🏠 Bangalore Housing Price Analysis

📌 Project Overview

The real estate market in Bangalore is highly dynamic, with significant price variations across locations and property types. This project analyzes a dataset of **13,129 properties across 11 features**, focusing on **price per square foot**, **BHK configurations**, and **location trends** to detect outliers and uncover business insights.

🛠 Tools & Technologies

- **Python** → Data cleaning, outlier detection, and anomaly detection
- **Pandas, NumPy** → Data manipulation
- **Matplotlib & Seaborn** → Visualizations
- **Power BI** → Interactive dashboards for business insights

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📊 Key Steps

1. **Data Cleaning**
    - Removed missing values and duplicates.
    - Standardized location names.
    - Removed extreme outliers in price_per_sqft.
2. **Exploratory Data Analysis (EDA)**
    - Distribution of prices by **BHK & Location.**
    - Average property price = **₹3 Lakhs per BHK (approx.).**
    - Most expensive location: **Cunningham Road.**
    - Cheapest location: **Doddathoguru.**
3. **Outlier Detection**
    - Cases where **2 BHKs are more expensive than 3 BHKs in the same area.**
    - Cases where **4 BHKs are more expensive than 5/6 BHKs.**
    - Built scatter plots & heatmaps to visualize anomalies.
4. **Dashboard (Power BI)**

- Average Price by BHK
- Average Price per Sqft by Location
- Anomaly Heatmap (2 BHK vs 3 BHK, 4 BHK vs 5 BHK)
- Location-wise property distribution

🔎 Observations

- Average **price per BHK ≈ ₹3 Lakhs**
- **Cunningham Road** → Premium location with highest property prices.
- **Doddathoguru** → Cheapest per sqft prices.
- Several locations show **pricing anomalies** (2 BHK > 3 BHK, 4 BHK > 5 BHK), suggesting:
  - Developer mispricing
  - Market inefficiencies
  - Scope for negotiation

💡 Business Insights

- **Investors** → Look for mispriced 3 BHKs in areas where 2 BHKs are costlier.
- **Home Buyers** → Target locations with stable price trends (avoid anomaly zones).
- **Real Estate Companies** → Standardize pricing to avoid customer confusion.
- **Data Teams** → Deploy anomaly detection models for dynamic pricing strategy.

📌 Conclusion

- This project demonstrates how **data cleaning, anomaly detection, and visualization** can uncover hidden insights in real estate pricing.
- With Python + Power BI, I can build **data-driven dashboards** that help investors, buyers, and businesses make smarter decisions.