/bathrooms impact
- Analyses property age influence

2. Improved Decision-Making

For Real Estate Investors:

- Identify high-growth neighbourhoods
- Spot undervalued properties
- Predict future market movement

• For Home Buyers:

ESTD-2001

- Understand fair pricing
- Compare features vs price
- Avoid overpaying

○ For Sellers:

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

- Price properties competitively
- Understand value-adding features

⊕ Interactive & Dynamic Analysis

Unlike static reports, this project offers:

- ✓ Real-time filter interaction
- ✓ Dynamic parameters (Average vs Median)
- ✓ Drill-down capability
- ✓ Custom tooltips

⊕ Performance Optimization Benefits

When properly built:

- Fast load time using extracts
- Scalable for larger datasets
- Efficient filtering and aggregation

The project demonstrates strong data engineering practices.

⊕ Professional Presentation & Storytelling

- Advantages:
 - Clean dashboard layout
 - Clear data storytelling
 - Business-ready visuals
 - Executive-friendly summaries

It improves communication between:

- Data analysts
- Real estate professionals
- Business stakeholders

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

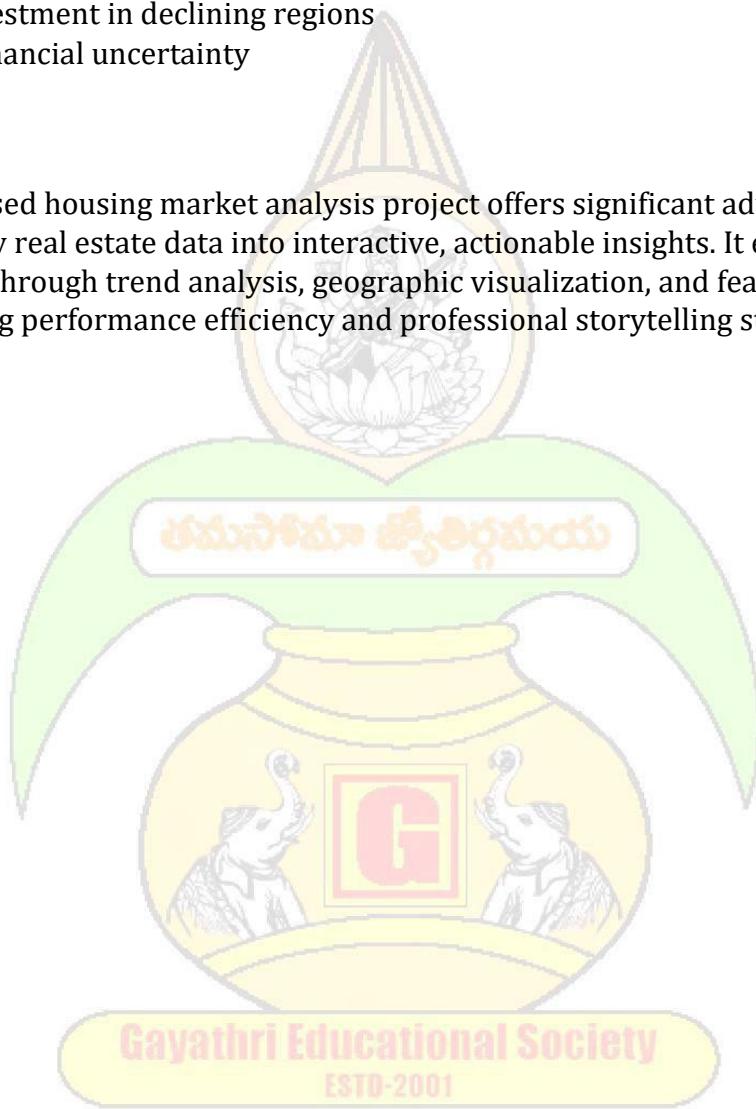
✚ Risk Reduction

The project helps:

- Identify overheated markets
- Detect unusual price fluctuations
- Avoid investment in declining regions
- Reduce financial uncertainty

Example

"The Tableau-based housing market analysis project offers significant advantages by transforming raw real estate data into interactive, actionable insights. It enhances decisionmaking through trend analysis, geographic visualization, and feature comparison while maintaining performance efficiency and professional storytelling standards."



