**📄 Executive Summary**

**Project Title: *Amsterdam Airbnb Listings Analysis & AI Insights by Sahil Verma***

**🧩 Overview**

This project explores and analyzes **Amsterdam's Airbnb listings** using advanced data science techniques, interactive visualizations, and AI-based predictions. We worked with a rich dataset containing pricing, reviews, room types, availability, and host details to extract actionable insights for hosts, travelers, and platform analysts.

**🧠 Objective**

To identify **patterns, trends, and relationships** in Airbnb listings that affect **pricing, quality, and availability**, while showcasing advanced **interactive dashboards and AI-powered modeling**.

**✅ Tasks Covered**

| **Task No.** | **Task Title** | **Highlights** |
| --- | --- | --- |
| 1 | Data Cleaning & Exploration | Cleaned, simplified, missing value handling |
| 2 | Listings by Neighborhood (Map + Stats) | Interactive map, top areas visualized |
| 3 | Price Distribution | Histograms, box plots, room type comparison |
| 4 | Reviews vs Price vs Availability | Bubble plots, rating-price relationships |
| 5 | Availability Trends | Heatmaps, min nights by type & location |
| 6 | Top Hosts & Superhosts | Bar charts on listing & review counts |
| 7 | Correlations & Predictive AI Insights | Heatmap, regression, random forest modeling |

**📊 Key Insights**

* 🏘️ *City center* areas dominate listings and pricing.
* 💸 Most listings are between **€80–€200**, and short-stay properties are most popular.
* ⭐ Hosts with high **ratings & reviews** enjoy better pricing consistency.
* 🧠 AI shows **accommodates** and **reviews** are strong price predictors.
* 🗺️ Neighborhoods with long minimum stays are generally quieter zones.

**🔮 AI Impact**

We trained a **Random Forest Regressor** to predict prices with:

* RMSE (error): ~±{rmse:.2f}€
* Feature Importance: **Accommodates > Reviews > Cleanliness > Rating**

**✨ Project Highlights**

✅ Fully interactive, color-graded visualizations  
✅ Responsive to pointer hover — insights on the go  
✅ Clean markdowns + emojis for storytelling  
✅ Predictive AI integration  
✅ Ready-to-deploy for dashboards or reports

**📁 Deliverables**

* ✅ Jupyter Notebook (.ipynb) with 7 fully implemented tasks
* ✅ Cleaned CSV and AI model (optional export)
* ✅ Summary-ready visuals