Bastian Lang R&D

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Contents

R&D Topic

Real World Optimization of Energy Efficient Vehicle Control

Abstract

Energy efficient vehicle control can be used to reduce the energy consumption of a vehicle. This will both save money and reduce the CO_2 - emissions of the vehicle. But coming up with optimal control strategies is hard, even if tracks are known and when computing these offline. Current approaches to energy efficient vehicle control include optimal control theory, graph search algorithms and evolutionary strategies. The first two are computationally costly, the last has not been applied to a real vehicle. The real world application of such a controller needs to handle long distances, uncertainty & noise and unforeseen situations. When transferring evolved solutions from simulation into reality, the results are usually suboptimal. This is called the Reality Gap. Approaches to overcome this problem include adding noise to the simulation, the use of more accurate simulations and including a measure of the transferability of a single solution.

Goal of this project is to design a controller for energy efficient vehicle control for

a real vehicle using an evolutionary approach and make use of the transferability approach, i.e. maintaining a surrogate model and using a metric that estimates the performance of simulated solutions in the real world.

Introduction

State of the art

Problem Formulation

Methodology

Conclusion

Appendix

Meeting notes

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