CAP 5619 - Deep and Reinforcement Learning
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In this project, I will use Reinforcement Learning to play the Atari game of Pong [1]. Since most of the efforts in the literature are in the direction of CNN+q learning, and we know that Q learning plus bootstrap plus non--linear function approximation is inherently unstable. So all the algorithms based on DQN and the original DQN paper have to tackle the instability by some carefully designed techniques. While we know the SARSA is on-policy algorithm, and is inherently much more stable then Q-learning. So it will be worthwhile to try how SARSA performs in playing this game.

Linear function approximation will be considerred in addition to Neural Network here. Linear function approximation based on Fourier basis [2] will be implemented here. Fourier basis is mathematixally appealing with its solid math ground. I would like to see how well it can perform, and make a comparison with the deep model.

References

[1] Mnih, V. et al. *Human-level control through deep reinforcement learning.*Nature 518, 529-533 (2015).

[2] Georgia Konidaris et al. *Value Function Approximation in Reinforcement Learning using the Fourier Basis*, AAAI, 2011.