

Joint Multi-Policy Behavior Estimation & Receding-Horizon Trajectory Planning for Automated Urban Driving



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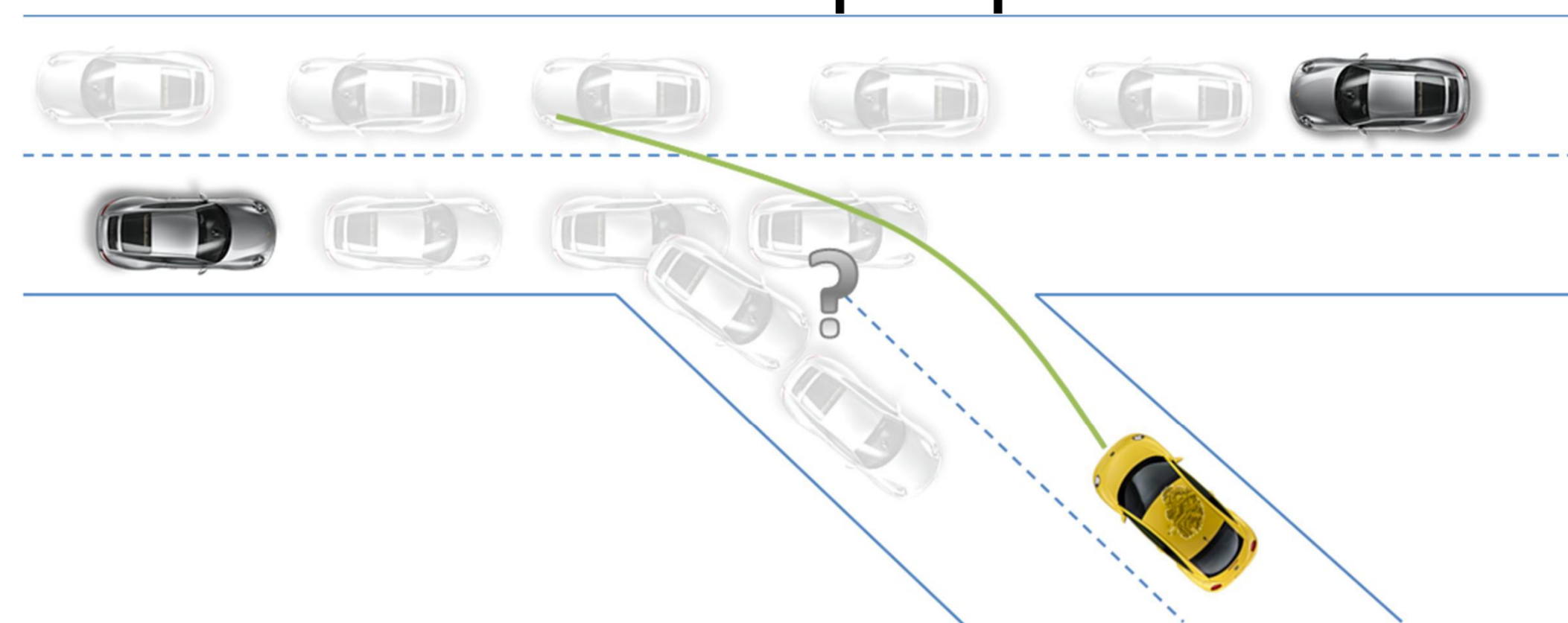


