Introduction

The Real Estate Dashboard provides an intuitive interface with interactive visualizations, analytical insights, and AI-powered forecasting tools. Designed for buyers, sellers, investors, and analysts, the platform delivers valuable perspectives on Lebanon's dynamic real estate market.

Data Collection

Web-Based Data Collection

We collect data by **scraping property listings from real estate websites in Lebanon**. This enables real-time access to current market offerings, including property prices, areas, locations, and types, ensuring that users have access to **up-to-date market intelligence**.

Data Source Exploration

To enhance data richness and historical context, an in-depth investigation was conducted to identify and acquire real estate data in Lebanon, focusing on:

- **Historical transaction records** – enabling analysis of past market trends and pricing behaviors.
- **Mortgage data** – providing insight into lending activity and financing patterns in the property sector.
- **Property seizure details from Lebanese banks** – highlighting distressed or foreclosed properties for potential investment opportunities.

Market Insights & Visual Analytics

• *Price vs. Area Scatter Plot*

- **Purpose**: Illustrates the relationship between property price and area (sqm).
- **User Benefit**: Helps evaluate property value relative to size and identify pricing anomalies.

- ***Average Price by Province***

  - **Purpose**: Provides a comparative view of average property prices across Lebanon's provinces.
  - **User Benefit**: Enables users to assess regional pricing differences and select areas aligned with their budget.

- ***Price per Square Meter by Region (Connected Scatter Plot)***

  - **Purpose**: Displays price per square meter across different regions.
  - **User Benefit**: Highlights premium or high-return investment locations.

- ***Price per Square Meter Distribution (Pie Chart)***

  - **Purpose**: Visualizes how property prices per square meter are distributed across cities.
  - **User Benefit**: Offers a snapshot of each city's contribution to overall market pricing.

- ***District-Level Price Comparison (Column Chart)***

  - **Purpose**: Compares property prices across districts within provinces.
  - **User Benefit**: Supports localized market analysis for deeper insight.

- ***Real Estate Heat Map of Lebanon***

  - **Purpose**: Geographic visualization of real estate activity by province and district.
  - **User Benefit**: Identifies property hotspots and areas with significant market activity.

- ***Transaction Volume Trends (Line Graph)***

  - **Purpose**: Shows transaction volume variations over time, with city-specific filtering.
  - **User Benefit**: Aids in understanding market seasonality and transaction patterns.

Predictive Tools

Property Price Estimation Tool

- **Model Used**: LGBM (Light Gradient Boosting Machine)
- **Input Parameters**:
    - Province
    - Property Type
    - Area (sqm)
    - Number of Bedrooms
    - Number of Bathrooms
- **Output**: Estimated property price
- **User Benefit**: Assists in assessing fair property value for buying, selling, or investment decisions.

Transaction Value Forecasting Tool

- **Model Used**: XGBoost (Extreme Gradient Boosting)
- **Input Parameters**:
    - Year
    - Month
    - City
    - Number of Transactions
- **Output**: Projected total transaction value
- **User Benefit**: Facilitates financial planning and market activity forecasting.

Data Tables

• *Real Estate Transactions Table*

- **Content**: Comprehensive list of individual real estate transactions.
- **Functionality**: Filterable by location, date, and price.

• *Provincial Real Estate Metrics Table*

- **Content**: Summary statistics of real estate data per province.

- **Functionality**: Provides quick reference for provincial-level analysis.

• *Aggregated Price by Province Table*

- **Content**: Average property prices grouped by province.
- **Functionality**: Enables straightforward regional price comparisons.

• *High-Demand Properties Table*

- **Content**: Properties with high demand or notable market interest.
- **Functionality**: Useful for identifying potential investment opportunities.

Getting Started

1. **Navigation**: Use the dashboard's sidebar or main menu to access visualizations and tools.
2. **Filtering Options**: Refine displayed data using location and time filters.
3. **Prediction Inputs**: Enter relevant values into forecasting tools for real-time predictions.
4. **Interactive Exploration**: Engage with visuals for dynamic insights and deeper analysis.
5. **Data Export**: Download data or visuals for offline reporting or further evaluation.

Project Team & Repository

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GitHub Repository: https://github.com/MostafaDawi/real-estate-dashboard-system