LSTM-BASED-AUTO-BI-LSTM FOR REMAINING USEFUL LIFE (RUL) PREDICTION: THE FIRST ROUND OF TEST RESULTS

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ABSTRACT

The Remaining Useful Life (RUL) is one of the most critical indicators to detect a component's failure before it effectively occurs. It can be predicted by historical data or direct data extraction by adopting model-based, data-driven, or hybrid methodologies. Data-driven methods have mainly used Machine Learning (ML) approaches, despite several studies still pointing out different challenges in this sense. For instance, traditional ML methods cannot extract features directly from time series depending, in some cases, on the prior knowledge of the system. In this context, this work proposes a DL-based approach called LSTM-based-AUTO-Bi-LSTM. It ensembles an LSTM-based autoencoder to automatically perform feature engineering (instead of manually) with Bidirectional Long Short-Term Memory (Bi-LSTM) to predict RUL. We have tested the model using the Turbofan Engine Degradation Simulation Dataset (FD001), an open dataset. It was generated from the Commercial Modular Aero-Propulsion System Simulation (C-MAPSS) from the Prognostics Center of Excellence (PcoE), from the National Aeronautics and Space Administration (NASA). The objective is to release the first round of analytical results and statistical visualisations of the model application, which will guide us in future improvements.