Real World Optimization of Energy Efficient Vehicle Control

Current State

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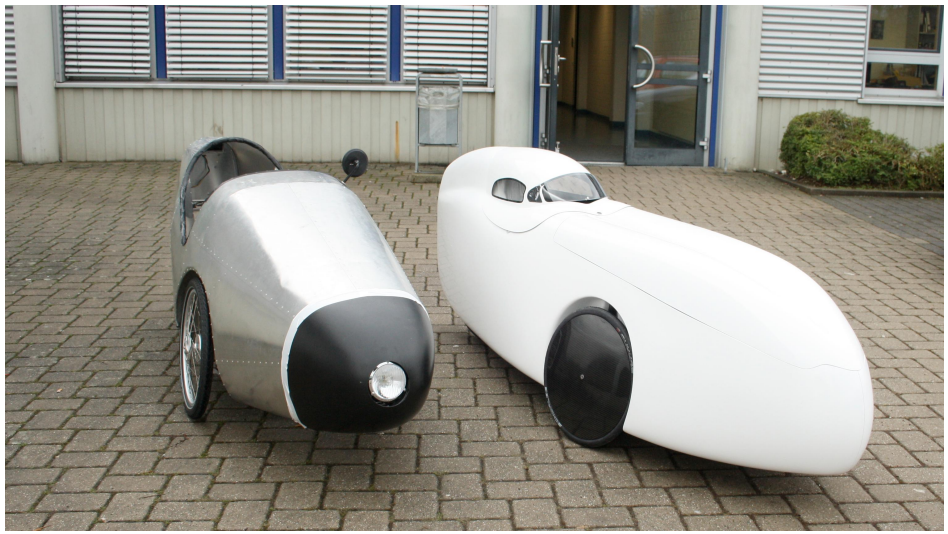

Content

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What is the project about?

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Creating Energy Efficient Vehicle Controller

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What ML technologies are being used?

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What is the project based on?

Paper showing ANNs can compete with state-of-the-art approaches (cite paper)

Project Description

Task Overview

Minimum

Minimum

- Evolve Energy Efficient Controller with Simple Model

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- Evaluate in Reality

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- Compare Simulation vs Reality

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Maximum

- Use Multi-Objective Approach (i.e. Surrogate Modelling)

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Simple Vehicle Model

Time Based Model

$$\frac{ds}{dt} = \begin{pmatrix} t' \\ x' \\ v' \\ W' \end{pmatrix} = \begin{pmatrix} 1 \\ v \\ \frac{F(x,v)}{m} \\ F_u * v \end{pmatrix}$$

Where

- F_U: Force at wheel due to control command
- $F(x, v)$: F_U - some drag

Simple Vehicle Model

Visualizations of Simulations

Content

Tracks Used

- 35
- cross validation

NEAT Parameters

- population
- speciation kmeans
- maximum generations
- nr of runs
- topology

- Average Best Fitness
- Average Nr Generations

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Control Program

TODO: diagram multi-threading

The Task

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