

ProjectReportFormat

1. INTRODUCTION

1.1 ProjectOverview

This project explores the dynamic landscape of the housing market through data visualization. Using Tableau, the project analyzes historical and regional housing sales trends. The objective is to present insights in an interactive and accessible format. Data is sourced from open government datasets and real estate listings. Stakeholders such as buyers, investors, and developers benefit from market transparency.

1.2 Purpose

The main purpose is to help users understand and analyze housing market trends. Buyers can track price movements across time and regions. Policymakers can identify affordability gaps and plan developments. Investors may uncover lucrative markets and monitor returns. The dashboard is designed to simplify decision-making.

2. IDEATIONPHASE

2.1 ProblemStatement 1

I am	I'm trying to	But	Because	Which makes me f...
I am Data analyst	I'm trying to Identify clear patterns and insights from housing sales data to inform decisions and strategies	But The raw data is complex, overwhelming, and lacks intuitive visualization tools	Because Most datasets are presented in spreadsheets or static reports without interactive or visual storytelling elements	Which makes me feel Frustrated and uncertain about making timely, data-driven decisions

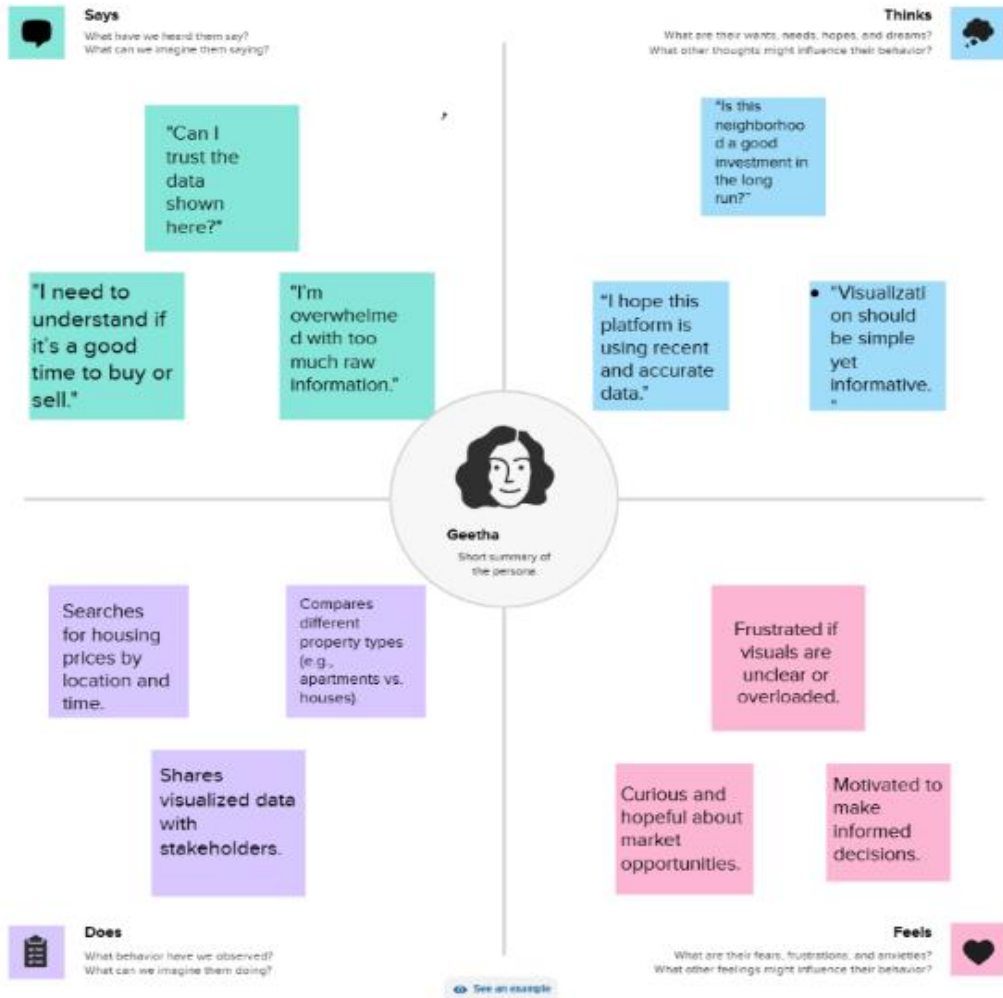
Problem Statement 2

I am	I'm trying to	But	Because	Which makes me f...
I am Real estate researcher	I'm trying to A real estate investor looking for market opportunities	But Understand pricing patterns and regional market fluctuations	Because Housing data is often provided in raw or static formats	Which makes me feel Overwhelmed by data complexity and lack of clarity

Problem	I am	I'm trying to	But	Because	Which makes me feel
---------	------	---------------	-----	---------	---------------------

