Göteborg, 2018-06-13

# Volvo Group Trucks Technology

Master Thesis proposal:

Vehicle speed optimization

A transport mission typically starts at point A and ends at B as seen in the figure below. For this mission to be successful, from an operator perspective, following aspects should be considered: 1) fulfillment of required arrival time, 2) low ownership cost and 3) safety.

For planning the vehicle speed, some important input is "static" information like topography, curvature and legal speed limits. Traffic flow variation is an example of a dynamic input.
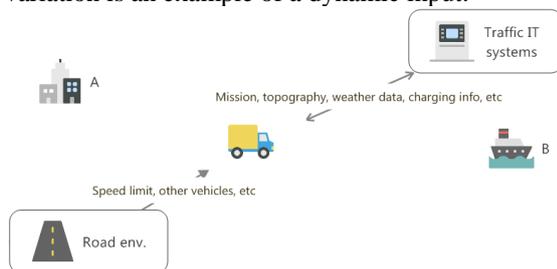
The speed optimization problem can be seen as a trade off between operation cost (often dominated by fuel consumption) and productivity (time efficiency). The figure below is taken from a journal paper, w_f is weight for fuel and w_D is for duration. The vehicle speed trajectory represents higher speeds then the fuel weight is zero and duration weight is one.
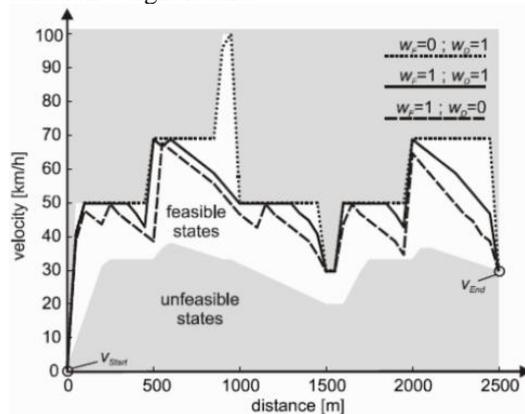
This master thesis handles the following questions:

1. What is the research front in the field of speed optimization?
2. How can a speed trajectory optimization balancing energy and speed efficiency be constructed?
3. How can the above mentioned weight factors be defined for a specific transport task?

Potential techniques for approaching these questions are dynamic programming based optimization and/or artifical intelligence methods such as reinforcement learning.

The thesis work will include various fields such as simulation and optimization. Personal interest in programming is seen as benefit. The work will be carried out at Volvo Group Trucks Technology, Vehicle Automation. The thesis is recommended for one or two students with programming profile and good mathematical skills. Thesis start TBD.

If you find this proposal interesting, send your application via AB Volvo home page. www.volvogroup.com/en-en/career

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