MACHINE LEARNING BASED VEHICLE PERFORMANCE ANALYSER

Nalaiya Thiran

Professional Readiness for **Innovation, Employability & Entrepreneurship**

A Project Report

Submitted by

NASIIRUDIN.AS (311419106017)
NAVEEN BALAN.S (311419106018)
MOHAMEDRAHMATHULLAH.M(311419106015)
MUKESH KUMAR .M (311419106016)

in partial fulfillment for the award of the degree of

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in

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MEENAKSHI COLLEGE OF ENGINEERING,

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ANNA UNIVERSITY: CHENNAI 600 025

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FACULTY MENTOR	FACULTY EVALUATOR
R.ANANDHA PRABA	D.SATHEESWARI

LITERATURE SURVEY

1. MACHINE LEARNING BASED MISBEHAVIOUR DETECTION SYSTEM FOR VEHICULAR NETWORKS (2022)

Introduction:

The emergencen of fifth generation ofmobile communications networks(5G) has brought tecnological revolution.it provides ultra low latency,ultra reliability,high bandwidth and large area coverage. As a part of vission of 5G, v2X communication are tremendous advances. it can lead to hazardous situation for drivers and passengers. these issues have been taken special attention by research communities since early research investigation of v2x

Machine learning has recently emerged a key enabler of intelligence for our future networks. In addition machine learning algorithm has already proven success in areas of network security.

ADVANTAGES:

1. Significant progress has been made towards deploying Vehicle-to-Everything (V2X) technology.

2. Integrating V2X with 5G has enabled ultra-low latency and high-reliability V2X communications.

3. Many V2X Misbehavior Detection Systems (MDSs) have adopted this paradigm. Yet, analyzing these systems is a research gap, and developing effective ML-based MDSs is still an open issue.

DISADVANTAGES:

1. Additional Cost in misbehaviour detection system.

2. Broadcast Distance is low in vehicular networks.

3. Battery drain and device overheating for networks.

4. Upload speeds will consume more data.

5. Coverage issues in Rural areas.

CORRESPONDING AUTHOR:

F. Sakir and S. Sen.

Literature survey

2. A General machine - Learning Framework for On-Road Vehicle Recognisation and tracking. (2010)

Introduction:

WORLDWIDE automotive accidents injure between 20 and 50 million people each year, and at least 1.2 million people die as a result of them. Between 1% and 3% of the world's domestic product is spent on medical care, property damage, and other costs that are associated with auto accidents . As a result, over the years, there has been great interest in the development of active safety systems among vehicle manufacturers, safety experts, and academics.

The design of active safety systems presents many difficult challenges. A key requirement of active safety systems is that they accurately, reliably, and efficiently identify dangerous conditions . Often, we would like an active safety system to help avoid collisions by detecting lane departures , pedestrians , or other vehicles .

It is widely recognized that computer vision is a critical technology for the development of intelligent vehicles

Advantages:

1. Using a vehicle tracking device can help you to circumnavigate these obstacles.

2. Fuel accounts for the highest expense in utilizing a vehicle,

3. There are numerous fleet businesses in India today. And the competition between them is very tight.

Disadvantages:

1. Poor performance under bad pavement conditions on recognization and tracking.

2.Installation personnel safety issues are occurred.

3.Requires multiple detectors for a location tracking.

4. Water penetration affects performance of vehicle.

5. Extensive effort for installation.

CORRESPONDING AUTHOR:

Y.Cao, A.Renfrew, and P. Cook

LITERATURE SURVEY

3. MACHINE LEARNING BASED VEHICLE INTERNAL COMBUSTION ENGINE CONTROL (2021)

Introduction:

Analysis of state-of-the-art machine learning (ML) techniques to address the existing challenges in ICE perfor- mance, optimization, and controlis the focus of this paper. To this end, the paper includes review of models that can be used for real-time engine control and optimization. Thus, detailed Computational Fluid Dynamics (CFD) models or the ML methods for engine design is outside the scope of this paper. The focus of the paper will be mainly on review of ML methods for realtime performance optimization, onboard combustion diagnosis, and control of ICEs via data-driven and grey-box ML approaches.

The first and the second waves of artificial intelligence (AI) started in 1970s and 2000s respectively, but we are now amid the third and the largest wave of AI [43]. This is partially due to the recent progress in ML techniques, computing power, and the availability of extremely large sets of information.

Advantages:

Internal combustion engines have several advantages over external combustion engines. Because the fuel burns directly in the cylinder of the internal combustion engine, the heat loss is smaller, the thermal efficiency is higher, and fuel consumption is lower.

Disadvantages:

1.Variety of fuels that can be used is limited to very fine quality gaseous and liquid fuel.

2.Fuel used is very costly like gasoline or diesel.

3.Engine emissions are generally high compared to external combustion engine.

4.Not suitable of large scale power generation.

CORRESPONDING AUTHOR:

Masoud Aliramezani,Charles

Robert koch,Mahdi shahbakhti

Literature survey

4. A Reliable Sensor Network Infrastructure for Electric Vehicles to Enable Dynamic Wireless Charging Based on Machine Learning (2022)

Introduction:

Electric are gaining popularity in the recent past, due to the environmental change and energy crisis in the world, as an alternative source of transportation. EV(s) are very friendly to the environment, because of its free pollution nature. Developed countries in the world such as China, United Kingdom, and USA take initiatives to resolve the energy crisis in the world with an alternative technology.