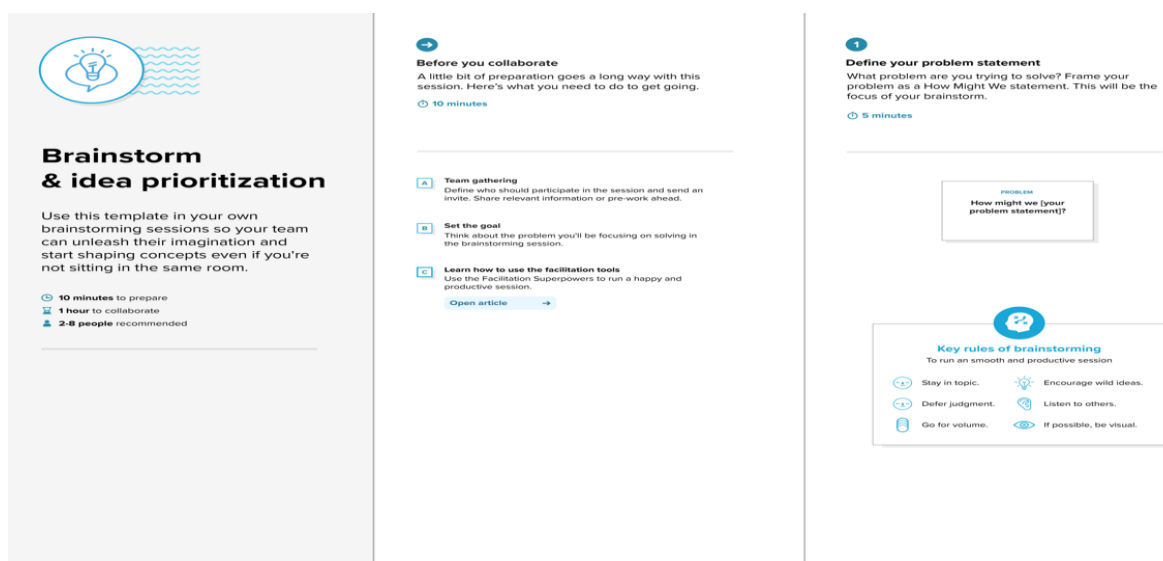
Statement (PS)	(Customer)				
PS-1	Data analyst	<i>Identify clear patterns and insights from housing sales data to inform decisions and strategies</i>	<i>The raw data is complex, overwhelming, and lacks intuitive visualization tools</i>	Most datasets are presented in spreadsheets or static reports without interactive or visual storytelling elements	<i>Frustrated and uncertain about making timely, data-driven decisions</i>
PS-2	Real estate researcher	A real estate investor looking for market opportunities	Understand pricing patterns and regional market fluctuations	Housing data is often provided in raw or static formats	Overwhelmed by data complexity and lack of clarity

2.2 EmpathyMapCanvas



2.3 Brainstorming

Team Gathering, Collaboration and Select the Problem Statement



Brainstorm, Idea Listing and Grouping

2 Brainstorm

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

10 minutes

TIP

You can repeat or add to ideas that are already on the sticky notes, but don't remove them.

Person 1

Interactive heat maps of price trends by city/locality

Predictive trends using historical sales data

Mobile-friendly version for on-the-go access

Person 2

Time-lapse visualization of property price changes

Integration with interest rate/economic indicators

Tooltip explanations of complex data points

Person 3

Filters by property type, price range, and location

Comparison dashboard for neighborhoods

Alerts/notifications for specific market movement

3 Group ideas

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

20 minutes

TIP

After you've grouped the sticky notes, cluster them by color or shape. If you have a lot of sticky notes, you can also group them by color or shape.

