**Project Title: Hotel Booking Demand Analysis Using Predictive Analytics**

**Problem Statement:** The hotel industry faces the many challenges of efficiently managing its resources and optimizing revenue generation while meeting customer expectations. To address this, the hotel management needs accurate and timely predictions of booking demand to make informed decisions regarding room inventory, pricing strategies, and staffing levels. The problem at hand is to develop a robust predictive model that can predict hotel booking demand. This model should take into account a wide range of influential factors such as seasonal trends, hotel amenities, room rates, and historical booking patterns.

**Link:** <https://www.kaggle.com/datasets/jessemostipak/hotel-booking-demand>

**Description of Dataset:** To address this, proposed an in-depth analysis of the Hotel Booking Demand dataset from Kaggle. This Dataset comprises comprehensive records of hotel bookings, encompassing a total of approximately 11939 entries. The dataset offers valuable insights through 32 columns, including features like hotel type, customer details, booking date, arrival and departure dates, booking channels, and booking cancellations. This dataset is suitable for comprehensive spark big data analysis. The primary aim of this project is to analyze the Hotel Booking Demand and extract actionable insights.

**Work Plan and Techniques:**

1. Identify critical factors leading to booking cancellations and understand patterns influencing customer decisions using Spark.
2. To Analyze booking trends over time, including seasonal variations and peak booking periods, to enable efficient resource allocation and staffing using Tableau.
3. Develop a predictive model for booking demand prediction using machine learning.
4. To Summarize the findings in a detailed report and provide actionable recommendations for hotel management to improve booking strategies and enhance customer experience.

**Tools: & Techniques** Python (3.8), Spark, Pandas, matplotlib, Scikit-Learn, and Tableau for data visualization

1. Exploratory Data Analysis
2. Data Preprocessing
3. Feature Engineering
4. Principle component analysis
5. Model Training & Evaluation