To design new improved techniques for EV(s) charging are greatly emphasized on the management of different elec- trical machines, such as induction machine, magnet syn- chronous machine and switch reluctance machines

Advantages:

1.Unlimited mobility and no recharging hassles.

2.Due to dynamic and static energy transfer.

3.Applicable to all types of vehicles.

4.One technology for slow- and high-speed charging.

5.Safe, invisible and tamper-proof.

6.High power, high efficiency and cost-effective.

7.Low installation and maintenance requirements.

Disadvantages:

Firstly, negative mutual inductance between adjacent transmitter coils could generate negative current stress when several transmitting coils are supplied simultaneously. Secondly, design cost will be increased with many transmitting coils in a given length of the track.

CORRESPONDING AUTHOR:

Tae-Sun Chung

Muhammad Adil

LITERATURE SURVEY

5.Predicting Vehicle Usage Using Incremental Machine Learning (2022)

INTRODUCTION:

Today, there is an ongoing transition to more sustainable transportation, and an essential part of this transition is the switch from combustion engine vehicles to battery electric vehicles (BEVs). BEVs have many advantages from a sustainable perspective, but issues such as limited driving range and long recharge times slows down the transition from combustion engines. One way to mitigate these issues is by performing battery thermal preconditioning, which increases the energy efficiency of the battery.

The sensitivity analysis shows that the battery thermal preconditioning requires more precise predictions. The performance of the battery thermal preconditioning is sensitive, as the energy that can be saved from accurate predictions is less than what may be lost by adapting the preconditioning to incorrect predictions.

ADVANTAGES:

A significant improvement in forecasting the travel distance when the driving behavior is tied to a specific travel behavior pattern is found.

Trip distance is an important factor when deciding whether battery thermal preconditioning will be beneficial.

The novelty in their work is that they considered charging at more places than at home.

DISADVANTAGES:

Do not attempt to implement or optimize a battery thermal preconditioning strategy in this work, rather, we simulate an already existing strategy developed by Cars.

The aim is to investigate whether it is plausible to predict vehicle usage using incremental learning will not be considered.

External factors such as road conditions and local events may affect the driving behavior of a particular trip will not be considered as an information.

CORRESPONDING AUTHOR:

Tobias Lindroth

Axel Svensson.

LITERATURE SURVEY

6.Modeling Freight Vehicle Type Choice using Machine Learning and Discrete Choice Methods (2022)

INTRODUCTION:

The choice of vehicle type is one of the important logistics decisions made by firms. The complex nature of the choice process is because of the involvement of multiple agents. This study employs a random forest machine learning algorithm to represent these complex interactions with limited information about shipment transportation. The data are from Commercial Travel Surveys with information about outbound shipment transportation. This study models the choice among four road transport vehicle types: pickup/cube van, single-unit truck, tractor trailer, and passenger car. The characteristics of firms and shipments are used as explanatory variables. SHAP-based variable importance is calculated to interpret the importance of each variable, and shows that employment and weight are the most important variables in determining the choice of vehicle type. The random forest model is also compared with the multinomial and mixed logit models. The model prediction results on the validation data are compared.

ADVANTAGES:

Machine learning algorithms have been used to model freight mode choice.

This study develops a vehicle type choice model using a random forest (RF) machine learning algorithm.

It helps in the transportation-related domain show that RF has better prediction accuracy than other machine learning algorithms.

DISADVANTAGES:

The pattern is unclear for pickup/cube van and single-unit truck.

A longer tail to the right side but not to the left side for weight shows that extreme values of weight can significantly increase the chance of tractor trailer selection but cannot significantly reduce the chance of selection.

An increase in number of trees generally results in a decrease in error.

CORRESPONDING AUTHOR:

Usman Ahmed

Matthew J.Roorda

LITERATURE SURVEY

7.Intelligent Systems Using Sensors (2022)

INTRODUCTION:

Worldwide, the persistent trend of human and animal life losses, as well as damage to properties due to wildlife–vehicle collisions (WVCs) remains a significant source of concerns for a broad range of stakeholders. Our study combines a systematic review with bibliometric analysis.

Future research directions identified include the design and development of algorithms for real-time animal detection systems. The latter provides a rationale for the applicability of our proposed solutions, for which we designed a continuous product development lifecycle to determine their feasibility.

The Wildlife study shows that unpaved roads recorded less WVCs than paved roads. High numbers of WVCs were both in hot and wet seasons, while cold and dry seasons experienced the lowest numbers. In February 2012, researchers recorded 470 animal mortality rates due to WVCs in just two fortnights in South Africa. Birds had the highest numbers, followed by reptiles, mammals, and amphibians. Roadkill and WVCs also happen in other parts of Africa, such as Tanzania. In 2015, John Kioki et al. Recorded a death rate of 3% for domestic animals and 97% for wildlife due to WVCs. Their research findings show that roads are a potential threat to wildlife in East Africa. Massive units with various components such as weights, activation functions, and backward and forward neurons connections to handle the vanishing gradient problem, which a very deep CNN would likely fail to address.

