VEHICLE PERFORMANCE ANALYZER

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INTRODUCTION:

Predicting the performance level of cars is an important and interesting problem. The main goal of the current study is to predict the performance of the car to improve certain behavior of the vehicle. This can significantly help to improve the system's fuel consumption and increase the efficiency.

The performance analysis of the car based on the engine type, no of engine cylinders, fuel type and horsepower etc.These are the factors on which the health of the car can be predicted. It is an on-going process of obtaining, researching, analyzing and recording the health based on the above three factors.

The performance objectives like mileage, dependability, flexibility and cost can be grouped together to play a vital role in prediction engine and engine management system. This approach is the very important step towards understanding the vehicles performance.

LITERATURE SURVEY:

[1] Automotive Performance Tests Based on Machine Learning Algorithms

Authors:

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Abstract:

This paper suggests an innovative approach to define and perform tests of communication systems 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 communication systems in the sense of a virtual drive test. One key topic - which is still open - is the definition of sufficiently realistic test scenarios related to real outdoor scenarios. The full description of those scenarios would require a prohibitively large number of parameters from the network and the channel to be considered, making it impractical to perform this derivation following a classical straight-forward approach. Therefore, this paper suggests the derivation of realistic test cases via a machine learning (ML) approach: instead of attempting to create a 1:1 mapping of real scenarios into the test chamber, we propose to use ML to identify and classify critical test cases via analysis of key performance indicators (KPI) of test data and from this to create representative synthetic test cases. This approach is currently under development and open for discussion here.

[2] Performance of Motor Vehicle based on Driving and Vehicle Data using Machine Learning

Authors:

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- Punith Kumar, Dublin, National College of Ireland**.**

Published on: 2020, Masters thesis, Dublin, National College of Ireland.

Abstract:

With the increasing population demographics and the dependency of man on motor vehicles as the primary source of transportation, the number of motor vehicles being registered for commercial as well as non-commercial activities on a daily basis is massive and yet continues to increase at an alarming rate. This has a direct and an unambiguous effect on the amount of fossil fuels being utilized globally and its subsequent environmental effects, which is of great concern in the present situation. Several attempts from various research sectors are ongoing in order to overcome this global issue and promising results are expected. This project is one such attempt at identifying the performance of small passenger cars in terms of fuel efficiency and map them with factors affecting it using machine learning techniques. The commencing activity while carrying out any such research activity will be the identification of the problem and all its possible sources. In this case, two potential sources can be identified and they are; the vehicle characteristics and the driver/driving behaviour. The relevant data for this analysis was taken from the public source, Kaggle which is the data collected from the OBD of the car and models are built using techniques like Multiple Linear Regression, XGBoost, Support Vector Machine and Artificial Neural Network and their performance is compared to discover the first-rate technique in predicting the fuel efficiency and to propose the optimum driving behaviour in terms of throttle position to achieve better fuel efficiency. The results reveal that XGBoost model outperforms all other models developed in predicting the fuel efficiency for the different split ratios evaluated and comparing the throttle position with the predicted fuel efficiency explains that to achieve better fuel efficiency the throttle position must be around 70 to 80 on a scale of 100, referred

to as full throttle position. The knowledge discovered from the research could be used by car manufacturers to design cars in future to mitigate the fuel consumption.

[3] Transmission system performance analysis of traditional power vehicle

Authors:

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Published on: 2020, Masters thesis, Dublin, National College of Ireland.

Abstract:

Based on simulation software GT-drive, the author analyzed the transmission system performance of a passenger car with diesel engine and provided the appropriate research methods. Firstly, the numerical simulation model of a vehicle was built based on vehicle weight, frontal area, rolling, air-drag coefficient, etc. The different matching schemes were simulated and compared. The results show that, for a given engine, using different transmission systems, the matching efficiency is significantly different. In view of power and economy of the vehicle, it is important that selected suitable power transmission device. This method has provided a theoretical basis for studying traditional power vehicle, also giving some information to study the new type vehicle power train system.

[4] Steering performance simulation of three-axle vehicle with multi- axle dynamic steering

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Published on: 2008 IEEE Vehicle Power and Propulsion Conference

Abstract:

Because three-axle heavy-vehicle with front-wheel steering has big radius at low speed and bad stability at high speed, in order to improve heavy vehicle steering performance at different speed, the multi-axle dynamic steering technology is put forward. Selecting zero side-slip angle of mass center and proportional control strategy to control vehicle, Using MATLAB, the steering performance of the three-axle vehicle with different steering modes are simulated. The result shows that multi-axle dynamic steering can decrease the steering radius at low speed and improve vehicle stability at high speed.