Project Proposal: Predictive Analysis of Material Wear

Objective

Develop a machine learning model to predict material wear stages from historical thickness measurements, assisting in maintenance strategies in the industrial and manufacturing sector.

Initialization: A Python script will initialize the LSTM (Long Short-Term Memory) model suitable for time-series analysis.

Training and Evaluation: The script will train the model on historical data and evaluate its performance using metrics like accuracy and R-squared.

Data Cleaning: Python Pandas will be used to create the .csv data files “uploaded by users”.

Normalization and Standardization: Data normalization and standardization techniques will be applied to ensure consistency and reliability of the model inputs.

Data Source: The model will utilize data retrieved from Spark, ensuring efficient data handling and retrieval.

Performance Metrics: The LSTM model will aim for at least 75% classification accuracy or 0.80 R-squared, demonstrating its predictive power.

Iterative Improvement: The Python script will document the optimization process, recording changes made to the model parameters and architecture.

Results Presentation: Upon completion of the training and testing phases, the script will print or visually display the model's overall performance, highlighting its accuracy and R-squared values.

Deliverables

A Python script encompassing the model initialization, training, evaluation, and optimization.

Documentation within the script detailing the model's development and optimization process.

Final performance metrics displayed in the script.