ADVANTAGES:

It helps to analyze negative factors that influence WVCs, such as human behaviors, animal behaviors, road features, and climatic changes.

The Applicability and feasibility of the proposed solutions to existing damaged roads, accident car collisions, humans, animals, and the environment.

It helps to design a continuous product development lifecycle to help engineering teams determine the feasibility of the proposed solutions.

DISADVANTAGES:

The traditional approaches are limited and are not always possible with steep rocky slopes and deep snowpack.

The negative factors contributing that act as features when developing intelligent systems which prevent WVCs.

Because of these limitations, other systems have received much attention.

CORRESPONDING AUTHOR:

Irene Nandutu,

MarcellinAtemkeng

LITERATURE SURVEY

8.Predicting Gasoline Vehicle Fuel Consumption in Energy and Environmental Impact Based on Machine Learning (2022)

INTRODUCTION:

The underestimation of fuel consumption impacts various aspects. In the vehicle market, manufacturers often advertise fuel economy for marketing. In fact, the fuel consumption reference value provided by the manufacturer is quite different from the real-world fuel consumption of the vehicles. The divergence between reference fuel consumption and real-world fuel consumption also has negative effect on the aspects of policy and environment. In order to effectively promote the sustainable development of transport, it is urged to recognize the real-world fuel consumption of vehicles. The gaps in previous studies includes small sample size, single data dimension, and lack of feature weight evaluation.

According to the relative weight of each factor in the most optimal model, the three most important factors are brake and accelerator habits, engine power, and the fuel economy consciousness of vehicle owners in sequence.

ADVANTAGES:

It is worth noting that strong correlation between climate features often leads to multicollinearity, so we conducted a correlation coefficient test on the input climate features.

Vehicle owners chose less stop-go, more unblocked road in the past year.This is seen as better driving habits.

The real-world fuel consumption rate with the corresponding driving behavior information and climate information is used as input variables in our models.

DISADVANTAGES:

Random forest regression averages multiple decision trees based on bagging algorithm and can significantly reduce variance to improve overfitting.

Linear regression cannot capture a nonlinear relationship.

Fuel consumption forecast is a continuous variable forecast, where regression models should be applied.

CORRESPONDING AUTHOR:

Yushan Yang,

Nuoya Gong.

LITERATURE SURVEY

9.MACHINE LEARNING IN VECHICLE CONTROLLER AREA NETWORK (2021)

INTRODUCTION:

Communication between the notes in a vehicle is performed using many protocols. The most common these is known as the Controller Area Network (CAN). The functionality of the CAN protocol is based on sending messages from one node to all others throughout a bus. The most existing work focuses on the physical aspects without taking into consideration the data itself. Machine Learning (ML) Tools, especially classification techniques, have been widely used to address similar problems. The paper provides a comparative study of the most common ML techniques. The results show that the techniques under consideration in this paper outperform other techniques that have been used previously

Recently, a considerable amount of research has focused on vehicle communication technology, such as smart vehicles, Vehicular ad hoc Networks (VANET) and Intelligent Transportation Systems (ITS). Vehicles are necessary for daily life, and they are becoming more electronically equipped and are on longer simple mechanical machines. Electronic Control Units (ECUs) are used in vehicles to monitor and control different components.

ADVANTAGES:

The best performance is given with impersonation attacks due to the support included in the dataset.

The first comparison is based on attack type, and the second is an overall comparison with well- known methods.

The process of labelling has been performed by executing prepossessing according to the data set description given.

DISADVANTAGES:

The result of experimental study can only be performed with data sets.

The values are underlined and the out performance of RF Classified can only be suitable in context of intrusion detection for CAN based in vehicle networks.

The explored research space yields results comparable to the neural network techniques.

CORESPONDING AUTHOR :

Abdulatif Alabdulat

LITERATURE SURVEY

10. Machine Learning Based Vehicle to Grid Strategy for Improving the Energy Performance of Public Buildings (2020)

INTRODUCTION:

Carbon neutral buildings are dependent on effective energy management systems and harvesting energy from unpredictable renewable sources. One strategy is to utilise the capacity from electric vehicles, while renewables are not available according to demand. Vehicle to grid (V2G) technology can only be expanded if there is funding and realisation that it works, so investment must be in place first, with charging stations and with the electric vehicles to begin with. The installer of the charging stations will achieve the financial benefit or have an incentive and vice versa for the owners of the electric vehicles. The paper presents an effective V2G strategy that was developed and implemented for an operational university campus.

ADVANTAGES:

An effective V2G scheme has been developed and implemented into an operational university building, enabling it to be used on a larger scale.

Application of machine learning (ML) for predicting energy consumption and cost have also been conducted.

The energy demand is low, the EVs can be charged, as the electricity can be bought from the grid.

DISADVANTAGES:

Surrounding the growth of EVs and V2G systems, there is some uncertain for both the driver and the building which is a problem.

EV chargers must be installed, and there must be a return on investment.

