Schnitzer Steel Tacoma Industries Applied Project
Metal Shredder Performance Analysis and Optimization

Project Introduction

Data Understanding & Building a Data Dictionary

Complete Shredding System
Productivity – 1 Ton / Hr to 16 Tons / Hr

Data Discovery:
Our data consists of Process Variables that are measured at different points in the Shredding Process. Ferrous Belt Scale is measuring Tons of metal that get shredded. Mill Motor Current is sensor recording amps. These are some examples. There are a total of 38 Process Variables and other variables as the data captured for this shredding system.

Business Intelligence & Power BI Dashboards

Predicting Performance and Maintenance Risks

Predicting Shredder Performance:
Using machine learning techniques in R our team wanted to predict when the shredder would be in production or in downtime. The goal was to predict if the shredder was going to be in production and forecast the shredder performance and plan maintenance around high production days. The Models used were classifiers Support vector Machines (SVM), Naïve Bayes, and neural network. Using oversampling methods and PCA to train our model, we evaluated our performance using ROC curves as you can see on the right graph. The ROC curve shows that SVM had the best performance predicting when the shredder is in production. Recommendations to build a better model included importing a bigger dataset to train the model. Get more information on the down time classification, and set up a data refresh that can continuously provide the predicted information for the next week.

Meet the Project Team

Morgan Bullock
www.linkedin.com/in/morgan-bullock921

Kevin Byrd
http://www.linkedin.com/in/kevin-byrd-uw
tp://www.linkedin.com/in/kevin-byrd-uw

Wendy DuBois
https://www.linkedin.com/in/wendy-du-bois/

Sina Kouhi
https://www.linkedin.com/in/sinadadvand/

Shwetha Shankar
https://www.linkedin.com/in/shwethayy/

Business Intelligence Dashboards:
To the right is a Power BI visualization is a snapshot of our overall project goal. Our team was tasked with improving scheduled maintenance efficiency by creating a maintenance dashboard. Another key aspect of the project is to identify how to improve production and limit speed losses. The green bar in graph is continuous production throughout the day. Each red section is downtime where the shredder had to decrease shredding speed or shut down altogether. As you can see, June 02 had significantly more downtimes than June 01. The ability to predict and reduce the number of scheduled downtimes will substantially increase Schnitzer’s production capacity. During the descriptive and diagnostic analytics phase, the team had to use utilized R and Power BI software to investigate the historical shredder production data.

Added Business Value

Save Time
Faster Reports & Faster Decisions on Operations
Advance Calculations for Performance
Save Mental Energy

Milgard School of Business—Applied Project Class of 2021
Master of Science in Business Analytics
University of Washington Tacoma