**📊** **PowerCo Customer Retention Strategy: A Machine Learning Approach (Random Forest Model)**

**Project Scenario: BCG Data Science– PowerCo Churn Analysis**

**🔹 Task 1: Business Understanding & Hypothesis Framing**

**Objective:**  
Gain an understanding of the business problem and define a strategic approach.

**What was done:**

* Met the client, PowerCo — a major gas and electricity utility concerned about customer churn.
* Interpreted the business context and identified the key challenge.
* Determined the relevant client data needed for analysis.
* Outlined techniques to investigate the churn issue.
* Drafted a professional email summarizing the analytical approach for the Associate Director (AD).

**Key Roles Context:**  
As a Junior Data Scientist at BCG X, this project followed BCG’s 5-step methodology:

1. Business Understanding & Problem Framing
2. Exploratory Data Analysis (EDA)
3. Feature Engineering
4. Modeling & Evaluation
5. Insights & Recommendations

**Client Brief Highlights:**

* PowerCo serves small and medium-sized enterprises.
* Customer churn has increased due to market competition and pricing sensitivity.
* The hypothesis to test: **Is price sensitivity a key driver of churn?**

**🔹 Task 2: Exploratory Data Analysis (EDA)**

**Objective:**  
Analyze the dataset to explore the relationship between pricing and churn behavior.

**What was done:**

* Used Python (Pandas, NumPy) for data analysis.
* Applied EDA frameworks to interpret trends.
* Created visualizations to identify patterns and correlations.
* Investigated the impact of **price sensitivity** using price elasticity concepts.

**🔹 Task 3: Feature Engineering & Modeling**

**Objective:**  
Enhance the dataset and build predictive features for churn modeling.

**What was done:**

* Created new features based on domain knowledge (e.g., difference in off-peak prices).
* Removed irrelevant or redundant columns.
* Extracted useful information from date features (e.g., month, year).
* Combined datasets where appropriate.
* Built features to improve model accuracy using Python.

**Feature Engineering Goal:**  
Prepare a feature-rich dataset for churn prediction.

**🔹 Task 4: Predictive Modeling & Executive Summary**

**Objective:**  
Develop a churn prediction model and summarize findings.

**What was done:**

* Trained a **Random Forest Classifier** for binary classification.
* Achieved **85% accuracy** in predicting customer churn.
* Evaluated model performance using appropriate metrics (precision, recall, F1-score).
* Wrote a concise **executive summary** highlighting key findings and business impact.

**Summary Highlights:**

* The model suggests **price sensitivity alone does not fully explain churn**.
* Future improvements may involve rebalancing techniques or including other behavioral features.
* Key insight: Retention efforts should consider more than just pricing — customer segmentation and value analysis are also crucial.

**✅ Key Takeaways**

* Applied end-to-end data science workflow in a business context.
* Gained hands-on experience with Python, data visualization, feature engineering, and modeling.
* Strengthened communication skills by delivering insights clearly to non-technical stakeholders.