Project Title: MSBA Capstone - Predictive Analytics Model for Machinery Failure

Client: Swire Coca Cola

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Project Background: Swire Coca-Cola operates a network of six production plants and nearly 50 distribution centers across 13 states in the Western US. Within the normal scope of business, production machinery fails, leading to unpredictable repairs and downtime. These breakdowns result in lost revenue from halted production, decreased product availability, urgent repair costs, and delayed distribution, impacting revenue by nearly sixty million dollars annually.

Business Problem: Develop an analytics model to predict machinery failure and downtime variance to reduce maintenance costs and minimize downtime in Swire Coca-Cola's bottling operations. Depending on further EDA and the team expertise, potential viable models include Random Forest, Logistic Regression, or Time Series Models. As there is no predefined target variable, we will use the provided dataset to establish a baseline for standard downtime and generate a target variable for prediction to identify "Hot Spots" to address.

Benefit of a Solution: By implementing a predictive analytics model, Swire Coca-Cola can proactively identify which plants and/or assembly lines are likely to experience machinery failures. This proactive identification will allow the company to anticipate breakdowns and address issues before they result in significant operational disruptions. The benefits include reduced maintenance costs, minimized production downtime, and optimized scheduling of maintenance activities. Moreover, the model can identify hotspots or common factors leading to breakdowns, providing insights for long-term machinery and operational improvements.

Success Metrics:

- [ ] Reduction in Downtime: Achieve a measurable decrease in unplanned downtime incidents by a targeted percentage within the first six months post-implementation.
- [ ] Identify maintenance "Hot Spots", either on a wide or deep scale, by analyzing plants or assembly lines which fall outside of standard deviation or production clustering.
- [ ] Maintenance Cost Savings: Demonstrate a reduction in maintenance-related costs by a specific target by optimizing the maintenance schedule and reducing urgent repairs.
- [ ] Operational Efficiency: Improve overall plant operational efficiency, measured by an increase in production uptime percentage across all plants.

Scope/Deliverables:

On or before November 27th, the primary deliverables for this project will be the following:

- ☐ **Detailed Report of Findings and Model Predictions:** A comprehensive report summarizing the model development process, key findings, predictive performance, and actionable insights for Swire Coca-Cola's machinery maintenance strategy.
- ☐ **GitHub Repository of All Code and Notebooks:** A well-documented GitHub repository containing all code, including data preprocessing, model building, evaluation scripts, and Jupyter Notebooks for further analysis.
- ☐ **Presentation of Results:** An executive-level presentation to showcase key findings, the model's impact on reducing downtime or identifying behavioral anomalies, and recommendations for implementation.