The replicability of the V2G method is dependent on available space for EV chargers, energy characteristics of the building, initial investment and storage techniques.

CORRESPONDING AUTHOR:

Connor Scott

Mominul Ahsan

Ideation Phase
Define the Problem Statements

Date	15 October 2022
Team ID	PNT2022TMID27734
Project Name	Project – Machine learning by Vehicle Performance Analyser
Maximum Marks	2 Marks

Customer Problem Statement Template:

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

Example:

Problem Statement (PS)	I am (customer)	I'm trying to	but	Because	Which makes me feel
PS-1	Traveller	Reach the desired destination	Engine get ceased	Of overheating of engine	frustrated
PS-2	Delivery boy	Reach destination on time	There is high fuel consumption	Low mileage	Sad
PS-3	Racer	Attain my top speed	My straight line speed is not performing well	Of low efficient engine construction	disatisfied
PS-4	Cab drivers	Charge my car	No charging station around here	Of Low battery performance	Angry

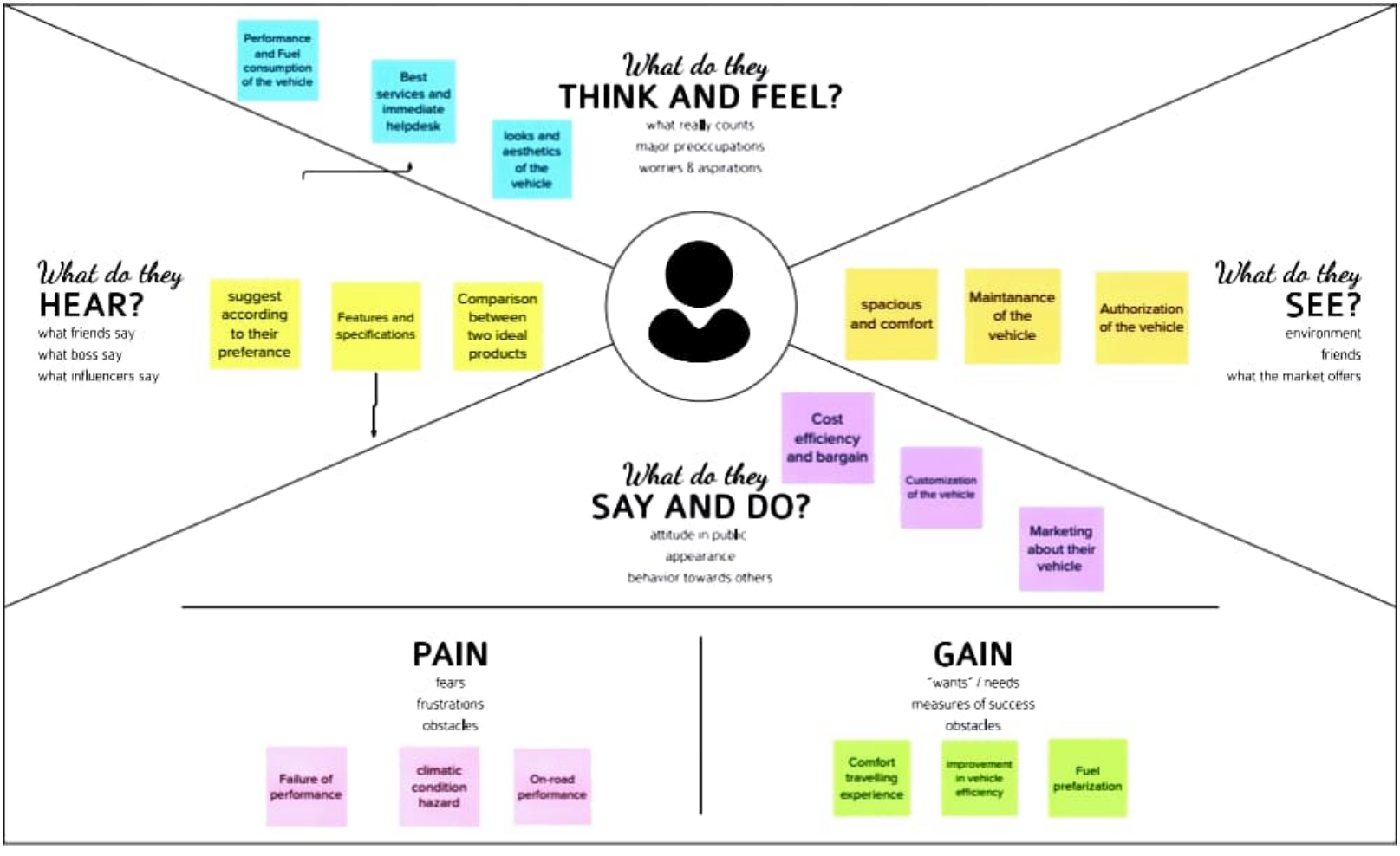

Vehicle Performance Analyser
Brainstorm & idea prioritization
To get an ideal Vehicle that meets your everyday needs with Good Performance
Install RPM Limiters
Weight Reduction
Check For Adequate Air Pressure
Fuel Injector Installation
Customized ECU Tuning
Bigger Bore Kit with Custom Made Piston
Free Flow Exhaust with Custom made Headers
Installing a Bigger Air Intake
CONCLUSION
Importance
Feasibility

Empathy Map Canvas

Gain insight and understanding on solving customer problems.

