CPS: Small: Self-Improving Cyber-Physical Systems/Award # 1740079/Year: 2017

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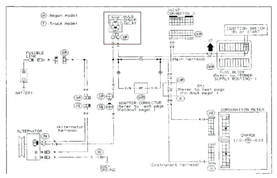
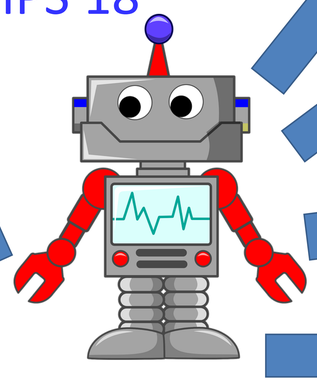
Challenge: Designing safe, data-driven, and model-based adaptive cyber-physical systems

Uncertainty-aware Synthesis from Chance-constrained STL FORMATS'18, JAR'18, ACC'19



Specification Mining RV17, NeurIPS'18



Verification: ML model + closed loop NASA FM'18, ADHS'18, HSCC'19, VNN/AAAI'19, CoRL'20

Characterize uncertainty of ML models MILCOM'18, NeurIPS'19, DAC'20, ICLR'20

Logic-guided And Robust Control DISE/ICML'18, Allerton Control'18 SafeComp'20

Explanations NASA FM'17, JAR'18, NeurIPS'18, IJCAI'21

Broader Impact:

- Enabling design of assured autonomous systems. The PI has been concurrently working on DARPA Assured Autonomy to transition ideas from NSF project to higher TRL.
- Application to robust and resilient Internet of Things via Army Research Lab's Collaborative Research Alliance on Internet of Battlefield Things.
- 3 internships including 2 female students were supported last year.

Github: https://github.com/SRI-CSL/Trinity

Scientific Impact:

- Contributions to machine learning and control published in venues such as NeurIPS, ICLR, IJCAI and AAAI over last three years.
- Extension of the developed approach for finding safe and optimal policy for CPS being pursued for joint exploration of cyber and physical design in DARPA SDCPS where the PI leads one of the teams. The goal is to design novel CPS designs such as autonomous underwater vehicles and air taxis.