

- Survey on safe RL
 - J. Gracia and F. Fernandes. “A Comprehensive Survey on Safe Reinforcement Learning.” *Journal of Machine Learning Research*, 2015.
- Model-free approach
 - Add safety constraints to optimization problem
 - Certify learned policy to be safe
 - Do not guarantee the safety during learning phase
- Model-based approach
 - Using model information to guarantee the safety
 - Certify the safety during learning phase
 - Do not address the issue of exploration and performance optimization

- Incorporating model information into model-free RL
 - The study, I reported last week[1], uses control barrier function
 - [1] has a probability of safety violation
 - Is there more effective use of prior knowledge???

[1] : R. Cheng, G. Orosz, R. M. Murray, and J. W. Burdick. "End-to-end safe reinforcement learning through barrier functions for safety-critical continuous control tasks." *Thirty-Third AAAI Conference on Artificial Intelligence (AAAI-19)*, 2019.