Introduction

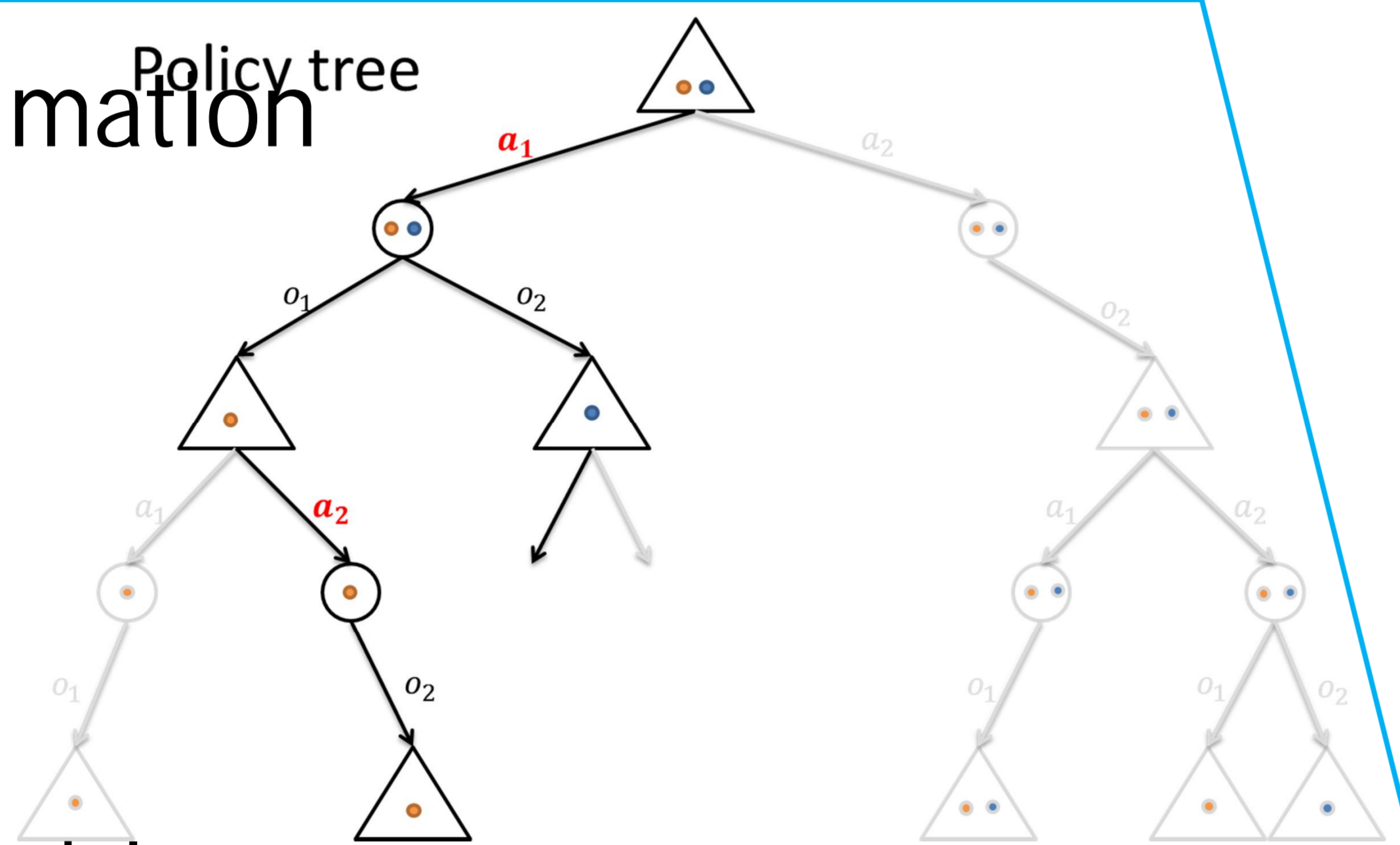
- A joint strategy of reasoning about obstacles' future behavior and motion planning for the self-driving car at the urban environment is presented
- We focus on the following two questions:
 - How to model the interaction between the ego-vehicle and obstacles
 - How to incorporate the uncertainty of motion intentions into the motion planning process

Contribution

- A joint behavior estimation and trajectory planning method based on MPC and online POMDPs to achieve intention-aware navigation
- A chance constrained formulation of MPC accounting for the uncertainty of motion intentions over multiple policies

