**UNIVERSITI TEKNOLOGI MARA**
**CAWANGAN PULAU PINANG**

# TRANSMISSION LINE FAULT LOCATION ANALYSIS USING DEEP NETWORK DESIGNER

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February 2025

# AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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# ABSTRACT

This study presents significant advancements in the application of Long Short-Term Memory (LSTM) networks for fault location analysis in transmission lines, a method not extensively explored in previous research. By utilizing an LSTM model to analyse fault signals from a 100 km transmission line with a voltage rating of 400 kV, the research demonstrates robust performance in accurately identifying fault locations, addressing the limitations of traditional machine learning methods that rely heavily on feature extraction and are sensitive to specific line parameters. The model's performance was benchmarked against four other fault location techniques, revealing that although the LSTM with 500 epochs exhibited lower accuracy initially, it highlights the potential for improved performance through further training. Notably, this study emphasizes the use of root mean square error (RMSE) as a metric for evaluating fault location accuracy, providing a nuanced understanding of model performance that is relatively rare in existing literature. Furthermore, the findings suggest that while LSTM models may face challenges when trained on specific transmission lines, there is substantial potential for generalization across different lines with continued refinement. Overall, this research contributes valuable insights to the field of electrical engineering and machine learning applications in power systems, paving the way for future innovations to enhance reliability and efficiency in fault detection and location.

# ACKNOWLEDGEMENT

In the name of Allah, Most Gracious, Most Merciful.

Firstly, I would like to take this opportunity to thank and appreciate Sir Ts. Mohammad Adha bin Mohammad Idin, my project supervisor, and Sir Abdul Malek bin Saidina Omar my project co-supervisor for their counsel, recommendations, and guidance during the completion of this Final Year Project Progress Report. Their insightful feedback and suggestions have enabled me to refine and amend this thesis. Along with thanks to my supervisor and co-supervisor, I would like to sincerely thank everyone who has helped me, whether directly or indirectly. Special thanks to my colleagues and friends for helping me with this project. In addition, I want to express my gratitude to my family and friends for their everlasting inspiration and support, which have motivated me to finish writing the report as quickly as possible.

Finally, this thesis is dedicated to the loving memory of my very dear mother and sister for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulilah. Thank you and May Allah bless all of you.

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