Innovation & Entrepreneurship Hub for Educated Rural Youth (SURE Trust – IERY)

Real Estate And Property Management Dashboard

The domain of the Project

Data Analysis, Visualizations Using Power BI

Under the guidance of

Ms. Siddhika Shah

By

Mr. Mridul Rastogi (B.Tech CSE)

Period of the project

December 2024 to March 2025

SURE TRUST

PUTTAPARTHI, ANDHRA PRADESH

DECLARATION

The project titled **"*Real Estate And Property Management Dashboard*"** has been mentored by **Ms. Siddhika Shah** and organized by SURE Trust from December 2024 to March 2025**.** This initiative aims to benefit educated unemployed rural youth by providing hands-on experience in industry-relevant projects, thereby enhancing employability.

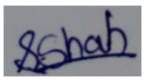
I, **Mr. Mridul Rastogi,** hereby declare that I have solely worked on this project under the guidance of my mentor. This project has significantly enhanced my practical knowledge and skills in the domain.

Name
Mr. Mridul Rastogi

Signature

Mentor
Ms. Siddhika Shah

Signature



Seal & Signature

Prof.Radhakumari
Executive Director & Founder
SURE Trust

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Executive Summary

This Power BI dashboard is designed to support property managers in efficiently overseeing and managing real estate operations across multiple properties. It provides a centralized, visual overview of key property management functions such as occupancy status, maintenance tracking, lease expirations, and property conditions.

The main goals of this dashboard are to:

- Monitor and manage ongoing and scheduled maintenance tasks
- Track properties timelines, renewals, and upcoming expirations
- Maintain an organized record of renovation information and property updates
- Streamline day-to-day property management operations through data-driven insights

By simplifying access to essential information, the dashboard helps property managers stay proactive, reduce administrative overhead, and ensure timely attention to property needs. Built using Power BI, it serves as a practical tool for improving operational oversight, enhancing the consumer satisfaction, and keeping properties in optimal condition.

Introduction

Background and Context

Managing multiple properties involves tracking various operational tasks such as occupancy, maintenance, lease timelines, and tenant activity. Often, this information is scattered across different sources, making it difficult to access and monitor efficiently. To address this, a Power BI dashboard was developed to centralize key property management data into a single, interactive platform. It provides property managers with a clear, real-time view of operations, helping them stay organized, proactive, and responsive to daily tasks. This tool enhances visibility, reduces manual effort, and supports more informed decision-making.

Problem Statement

Property managers often struggle to efficiently oversee multiple properties due to fragmented data, manual tracking, and lack of real-time visibility. These challenges can lead to delayed maintenance, missed lease renewals, poor communication, and reduced operational efficiency. Without a centralized system, managing daily tasks becomes time-consuming and error-prone. The Power BI dashboard addresses this by consolidating key property information into a single platform, providing real-time insights and streamlining overall management.

Scope

This project focuses on building a multi-page interactive Power BI dashboard with the following components:

1. **Overview Page :** Provides a comprehensive summary of 22K properties, including waterfront status, bedroom and floor distribution, property conditions, renovation status, and construction year trends, offering clear insights for effective real estate and property management.

2. **Location View :** Visualizes the geographic distribution of properties using an interactive map and provides detailed insights into property conditions and floor configurations across states, enabling location-based analysis for

strategic real estate decisions.

3. **About Page** : Introduces the objective of the dashboard, highlighting its focus on analyzing property distribution, floor types, waterfront presence, and location-wise conditions to support decision-makers in identifying properties that require attention

4. **Non-ML Approach :** This dashboard uses a non-machine learning approach focused on descriptive analytics. It analyzes historical property data through visualizations using Power BI to uncover patterns and trends. The insights support data-driven decision-making without predictive modeling.

Limitations

1. Only provides descriptive insights; no predictive or forecasting capabilities.
2. External market factors (e.g., interest rates, economic changes) are not considered.
3. Limited interactivity for deep drill-down or custom queries.
4. Not suitable for real-time decision-making due to static data.

Innovation

The dashboard offers an innovative, user-friendly way to analyze real estate data by combining multiple property features into a single interactive view. Using Power BI, it simplifies complex information through visual storytelling and geographic mapping—without relying on machine learning. This low-code solution enables quick, data-driven insights for both technical and non-technical users.