Alerts/notifications for specific market movements

Time-lapse visualization of property price changes

Integration with interest rate/economic indicators

User-uploaded data overlay feature

Filters by property type, price range, and location

Comparison dashboard for neighborhoods

Interactive heat maps of price trends by city/locality

Predictive trends using historical sales data

Mobile-friendly version for on-the-go access

Idea Prioritization

4 Prioritize

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

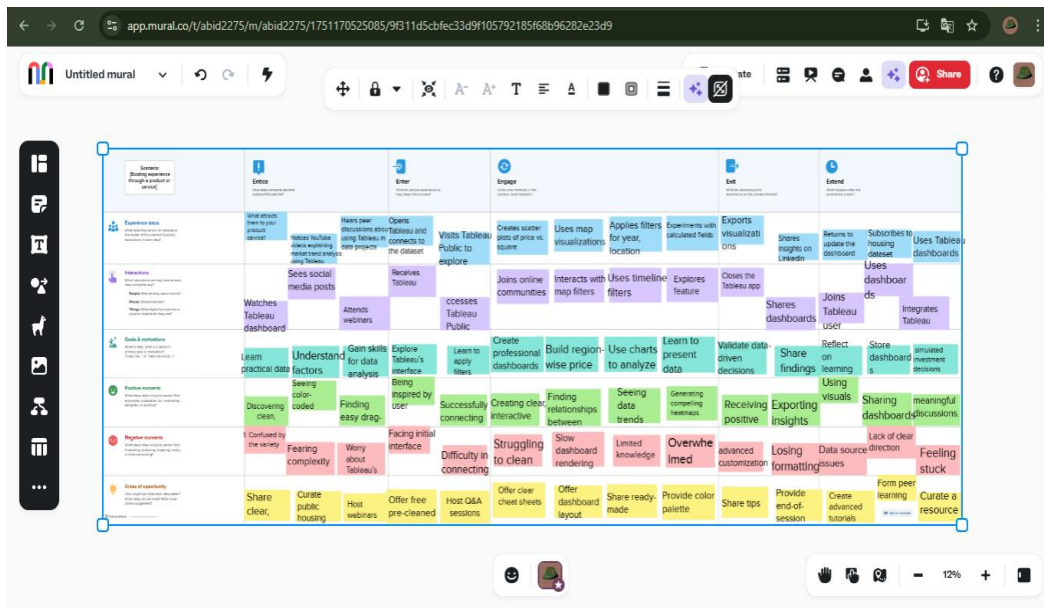
20 minutes

TIP

Participants can use their phones to point at ideas they want to add to the grid. The facilitator can confirm the spot by using the star marker located in the top right corner of the grid.

3. REQUIREMENT ANALYSIS

3.1 Customer Journeymap



3.2 Solution Requirement

Functional Requirements:

FRNo.	Functional Requirement(Epic)	SubRequirement(Story/Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Login & Access Control	Secure login with password OAuth-based login Role-based access control (Admin, User)
FR-4	Dashboard & User Interface	Personalized dashboard view Real-time updates on user activities
FR-5	Project & Task Management	Create new project spaces Define tasks and subtasks
FR-6	File Storage & Version Control	Upload and download documents Organize files in folders with search/filter

Non-functional Requirements:

FRNo.	Non-Functional Requirement	Description
NFR-1	Usability	The platform should have an intuitive and user-friendly interface accessible to all user types.
NFR-2	Security	All user data must be encrypted, secure login protocols used, and the platform must comply with data protection regulations.
NFR-3	Reliability	The system should provide consistent performance with minimal errors or downtime.
NFR-4	Performance	The platform should load within 3 seconds under normal usage and support simultaneous users efficiently.
NFR-5	Availability	The system should be accessible 24/7 with at least 99.9% uptime.

NFR-6	Scalability	This solution must support scaling to accommodate growing user base and increased data volume.
-------	-------------	--

