Machine Failure Prediction using Neural Networks and XGBoost

Sameer N. B.
Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai, India

Mahesh Padala
Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai, India

Vignesh Srinivasan
Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai, India

Abstract:

In modern industrial operations, predictive maintenance has become crucial, so we aim to minimize unplanned downtime and optimize maintenance schedule by accurately predicting failures. To enhance the prediction accuracy of machine failures this research combines Recurrent Neural Networks (RNN), with Extreme Gradient Boosting (XGBoost). The complex dependencies in time series data will be captured by the RNN component as they are often indicative of impend failures and to model non-linear interactions among the extracted features XGBoost is used to refine the system. By integrating these two techniques into single model that leverages the model's strength of predicting the failures resulting in reliable and robust tool. the proposed system is scalable and adaptable to various types of industrial equipment, offering a significant improvement in predictive maintenance, by predicting unexpected downtimes, lowering maintenance costs and improving overall operational efficiency.

Keywords:

XG-Boost, RNN, Integrating, Impending Failure, Adaptable.