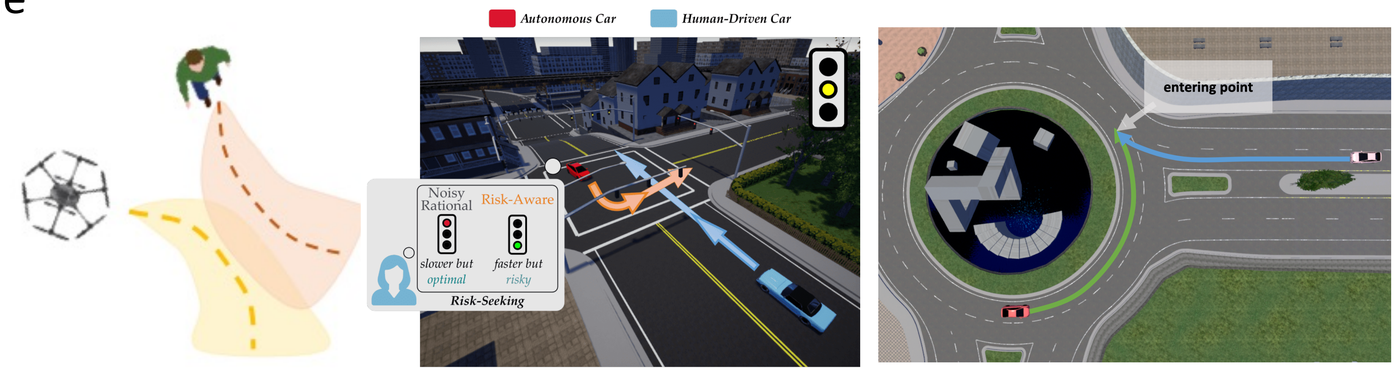
CPS: Small: Risk-Aware Planning and Control for Safety-Critical Human-CPS

Negar Mehr (UC Berkeley), Co-PI: Dorsa Sadigh (Stanford University)

In this project, we develop risk-aware control and planning algorithms for achieving safe human cyber-physical systems.

Challenges:

- Reasoning about risk and uncertainties over time horizons.
- Model human behavior in risky scenarios.
- Accounting for interactions between risk-aware agents.



Solution:

- New algorithms for risk-aware planning for systems subject to Non-Gaussian uncertainties.
- Novel algorithms for modeling humans' decision making under uncertainty.
- New game-theoretic planning algorithms that account for the feedback interactions between risk-aware agents.

Boarder Impact:

Safe human-robot interaction in safety-critical applications such as autonomous driving, drone delivery, assistive robotics, and in general multi-agent collaboration and coordination.

Scientific Impact:

- New algorithms for achieving safety in the presence of uncertainties
- Safety in any CPS domain that requires interactions with humans

Education and Outreach:

- Developing advanced graduate-level courses at UC Berkeley and Stanford that incorporate the topics of this research
- Mentoring programs at UC Berkeley and Stanford
- Summer research program for high school students