MEENAKSHI COLLEGE OF ENGINEERING

B.TECH-INFORMATION TECHNOLOGY

APPLIED DATA SCIENCE

LITERATURE SURVEY

MACHINE LEARNING BASED VEHICLE PERFORMANCE ANALYZER

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INTRODUCTION:

The automotive industry is extremely competitive. With increasing fuel prices and picky consumers. Automobile makers are constantly optimizing their processes to increase fuel efficiency. The performance analysis of the car is based on the various parameters. These are the factors on which the health of the car is analyzed, improved to gain the competitive advantage. Developing such application will solve the problems in evaluation of the vehicle.

SOFTWARE USED:

- 3Ds Max
- 3D CAD
- MINITAURs
- SBOX
- SIRIUS Modular

HARDWARE USED:

- Computer
- Wheel speed sensor

PAPERS	DESCRIPTION
1.Base paper- Online Vehicle Velocity Prediction Using an Adaptive Radial Basis Function Neural Network	**1.AIM**: To improve the performance of vehicle velocity prediction strategy. **2.ABSTRACT:** In order to improve the performance of predictive energy management strategies (PEMS), a novel neural network based vehicle velocity prediction strategy (NN-VVP) was proposed. First, an online trained radial basis function neural network (RBFNN) with a fixed structure was adopted to build online vehicle velocity prediction (VVP) model. The influence of order and width of RBF-NN on the online prediction accuracy was studied in depth, it was found that RBF-NN with a fixed structure was not always suitable for the overall online prediction process. Then, by introducing a neural network structure determination method (SDM) with the Akaike Information Criterion (AIC), an adaptive RBF-NN which adjust structure in real time was designed to perform online VVP to further improve the prediction accuracy. Simulation results indicate that, the VVP strategy proposed in this paper predicts the future vehicle velocity with acceptable accuracy. Compared with the fixed structure, the RBF-NN with an adaptive structure significantly improve the prediction accuracy by approximately 63.2%, 70.4%, and 71.1%.

3.EXISTING SYSTEM: NN-VVPs are more of an offline training method, which is not always appropriate for real driving situations. Drivers have different driving habits. The driving paths, road conditions and environmental factors are also complicated and variable. This means that though the generalization performance can be improved by collecting more training samples for NN training, the training samples are still unable to guarantee to cover all driving situations.

4.PROPOSED SYSTEM: In the future work, we will carry out further research in the following aspects:

1) to find the appropriate size of training samples to balance the prediction accuracy and the calculation time limit.

2) to utilize a more advanced global optimization algorithm to obtain the optimal structure and improve the computational efficiency.

3) to consider other driving information, such as accelerator pedal, brake pedal, driving time, weather and so on, to further improve the prediction accuracy.

For that we have an idea of using a wheel speed sensor to predict the vehicle velocity performance through computer.

2.Reference paper- Intelligent Trip Modeling for the Prediction of an Origin–Destination Traveling Speed Profile	**1.AIM:** To predict the traffic information for travelling using Neural Network. **2.ABSTRACT:** Accurate prediction of the traffic information in real time such as flow, density, speed, and travel time has important applications in many areas, including intelligent traffic control systems, optimizing vehicle operations, and the routing selection for individual drivers on the road. This is also a challenging problem due to dynamic changes of traffic states by many uncertain factors along a traveling route. In this paper, we present an Intelligent Trip Modeling System (ITMS) that was developed using machine learning to predict the traveling speed profile for a selected route based on the traffic information available at the trip starting time. The ITMS contains neural networks to predict short-term traffic speed based on the traveling day of the week, the traffic congestion levels at the sensor locations along the route, and the traveling time and distances to reach individual sensor locations. The ITMS was trained and evaluated by using ten months of traffic data provided by the California Freeway Performance Measurement System along a California Interstate I-405 route that is 26 mi long and contains 52 traffic sensors. The ITMS was also evaluated by the traffic data acquired from a 32-mi-long freeway section in the state of Michigan.

