Project Ideation Phase
Literature Survey

Date	15 September 2022
Team ID	PNT2022TMID20562
Project Name	Project - Machine Learning based Vehicle Performance Analyzer

1. Performance of Motor Vehicle based on Driving and Vehicle Data using Machine Learning - Punith kumar

Summary: The primary objective of the research was to develop a model using machine learning techniques which precisely predicts the fuel efficiency and to propose the optimum driving style and vehicle characteristics to achieve better fuel efficiency. Machine learning techniques like Multiple Linear Regression, Support Vector Machine, Artificial Neural Network and XGBoost were chosen to develop the model and 5 different models were built. Throttle position and speed were examined with the predicted fuel efficiency to evaluate their relationship with the fuel consumption. For better insights and recommendations to mitigate fuel consumption, Analysis on mass air flow rate, intake air temperature and other vehicle characteristics with the predicted fuel efficiency is also carried out.

2. Machine Learning Based Real-Time Vehicle Data Analysis for Safe Driving Modeling
- Pamul Yadav, Sangsu Jung, Dhananjay Singh

Summary: This paper identifies a necessity to evaluate the Meta features of vehicles which could be helpful in improving the vehicle driver's skill to prevent accidents and also evaluate the change in the quality of cars over passing time. This paper does an analysis of the vehicle data using supervised learning based linear regression model that is used as an estimator for Driver's Safety Metrics and Economic Driving Metrics. The results have proven to be approximately 80% fitting the given features and are very helpful to be used in different use cases such as a parameter in finding the driver's driving performance in a driving school, as a good estimate for finding an optimal price for a used car that can be based on several factors which we have analyzed in this paper etc.

3. Performance Analysis of Vehicle-Specific Methods and Sensors for Autonomous Vehicles

- Ernst Pucher, Andreas Gruber, Mathias Innerkofler, and Marco Buhmann

Summary: This article deals with the performance of modern sensor systems for autonomous vehicles. The examined automobile was equipped with state-of-the art sensor technology and provides a solid basis for the further close-to-production development of the increasing requirements for environmental recognition. Further, it can be said that the automotive industry and the research institutes will develop on- and off-board sensors and more powerful electronics, bringing the announced automation levels of the vehicles onto the road in the foreseeable future.

4. Automotive Performance Tests Based on Machine Learning Algorithms

- M. Geissler, J. Kunisch, C. Oikonomopoulos-Zachos and A. Friedrich

Summary: This paper suggests an innovative approach to define and perform tests in cars. The test concept requires the placement of the vehicle under test on a planar turntable in an anechoic chamber. Software-defined multimode transceiver modules, referred to as radio heads, are placed in a quarter circle or half circle around the car at an adequate distance. This setup allows flexible, realistic, reproducible and dynamic over-the-air testing of the cars in the sense of a virtual drive test. The derivation of realistic test cases via a machine learning (ML) approach is used instead of attempting to create a 1:1 mapping of real scenarios into the test chamber, i.e. use ML to identify and classify critical test cases via analysis of key performance indicators (KPI) of test data and from this create representative synthetic test cases.