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ABSTRACT

This project explores the development and implementation of an LSTM-based deep learning model for feature extraction and fault classification in transmission lines. The Long Short-Term Memory (LSTM) network, a type of recurrent neural network (RNN), is employed to capture temporal dependencies and extract meaningful features from time-series data. Additionally, Fourier Transform is applied to complement the feature extraction process by analyzing the frequency domain characteristics of the data. The extracted features are combined and subjected to clustering using the K-Means algorithm to identify fault signatures.

To evaluate the performance of the clustering process, metrics such as Silhouette Score and Davies-Bouldin Score are utilized, providing insights into cluster quality and separability. The results are further visualized through graphs generated from clustered data stored in organized directories. This approach demonstrates the effectiveness of LSTM models in time-series feature extraction and their integration with unsupervised learning for anomaly detection and classification tasks in power systems.

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