1

Build empathy and keep your focus on the user by putting yourself in their shoes.

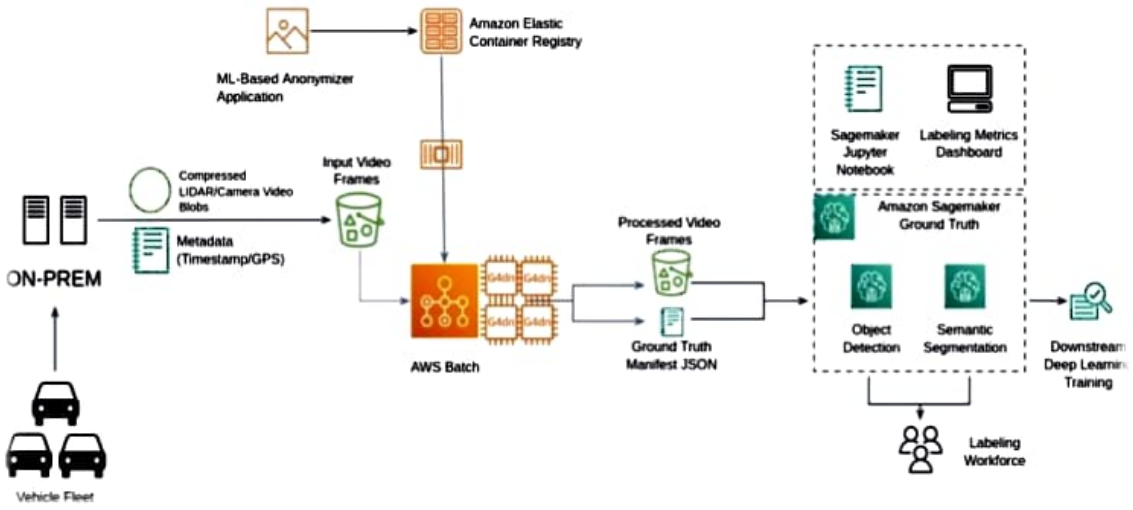


Project Design Phase-I
Solution Architecture

Date	15 October 2022
Team ID	PNT2022TMID27734
Project Name	Project – Machine Learning by Vehicle Performance Analyser
Maximum Marks	4 Marks

Solution Architecture:

1. Safe Drive, a dynamic driver profile (DDP) using a hybrid recommendation system that enables accurate prediction of accidents beforehand, and also minimizes the complexity of on-road vehicles and latency due to fog/cloud computing servers is proposed.
2. If the rider is found to be not wearing a helmet then his or her number plate will be scanned and stored in the fine database, from where a fine will be generated based on the vehicle registration number that has been captured by the surveillance camera



Project Design Phase-I
Proposed Solution

Date	15 October 2022
Team ID	PNT2022TMID27734
Project Name	Project – Machine Learning by Vehicle Performance Analyser
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Vehicle performance is the study of the motion of a vehicle. The motion of any vehicle depends upon all the forces and moments that act upon it
2.	Idea / Solution description	To improve the vehicle's performance efficiency, it is critical to analyse the factors using a variety of well-known machine learning algorithms such as linear regression, decision tree, and random forest.
3.	Novelty / Uniqueness	These algorithms helps us tracking of emission reduction, market globalization, geolocation, mobility as a service.
4.	Social Impact / Customer Satisfaction	Customers believe that the more they know about their vehicle, the level of impact increases accordingly as the above mentioned algorithms help them understand the cons and pros of the vehicle. With the help of this, the driver safety is improved and the service alerts provides better driving experience.
5.	Business Model (Revenue Model)	It plays a vital role in maintaining the efficiency of the vehicle and also in saving the environment from global warming it has a greater impact on the competitive business world.
6.	Scalability of the Solution	The system will analyse the performance of the vehicle and also gives periodic service alerts, when performance of the vehicle degrades. Multiple users can also access the system at same time, it processes the results without any delay.

Project Title: Machine learning based vehicle performance analyser

Project Design Phase-I - Solution Fit Template

Team ID: PNT2022TMID27734

Define CS, fit into CC

1. CUSTOMER SEGMENT(S)

CS

The customer was an young person(normal person)

6. CUSTOMER CONSTRAINTS

CC

The constraints based on the time ,scope and cost limit the customer choices and solution.

5. AVAILABLE SOLUTIONS

AS

Because of over heating of engine the bike performance gets low and uncomfort to drive
The customer tries many way in the local market .
It can be rectified by the service centers as they see quality and promise of the vehicle.

Explore AS, differentia

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEM

J&P

Clutch failure and over heating of engine.

9. PROBLEM ROOT CAUSE

RC

The customer did not change the oil at estimated time because they have these type of problems.

7. BEHAVIOUR

BE

The customer address the problem by their own or visits the nearby service centers

Focus on J&P, tap into BE, understand RC

3. TRIGGERS

TR

These problems occurs most frequently and makes customer angry.

