A-F01

Signal-free mobility: a distributed traffic coordination without traffic signals

Smart traffic coordination using learnable digital twin

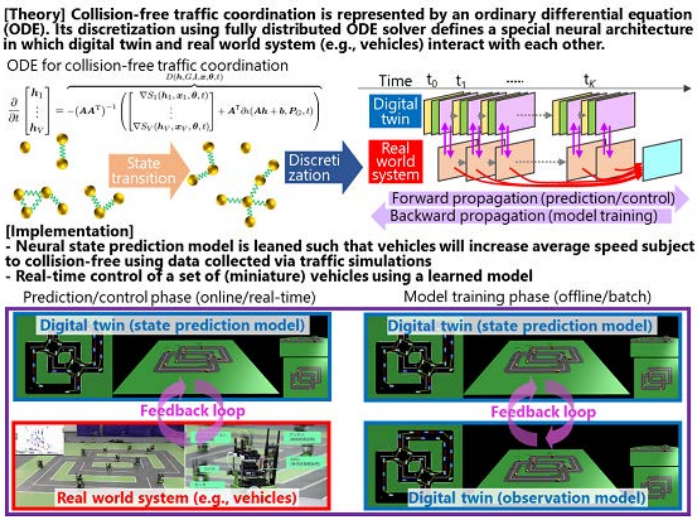
IOWN Future

Background

We introduce "signal-free mobility project", in which a set of vehicles autonomously coordinates their traffic states (e.g., speed, position) without using traffic signals, expecting that a reduction transportation time to the limit while vehicles are collision-free.

Summary

We succeeded to represent collision-free traffic flow as an ordinary differential equation (ODE) and its completely distributed solver for edge-computing. Then, optimal traffic coordination can be achieved via feedback loop between digital twin and real vehicles.



Feature 1

Distributed dynamics learning for optimally coordinate vehicle states for increasing average speed under collision-free constraints

Feature 2

Real-time vehicle state prediction and control by completely distributed ODE solver

Feature 3

State prediction model training on digital twin via a number of traffic simulations

Future benefits

This research shows a future of IoT communication, where autonomous dynamical communication following learned state transition model optimizes an overall system consisting of a large number of IoT devices.

Related Exhibits

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