

Predictive Maintenance Case at Swire Coca-Cola

Business Problem

Swire Coca-Cola is one of the five largest Coca-Cola bottlers in the US. Every year, they produce close to 192 million cases of beverages to sell in its markets in 13 states. Recently, Swire Coca-Cola is experiencing significant losses due to frequent and unplanned machine downtimes in its 6 production plants. These machine downtimes are costing the company greatly as only about 94.4% of ordered cases get produced while the rest are lost in unexpected mechanical failures. When these mechanical failures occur unexpectedly, there are unplanned downtimes that reduce efficiency and productivity at the plants. Due to these unplanned breakdowns, it costs the business an estimated \$60 million annually, bringing business to a grinding halt and delaying the time for delivery. The current maintenance strategy is inefficient, as machines are repaired only after breakdown occur, resulting in prolonged periods of inactivity. Swire Coca-Cola wants to further improve the accuracy of these downtime predictions in order to avoid disruptions, decrease the cost of unplanned maintenance, and optimize full production capacity

Benefit of Solution

Predictive maintenance deployed at Swire Coca-Cola will be able to detect potential machine failures ahead of time, hence avoiding breakdowns. That means fewer unplanned line stoppages and improved productivity due to the efficiency of operations. Operating costs would decrease by reducing the need for emergency repairs and unplanned stops, positively impacting profitability. Further, predictive maintenance will contribute to the stability of production capacity by reducing equipment failures that disrupt operations and, hence, prompt delivery for improvement in customer satisfaction. In the final analysis, this will enable Swire Coca-Cola to meet demand more predictably and stay competitive in the marketplace. By maintaining a steady operational flow, the company can save money, increase productivity, and better serve its markets across 13 states.

Success Metrics

Success for the predictive maintenance initiative will be measured through several key performance indicators that reflect both operational improvements and cost savings.

- Reduction in unplanned downtime incidents
- Decrease in the \$60 million annual losses caused by equipment malfunctions.
- Improvement in delivery timelines through fewer delays related to equipment breakdowns.
- Lowered maintenance costs due to optimized efficiency in component replacements, repairs, and resource management.
- Continuous tracking of key performance metrics to assess and refine the effectiveness of the predictive maintenance system.

Analytics Approach

The analytical approach for this project will focus on leveraging data to enhance operational efficiency and reduce equipment downtime. By thoroughly analyzing historical maintenance records and machine breakdown data, we will uncover patterns and early warning signs of potential failures.

The analytics strategy will include the following:

- **Data Exploration and Feature Engineering:** Key features such as machine age, maintenance history, last service date, and current condition will be identified and engineered to enhance the predictive model's accuracy.
- **Model Development:** A predictive model will be developed using either classification or regression techniques depending on the data to forecast potential equipment failures based on historical trends and patterns.
- **Model Validation:** The predictive models will undergo rigorous testing and cross-validation using historical data to ensure high accuracy in failure prediction before full deployment.

Scope

The scope of this project encompasses the development and deployment of a predictive maintenance system aimed at minimizing unplanned equipment downtime and enhancing operational efficiency.

- Creation of a predictive maintenance model to identify potential equipment issues in advance.
- Implementation of a dashboard providing real-time insights into equipment conditions and upcoming maintenance schedules.
- Delivery of a final report detailing the model-building process, analysis, and expected business impact.
- In future, Swire Coca-Cola existing enterprise systems, can be fully integrated with this solution and there is an increased production.

Project Details

The project will be executed by MSBA Team 8, by Charith Reddy Gopavaram, Adarsh FNU, and Dheeraj Yata.

The key milestones include

- The completion of the business problem statement by September 15.
- By October 6, the team will focus on data preprocessing and exploration, which involves cleansing the dataset and compiling historical downtime information as part of the exploratory data analysis (EDA).
- Model selection and feature engineering will be completed by November 3, utilizing key predictors of downtime, and documented in the modeling notebook.
- A formal presentation will be delivered on November 27
- The submission of the project's GitHub portfolio on December 8.