ACKNOWLEDGEMENT

I am deeply grateful to Prof. Prakash Babu G, Assistant Professor at Acharya Institute of Technology, for granting me the incredible opportunity to explore pattern recognition in time series data as part of my internship. My heartfelt thanks also go to, my mentor, and Mr. MVD Raghava, Deputy Manager & T.R.Ganesh , Chief General Manager , System Logistics for their unwavering guidance, encouragement, and invaluable insights.

Their expertise has been instrumental in shaping my understanding and skills, while Mr. MVD Raghava, seamless coordination of project work ensured a smooth and enriching experience. This internship has been a transformative phase in my academic journey, significantly enhancing my practical knowledge and professional growth. I am sincerely thankful to Mr. MVD Raghava for their mentorship and support, which have left an indelible mark on my career aspirations.

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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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