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A combinatorial dynamic network trajectory reservation algorithm for connected autonomous vehicles. (English) Zbl 07257993

[Netw. Spat. Econ.](#) 19, No. 1, 27-55 (2019).

Summary: We present a combinatorial assignment algorithm for reserving space-time trajectories from origins to destinations given an ordered list of vehicles. Space-time trajectories include guaranteed arrival times at every node in the path, including at the destination. Traffic flows are modeled using the cell transmission model, a Godunov approximation to the kinematic wave model. Space-time trajectories are constructed to follow the cell transmission model constraints and first-in-first-out behavior. Reservation-based intersection control for connected autonomous vehicles, which determines intersection access and delays for individual vehicles, is used to ensure that reserved trajectories are followed. The algorithm is suitable for city networks. Results show that vehicles with higher priority tend to have much lower travel times. In addition, the trajectory reservation system reduced overall congestion in the network compared with dynamic user equilibrium assignments.

MSC:

- 90 Operations research, mathematical programming
- 68 Computer science

Keywords:

[autonomous vehicles](#); [trajectory reservation](#); [dynamic traffic assignment](#); [cell transmission model](#)

Full Text: [DOI](#)

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