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

9.2 Disadvantages

† Disadvantages of a Tableau Housing Market Project

- **Data Limitations and Outdated Information:** Housing data is dynamic, and static datasets (e.g., 2014-2015 data) may not reflect current market conditions. Missing external data (like mortgage rates or crime rates) limits comprehensive analysis.
- **Intensive Data Pre-processing:** [The Knowledge Academy](#) reports that Tableau is primarily a visualization tool, often requiring extensive, time-consuming data cleaning and transformation in external tools (like SQL or Python) before ingestion.
- **Manual Formatting and Maintenance:** The software requires manual formatting, which is tedious, and parameters are static, meaning they do not automatically update, as explained in Mind bowser's analysis of Tableau.
- **Oversimplification and Misinterpretation:** Complex housing factors can be oversimplified in visualizations, potentially leading to incorrect conclusions. Improperly built visualizations might not accurately represent the data.
- **High Licensing and Training Costs:** Tableau is expensive, making it less accessible for small-scale projects, note [Sam Solutions](#) and [Smart Solutions](#).
- **Outlier Influence:** As shown by [Raymond Ng's analysis](#), outliers can disproportionately impact, and thus mislead, the overall trends shown in visualizations.

○ Disadvantages of This Project

While this Tableau housing market analysis project offers strong insights and visualization benefits, it also has several limitations and potential drawbacks. Below is a structured explanation suitable for academic reports or presentations.

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

1. Data Dependency & Quality Issues

⚠ Accuracy Depends on Data Quality

- Incomplete records (missing sale prices or features)
- Duplicate entries
- Incorrect property details
- Outdated market information

If the dataset is inaccurate, visualizations may lead to misleading conclusions.

2. Limited Historical or External Data

The analysis may not include:

- Economic indicators (inflation, interest rates)
- Mortgage rate trends
- Government housing policies
- Employment rates

Without external factors, price trends may be oversimplified.

3. Performance Issues with Large Datasets

When working with large housing datasets:

- Dashboards may load slowly
- Maps may render slowly
- Complex calculated fields may reduce performance

Performance optimization (extracts, aggregation) is required to avoid delays.

4. Maintenance & Update Challenges

If the housing dataset updates frequently:

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

- Dashboard must be refreshed regularly
- Extracts must be updated
- Calculations may need revision

Without maintenance, insights become outdated.

○ Limited Advanced Statistical Modeling

Tableau is strong in visualization but limited in:

- Advanced machine learning
- Deep predictive modelling
- Complex econometric analysis

For deeper forecasting, tools like Python or R may be more powerful.

Example

“Despite its strong visualization and interactive capabilities, the Tableau-based housing market analysis project has certain limitations. The accuracy of insights depends heavily on data quality and completeness. Additionally, Tableau’s limited advanced statistical modeling capabilities and potential performance constraints with large datasets may restrict deeper analytical exploration. Regular maintenance and careful design are required to ensure reliable and meaningful results.”

Gayathri Educational Society

ESTD-2001

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

Chapter 10

10.1 Conclusion

This Tableau project reveals that housing market trends are heavily influenced by location, square footage, and property features like the number of bathrooms and bedrooms. Interactive dashboards effectively visualize these trends, highlighting that higher quality, larger homes, and specific amenities (like AC) drive higher prices. It provides actionable insights for stakeholders to make data-driven investment decisions.

† Key Conclusions & Insights:

- **Key Value Drivers:** Square footage (stationing) shows the strongest positive correlation with price, followed by the number of bathrooms and bedrooms.
- **Geographical Impact:** Visualizing sales data via map visualizations identifies high value zones, allowing stakeholders to identify, which areas have the best price potential.
- **Feature Influence:** Amenities like air conditioning and proximity to main roads significantly increase home value.
- **Market Trends:** The dashboard acts as a decision-support tool, enabling users to identify market trends, such as price spikes in specific neighborhoods or changes in inventory.
- **Data Optimization:** [Transforming data to normalize price distribution](#) (e.g., using log transformation) is crucial for accurate modelling and analysis of outliers.

