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:	ZHANG LONG
Metric Number:	MCS241034
Student Email & Phone:	zhanglong@graduate.utm.my
Project Title:	Prediction of Electric Vehicle Charging Behavior Using Deep Learning
Supervisor 1:	
Supervisor 2 / Industry Advisor(if any):	

SECTION B: Project Proposal

Introduction:

Electric vehicles (EVs) are becoming increasingly popular due to their environmental benefits. However, managing charging infrastructure efficiently remains a challenge. This project aims to predict EV charging-related states (e.g., home charging, outside charging) using deep learning techniques to optimize charging station operations and improve user convenience.

Problem Background:

EV charging behavior is complex and varies among individuals. Traditional methods struggle to predict these behaviors accurately, leading to inefficient charging station management. Deep learning models, such as GRU and LSTM, have shown promise in sequence prediction tasks but require further exploration for EV-specific applications.

Problem Statement:

Current methods for predicting EV charging states lack accuracy and fail to account for individual variability. A robust

model is needed to forecast charging behaviors to optimize infrastructure and enhance user experience.

Aim of the Project:

To develop a deep learning model that accurately predicts EV charging-related states, leveraging historical trajectory

data and user behavior patterns.

Objectives of the Project:

1. Analyze EV trajectory data to identify charging patterns.

2. Implement a deep learning model (e.g., Bi-GRU with attention mechanism) for state prediction.

3. Evaluate the model's performance against baseline methods.

Scopes of the Project:

- Focus on predicting discrete EV states (e.g., home charge, outside charge).

- Use real-world EV trajectory data for training and validation.

- Compare the proposed model with traditional methods like n-gram and simple GRU.

Expected Contribution of the Project:

- A practical deep learning model for EV state prediction.

- Insights into charging behavior patterns to aid infrastructure planning.

- Improved accuracy over existing prediction methods.

Project Requirements:

Software:	Python, TensorFlow/Keras, Pandas, NumPy
Hardware:	GPU-enabled system for deep learning
Technology/Technique/Methodology/Algorithm:	Bi-GRU with attention mechanism

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: ZHANG LONG

ZHANG LONG
Signature

April 7, 2025
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** ....