



A Distributed and Self-Regulating Approach for Organizing a Large System of Mobile Objects

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Goal

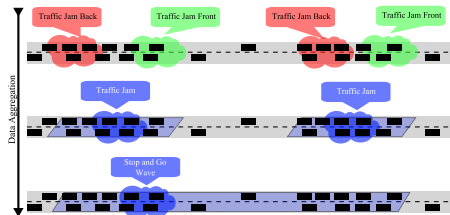
Improve traffic flow by car-to-car (C2C) communication.

- Cars as self-organizing entities
- Ad-hoc C2C communication
- Distributed algorithms
- Avoidance of centralized coordination and organization



Main Design Components

- Hovering Data Cloud (**HDC**): Mix of system of rules and data structure which is independent of physical carriers (e.g., vehicles)
- Organic Information Complex (**OIC**): Aggregation of information of several HDCs
- Advanced Distributed Strategy (**ADS**): Strategies pursued by equipped vehicles to deal with detected traffic phenomena



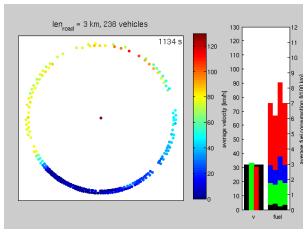
Jam-ADS

- Goal** Increase traffic flow on a highway while decreasing the fuel consumption
- Idea** Recommend a velocity which depends on average velocity of the cars ahead



AutoNomos-Simulator

Implementation of
Krauß and IDM
model on a circular
road,
interactive or script
driven



Operation Control

Run Stop

Stop At: 0 s

Plot Close All Check All Uncheck All

Positions
☒ Average Velocity
☐ Velocity Histogram
☐ Particular Car
☐ Fuel Consumption
☐ Lane Changes
☐ Fundamental Diagram
☐ Distances Distribution

Save Load

Info Reset Quit

Time: 3500 s

Initialization

Road: 3000 m Population Length: 3000 m

rho: 39.7 cars/km/lane

Number of Lanes: 2

Traffic Model

random deceleration factor: 1.00

Model: ☒ Krauss ☐ IDM

Computation of v_{safe}: ☒ Dissertation ☐ SUMO ☐ Discrete

Thresh Speed: 60 km/h

probability of random lane change: 0.02

AutoNomos

AutoNomos

Lane Method: ☒ ACC ☒ Lanewise

Method: ☐ Number ☒ Distance

Penetration: 0.60

Considered Distance: 700 m

Lambda: 0.50

v_{avg} v_{des}

Acceleration: Steps: 0 Factor: 1.00

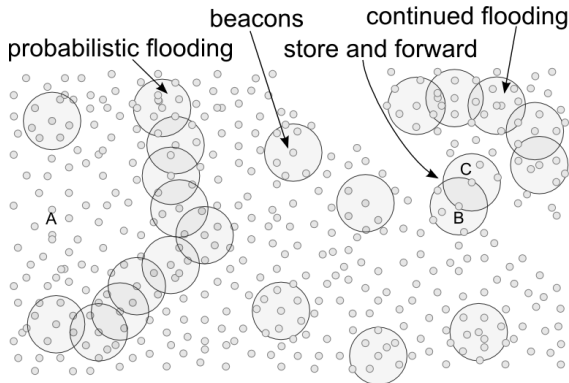
Speedlimit

Speedlimit: 30 km/h



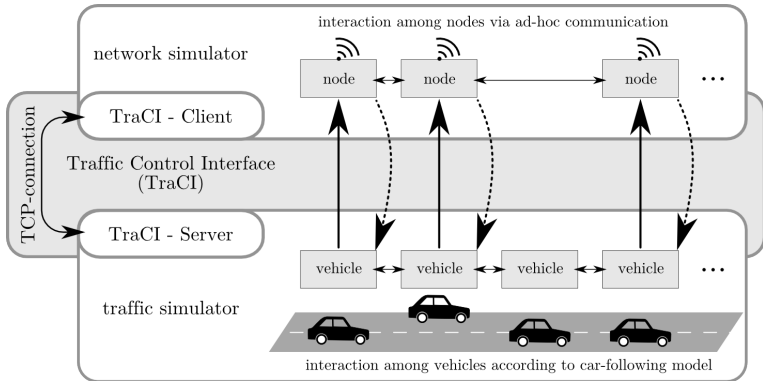
AutoCast

AutoCast: a robust protocol to disseminate data units among cars, scaling well for all traffic densities



TraCI

Connecting traffic and communication network simulator

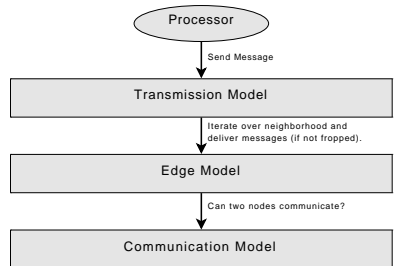
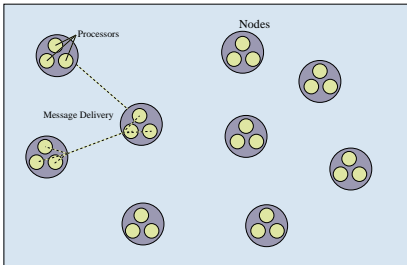


Shawn

Open source simulator for wireless sensor networks

- Abstracts the radio communication
- Independent plugins for processors and communication models

World



More at shawn.sourceforge.net