Project Objectives

Project Objectives and Expected Outcomes

1. **Data Cleaning and Preparation**
   To preprocess and transform raw datasets into a structured format suitable for analysis in Power BI. This includes handling missing values, renaming columns, changing data types, and creating calculated columns/measures using DAX.

   Expected Outcome: Removal of duplicate, incomplete, or inconsistent records to ensure data accuracy. Standardized formatting and consistent data types for smoother analysis. Enhanced performance of the dashboard with cleaner, well-structured data.

2. **Data Modeling**
   Structured the dataset into a logical model by defining relationships between key attributes such as location, condition, renovation status, and floor count. Created calculated columns and measures in Power BI to enable meaningful aggregations and comparisons.

   Expected Outcome: Establishment of logical relationships between data tables and fields. Enhanced data consistency, performance, and visualization accuracy.

3. **Visual Design and Layout**
   To create an intuitive and visually appealing dashboard by organizing charts, tables, slicers, and KPIs in a clean layout. Emphasis is placed on clarity, interactivity, and ease of navigation between multiple report pages.

   Expected Outcome: Simplified interpretation of complex data through interactive charts and maps. Quick identification of patterns, trends, and outliers in property attributes.

4. **Interactive Features and Filters**

   To enable interactivity through slicers (e.g., date, category, status) and navigation buttons. These features empower users to explore data dynamically and focus on specific subsets of interest without modifying the underlying dataset.

   Expected Outcome: Personalized user experience by allowing dynamic data exploration. Improved decision-making with focused views based on selected criteria. Enhanced dashboard usability for diverse stakeholders with varying need

Methodology and Results

Methods/Technology Used

The project applies Data Analytics and Business Intelligence (BI) methodologies to transform raw Amazon sales data into meaningful insights. It includes:

1. **Data preprocessing**
   Cleaning and transforming the sales, product, and order status data using Power Query Editor in Power BI.
2. **Descriptive analysis**
   Summarizing sales history to show what products and locations contributed most to revenue and units sold
3. **Diagnostic analysis**
   Analyzing returns, reviews, and delivery statuses to understand potential issues in sales or logistics performance.

Tools/Software Used

1. **Microsoft Power BI Desktop**
   Primary tool for dashboard creation, data modeling, and interactive visualization.
2. **Power Query Editor**
   Used for cleaning, filtering, and shaping the data before analysis.
3. **DAX (Data Analysis Expressions):**
   For creating custom KPIs, aggregations, and calculations.
4. **Excel/CSV Files:**
   Data source format used for importing Amazon sales and product data.

Data Collection Approach

The data for the real estate and property management dashboard is gathered from a combination of property management systems, market data providers, and publicly available sources. The data is integrated using automated scripts and cleaned for accuracy and consistency.

Project Architecture

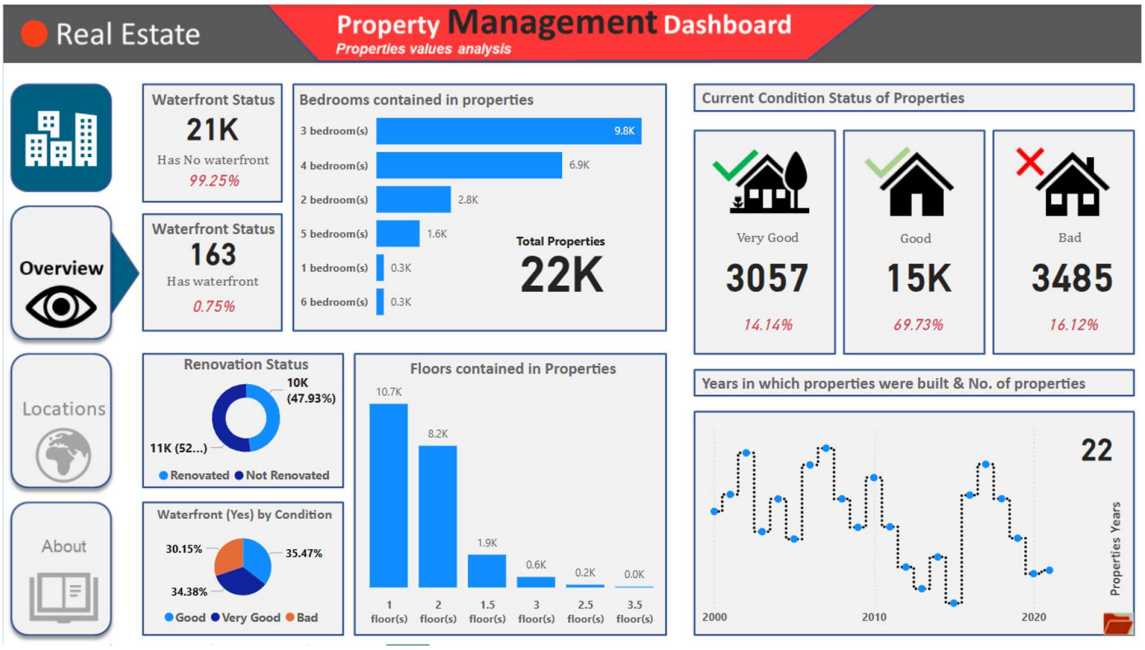
1. **Data Source**
   CSV files containing structured data related to sales, products, order statuses, and customer reviews.
2. **Data Preparation**
   Power Query Editor was used for cleaning and transforming the data. This included removing duplicates, changing data types, splitting columns, and renaming headers for clarity.
3. **Data Modeling**
   Logical relationships were created between tables. Calculated columns and DAX measures were developed to compute metrics like total sales, returns, filtered sales, and number of reviews.
4. **Visualization**
   Dashboards were designed using various Power BI visuals such as bar charts, line graphs, cards, slicers, and tables to showcase sales trends, product performance , and location-wise analysis.
5. **User Interaction**
   Slicers and buttons were added to enable end-users to interact with the report—filtering by date, product category, city, or order status for dynamic data exploration.

