Project Design Phase Document

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

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# 1. Problem-Solution Fit Template

## Problem

Homebuyers, investors, and analysts often struggle to interpret complex housing market data to make informed decisions. Current tools provide raw data but lack user-friendly visualization for trend analysis and feature impact.

## Target Audience

Homebuyers, real estate agents, property investors, and policy analysts.

## Proposed Value

Provide an intuitive, interactive dashboard that visualizes key housing market metrics such as sale price trends, neighborhood comparisons, and feature influence (e.g., lot size, quality, year built).

# 2. Proposed Solution

Develop a data pipeline that cleans, processes, and visualizes housing data using Tableau. Users can upload datasets, analyze trends, and generate visual insights without deep technical knowledge. Optional ML models can also provide price predictions or market segmentation.

# 3. Solution Architecture

The architecture includes the following layers:  
- \*\*Data Source Layer\*\*: CSV files or real estate APIs (e.g., Zillow, Kaggle datasets)  
- \*\*Processing Layer\*\*: Python scripts for cleaning and feature engineering  
- \*\*Visualization Layer\*\*: Tableau dashboards built on the processed dataset  
- \*\*Optional Integration\*\*: Flask app for user-uploaded dataset analysis and chart generation

# 4. Design Considerations

## Data Flow

Raw housing data → Preprocessing (Pandas) → Clean dataset → Tableau import → Interactive Dashboards

## Performance

- Optimize visualizations for real-time filter updates  
- Use calculated fields in Tableau to minimize backend processing  
- Allow incremental loading for large datasets

## Security & Privacy

- Ensure no sensitive user data is exposed in uploaded datasets  
- Sanitize file uploads if hosted on a web server

## Scalability

- Support different formats (CSV, Excel)  
- Allow expansion to new visualization tools like Power BI or Looker  
- Possibility to host on cloud with scheduled auto-updates