Augmented reality for control of reservation-based intersections with mixed autonomous-non autonomous flows

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Intersections are a major cause of traffic congestion in cities. To improve intersection throughput, we have to minimize intersection delays. This project focuses on smart intersections where individual vehicles are guided through the intersection using Augmented Reality (AR), maximizing the available capacity.

Challenge areas:

- Infer the trajectory of uncontrolled road users
- Design intersection control schemes
- Learn the performance of road users when following a recommended trajectory

Solution architecture:

- Learn user tracking performance
- Issue AR collision-free trajectory commands
- Display commands using AR/update user model

By efficiently using the available time, the onset of congestion is delayed.

Faster travel times would reduce externalities:

- Lost time
- Pollution
- Economic impact of congestion

Broader impact (education)

- Learning of human performance models (traffic simulator)
- Integration in graduate courses

Scientific impacts:

- Path prediction schemes can be used to model uncontrolled multi agent interactions
- Novel schemes for collision avoidance, where some robots/users are uncontrolled
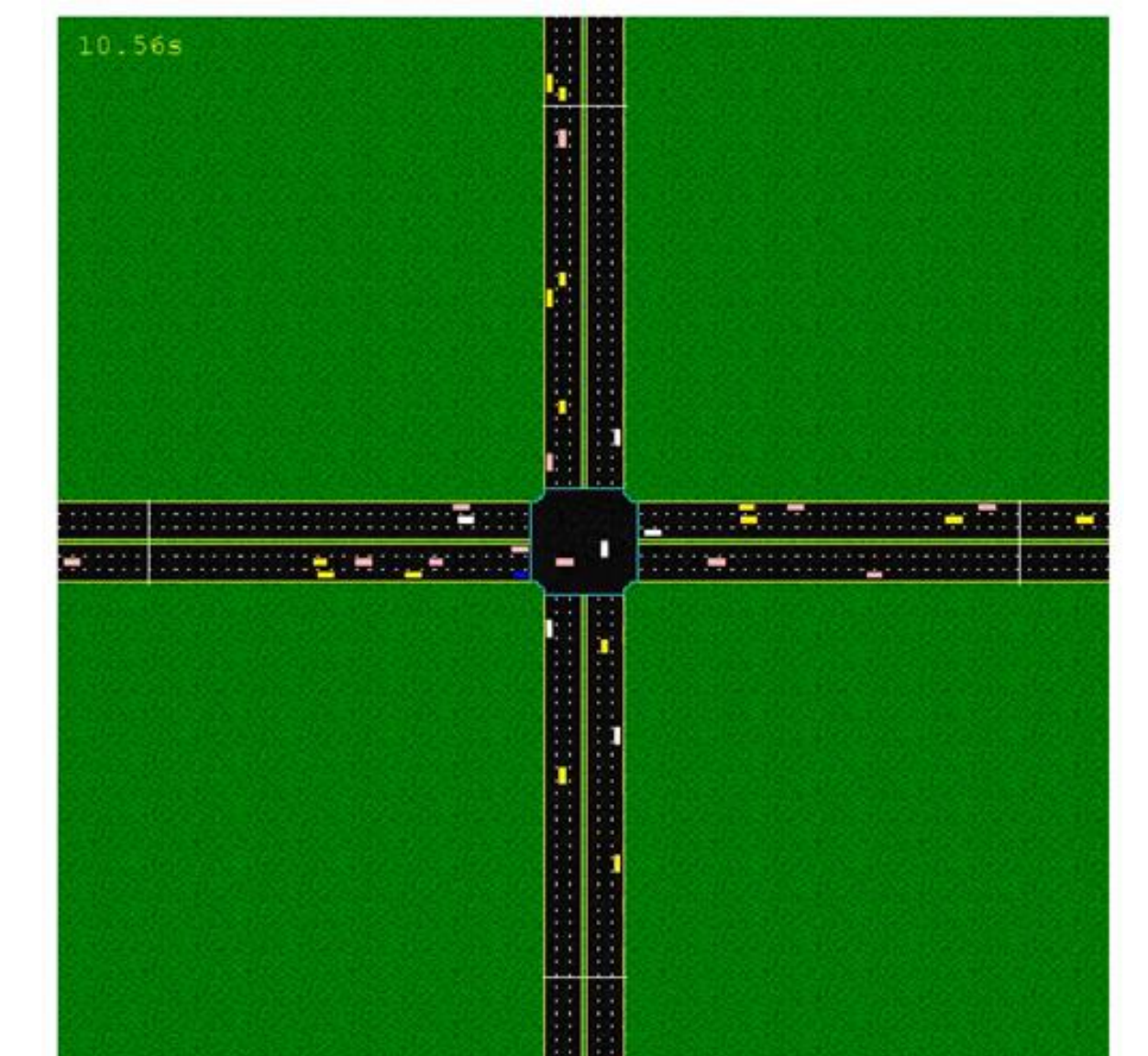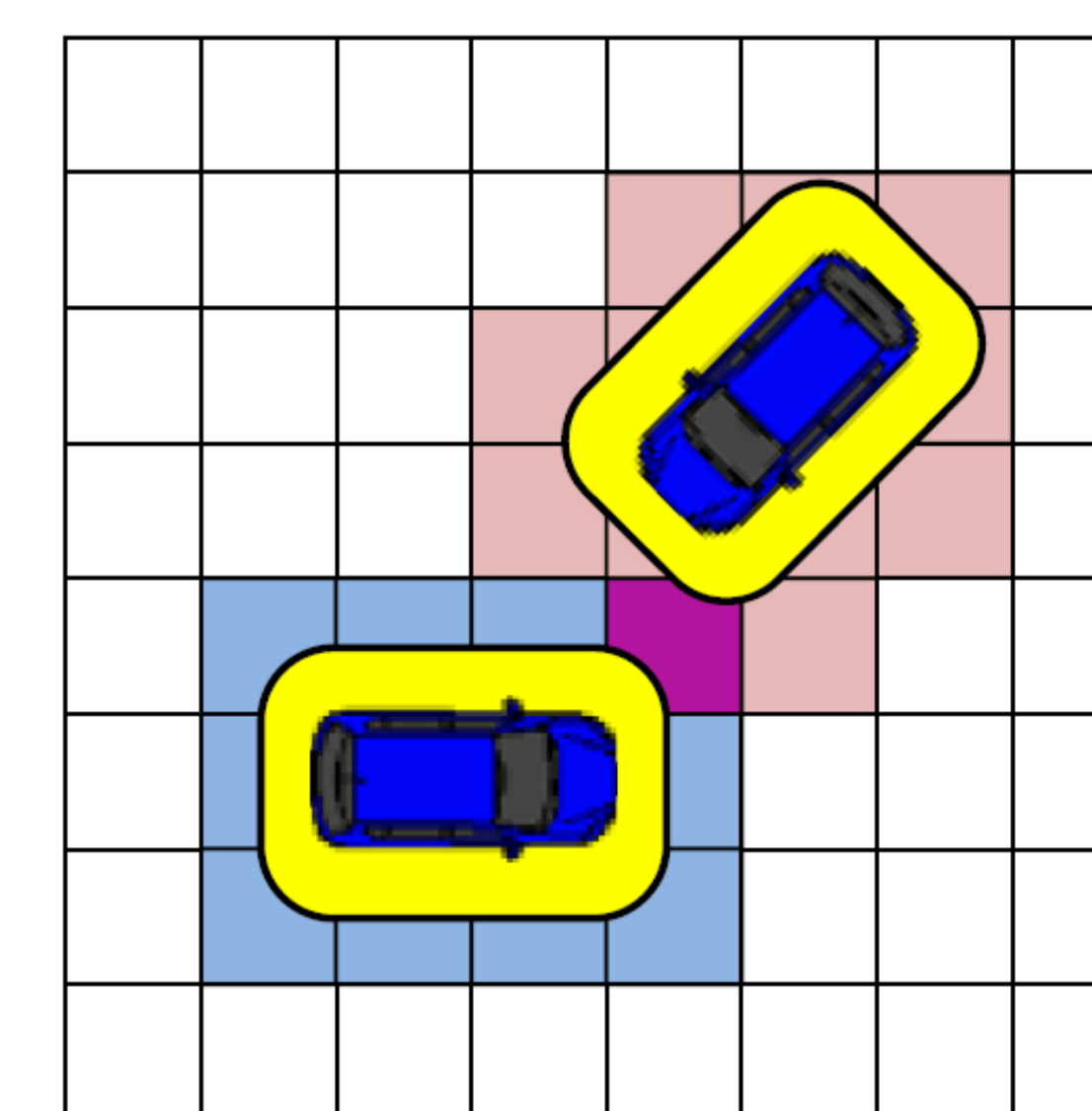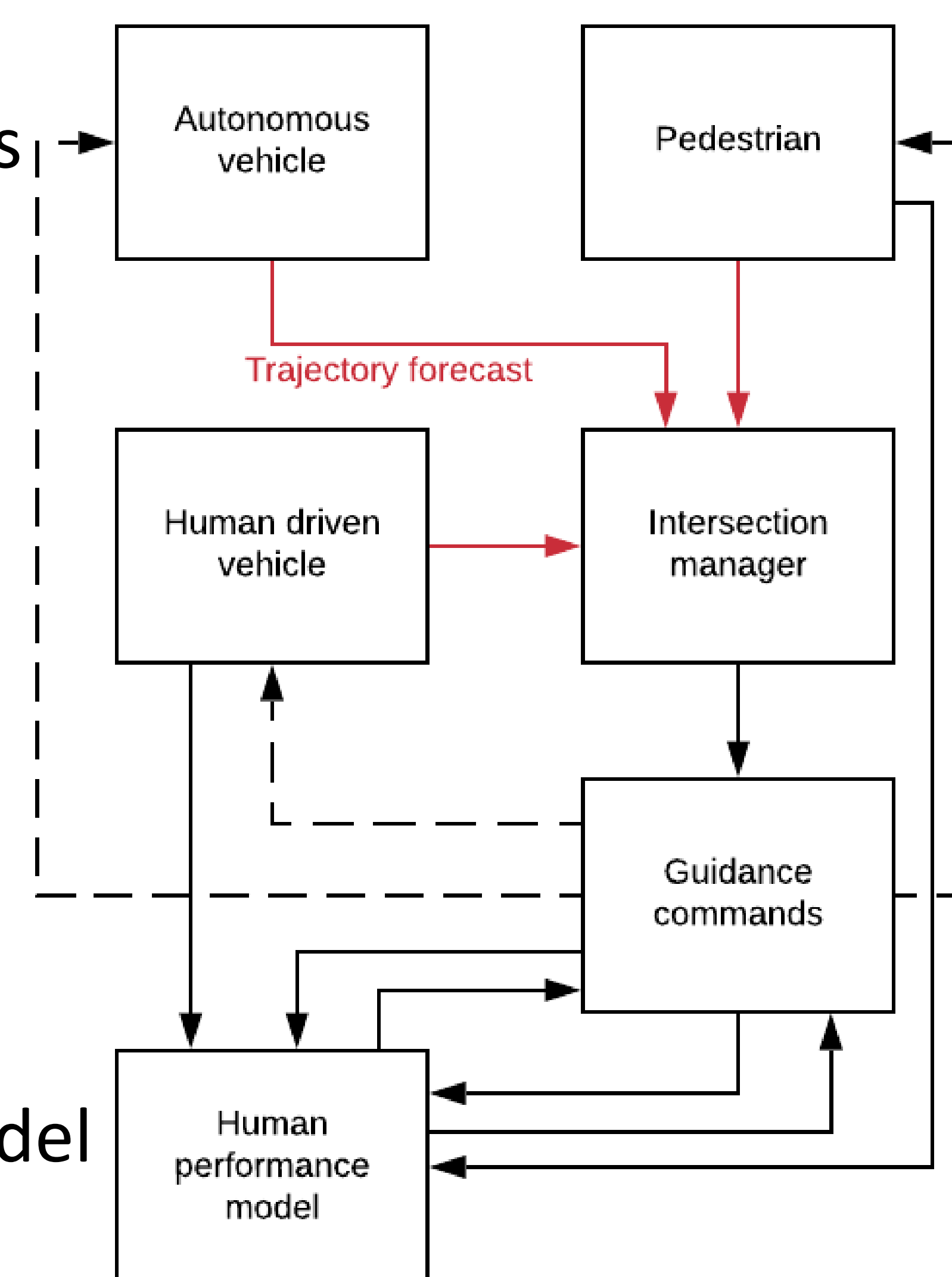
Augmented reality guidance can be applied to other partially controlled scenarios:

- Crowd control
- Control of autonomous vehicles in mixed flows
- Reducing human/robot collision risks