

Draft Abstract

1 Questions?

- Can a RL agent learn symbolically?
- How can a safe controller [1] ensure the safe deployment of RL in the physical world [Safe set property]?
- Would a RL whose rewards are adapted to the safe sets given by the controller converge to the same safe sets?

2 What?

- Combining a car platooning safe controller w/ soft constraints and RL as to optimize the speed values that minimize the gap between vehicles
- Exploring different combinations:
 - Constraining actions given the controller constraints as to ensure that safety properties are respected [efficiency + structure algorithm]
 - Adapt rewards given the controller constraints, as to investigate the convergence towards optimal policy [faster learning? can expect a crash before it happens?]
- Controller to act as action governor of the RL agent.

3 Why?

- From AI side: Importance of developing methods to make it acceptably safe to embed reinforcement learning controllers in a real life physical environment.
- From Controller side: Optimizing final values given in the range as to minimize gap.

4 How?

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References

- [1] Yuri Gil Dantas, Vivek Nigam, and Carolyn Talcott. A formal security assessment framework for cooperative adaptive cruise control. In *2020 IEEE Vehicular Networking Conference (VNC)*, pages 1–8, 2020.