LITERATURE SURVEY

INTRODUCTION

Fuel consumption models for vehicles are of interest to manufacturers, regulators, and consumers. They are needed across all the phases of the vehicle life-cycle. In general, techniques used to develop models for fuel consumption fall under three main categories:

- Physics-based models
- Statistical models
- Machine learning models

Previously proposed machine learning models for average fuel consumption use a set of predictors that are collected over a time period to predict the corresponding fuel consumption in terms of either gallons per mile or liters per kilometer. While still focusing on fuel consumption, our proposed approach differs from that used in previous models because the input space of the predictors is quantized with respect to a fixed distance as opposed to a fixed time period.

RELATED WORK

The generalizable characteristics of machine learning models to different vehicles and different operating conditions made this modeling methodology attractive for fuel consumption.The output of the fuel consumption models can be either fuel rate (liters/hour) or average fuel consumption (liters/100km). By averaging the predicted fuel rates over an extended time period or distance, the models are able to deliver relatively accurate average fuel consumption.

DATA COLLECTION AND SUMMARIZATION

Several processing steps were needed in order to generate the predictors of the model. These predictors are derived from two measurements, namely, road grade and transmission output speed. the first processing step consisted of down sampling the road grade and obtaining the vehicle speed from the transmission output speed.

An analysis of the segments in the real data collected from the field shows a variance in average fuel consumption over all the trips. For example, a 20% difference in fuel consumption was observed between good and bad driver behavior over entire trips.

CONCLUSION

This paper presented a machine learning model that can be conveniently developed for each heavy vehicle in a fleet. The model predictors are aggregated over a fixed distance traveled (i.e., window) instead of a fixed time interval. Expanding the model to other vehicles with different characteristics such as varying masses and aging vehicles is being studied.

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