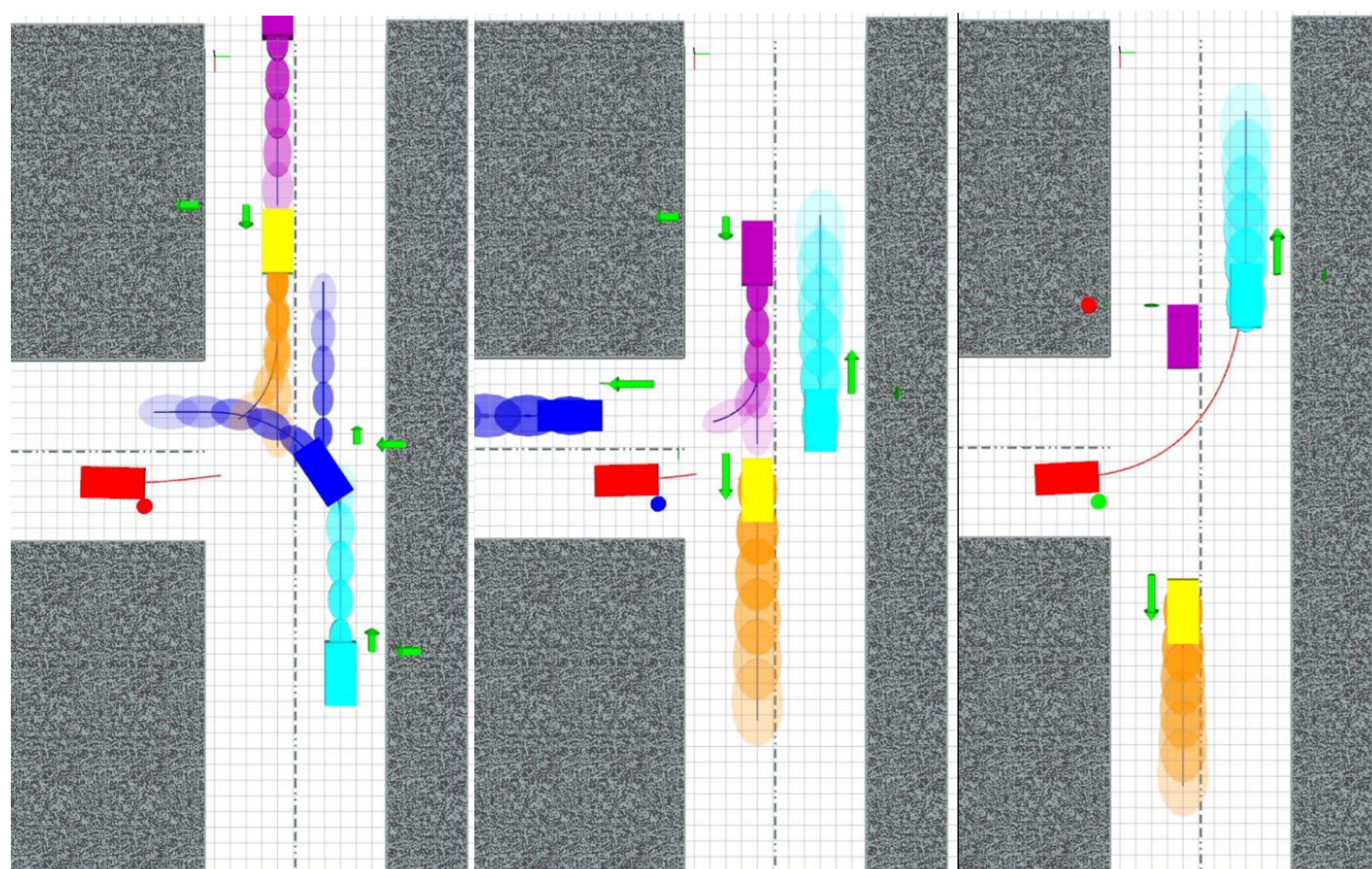


Behavior Estimation



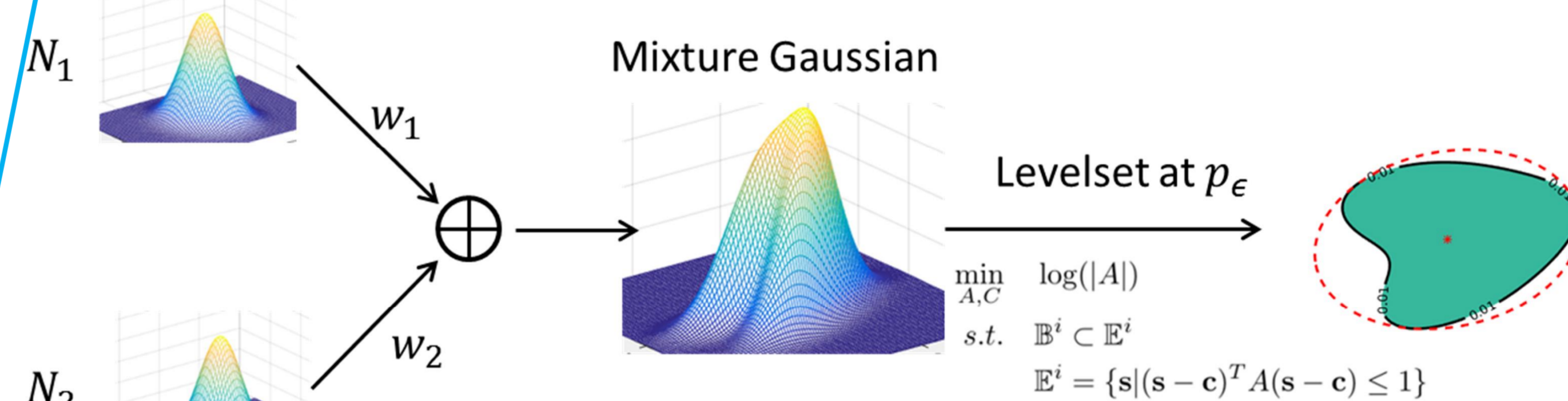
Use POMDP model to compute optimal sequence of actions for obstacles under all motion intentions