10. YOUR SOLUTION

SL

Good service makes better and improved performance.

8. CHANNELS of BEHAVIOUR

CH

8.1 ONLINE

The customers can understand what sort of problem they have.

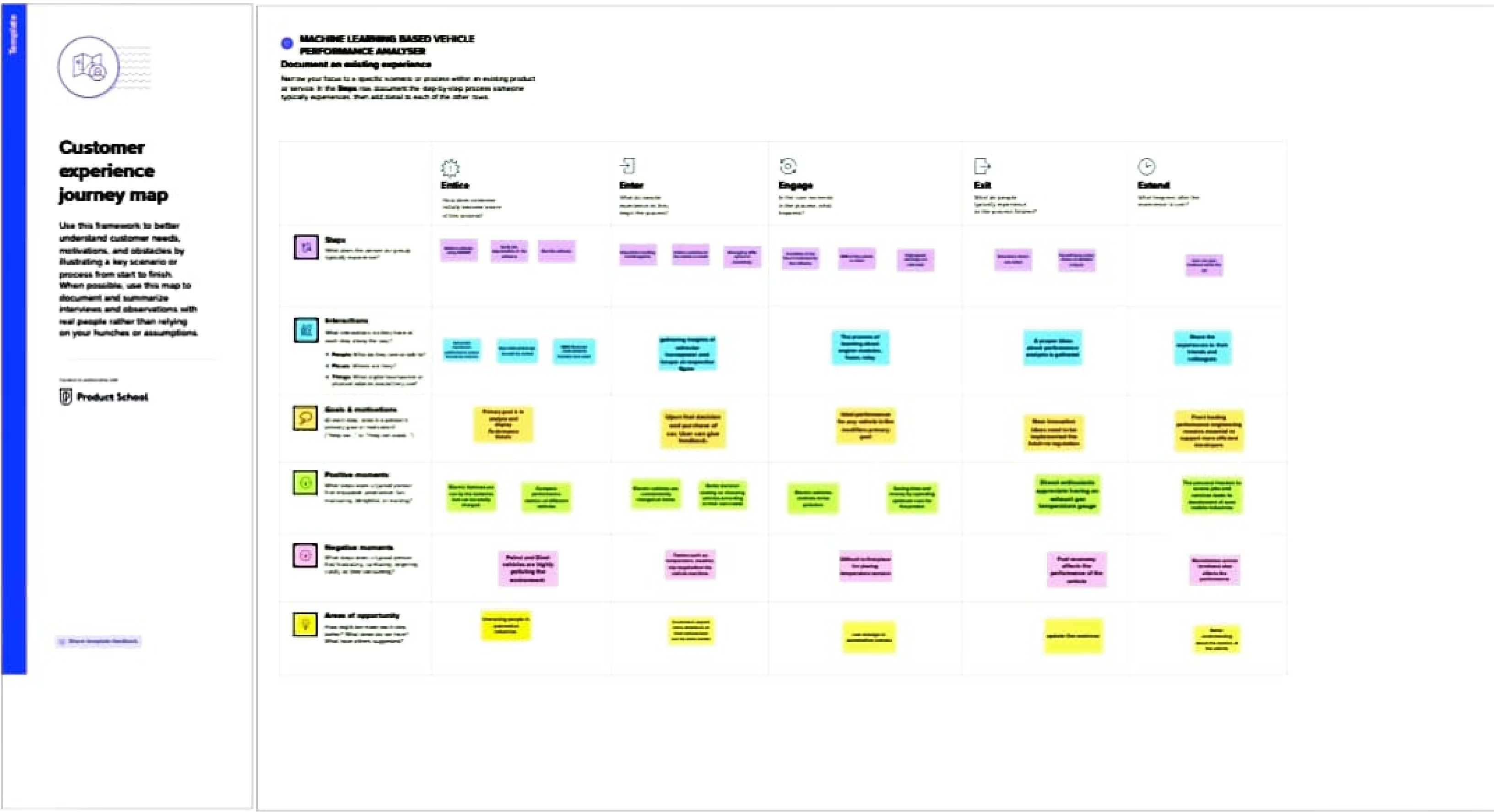
8.2 OFFLINE

The customers should reach the nearby service center to rectify their problems.

4. EMOTIONS: BEFORE / AFTER

EM

The customer lost his confident while driving in roads and highways.