The project successfully demonstrates that Tableau transforms raw, complex real estate data into actionable insights for buyers, sellers, and investors.

○ Conclusion of the Project

The **Housing Market Trends Analysis using Tableau** successfully transformed raw real estate data into meaningful, interactive, and actionable insights. By analyzing sale prices alongside key property features such as square footage, number of bedrooms, bathrooms.

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

This project successfully utilized Tableau to analyze housing market trends, revealing that location, square footage, grade/condition, and, notably, waterfront access are the primary drivers of sale prices. Through interactive dashboards, it identified that, while larger homes generally command higher prices, value increases significantly with better views and conditions.

- **Key Drivers:** Location and square footage are the most influential features, with price per square foot varying widely by neighbourhood.
- **Property Features:** Amenities such as waterfront access, air conditioning, and a higher number of bathrooms significantly boost property value.
- **Market Trends:** Most sales occur during spring and summer months.
- **Analysis Utility:** The interactive Tableau dashboards provide actionable, data-driven insights for buyers, sellers, and investors, aiding in identifying high-value properties and assessing market, geographic, or temporal trends.
- **Future Scope:** Future iterations could incorporate predictive modelling to forecast prices, offering further refined investment decision-making.

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

Chapter 11

11.1 Future Scope

Visualizing housing market trends in Tableau utilizes, spatial mapping, scatter plots, and time-series analysis to connect property features (size, location, amenities) with price, aiding developers and investors in identifying market shifts, investment hotspots, and demand patterns. Future applications involve integrating real-time data, predictive AI, and geospatial analytics.

- **Future Scope and Enhancements**
- **Predictive Analytics & AI Integration:** Future developments can incorporate predictive modelling, such as forecasting price trends and identifying investment opportunities using machine learning integrated into Tableau.
- **Real-Time Data Feeds:** Shifting from static to real-time dashboards that connect to live data sources (MLS, APIs) to track daily market changes and, and to identify inventory levels instantly.
- **Advanced Geospatial Analysis:** Implementing more detailed spatial analysis, such as zip code-level mapping and heatmaps to identify specific, granular, and, hotspots and trends in, and, in neighbourhood, development, and, and, and growth.
- **Comprehensive Feature Analysis:** Expanding analysis beyond basic features to include, and, such as proximity to, amenities, transport, or even environmental factors (e.g., green spaces, flood risks).
- **Integration with Tableau Pulse & Co-pilot:** Leveraging advanced AI tools like Tableau Pulse and Co-pilot to enable automated insights, natural language querying, and more intuitive, and, and, and, user-friendly, and, discovery of, and, and, and, of, and, key metrics.

Potential Impact

- **Improved Decision-Making:** Investors and developers can make more informed, data-driven decisions.

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

- **Optimized Strategies:** Real estate agents can, and, better understand, and, and market demands.
- **Enhanced User Experience:** Interactive dashboards will offer deeper insights for, and, more engaging and intuitive, for users.

⊕ Future Scope: Visualizing Housing Market Trends Using Tableau

Expanding your project “**Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau**” can significantly increase its analytical depth, realworld applicability, and business value. Below are key areas for future enhancement:

⊕ Predictive Price Forecasting

- Implement time-series forecasting to predict future housing prices.
- Use advanced statistical models (ARIMA, Linear Regression, Machine Learning).
- Integrate Tableau with Python/R for enhanced predictive analytics.

⊕ Real-Time Data Integration

- Connect Tableau dashboards to live real estate APIs.
- Incorporate continuously updated listing prices.
- Enable automated data refresh for current market trends.

⊕ Economic Indicator Integration

- Combine housing data with:
- Interest rates
- Inflation rates
- Employment statistics
- Mortgage trends

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

⊕ Market Segmentation & Comparative Study

- Compare urban vs suburban markets.
- Analyse luxury vs affordable housing segments.
- Benchmark regional markets against national trends. Supports targeted investment and strategic planning.