3.EXISTING SYSTEM: Intelligent Trip Modeling System (ITMS), developed using machine learning for the prediction of the entire traveling speed profile of a given route at the trip starting time. The ITMS consists of two major components: the Speed Prediction Neural Network System (SPNNS) and the Dynamic Traversing Speed Profile (DTSP) algorithm. The second component, the DTSP algorithm, puts the SPNNS together with the dynamic traversing algorithm to generate the whole speed profile from the trip origin to the destination by traversing the space and time domain and calling the SPNNS with dynamic time intervals.

4.PROPOSED SYSTEM: For spot speed prediction, we developed NNs for different weekdays, different traffic congestion levels, and different prediction time periods. These NNs were trained with historic traffic data to predict traffic speed at each traffic sensor location based on the dynamic traffic information available at the trip starting time. A trip speed profile along the given route was generated by a dynamic traversing system based on the predicted short-term sensor spot speed and distances between sensors.

3.**Reference Paper-** Improving Vehicle Handling Stability Based on Combined AFS and DYC System via Robust Takagi-Sugeno Fuzzy Control	**AIM**: To identify the vehicle handling stability. **ABSTRACT**: This paper presents a robust fuzzy H∞ control strategy for improving vehicle lateral stability and handling performance through integration of direct yaw moment control system (DYC) and active front steering. Since vehicle lateral dynamics possesses inherent nonlinearities, the main objective is dedicated to deal with the nonlinear challenge in vehicle lateral dynamics by applying Takagi-Sugeno (T-S) fuzzy modeling approach. First, the nonlinear Brush tire dynamics and the nonlinear functions of longitudinal velocity are represented via a T-S fuzzy modeling technique, and vehicle parametric uncertainties are handled by the norm-bounded uncertainties.

EXISTING SYSTEM: For vehicle lateral dynamics control, it is not desirable to use too complex vehicle models due to the difficulty of designing and implementing the controller in real vehicle applications.

PROPOSED SYSTEM: We conclude that vehicle handling stability can be done using a FIXD sensor to overcheck the vehicle performance and alerting to the drivers by using an mobile phone and finally tap to scan the vehicle's stability by Bluetooth connection over the car and the mobile phone.

4.Reference Paper- Simulation for prediction of vehicle efficiency, performance, range and lifetime: a review of current techniques and their applicability to current and future testing standards	**AIM:** A Review of Current Techniques and their Applicability to Current and Future Testing Standards. **ABSTRACT:** Computer simulation tools can give early indicators of key vehicle characteristics. In traditional hybrid vehicles, this is important in designing for optimal fuel consumption; in plug-in hybrids and pure electric vehicles, it is critical for accurate prediction of range, a key market qualifier. The paper also explores the sensitivity of predictions to 'PID control' driver models, and discusses the effect of cycle-following tolerance on predictions. Finally, the paper proposes new standards – suitable for simulation or real-world testing – for a common quantification of in-use battery lifetime. **EXISTING SYSTEM:** The range, durability and longevity of automotive traction batteries are 'hot topics' in automotive engineering. Hybrid and electric vehicles need power sources that will meet consumer expectations. The phenomenon of 'range anxiety' is well known, showing how important customers feel about range. The presence of 'battery rental' schemes for electric vehicles shows another concern: consumers want their purchases to last, and find the prospect of a key, expensive com-

ponent ‘wearing out’ before its time worrying.

PROPOSED SYSTEM: We have performed parameter sensitivity analysis on drivetrain components, and found that for the NEDC combined cycle and the WLTP Class 3 cycle, results should be relatively insensitive to approximations and errors modelling regenerative braking. We have explored the sensitivity of ‘driver model’ gains used in ‘forwards models’ to follow predefined cycles, and found that if we use the Ziegler-Nichols tuning rules with P, PI and PID controllers as a starting point, the energy consumption does not change greatly in response to small variations in controller gain.