



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

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:

The global automotive industry has experienced a significant shift towards electric vehicles (EVs) since 2010. Driven by technological advancements, supportive government policies, and increased environmental awareness, EVs have seen rapid growth and are projected to dominate the market by 2030.

Data science plays a crucial role in this transformation. By utilizing tools such as predictive modeling, machine learning, and time series analysis, data scientists can analyze historical sales data, identify trends, and forecast future market behavior.

For this study, data is collected from Kaggle and the IEA Global EV Data Explorer, both of which provide comprehensive datasets on global EV sales. The focus is on data from prominent countries known for significant EV adoption and market influence, including the United States, China, Germany, and Norway. These datasets encompass historical sales figures, charging infrastructure, and other relevant metrics from 2010 to 2020. By leveraging these rich datasets, the research aims to explore global EV sales trends and provide valuable insights for stakeholders in the automotive industry.

Problem Background:

The global shift towards electric vehicles (EVs) is driven by environmental concerns, technological advancements, supportive government policies, and changing consumer preferences. Despite the rapid growth of EVs since 2010, challenges like charging infrastructure, range anxiety, and initial costs persist.

Using data science tools such as predictive modeling, machine learning, and time series analysis, this study aims to analyze historical EV sales data (2010-2020) and predict future trends up to 2030. Data for this study is sourced from Kaggle and the IEA Global EV Data Explorer, focusing on prominent countries like the United States, China, Germany, and Norway. This research provides valuable insights for stakeholders to navigate the evolving EV market.

Problem Statement:

The global transition to electric vehicles (EVs) is reshaping the automotive industry, driven by environmental concerns, technological advancements, and supportive policies. However, this shift presents several challenges and opportunities that need to be understood and addressed. Specifically:

1. **Identifying Trends:** There is a need to analyze historical EV sales data to identify key trends and patterns that have emerged since 2010. Understanding these trends will provide insights into the factors that have influenced EV adoption rates globally.
2. **Predicting Future Sales:** Accurate prediction of future EV sales is crucial for stakeholders, including automakers, policymakers, and investors. This requires the application of advanced data science techniques, such as predictive modeling and machine learning, to forecast sales trends up to 2030.
3. **Evaluating Influencing Factors:** It is important to assess how technological advancements, government policies, market dynamics, and consumer preferences impact EV adoption. Analyzing these factors will help in understanding the drivers and barriers to the widespread adoption of EVs.

Aim of the Project:

By addressing these areas, the research aims to provide a comprehensive understanding of the EV market dynamics and support strategic decision-making for the future of electric mobility. This study leverages datasets from Kaggle and the IEA Global EV Data Explorer, focusing on key countries with significant EV adoption to provide valuable insights and predictions.

Objectives of the Project:

1. Analyze Historical Trends: Examine global EV sales data from 2010 to 2020 to identify key trends and factors influencing growth.
2. Predict Future Sales: Develop predictive models using machine learning and time series analysis to forecast EV sales trends up to 2030.
3. Evaluate Influencing Factors: Assess the impact of technological advancements, government policies, market dynamics, and consumer preferences on EV adoption.
4. Provide Strategic Insights: Offer recommendations for 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, focusing on major markets.
2. Technological Advancements: Assess impacts of battery, charging, and vehicle design improvements.
3. Government Policies: Evaluate the influence of policies, incentives, and regulations.
4. Market Dynamics: Understand consumer preferences and economic factors.
5. Predictive Modeling: Develop models to forecast EV sales trends up to 2030.

Expected Contribution of the Project:

1. Insights into EV Market Trends: Provide a detailed analysis of global EV sales trends from 2010 to 2020, highlighting key factors that have driven growth in prominent markets like the United States, China, Germany, and Norway.
2. Future Sales Predictions: Develop predictive models to forecast EV sales trends up to 2030, offering valuable projections that can guide stakeholders in the automotive industry.
3. Impact Analysis: Assess the influence of technological advancements, government policies, and market dynamics on EV adoption, providing a comprehensive understanding of the drivers and barriers in the EV market.
4. Strategic Recommendations: Offer actionable insights and recommendations for automakers, policymakers, and investors, supporting informed decision-making and strategic planning for the future of electric mobility.

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

- ☒ 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: LIAO XIUYA

LIAO XIUYA
Signature

16 November 2024
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:

Blank lined area for writing the proposal.

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Name of Evaluator 1:

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Signature

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Date

Name of Evaluator 2:

.....

Signature

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Date