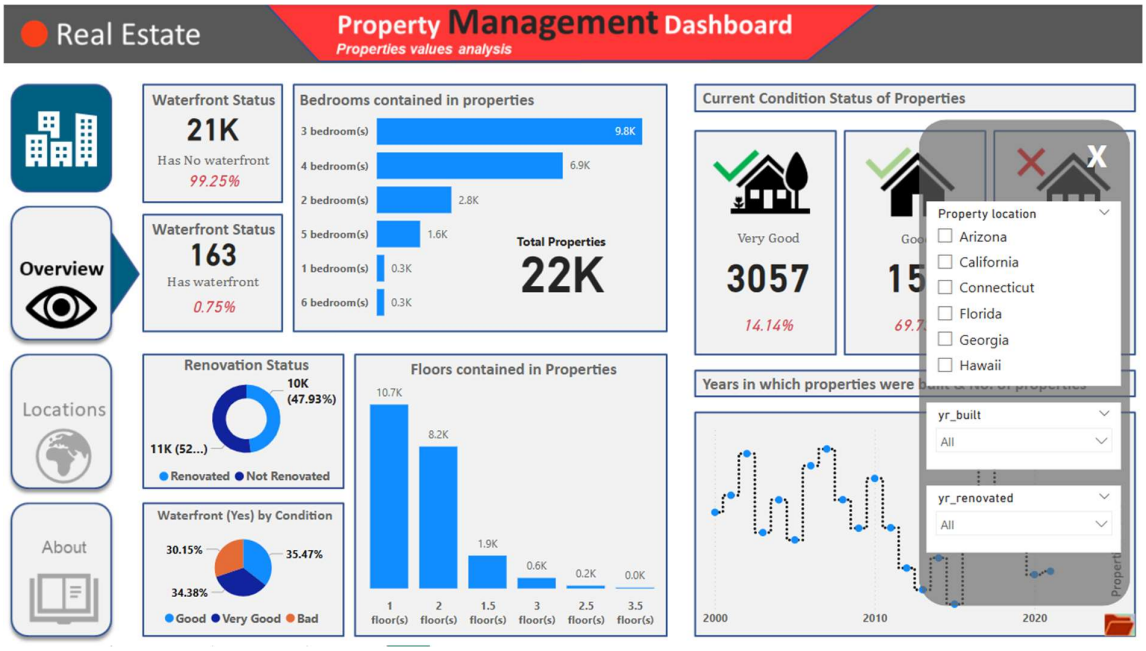
Results

1. **Property Details:** Displays key information such as the number of floors, bedrooms, and waterfront availability for each property.
2. **Interactive Features:** Includes a button that opens a menu for easy navigation and filtering of property data.
3. **Location Map:** Features a map displaying the geographical locations of properties, offering visual insights into their distribution.
4. **Property Condition:** Highlights the condition of the properties, providing an overview of their current state.
5. **Year of Construction:** Shows the years in which the properties were built, helping users assess the age of the properties.
6. **Condition-Based Table:** Presents a table that categorizes properties based on their condition.

