March 2020

IMPROVING PART FAILURE PREDICTION PERFORMANCE THROUGH TARGETED PREDICTION DELAYS

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Improving Part Failure Prediction Performance through Targeted Prediction Delays

Abstract: The performance accuracy of a machine learning model that predicts the impending failure of a part can be improved by including an embedded delay period in the processing for determining when a part is to be replaced in order to remove early false positives from the prediction.

This disclosure relates to the field of machine learning.

A technique is disclosed that improves the performance accuracy of a machine learning model that predicts the impending failure of a part.

Some machine learning models have the tendency to produce early life anomalies which can trigger false positive predictions. These false positives have a negative financial impact because the customer will replace a part prematurely based on the anomalous prediction. These false positives also erode confidence in the prediction model itself, which leads to customers not trusting the results, even when they are good. Up to now, the workaround was to allow the anomalies, rely on the judgment of the partner, or use things like percent life remaining of the part if available.

According to the present disclosure, the machine learning model is improved by including an embedded delay period in the processing for determining when a part is to be replaced. The delay filters out the early false positives that were seen during the analysis of the machine learning model. This delay trigger takes many things into account to initiate the delay. Specifically, it watches for the part being replaced, the product being updated, or the system triggering a new predictive replacement action.

When the delay is active, the prediction values are analyzed. If the value is greater than our configurable threshold, the delay period is restarted to ensure there are no anomalies in the delay period. When the prediction value stays below the threshold for the maximum delay period, then predictions will become live and acted upon.

The system will wait a certain amount of pages before notifying the customer of the prediction. If the prediction is at our notification level during this delay period, we also may reset the delay period. Using this new model for predictions has shown significant improvement in our model accuracy and precision.

The disclosed technique advantageously improves machine learning models to reduce the number of false positive predictions regarding the need to replace a part in a product.

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