The ego-vehicle makes a left turn by interacting with the other 4 vehicles



Simulation in T-junction

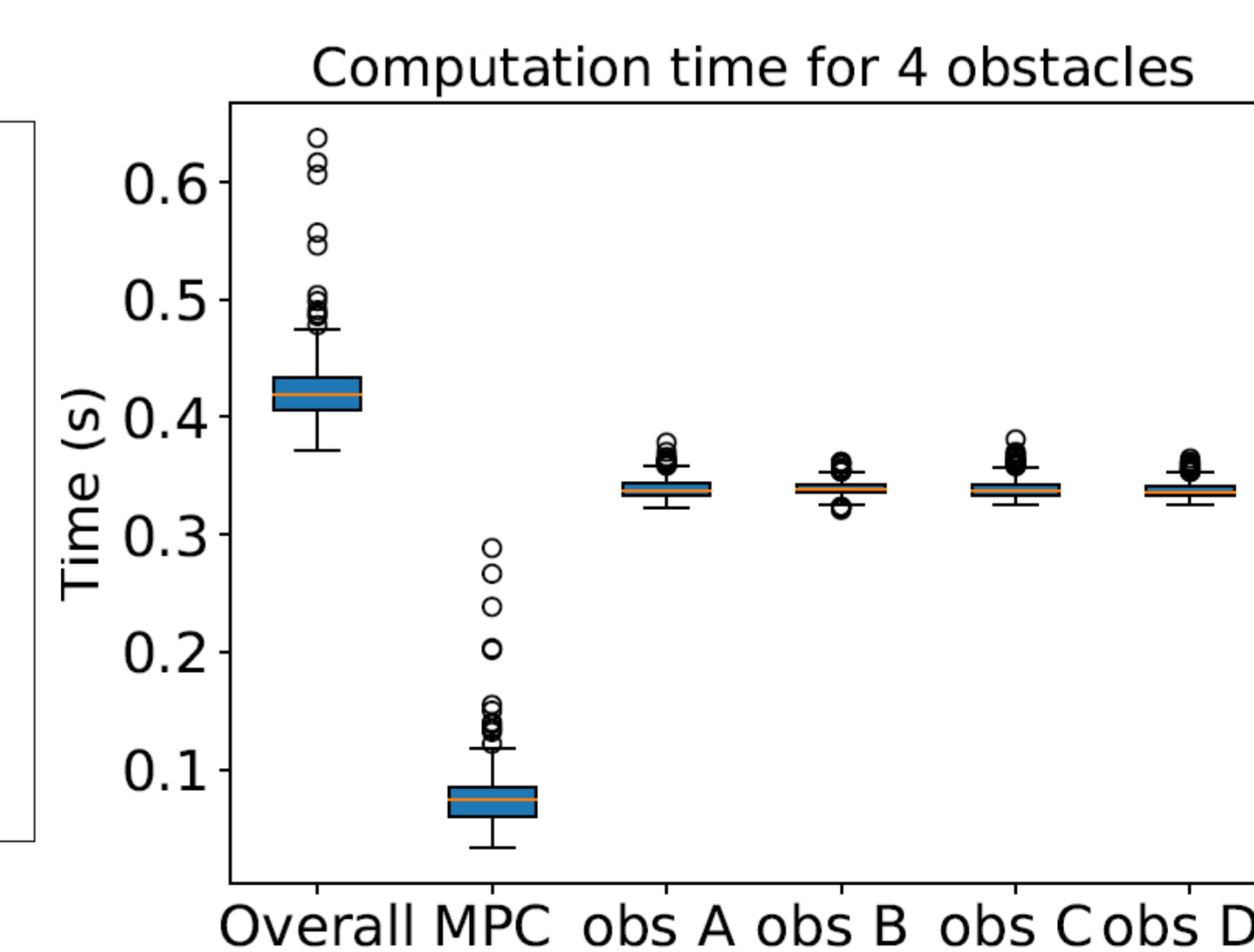
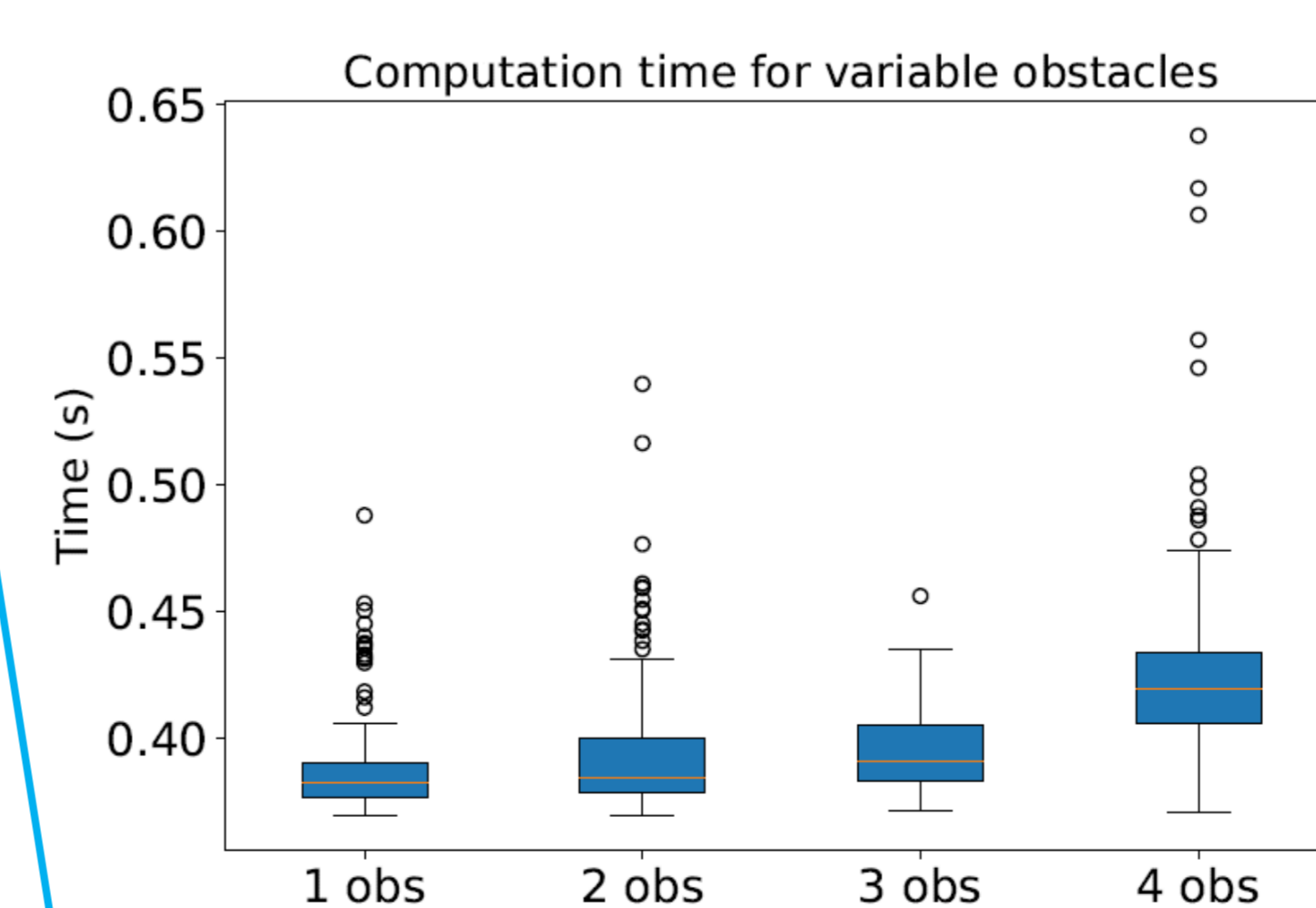