3.3 DataFlowDiagram

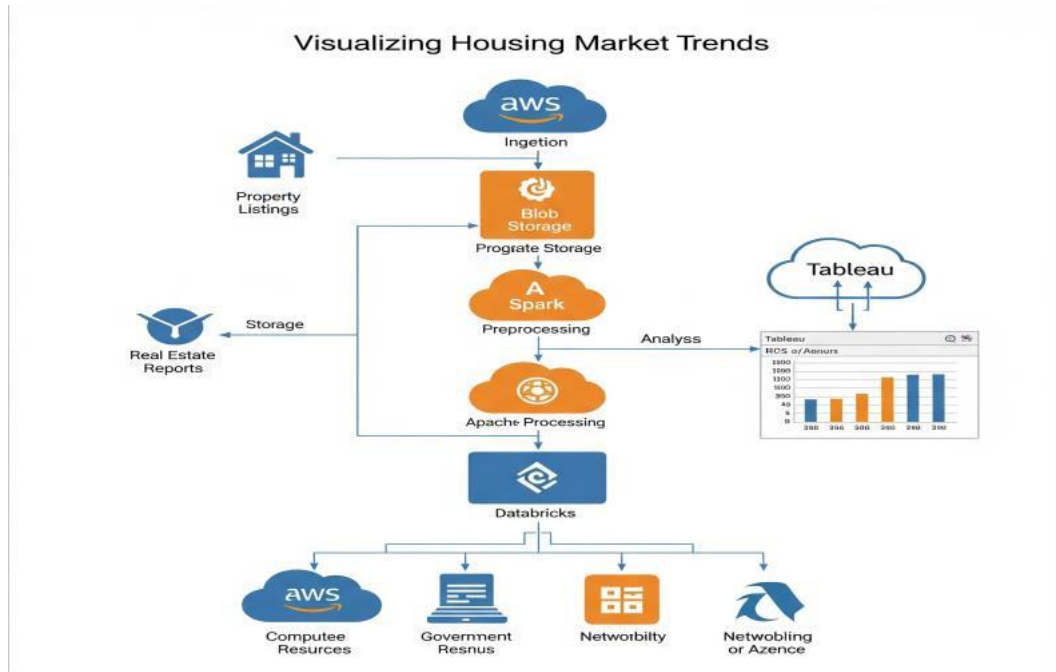


User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria
Customer (Web user)	View Market Dashboard	USN-1	As a user, I want to explore visual trends in house prices by selecting city and time range.	I can see graphs for selected cities
Customer (Web User)	Filter and Compare	USN-2	As a user, I want to compare different locations to see price trends side-by-side	I can compare locations v
Customer (Web User)	Save Report	USN-3	As a user, I want to download or save my filtered charts	I can save/download charts in PDF
Customer (Web User)	Email Notifications	USN-1	As a user, I want to receive alerts when prices rise or drop significantly	I get email notifications on threshold
Administrator	Manage Data Source	USN-2	As an admin, I want to upload/update property sales data regularly	I can add/delete data sources via CSV/API & it is reflected in the dashboards

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria
Administrator	Monitor Usage	USN-3	As an admin, I want to view how many users are using the tool & what filters are common	I can see user activity stats

3.4 Technology Stack



Components & Technologies

S.No	Component	Description	Technology
1.	User Interface	Web interface for viewing trends	HTML
2.	Application Logic-1	Data preprocessing and aggregation	Python
3.	Application Logic-2	Data visualization and trend generation	Tableau
4.	Application Logic-3	Optional NLP for interpreting user search queries	Python, TensorFlow
5.	Database	Stores processed trend data.	PostgreSQL
6.	Cloud Database	Cloud-hosted analytics database	Google BigQuery
7.	File Storage	Storage for uploaded datasets or exports	AWS S3
8.	External API-1	API for real-time housing price	Zillow
9.	External API-2	API for demographic/geographic data	Google Maps
10.	Machine Learning Model	Predictive trend modeling (e.g. price forecast)	Scikit-Learn
11.	Infrastructure (Server / Cloud)	Deployment environment	Cloud

			or I
--	--	--	------

Application Characteristics

S.No	Characteristics	Description	Tech
4.	Open-Source Frameworks	Frameworks and libraries used	React, D3.js
5.	Security Implementations	Securing API access, user data encryption, IAM	JWT, (Cloud)
6.	Scalable Architecture	Modular services for UI, backend, and analytics	Microservices, Docker
7.	Availability	High availability using cloud infrastructure and load balancers	AWS
8.	Performance	Optimized queries, caching, CDN	Redis, index

