

# Data driven model for truck driver behavior

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## Background

The fuel consumption of a vehicle depends on many things. One of the most influential factors is the driver's behavior. Depending on the properties of the vehicle (and mood), the driver will react on geographical parameters such as local speed limit, line of sight, traffic situation etc. This behavior will then translate to a fuel consumption through the vehicle's response to how it is driven. A versatile model for fuel consumption is necessary in order to carry out energy efficient route planning. There are mechanistic models for the vehicle's fuel consumption response, and several driver behavior models exist. The purposes of these behavior models vary. Collision detection and prediction of fellow road user behavior in self-driving vehicles are two examples, which are, however, not directly applicable for the task to simulate fuel consumption on a macro level.



Figure 1. Different routes infer different behaviors. Can knowledge of features along the chosen route be used to predict the driver's behavior?

## **Aim of the project**

Starting from an existing large set of data recorded in a roundwood transportation truck, the aim is to suggest a data driven model capable of predicting the driver's behavior on different locations along a given route. The model is intended to represent an average behavior in the respective situations, with the possibility in the future to serve in conjunction with a vehicle fuel response model for fuel consumption calculations. (The latter is not part of the current project.)

## **Technical details**

Available data presents GPS-position, speed, road gradient, road curvature, accelerator position and other signals, with a resolution of 10 Hz. The data was recorded for one week's operation of a timber truck in Värmland in western Sweden. The solution approach is rather open, but it is reasonable to test, for instance, both machine learning (statistical models) and AI methods (such as deep learning).

## **Outcome of the project**

The project shall propose and compare different algorithms that, after being fed with training data from the dataset, can give a reasonably good prediction of driver behavior when confronted with a test dataset. The algorithms can be implemented in any programming language deemed to be appropriate for the task. Meticulous documentation of all developed code is however requested, for easy porting of the code to other environments.

Skogforsk is the research institute of the Swedish forestry. It is funded by the forestry sector and the state. In total, we are 120 employees, of which 80 are researchers. We are located in Uppsala (main office), Sävar and Ekebo.