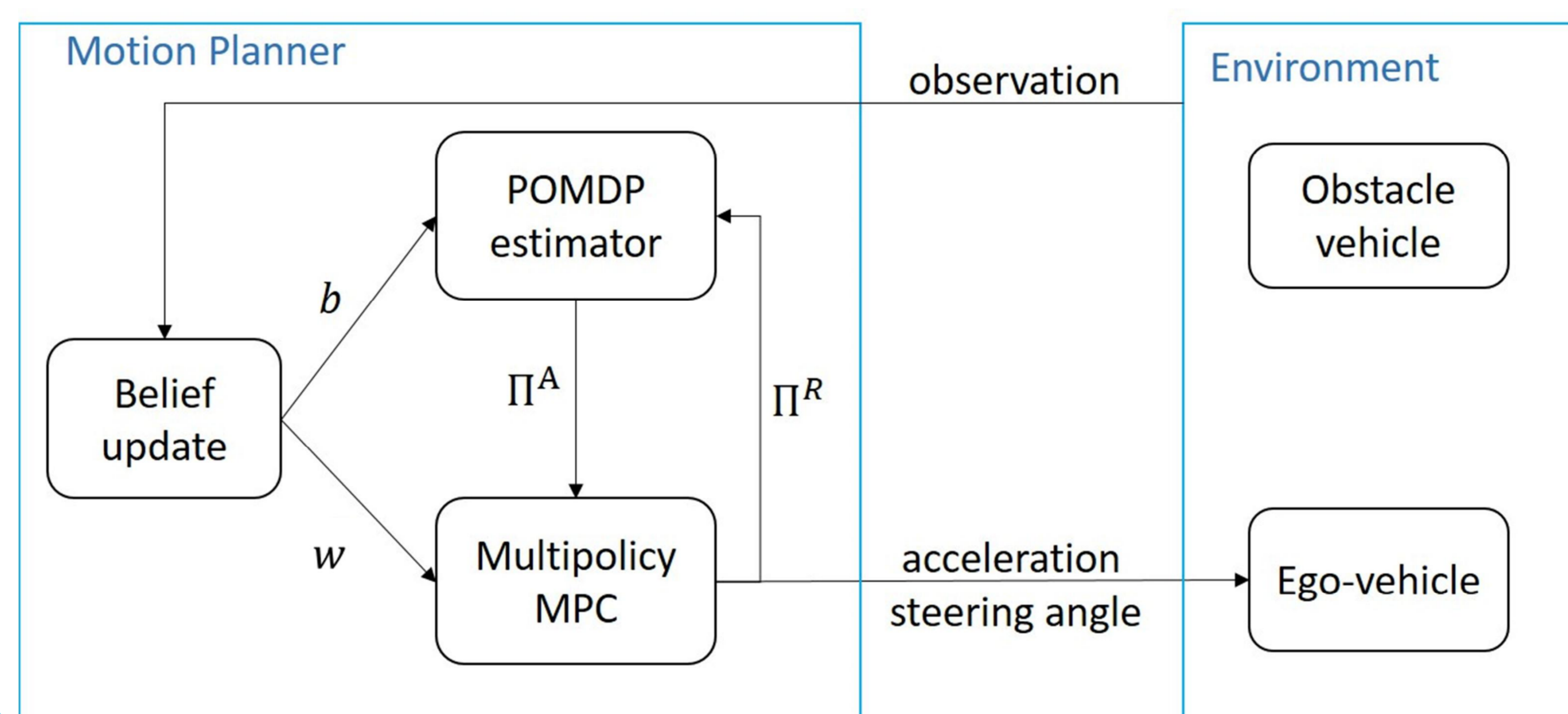
Motion Planning



Compute the optimal trajectory of the ego-vehicle based on estimated obstacles' trajectories and associated beliefs of intentions

Computation time recorded for over 20 times random simulations

Joint Behavior Estimation & Planning



Computation time