Reinforcement Learning Methods for Risk-Sensitive Sequential Decision Making

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This talk surveys recent developments in reinforcement learning (RL) methods for risk-aware model-free decision-making in Markov decision processes (MDPs). In the discounted setting, we adapt two popular risk neutral RL methods to account for risk aversion. The first approach minimizes a dynamic utility-based shortfall risk measure, while the other optimizes a specific quantile of the total discounted cost. We then present an RL framework for average-cost MDPs that incorporates dynamic risk measures. Together, these contributions represent a significant step toward scalable, risk-aware, model-free, sequential decision-making methods. The presentation will highlight the theoretical motivations, convergence guarantees, and empirical performance of these algorithms, offering insights into their applicability in finance and beyond.

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