Project Title: Predicting On-Time Delivery in Supply Chain

Objective: The goal of this project is to analyze operational data and build predictive models to determine whether an order will be delivered on time.

Dataset Description:

- **Order Details:** Order volume, priority, lead time
- **Production Efficiency:** Machine uptime, defect rate, production time
- **Inventory Management:** Stock levels, demand forecast accuracy
- **Supplier Performance:** Supplier on-time percentage, quality rating
- **Logistics & Shipping:** Shipping cost, transport mode, delivery time
- **Target Variable:** On_Time_Delivery (1 = On-time, 0 = Delayed)

Order_Volume	Number of units in the order	Units (count)
Priority	Order priority level (Low, Medium, High)	Categorical (Encoded as 0,1,2)
Lead_Time	Time between order placement and shipment	Days
Machine_Uptime	Percentage of time machines are operational	% (0-100)
Defect_Rate	Percentage of defective products in an order	% (0-100)
Production_Time	Time taken to produce one unit	Hours per unit
Stock_Levels	Number of units in stock	Units (count)
Demand_Forecast_Accuracy	Accuracy of demand forecasting	% (0-100)
Supplier_On_Time	Percentage of supplier deliveries on time	% (0-100)
Supplier_Quality_Rating	Supplier quality rating	Scale (1-5)
Shipping_Cost	Cost of shipping per order	Currency (e.g., USD)
Transport_Mode	Mode of transport (Air, Sea, Road, Rail)	Categorical (Encoded as 0,1,2,3)
Delivery_Time	Time taken to deliver after shipping	Days
On_Time_Delivery	Whether the order was delivered on time	Binary (1 = On-time, 0 = Delayed)

Project Tasks:

1. Data Preprocessing and Exploration

- Load the dataset and handle missing values (if any)
- Convert categorical features into numerical format
- Perform exploratory data analysis (EDA) using visualizations

- Identify correlations between features and the target variable

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Deliverables:

1. **Python notebook (.ipynb) or Python script (.py) with model implementations**
2. **A presentation covering methodology, results, and recommendations**

Grading Criteria:

- Data preprocessing and EDA (20%)
- Model implementation and performance evaluation (40%)
- Interpretation of results and business insights (20%)
- Presentation and report clarity (20%)