Template
Customer experience journey map
Use this framework to better understand customer needs, motivations, and obstacles by illustrating a key scenario or process from start to finish. When possible, use this map to document and summarize interviews and observations with real people rather than relying on your hunches or assumptions.
Product School
MACHINE LEARNING BASED VEHICLE PERFORMANCE ANALYSER
Document an existing experience
Entice
Enter
Engage
Exit
Extend
Steps
Interactions
Goals & motivations
Positive moments
Negative moments
Areas of opportunity
Petrol and Diesel vehicles are highly polluting the environment
Fuel economy affects the performance of the vehicle
A proper idea about performance analysis is gathered
Share the experiences to their friends and colleagues
Diesel enthusiasts appreciate having an exhaust gas temperature gauge
update the customer

Project Design Phase-II Technology Stack (Architecture & Stack)

Date	18 October 2022
Team ID	PNT2022TMID27734
Project Name	Project - Machine Learning Based Vehicle Performance Analyzer.
Maximum Marks	4 Marks

Technical Architecture:

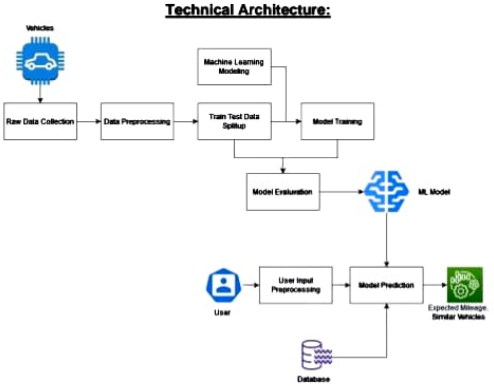


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user interacts with the application through a Web Application that is responsive to the device that is being used.	React Js
2.	Get User Data	The process collects the user input data that is collected via a form to the server as a JSON Object	REST API
3.	Model Prediction	Use the data collected from the user to make predictions on the mileage expected.	IBM Watson ML
4.	Send User Report	Send the predictions along with suggestions to the user as JSON Object	REST API
5.	Database	Database contain user information such as name, email, vehicle basic information, mileage predicted over time.	MySQL
6.	Cloud Database	Database Service on Cloud	IBM DB2
7.	External API-1	Vehicle Details Database	https://api.auto-data.net/
8.	Machine Learning Model	The machine learning model is used to predict mileage from the user inputs	Regression Modelling.
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Core i5, 8GB RAM Cloud Server Configuration :	Local, Docker

Table 2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	React Js, Flask, Sci-kit Learn	Java script, Python
2.	Security Implementations	Identity and Access Management, OAUTH, WAF	IBM Cloud
3.	Scalable Architecture	3 Tier Architecture, Model-View-Controller implementation.	Model - SQL DB, View - ReactJS, Controller - Flask Server
4.	Availability	Proxy servers, Load Balancers to help balance traffic among servers to help improve uptime	IBM Cloud load balancers
5.	Performance	The front end is detached from the Business logic server reducing requests sent to the server.	Nginx proxy

Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	17 October 2022
Team ID	PNT2022TMID27734
Project Name	Project – Machine Learning by Vehicle Performance Analyser
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Customer Test Drive	Driving certificates should be assured to the dealer
FR-4	User Identification	Personal documents should be verified by the dealers for safety purpose.
FR-5	Vehicle data collection	Customer input information are saved in form and sends the data to the authorized company

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

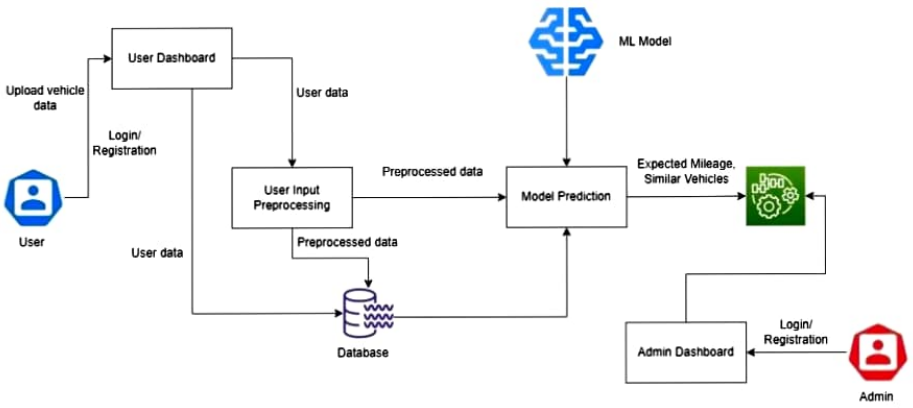
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The knowledge about the performance of the vehicle can be known through its frequent use.
NFR-2	**Security**	Protects against all forms of theft and tracking of vehicle using OWASP software.
NFR-3	**Reliability**	Regular measure should be taken in order to attain better performance so, the vehicle last for long term.
NFR-4	**Performance**	Better maintanace of the engine gives better results.
NFR-5	**Scalability**	This supports not only for cars but for all vehicles.

Project Design Phase-II
Data Flow Diagram & User Stories

Date	17 October 2022
Team ID	PNT2022TMID27734
Project Name	Project – Machine learning based vehicle performance analyser
Maximum Marks	4 Marks

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard					
Administrator			As an admin, I can log into the application by entering email & password	I can access my admin dashboard	High	Sprint-1

Project Planning Phase
Milestone and Activity List

Date	27 October 2022
Team ID	PNT2022TMID27734
Project Name	MACHINE LEARNING BASED VEHICLE PERFORMANCE ANALYSER.