4.PROJECTDESIGN

4.1ProblemSolutionFit

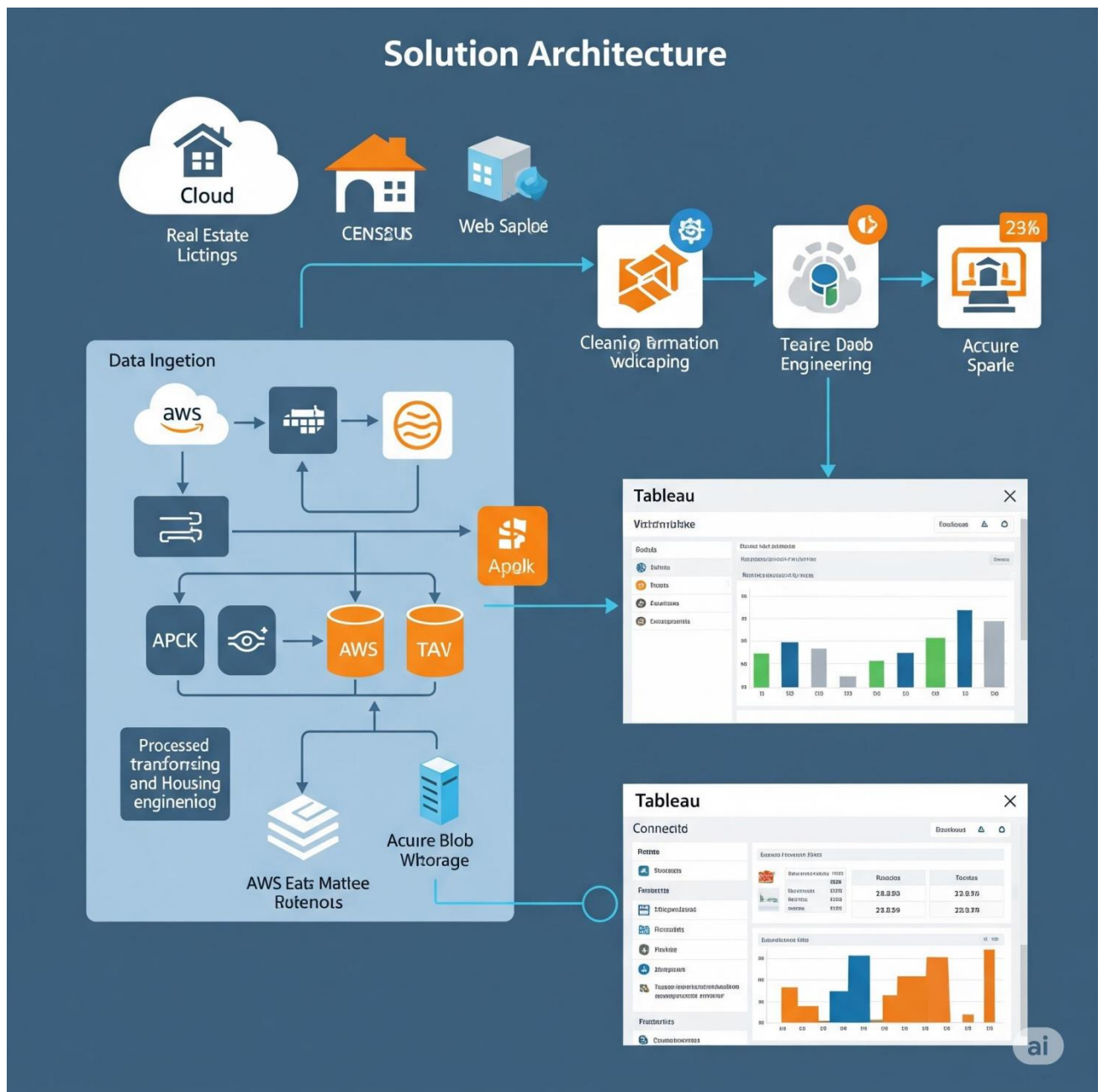
Define CS, fit into CC	1. CUSTOMER SEGMENT(S) <small>Who is your customer? (i.e. working parents of 0-5 y.o. kids)</small> CS Home buyers and sellers Real estate agents	6. CUSTOMER CONSTRAINTS <small>What constraints prevent your customers from taking action or limit their choices of solutions? (i.e. spending power, budget, no cash, network connection, available devices)</small> CC Limited technical knowledge Budget for premium tools or consultants	5. AVAILABLE SOLUTIONS <small>Which solutions are available to customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? (i.e. pen and paper is an alternative to digital note-taking)</small> AS Static real estate reports and PDFs Real estate agent advice (subjective)	Explore AS, differentiate
	2. JOBS-TO-BE-DONE / PROBLEMS <small>Which (jobs-to-be-done) or problems do you address for your customer? There could be more than one; explore different sides.</small> J&P Identify areas with increasing/decreasing housing prices Make data-driven investment choices Analyze trends to time property buying/selling decisions	9. PROBLEM ROOT CAUSE <small>What is the real reason that the problem exists? What is the back story behind the need to do this job? (i.e. customers have to do it because of the change in regulations)</small> RC Disorganized, non-visual, outdated housing data Inability to spot patterns without technical or statistical tools Decisions based on guesswork instead of trends	7. BEHAVIOUR <small>What does your customer do to address the problem and get the job done? (i.e. directly related: find the right seller/paper; indirectly associated: customers spend time on volunteer work (i.e. dreamcast))</small> BE Use property listing websites Consult agents or property blogs Attempt to use Excel for tracking trends	Focus on J&P, map into BE, understand RC
	3. TRIGGERS <small>What triggers customers to act? (i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news)</small> TR Make data-driven investment choices Real estate news or market reports	10. YOUR SOLUTION <small>If you are working on an existing business, write down your current solution first. Fit in the canvas, and check how much it fits the reality. If you are working on a new business proposition, then keep it blank until you fit in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</small> SL "Visualizing Housing Market Trends: An Analyst's Self" <small>An interactive web-based visualization platform that aggregates housing market data and provides real-time trend analysis through dashboards, charts, and geospatial visualizations. Users can compare locations, filter by price/range/date, and even predict future price movements with built-in models.</small>	8. CHANNELS of BEHAVIOUR 8.1 ONLINE <small>What kind of actions do customers take online? Connect online channels from ST</small> CH Visit websites like Zillow, Realtor.com Social media discussions or forums 8.2 OFFLINE <small>What kind of actions do customers take offline? Connect offline channels from ST and use them for customer development.</small>	Extract online & offline CH of BE
Identify using TR & EM				
4. EMOTIONS: BEFORE / AFTER <small>How do customers feel when they face a problem or a job and afterwards? (i.e. lost, insecure > confident, in control > use it in your communication strategy & design)</small> EM Before: Confused, overwhelmed, unsure about timing and location After: Empowered, informed, confident in decision-making				

4.2 ProposedSolution

S.No.	Parameter	Description
-------	-----------	-------------

1.	ProblemStatement(Problemto be solved)	Thehousingmarketiscomplex,with fluctuating prices, varying regional demands, and inconsistent availability of public data
2.	Idea/Solutiondescription	Our project proposes a web-based interactive data visualization tool that collects, processes, and visualizes housing market trends across different regions.
3.	Novelty/Uniqueness	Unlike static charts or scattered portals, our solution offers dynamic, user-friendly visualization with multi-variable filters.
4.	Social Impact/Customer Satisfaction	Home buyers will make better decisions with transparent data. Investors can track trends for better ROI.
5.	Business Model (Revenue Model)	The tool can follow a freemium model: basic features free, premium subscriptions for detailed analytics and predictive models.
6.	Scalability of the Solution	The solution is scalable across cities and countries by integrating more datasets. It can expand into rental markets, commercial properties, or infrastructure planning.

