Minimising fuel consumption of vehicles as a function of path parameters

Author Names:Sagnik Choudhury, Y.V. Mahesh Kumar and Ankit Aggarwal

Published Year:2011

Summary :

This paper deals with minimizing the fuel consumed by the transportation sector and considers the specific case of light duty vehicles. It is proposed that the net fuel consumed by a vehicle when travelling from one place to another is a mainly due to the distance factor. The Dijkstra's algorithm is applied to the graph obtained. Each node maintains a routing table which has the cost and next hop values for each other destination node. All that remains at the end is to query for the required path. So the path of minimum fuel consumption from A to B is obtained as our result.

Merits:

- One of the main advantages of Dijkstra's algorithm is its little complexity which is almost linear.
- It can be used to calculate the shortest path between a single node to all other nodes and a single source node to a single destination node by stopping the algorithm once the shortest distance is achieved for the destination node.

Demerits:

- As it heads to the acyclic graph, so can't achieve the accurate shortest path.
- Also, there is a need to maintain tracking of vertices, have been visited.

Application of Machine Learning for Fuel Consumption Modelling of Trucks

Author Names:Federico Perrottaa , Tony Parryaand Luis C. Neves

Published Year:2017

Summary :

This paper Support Vector Machine (SVM),Random Forest (RF), and Artificial Neural Network (ANN) models have been developed for the purpose and their performance compared. Fleet managers use telematic data to monitor the performance of their fleets and take decisions regarding maintenance of the vehicles and training of their drivers. The data, which include fuel consumption, are collected by standard sensors (SAE J1939) for modern vehicles. Together, these data can be used to develop a new fuel consumption model, which may help fleet managers in reviewing the existing vehicle routing decisions, based on road geometry.

Merits:

SVM

- It is effective in cases where the number of dimensions is greater than the number of samples and also it uses a subset of training points in the decision function (called support vectors), so it is also memory efficient.

Demerits:

SVM

- It doesn't perform well when we have large data set because the required training time is higher.
- It does not execute very well when the data set has more sound i.e. target classes are overlapping.

Trip Based Modeling of Fuel Consumption in Modern Heavy-Duty Vehicles Using Artificial Intelligence

Author Names:SasankaKatreddi and Arvind Thiruvengadam

Published Year:2021

Summary :

Predicting fuel consumption per trip based on dynamic on-road data can help the automotive industry to reduce the cost and time for on-road testing. Data modeling can easily help to diagnose the reason behind fuel consumption with a knowledge of input parameters. In this paper, an artificial neural network (ANN) was implemented to model fuel consumption in modern heavy-duty trucks for predicting the total and instantaneous fuel consumption of a trip based on very few key parameters, such as engine load (%), engine speed (rpm), and vehicle speed (km/h). Instantaneous fuel consumption data can help to predict patterns in fuel consumption for optimized fleet operations.

Merits:

- Neural network models can implicitly detect complex non-linear relationship between independent and dependent variables.
- Neural networks can be developed using multiple different training algorithms

Demerits:

- Neural network models may be more difficult to use in the field.
- Neural network modelling require greater computational resources

An Enhanced Fuel Consumption Machine Learning Model Used in Vehicles

Author Names:Dr. B. Dhanalaxmi, M.Varsha, K. Roshan Chowdary and P. Mokshitha

Published Year:2021

Summary :

In the present world, some of the people are not able to pay expenses for petrol/diesel. The model which we are generating will be useful for many people. The system which we are generating is a data summary approach will be based on distance rather than traditional conventional time period when developing personalized machinelearning model for fuel consumption. In previous model the sample input space of the predictors is quantized by time where as in this model the sample input space is quantized by fixed distance. In this proposed method the data is collected with proportional to its output impact. In this model the measure about information gathered from a consistent vehicle or vehicle which is ceased is same as the measure of information gathered the point when the vehicle is in movement.

Merits:

- The amount of fuel consumed will be provided as a numeric value based on the vehicle so the consumption of fuel for each and every vehicle will be differing

Demerits:

- Those models depend around seven predictors: number from claiming stops, prevent time, normal moving speed, trademark

acceleration, air motion facilitating pace squared, progress to dynamic vitality and also transform for possibility vitality. These variables would not be promptly accessible all the time.