SCHOOL OF COMPUTING
Faculty of Engineering

Project Proposal Form MCST1043
Sem: 2 Session: 2024/25

SECTION A: Project Information.

Program Name: **Masters of Science (Data Science)**

Subject Name: **Project 1 (MCST1043)**

Student Name: CHANG ZI YIN

Metric Number: MCS241049

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Project Title: Sentiment Analysis of Electric Vehicle Discourse Using BERT-Based Language Model

Supervisor 1:

Supervisor 2 / Industry Advisor(if any):

SECTION B: Project Proposal

Introduction:

The Electric Vehicle market in Malaysia is experiencing significant growth, with yearly sales increasing substantially. As the statistik from JPJ Malaysia shows that at the first quarter of year 2025 there were 6827 electric vehicles registered as compared to the first 3 months of 2024 with a record of 4689 electric vehicles registered, which marks an increase of 45.6% (Government of Malaysia, 2025). Several initiatives had been implemented by the Malaysia government in full exemption of import and excise duties to encourage manufactured of electric vehicle and tax relief for the electric vehicle owner ("Tax Reliefs | Lembaga Hasil Dalam Negeri Malaysia," 2025). However, besides the incentive effort in boosting the EV sales performance, the ratings and reviews of consumer sharing experience online is also crucial in influence consumer buying behavior. Research by Kutabish et. Al. (Kutabish, Soares, & Casais, 2023) indicated that consumer nowadays influence by and rely on online reviews to assist their decision before purchasing. Online reviewer platforms such as YouTube, social media, automotive news and community. It is challenging to surf through a large volume of reviews on these web review platforms. Hence, this project aims to assist in providing nuanced information and evaluation by using structured sentiment analysis in gaining real time user's feedback information on strength, limitation and future prospective of the electric vehicle. This would help fostering the market growth of EV industry and ensure wider market acceptance for consumer in making wiser decision.

Problem Background:

Recently, with the Ev revolution in Malaysia automotive market, had lead to surge of online discussion. Online platform

such as social media, forums or video review had become key venue for consumer to share experience, discussing and debating about their concern (Ruan & Qin Lv, 2023). Hence, to leverage those reviews on online platform, research on sentiment analysis of EV has gained significant traction in recent years. Recent studies implemented deep learning model such as ERNIE combined with deep CNNs to improve sentiment classification accuracy (Wang, You, Ma, Sun, & Wang, 2023). Even though it achieves a high accuracy, there persisting gap lies in the limited sentiment diversity which model only classify sentient into basic categories: positive, neutral and negative. As noted by Wang et. Al. such simplistic Classification cannot capture the full spectrum of aspect-based sentiment analysis in public discourse. Besides, there research leveraging Large Language Model such as BERT have demonstrating promising result, however there is limited data diversity in this research as it solely rely on small dataset from single platform. This narrow data source may result in potential bias. As proposed by Sharma et. Al. (Sharma, Din, & Ogunleye, 2024) future research can be done on wider dataset to include user generated content from other platform is crucial for more unbiased sentiment analysis.

Problem Statement:

Although there is research applied for sentiment analysis, however existing approach rely on single source dataset which might lead to bias insight. Besides, current sentiment classification is simplified, cause failing in capturing nuance consumer information. There gap remain in current sentiment analysis of EV domain.

Aim of the Project:

To develop a BERT-based sentiment analysis model that effectively classifies sentiment in electric vehicle discourse collected from multiple web-based platforms.

Objectives of the Project:

1. To collect and preprocess electric vehicle related text data from multiple online resources
2. To implement and compare pre-trained Bert-based model in determining structured sentiment analysis
3. To test and evaluate the model performance using standard evaluation matric
4. To visualize sentiment distribution and derive actionable insight

Scopes of the Project:

The project scope is conducted on English-language electric vehicle related textual data. The text data source is to be obtain through platform such as social media or online electric vehicle review website using web crawlers. Structured

sentiment analysis on text data will be conduct using BERT and its variant. Python programming language will be implement to develop this project.

Expected Contribution of the Project:

1. A fine-tuned BERT-based model capable of handling diverse sentiment expressions
2. An insight of public concerns and adoption barriers surrounding EVs from a user perspective.

Project Requirements:

Software: Google Colab

Hardware: Intel i5- 1155G7, 8GB+ RAM

Technology/Technique/ Methodology/Algorithm: Deep learning

Type of Project (Focusing on Data Science):

[/] Data Preparation and Modeling

[/] Data Analysis and Visualization

[ ] Business Intelligence and Analytics

[ ] Machine Learning and Prediction

[/] Data Science Application in Business Domain

Status of Project:

[/] New

[ ] Continued

If continued, what is the previous title?

SECTION C: Declaration

I declare that this project is proposed by:

[/] Myself

[ ] Supervisor/Industry Advisor ( )

Student Name: CHANG ZI YIN

Chang 17/4/2025

Signature **Date**

SECTION D: Supervisor Acknowledgement

The Supervisor(s) shall complete this section.

I/We agree to become the supervisor(s) for this student under aforesaid proposed title.

Name of Supervisor 1:

Signature **Date**

Name of Supervisor 2 (if any):

Signature **Date**

SECTION E: Evaluation Panel Approval

The Evaluator(s) shall complete this section.

Result:

[ ] FULL APPROVAL [ ] CONDITIONAL APPROVAL (Major)*

[ ] CONDITIONAL APPROVAL (Minor) [ ] FAIL*

***** Student has to submit new proposal form considering the evaluators' comments.

Comments:

Name of Evaluator 1:

Signature **Date**

Name of Evaluator 2:

Signature **Date**