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The Hong Kong University of Science and Technology

Department of Mathematics

**Seminar on Data Science and
Applied Mathematics**

Safety Masked Reinforcement Learning

By

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Abstract

Model-free reinforcement learning (RL) has shown great potential in finding policies maximizing accumulated return in uncertain environments. However, safety guarantees remain hard to derive, preventing the use of RL in many domains. In this work, we propose a model-free algorithm to learn a safety mask in an unknown environment modeled as a Markov decision process (MDP). The safety mask provides a quantitative measure of safety for each state-action pair of the MDP, and is learned using deep reinforcement learning without requiring external knowledge. The safety measure is then used to prevent unsafe actions during later RL algorithm whose objective is to maximize the return. We demonstrate that our method can scale to large domains and our learned mask can enhance safety in both later RL policy learning and deployment processes. This is joint work with Maxime Bouton and Mykel Kochenderfer.

Date: Friday, 1 February 2019

Time: 3:00p.m. - 4:20p.m.

**Venue: G009A, CYT Building, G/F
(near Lifts 35 - 36), HKUST**

All are welcome!