

# **Project Report: Hotel Booking Data Analysis & Chatbot**

## **1. Hotel Booking Data Analysis & Visualization API**

This task focuses on analyzing hotel booking data and serving visual analytics via a FastAPI service. Key insights were extracted, including booking cancellation trends, revenue trends, and geographical distribution of bookings. Various plots were generated to visualize these trends, and the API serves these plots as downloadable PDFs.

Key Features:

- Data preprocessing and feature engineering (arrival dates, night stays, revenue calculation)
- Insights on cancellations, revenue trends, and booking distributions
- FastAPI backend serving different visualizations
- Uses Matplotlib and Seaborn for data visualization
- Outputs charts as downloadable PDFs via API endpoints

## **2. SQL-Based Hotel Booking Chatbot**

This task involves building a chatbot using LangChain that interacts with a hotel booking database to answer user queries. The system generates SQL queries dynamically based on user input, executes them, and formats the response into a meaningful answer using an LLM.

Key Features:

- Uses LangChain to generate SQL queries from user questions
- Executes queries on an SQLite database storing hotel booking data
- Processes raw query results using an LLM to generate human-readable responses
- Implements a FastAPI service to serve chatbot responses
- API endpoint allows users to ask hotel-related queries dynamically

## **3. Challenges I faced**

The main challenge that I face is managing the LLM to perform the desired task. In analytics also merging the arrival date columns and then making it into datetime, remove the nan values from the data. During API building managing its code so that it will give the good output.

These are the challenges that I mainly faced.