Intelligent Road Control - But Shitty

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Abstract

1   Introduction

TODO

1.1   Motivation

1.2   Goal

1.3   Approach

In order to test the effect of different intelligent traffic control strategies, an appropriate simulation is required. For this work, maps are realised as undirected graphs in which vertices represent intersections and roads appear as edges between those. The simulation is *microscopic*. That is, instead of globally controlling traffic (*macroscopic*), the atomic parts of the simulation are locally controlled cars (see also Krajzewicz u. a., 2002). Car dynamics are modeled using the *Intelligent Driver Model* (IDM) (Treiber, Hennecke und Helbing, 2000). It models traffic flow time- and space-continuous as a combination of *free-road* and *interaction* behaviour. The *free-road term* is governed by a cars intention to reach its desired speed. The acceleration for this behaviour is calculated (Treiber, Hennecke und Helbing, 2000) as

$$v_{free} = a(1 - (\frac{v_a}{v_0})^{\delta}), \qquad (1)$$

where a refers to a cars maximum acceleration, v_a is its current velocity and v_0 the desired velocity. When a car approaches a leading vehicle, it is supposed to slow down in order to avoid collision. This behaviour is modeled by an *interaction term* which incorporates the distance to the leading vehical and its speed (Treiber, Hennecke und Helbing, 2000).

$$v_{int} = -a(\frac{s_0 + v_a T}{s_a} + \frac{v_a \Delta v_a}{2\sqrt{ab}s_a})^2 \qquad (2)$$

In the equation above, s_0 and T restrict the cars minimum distance in space and time respectively.

2   Theoretical Backgroud

3   System Architecture

4   Methodology

5   Results

6   Related Work

7   Discussion

8   Conclusion

Literatur

Krajzewicz, Daniel u. a. (2002). "SUMO (Simulation of Urban MObility)-an open-source traffic simulation". In: *Proceedings of the 4th middle East Symposium on Simulation and Modelling (MESM20002)*, S. 183–187.

Treiber, Martin, Ansgar Hennecke und Dirk Helbing (2000). "Congested traffic states in empirical observations and microscopic simulations". In: *Physical review E* 62.2, S. 1805.