Key future enhancements to expand this project's value:

- **Predictive Analytics Integration:** Move beyond descriptive analysis by integrating Python or R scripts within Tableau to forecast future house prices, enabling investors to identify emerging hotspots.
- **Real-Time Data Pipelines:** Connect the Tableau dashboard directly to live, automated data sources (APIs or SQL databases) to replace static data, providing up-to-the-minute market insights.
- **External Data Enrichment:** Incorporate socioeconomic data (crime rates, school ratings, unemployment rates) to analyze how external factors impact local property valuation.
- **Advanced Geospatial Analysis:** Utilize advanced Tableau spatial mapping for hyper-local, neighborhood-level analysis, such as walkability scores or proximity to public transportation.
- **User-Driven Personalization:** Implement user authentication, allowing users to save personalized filters, alerts for price drops, or customized property watchlists.
- **Mobile Optimization:** Develop dedicated mobile-first layouts to allow real estate professionals to interact with the data on the go

Example

These expansions will shift the project from a historical data visualization tool to an actionable, predictive, and real-time decision-support system for real estate stakeholders.

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

Chapter 12

12.1 Source Code about

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>About | Housing Trends</title>
    <link rel="stylesheet" href="{{ url_for('static',
filename='css/style.css') }}">
</head>
<body>
<nav>
    <h2>Housing Trends</h2>
    <ul>
        <li><a href="/">Home</a></li>
        <li><a href="/about">About</a></li>
        <li><a href="/dashboard">Dashboard</a></li>
        <li><a href="/story">Story</a></li>
    </ul>
</nav>
<section>
    <h1>About This Project</h1>
    <p>
        This application visualizes housing sales trends and prices
        using interactive dashboards and storytelling techniques.
    </p>
</section>
</body>
</html>
```

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

Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using

Tableau

Dashboard

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<!DOCTYPE html>
<html>
<head>
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    <link rel="stylesheet" href="{{ url_for('static',
filename='css/style.css') }}">
</head>
<body>
<nav>
    <h2>Housing Trends</h2>
    <ul>
        <li><a href="/">Home</a></li>
        <li><a href="/about">About</a></li>
        <li><a href="/dashboard">Dashboard</a></li>
        <li><a href="/story">Story</a></li>
    </ul>
</nav>
<h1>Dashboard</h1>
<p>Visualizations will appear here.</p>
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else if ( divElement.offsetWidth > 500 ) {  
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else {  
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vizElement.parentNode.insertBefore(scriptElement, vizElement);  
</script>  
</body>  
</html>
```

Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using

Tableau

Index

Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using

Tableau

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Housing Trends</title>
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    <h2>Housing Trends</h2>
    <ul>
```



```

<li><a href="/">Home</a></li>
<li><a href="/about">About</a></li>
<li><a href="/dashboard">Dashboard</a></li>
<li><a href="/story">Story</a></li>
</ul>
</nav>
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</header>
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</html>

```

Story

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<head>
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```



Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using

Tableau

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<link rel="stylesheet" href="{{ url_for('static',
filename='css/style.css') }}">
</head>
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        <li><a href="/dashboard">Dashboard</a></li>
        <li><a href="/story">Story</a></li>
    </ul>
</nav>
<section>
    <h1>Housing Market Story</h1>
    <p>
        Explore the journey of housing prices and sales over time
        through a data-driven narrative.
    </p>
    comprehensive houseprice analysis
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Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using

Tableau

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var scriptElement = document.createElement('script');  
scriptElement.src =  
'https://public.tableau.com/javascripts/api/viz_v1.js';  
vizElement.parentNode.insertBefore(scriptElement, vizElement);  
</script>  
</section>  
</body>  
</html>
```



Visualizing Housing Market Trends: An Analysis of Sale Prices and Features Using Tableau

Chapter 12

Dataset Link

Transformed Housing Data 2 | Kaggle.com

Data regarding Sale Prices of several houses and their respective features.

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



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

12.3 - GitHub and Project Demo Link

GitHub Link

<https://github.com/chitti4569/LTVIP2026TMID90925-YANDAPALLITTEJASWINTABLEAU/tree/master>



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

Project Demo Link

[https://drive.google.com/file/d/1P7i6IX8Jv5Th4g1bA3MaAgJNJND0naIX/view?
usp=drive_link](https://drive.google.com/file/d/1P7i6IX8Jv5Th4g1bA3MaAgJNJND0naIX/view?usp=drive_link)

