Project Proposal Form MCST1043
Sem:…1…. Session:……2024/2025…

SECTION A: Project Information.

Program Name:	**Masters of Science (Data Science)**
Subject Name:	**Project 1 (MCSD 6215)**
Student Name:	Liao Xiuya
Metric Number:	MCS241025
Student Email & Phone:	liaoxiuya@graduate.utm.my
Project Title:	Global Electric Vehicle Market: Historical Analysis and Future Predictions (2010-2030)
Supervisor 1:	
Supervisor 2 / Industry Advisor(if any):	

SECTION B: Project Proposal

Introduction:
Since 2010, driven by technological progress, government policy support and environmental awareness, the electric vehicle industry has developed rapidly and gradually occupied the market of the automotive industry. At present, the electric vehicle market is mainly popular with pure electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), fuel cell vehicles (FCEV) and hybrid electric vehicles (HEV). This study focuses on this trend and collects a comprehensive data set on global electric vehicle sales on authoritative platforms such as kaggle and the IEA Global EV Data Explorer. Focus on data from well-known countries with high electric vehicle penetration and market influence, including China, the United States, Germany and the United Kingdom.
These data cover historical sales data, charging infrastructure and other related indicators from 2010 to 2023. This study aims to use various data analysis tools, such as predictive models, machine learning, data analysis, etc., to analyze historical data and make a rough analysis and prediction of the future development trend of the electric vehicle industry.

Problem Background:
The global automotive market's shift toward electric vehicles (EVs) is driven by environmental concerns, technological advances, supportive government policies, and changes in consumer preferences. With the rapid growth of EVs since 2010, and the increasing variety of EV energy sources, which energy source will dominate the future EV market? This question is of particular concern to automotive companies, especially when it comes to their future development plans, and is also of concern to many consumers.
This study uses data science tools such as predictive modeling, machine learning, and time series analysis to analyze historical EV sales data from 2010 to 2020 and forecast future trends to 2030. The data for this study comes from Kaggle and IEA Global EV Data Explorer, focusing on major countries such as the United States, China, Germany, and Norway. This study provides stakeholders with valuable insights to respond to the changing EV market.

Problem Statement:

Here are some ways to formulate the problem of this project:

1. By analyzing the relevant historical data of the electric vehicle market sales since 2010, what trends and characteristics can be derived about the electric vehicle market?
2. How to accurately predict the future development trend of electric vehicles with these trends and data?

3. Based on these trends, what strategic insights can we provide to stakeholders, such as automakers, policymakers, and investors, to support informed decision-making and strategic planning?

Aim of the Project:
The goal of this study is to use the data sets of Kaggle and IEA Global EV Data Explorer to focus on major countries with high electric vehicle penetration and market influence in the world, so as to fully understand the dynamics of the electric vehicle market and effectively analyze and predict the future development of the electric vehicle industry.

Objectives of the Project:
1. To Analyze historical trends: Examine the sales data of various types of electric vehicles in major countries around the world from 2010 to 2020 to identify and analyze the main trend characteristics.
2. To Forecasting future sales: Leverage machine learning and time series analysis to develop forecasting models to forecast EV sales trends through 2030.
3. To Evaluate influencing factors: Evaluate the impact of technological advances, government policies, market dynamics, and consumer preferences on all types of electric vehicles.
4. To Deliver strategic insights: Advise automakers, policymakers, and investors to support informed decision-making and strategic planning.

Scopes of the Project:
1. Historical sales data: Analyze global EV sales from 2010 to 2020, with a focus on key country markets.
2. Technological Advancements: Assess the impact of energy options and vehicle design improvements.
3. Government policy: Evaluate the impact of policies, incentives, and regulations.
4. Market dynamics: Understand consumer preferences and economic factors.
5. Predictive modeling: Develop models to forecast EV sales trends through 2030.

Expected Contribution of the Project:
1. EV Market Trend Analysis: Provides a detailed analysis of global EV sales trends from 2010 to 2020, highlighting the trends driving changes in key markets such as the US, China, Germany, and Norway.
2. Future Sales Forecast: Develop forecasting models to predict EV trends in 2030, providing valuable forecasts.
3. Impact Analysis: Evaluate the impact of technological advancements, government policies, etc. on the EV market, and provide a comprehensive understanding of the various vehicle development trends in the EV market.
4. Strategic Advice: Provide valuable insights and recommendations to automakers, policymakers, and investors to support informed decision-making and strategic planning for the future electric market.

Project Requirements:

Software:	R, Rstudio, Google Collab and Python
Hardware:	ROG Strix G16 G614JVR
Technology/Technique/ Methodology/Algorithm:	Machine learning and time series analysis

Type of Project (Focusing on Data Science):

[X]   Data Preparation and Modeling

[X]   Data Analysis and Visualization

[   ]   Business Intelligence and Analytics

[X]   Machine Learning and Prediction

[X]   Data Science Application in Business Domain

Status of Project:

[X]   New

[   ]   Continued

If continued, what is
the previous title? ....

SECTION C: Declaration

I declare that this project is proposed by:

         [X]   Myself ....

         [   ]   Supervisor/Industry Advisor (   )

Student Name: LIAO XIUYA ....

                 LIAO XIUYA   16 November 2024
                     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:

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Name of Evaluator 1: ....

Signature   **Date**

Name of Evaluator 2: ....

Signature   **Date**

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