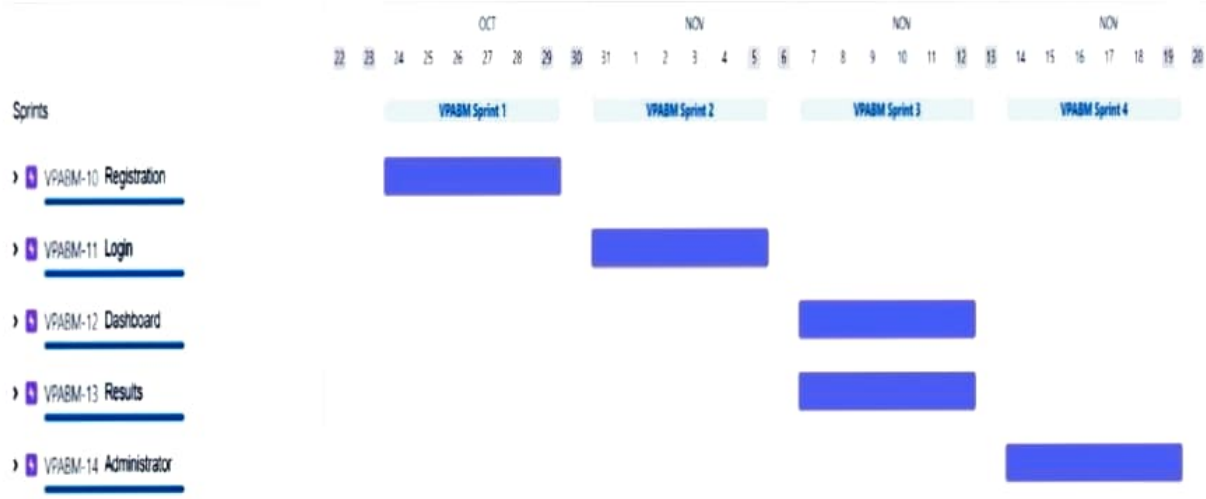
TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project & gathering information by referring the, technical papers,research publications etc.	19TH SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture the user Pains & Gains, Prepare list of problem statements	15TH OCTOBER 2022
Ideation	List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	19TH OCTOBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	21ST OCTOBER 2022
Problem Solution Fit	Prepare problem - solution fit document.	21ST OCTOBER 2022
Solution Architecture	Prepare solution architecture document.	21ST OCTOBER 2022
Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences with the application (entry to exit).	18th OCTOBER 2022
Functional Requirement	Prepare the functional requirement document.	18TH OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams and submit for review.	18TH OCTOBER 2022
Technology Architecture	Prepare the technology architecture diagram.	18TH OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity list of the project.	27TH OCTOBER 2022
Project Development - Delivery of Sprint-1, 2, 3 & 4	Develop & submit the developed code by testing it.	IN PROGRESS..

PROJECT PLANNING PHASE

ROAD MAP

Date	01 November 2022
Team ID	PNT2022TMID27734
Project Name	Vehicle Performance Using Machine Learning
Marks	2 marks

WEEKLY PROGRESS



MONTHLY PROGRESS

PROJECT PLANNING PHASE

PROJECT PLANNING TEMPLATE (product backlog, sprint planning, stories, story points)

Date	20 October 2022
Team ID	PNT2022TMID27734
Project Name	Project – Machine learning based vehicle performance analyser
Maximum Marks	8 Marks

PRODUCT BACKLOG, SPRINT SCHEDULE AND SPRINT ESTIMATION: (4 MARKS)

use the below template for product backlog and sprint schedule:

sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Priority	Story point	Team members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	High	3	NASIIRUDIN A.S
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	High	3	NASIIRUDIN A.S
Sprint-2		USN-3	As a user, I can register for the application through Gmail	Low	1	MOHAMED RAHMATHULLAH M
Sprint-2	Login	USN-4	As a user, I can log into the application by entering email & password	Medium	3	MOHAMED RAHMATHULLAH M
Sprint-2		USN-5	As a user, I can login by other sources	High	2	MOHAMED RAHMATHULLAH M
Sprint-3	Dashboard	USN-6	As a user I can view and access the dashboard.	Low	3	NAVEEN BALAN S
Sprint-3	Results	USN-7	As an user I can get output for vehicle performance.	High	2	NAVEEN BALAN S
Sprint-3		USN-8	As a user, I can decide to consult the authorized dealer.	Medium	1	NAVEEN BALAN S
Sprint-4	Administrator	USN-9	As an admin, I can log into the application by entering email & password	High	3	MUKESH KUMAR M

PROJECT TRACKER, VELOCITY & BURNDOWN CHART: (4 MARKS)

SPRINT	TOTAL STORY POINTS	DURATION	SPRINT START DATE	SPRINT END DATE	STORY POINTS COMPLETED (AS ON PLANNED END DATE)	SPRINT RELEASE DATE (ACTUAL)
Sprint 1	20	6 days	24th October 2022	29th October 2022	20	29th October 2022
Sprint 2	20	6 days	31th October 2022	5th October 2022	20	5th October 2022
Sprint 3	20	6 days	7th November 2022	12th November 2022	20	12th November 2022
Sprint 4	20	6 days	14th November 2022	19th November 2022	20	19th November 2022

VELOCITY:

AV=SPRINT DURATION / VELOCITY

AV=20/6

=0.3