4.3 Solution Architecture



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task
Sprint-1	Data Collection & Preparation	USN-1	As a user, I want the system to collect housing sale data from CSV files
Sprint-1	Data Cleaning	USN-2	As a user, I want to view only valid, clean data for analysis

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task
Sprint-1	User Login	USN-3	As a user, I can log in with email and password
Sprint-2	Trend Analysis Module	USN-1	As a user, I can view sales trends using filters like location and price range
Sprint-2	Interactive dashboard	USN-2	As a user, I can interact with graphs and maps for better visualization
Sprint-2	Predictive Modeling	USN-3	As a user, I can get price trend predictions based on past data
Sprint-3	Map Integration	USN-1	As a user, I can see housing sales on an interactive map
Sprint-3	Export Report Feature	USN-2	As a user, I can export visualizations as PDF/CSV

Project Tracker, Velocity & Burndown Chart

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed / Planned End
Sprint-1	5	2 Days	28 June 2025	30 June 2025	5
Sprint-2	6	2 Days	30 June 2025	1 July 2025	6
Sprint-3	6	2 days	1 July 2025	3 July 2025	6

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

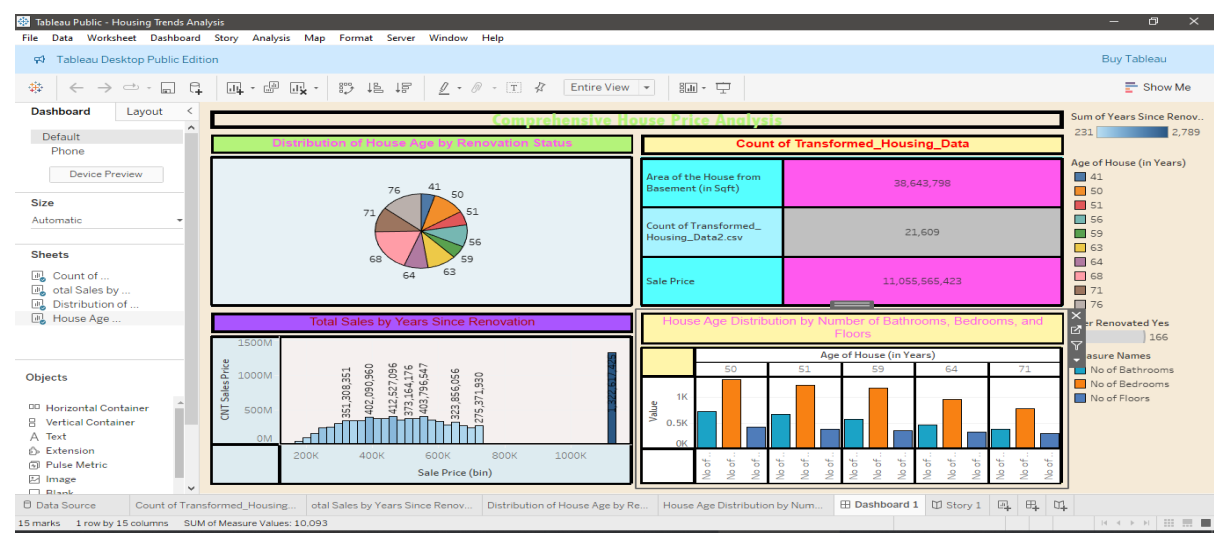
S.No.	Parameter	Screenshot / Values
12.	Data Rendered	Housing sales dataset including variables like price, location, year, square footage, and number of bedrooms
13.	Data Preprocessing	<ul style="list-style-type: none"> - Cleaned missing values - Converted dates to proper formats - Normalized pricing data - Created time-series aggregates
3.	Utilization of Filters	<ul style="list-style-type: none"> - Date range filter (year/month) - Region/City filter - Price range slider - Number of bedrooms selector
4.	Calculation fields Used	<ul style="list-style-type: none"> - YoY Price Growth (%) - Average Price per Square Foot - Moving Average (3 months) - Days on Market difference

5.	<div>Dashboard design</div> <div>DASHBOARD SCREENSHOT</div>	<div>No of Visualizations / Graphs - 6</div> <div><div>- Line Chart (Price Trend over Time)</div><div>- Map (Price by Region)</div><div>- Bar Chart (Sales Volume by City)</div><div>- Scatter Plot (Price vs Sqft)</div><div>- KPI Cards (Avg Price, Total Sales)</div><div>- Heatmap (Price Distribution by Month & Region)</div></div>
6	Story Design	<div>No of Visualizations / Graphs - 4</div> <div><div>- Story points explaining price trends, market hotspots, seasonal shifts, and future projections based on past data</div></div>