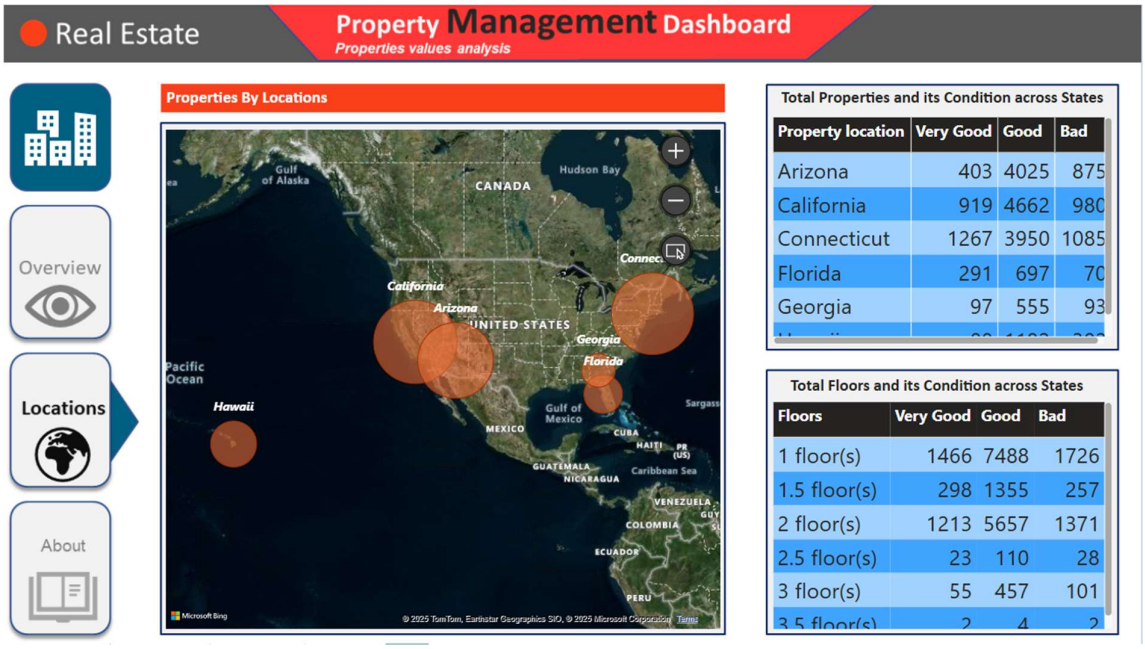
Final Project Screenshots

OVERVIEW PAGES

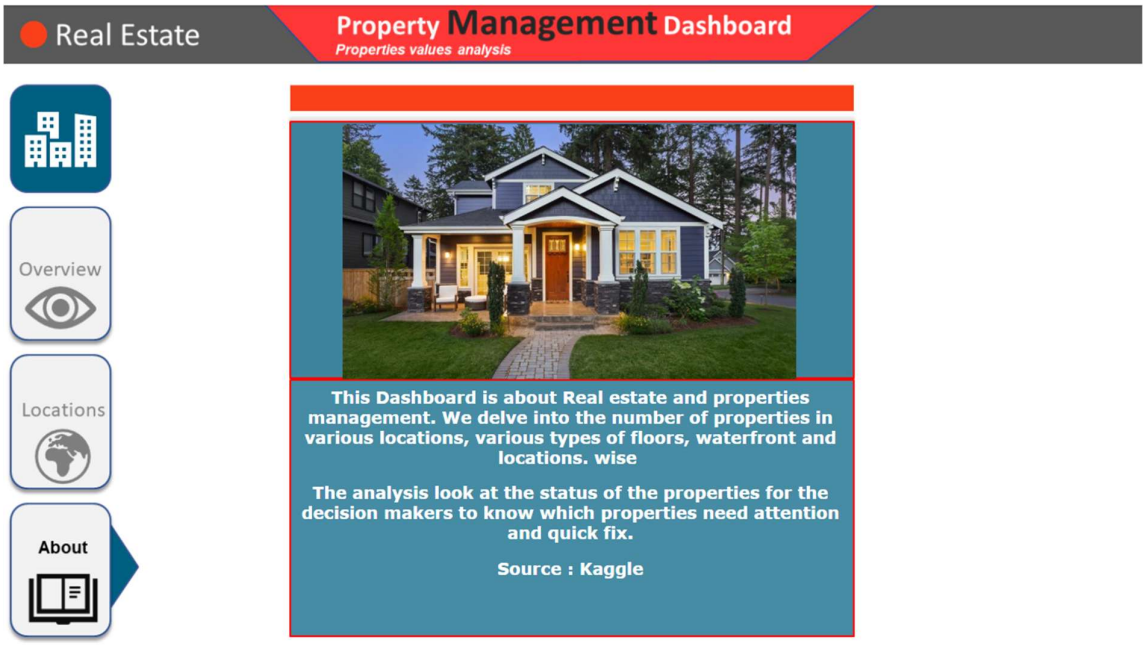




LOCATION PAGE



ABOUT PAGE



GITHUB LINK

https://github.com/Mehakmajeed/real-time-voice-command-recognition-system-using-ESP32-without-machine-learning.git

Learning and Reflection

Learning and Reflection

- **Data Visualization Skills:** Improved my ability to structure and present property data effectively using visuals like charts, tables, and maps.
- **Interactivity and Navigation:** Learned how to enhance user experience by adding interactive elements like buttons and drop-down menus.
- **Spatial Analysis:** Gained experience in using map visuals to display property distribution by location.
- **Insightful Breakdown:** Developed skills in categorizing data meaningfully, such as tables showing property conditions and floors by location.
- **Dashboard Design Thinking:** Understood the importance of clear layout, simplicity, and balance between visuals and functionality.
- **Critical Thinking:** Learned to approach dashboard creation from a user's perspective, ensuring the insights are both accessible and actionable.
- **Tool Proficiency:** Strengthened my technical proficiency in Power BI and its features.
- **Reflection:** Recognized the value of iteration and feedback in improving the dashboard's clarity and usefulness.

Experience

Working on the real estate and property management dashboard was a hands-on experience that helped me strengthen my skills in data visualization and Power BI. I learned how to clean and organize data effectively, design an intuitive overview page, and incorporate interactive elements like maps, tables, and navigation buttons.

Conclusion and Future Scope

Objectives

The primary goals of this project were to:

1. To provide a visual summary of real estate properties based on key features like floors, bedrooms, condition, and waterfront availability.
2. To display the distribution of properties using maps and year-built analysis.
3. To enable easy exploration of data through interactive elements such as tables and navigation buttons.
4. To support quick understanding and comparison of property characteristics for better insights.
