Swire Coca-Cola Business Problem Statement

The current reactive maintenance process involves waiting for machines to fail before addressing the issue, which leads to prolonged shutdowns and costly delays. Swire Coca-Cola lacks the ability to anticipate these breakdowns and efficiently manage maintenance schedules and inventory. This unpredictability not only affects the company's ability to meet customer demand but also increases operational costs, reduces productivity, and creates significant financial strain.

To address this, Swire Coca-Cola requires a predictive maintenance solution that can identify potential machine breakdowns before they occur, enabling the company to take proactive measures. By analyzing the historical data from the Internal Warehouse Controller (IWC) system, the goal is to understand the causes of machine failures, forecast future downtimes, and ensure the necessary parts are available in advance. The ultimate aim is to reduce unplanned downtimes, enhance machine reliability, optimize production capacity, and minimize financial losses.

This predictive model will not only provide insights into when and why downtimes occur but also allow for more informed decision-making regarding machine maintenance, inventory management, and production planning. By transitioning from a reactive to a predictive approach, Swire Coca-Cola can significantly improve operational efficiency and better meet production targets.

Benefit of Solution

The implementation of a predictive maintenance model will allow Swire Coca-Cola to:

- Forecast potential machine breakdowns and plan maintenance in advance, reducing unplanned downtimes.
- Optimize inventory management by stocking parts based on predictive insights, improving overall operational efficiency.
- Quantify opportunity costs related to downtime and improve financial performance by enhancing production capacity across plants.
- Establish operational thresholds to balance machine usage and longevity, ensuring that demand can be met without overburdening the equipment.

Analytics Approach

Our approach will involve:

- Data Exploration and Feature Engineering: Analyzing IWC (Internal Warehouse Controller) data, downtime records, and machine maintenance history to identify patterns in machine failures.
- Model Development: Building a predictive model that uses historical breakdowns, maintenance logs, and other relevant features to anticipate future downtimes and determine the required parts for repairs.
- Simulation and Validation: Using simulations to validate the model and adjust based on feedback from the production team.
- Predictive Maintenance Pipeline: Developing a comprehensive system to flag potential downtimes, recommend maintenance, and optimize spare parts inventory.

Success Metrics

Key performance indicators (KPIs) will include:

- Reduction in unplanned downtimes by a measurable percentage.
- Improvement in the overall equipment effectiveness (OEE) of machines.
- Increased production output, aiming to close the 5.6% gap in meeting the production target.
- Cost savings from reduced downtime and better inventory management.

Scope/Deliverables

- A detailed report outlining the predictive maintenance model, insights on downtime causes, and recommendations for maintenance schedules.
- A dashboard for the production and supply chain teams, offering real-time insights into machine health and predictions for potential failures.
- Python or R code for the predictive maintenance model, to be integrated with Swire Coca-Cola's existing systems.
- Comprehensive documentation covering model development, feature selection, and future improvements.

Project Details

This project will be executed by the MSBA Capstone team at the University of Utah, to be completed by December 12, 2024. Following is a list of project milestones:

- Business problem statement delivery: September 15, 2024
- Data cleaning and exploratory analysis: October 02, 2024
- Model development and validation: October 30, 2024
- Final presentation and handover: November 20, 2024