7.RESULTS

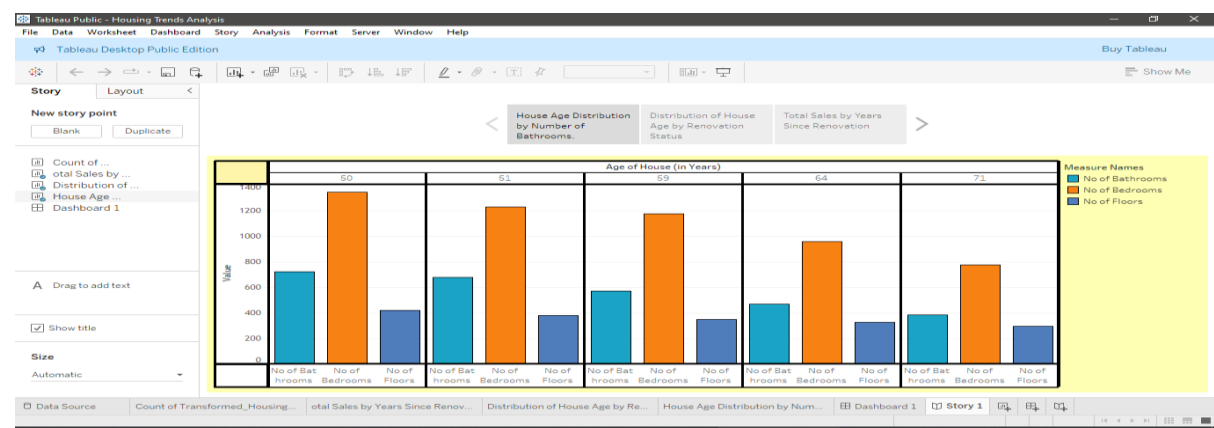
7.1OutputScreenshots

DASHBOARD SCREENSHOT

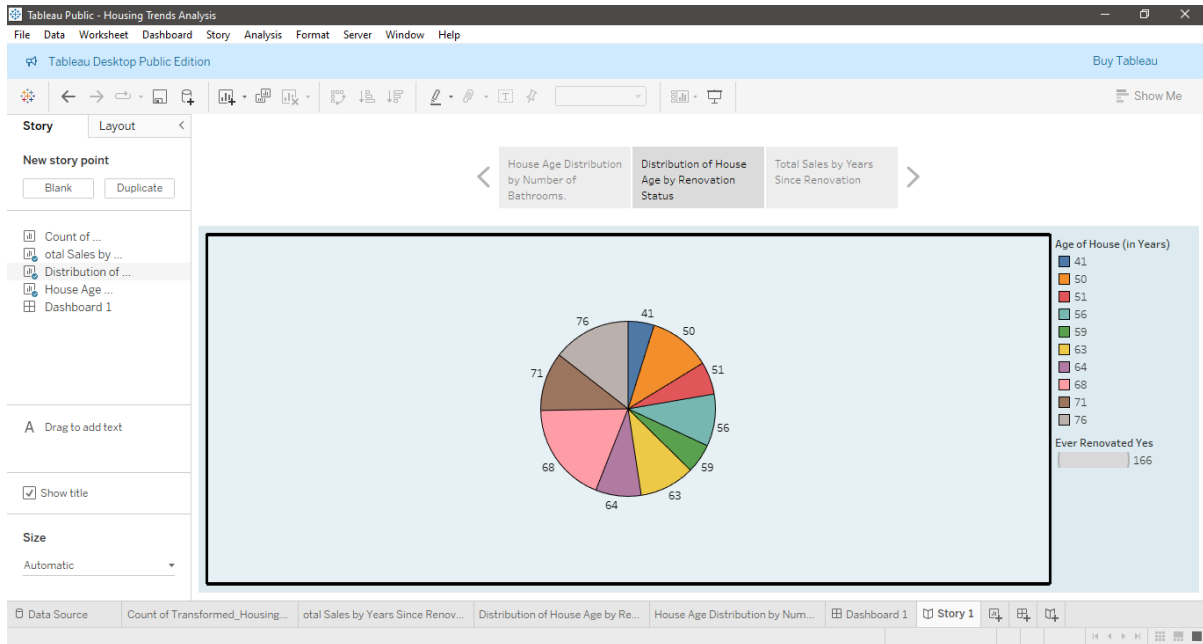


STORY SCREENSHOT

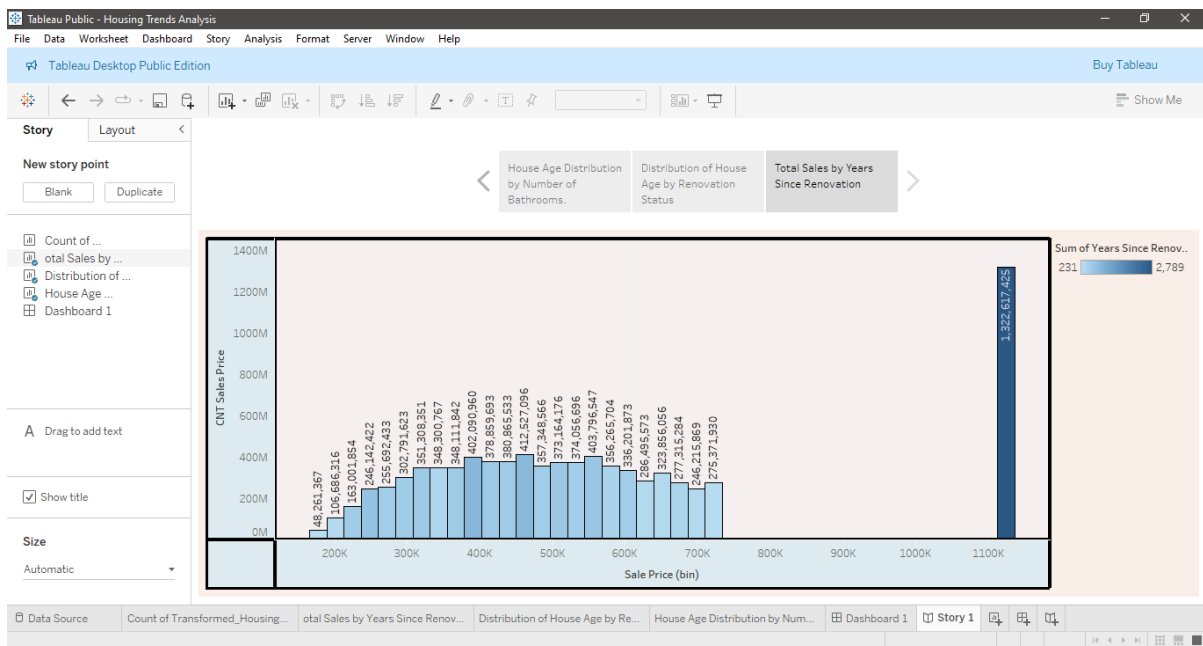
SUB-STORY 1



SUB-STORY 2



SUB-STORY 3



8.ADVANTAGES&DISADVANTAGES

ADVANTAGES

- Provides real-time, region-specific housing market trends
- Interactive and customizable dashboards for deeper insights
- Helps investors, buyers, and researchers make informed decisions
- Scalable and cloud-based, can integrate more datasets easily

DISADVANTAGES

- Requires an internet connection and device compatibility
- Tableau-based tools may have limitations for highly customized logic
- Some users may face a learning curve initially
- Reliance on external APIs could affect data consistency if not managed properly

9.CONCLUSION

The project successfully demonstrates the importance of interactive data visualization in understanding housing market trends. By providing region-wise and time-based insights, it empowers users to make evidence-based decisions. The use of Tableau enhances the user experience with intuitive graphs and maps. This initiative promotes data transparency and supports both individual and institutional stakeholders. The platform stands as a modern, scalable solution in the real estate analytics domain.

10FUTURESCOPE

