**Detailed Prompt for Dataset Generation**

**Prompt:**

*"Generate a synthetic dataset for FedEx’s AI-driven cargo optimization system in air freight logistics, specifically for Boeing 777 aircraft operations. The dataset should contain 5,000 rows and represent real-world data with the following attributes:"*

**1️.Shipment & Route Details**

* **Shipment\_ID:** Unique identifier for each cargo shipment.
* **Origin\_Hub:** Starting airport hub (e.g., Memphis, Indianapolis, Paris, Dubai, Hong Kong).
* **Destination\_Hub:** Ending airport hub (e.g., New York, Los Angeles, London, Shanghai, Sydney).
* **Shipment\_Distance\_km:** Distance in kilometers between the origin and destination (ranging from 500 km to 15,000 km).

**2️.Cargo Characteristics**

* **Shipment\_Weight\_kg:** Weight of the cargo in kilograms (ranging from 500 kg to 10,000 kg, reflecting Boeing 777 capacity).
* **Shipment\_Volume\_m3:** Volume of the cargo in cubic meters (ranging from 2 to 30 cubic meters).
* **Shipment\_Type:** Type of cargo (e.g., Perishable, Fragile, Standard, Hazardous).
* **Shipment\_Priority:** Priority level of shipment (High, Medium, Low).

**3️.AI Optimization Impact**

* **AI\_Optimized:** Boolean (True/False) indicating whether AI-driven optimization was applied to the shipment.
  + AI should be applied to **70%** of shipments (randomized).
* **AI\_Processing\_Time\_Sec:** Time in seconds AI takes to process shipment load optimization (if AI is applied).
* **Loading\_Time\_min:** Time in minutes taken to load the cargo (shorter for AI-optimized shipments).

**4️.Cost & Savings Metrics**

* **Cost\_Per\_Shipment\_USD:** Total shipping cost per cargo shipment.
  + AI-optimized shipments should generally have lower costs due to efficiency but must still include **some cost variance**.
* **Fuel\_Savings\_%:** Percentage fuel savings per shipment (higher for AI-optimized shipments).
* **Error\_Rate\_%:** Percentage error rate in cargo handling (AI should reduce this significantly).

**5️.AI-Related Costs**

* **AI\_Token\_Usage:** Number of tokens used if AI is applied (higher for long-haul shipments).
* **Cloud\_Compute\_Cost\_USD:** AI-related cloud computing cost per shipment (higher for heavier and longer shipments).
* **AI\_Token\_Cost\_USD:** Cost associated with AI API token usage (should scale with shipment distance).
* **AI\_Maintenance\_Cost\_USD:** AI system maintenance cost per shipment (should be a percentage of compute cost).
* **Total\_AI\_Cost\_USD:** Total cost of AI infrastructure per shipment (sum of cloud, token, and maintenance costs).
* **AI\_Savings\_USD:** Amount saved per shipment due to AI optimization (apply diminishing returns based on shipment size/distance).

**Environmental Impact**

* **Carbon\_Emissions\_kg:** CO₂ emissions per shipment (AI should reduce emissions via fuel efficiency).

**Additional Data Constraints**

* **Ensure AI is not unrealistically profitable** – AI must provide efficiency but not extreme cost reductions.
* **Introduce variability in AI savings and costs** based on shipment type, priority, and distance.
* **Reflect Boeing 777 cargo handling constraints** (max cargo weight/volume considerations).

**Final Instructions**

*"Generate this dataset in CSV format with 5,000 rows, ensuring the realism of values through statistical distribution techniques (e.g., normal distribution for shipment weights, exponential/logarithmic effects for AI cost savings). AI should provide cost reductions, but cloud computing and token costs should prevent excessive profitability. Apply realistic business logic to ensure insights are actionable."*