| **ECE-GY 9223 Reinforcement Learning** | Spring 2019 |
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| Research Project Proposal | |
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# 1 Introduction

In reinforcement learning, for small problems, the value function can be represented as a table. However, the large, probabilistic domains which arise in the real-world usually require coupling TD methods with a function approximator, which represents the mapping from state-action pairs to values via a more concise, parameterized function and uses supervised learning methods to set its parameters.

The goal is to automate the search for effective representations by employing sophisticated optimization techniques, with approach requires only 1) an evolutionary algorithm capable of optimizing representations from a class of functions and 2) a TD method that uses elements of that class for function approximation.

My work will focus on how to use different Policy Search Methods and reduce sample comlexity.

# 2 Motivation

TD methods could be combined with many different methods in the same way they are combined with evolutionary computation;

One disadvantage of evolutionary function approximation is its high sample complexity, since each fitness evaluation lasts for many episodes.

# 3 My Plan

(a) Mar.29th → Apr.15th: 2 weeks for reading and theoretical derivation,

(b) Apr.16th → Apr.29th: 1 week for implementation and simulation,

(c) Apr.30th → May.8th: 1 week for report writing and presentation.

# References

[1] Whiteson, Shimon, and Peter Stone. "Evolutionary function approximation for reinforcement learning." Journal of Machine Learning Research 7.May (2006): 877-917.