In the future, the tool can expand to cover rental trends, commercial property data, and infrastructure growth patterns. Predictive models can be enhanced using advanced machine learning techniques. Integration with GIS systems can provide spatial analytics. Additionally, AI-powered recommendation engines can be added to guide users based on preferences. Multilingual support and mobile-first design can increase accessibility and global reach.

11.APPENDIX

SourceCode(ifany)

Dataset

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

Tableau

ProjectWorkBook

File Link:

https://public.tableau.com/views/HousingTrendsAnalysis/CountofTransformed_HousingData?:language=en-

[US&:sid=&:redirect=a](#)
[uth&:display_count=n](#)
[&:origin=viz_share_li](#)
[nk](#)

Git Hub Links

Team GitHub Link <https://github.com/harshidunthala/visualizing-housing-market-trends-an-analysis-of-sale-prices-and-features-using-tableau>

Team Leader Github Link <https://github.com/harshidunthala/visualizing-housing-market-trends-an-analysis-of-sale-prices-and-features-using-tableau>

Team Member 1 GitHub Link <https://github.com/varshanreddyobulreddy/Visualizing-Housing-Trend-Analysis>

Team Member 2 Git Hub Link: <https://github.com/shaikabid123/visualizing-housing-market-trends-an-analysis-of-sale-prices-and-features-using-tableau>

Project Video Demo Link: <https://drive.google.com/file/d/1XaJHrnqN9QT5MiXA-NbY7dREs0MssBcE/view?usp=sharing>