5. To organize and present property data in a user-friendly dashboard that enhances decision-making and analysis.

Achievements

1. Successfully designed and developed a fully interactive dashboard using Power BI.
2. Created a clean and intuitive Overview page showcasing key property features like condition, floors, and waterfront presence.
3. Integrated map visuals to display property locations geographically for better spatial insights.
4. Developed dynamic tables to categorize properties based on condition and floor count by location.
5. Implemented an interactive navigation menu to enhance user experience and dashboard usability.
6. Improved data handling and visualization skills, including data cleaning, transformation, and presentation.

Conclusion

This Real Estate and Property Management dashboard offers a comprehensive and intuitive overview of property locations, conditions, and room configurations, enabling more efficient property monitoring and smarter decision-making. It lays a strong foundation for future enhancements such as real-time data integration, predictive analytics, and machine learning to further optimize operational efficiency and strategic planning. With continued development, the dashboard has the potential to evolve into an intelligent, data-driven management solution that not only tracks current assets but also anticipates future trends and supports long-term growth in the property management domain.

Future Scope

1. **Integration with Real-Time Data Sources :** Incorporating real-time data updates to ensure the dashboard reflects the most current information on property status, conditions, and changes.

2. **Predictive Analytics & Machine Learning :** Implement machine learning models to predict potential maintenance needs based on historical property condition data and usage patterns.

3. **Historical Data and Trend Analysis :** Introducing features to analyze property condition trends or location development over time for better long-term planning.

4. **Customer Segmentation :** Add functionality to segment customers based on purchase history, region, or demographics to tailor marketing and sales strategies.

5. **Mobile Responsiveness :** Optimize the dashboard layout and visuals for use on mobile devices and tablets, ensuring accessibility for users on the go.