

## Capstone Project Spring 2024

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Title: Machine Learning Techniques Applied to Robust Optimal Control Problems

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This capstone project aims to optimize robust optimal control methodologies by integrating Approximate Dynamic Programming. Approximate Dynamic Programming (ADP) is a powerful technique to solve large-scale, discrete-time, multistage stochastic control processes. Focusing on the optimization of the Average Value-at-Risk (AVaR) function, the project seeks to enhance the adaptability and risk management capabilities of control systems in the face of uncertainties.

The project uses the strengths of approximate dynamic programming to solve the Optimal Control Problem using the Bellman Equations. Dynamic programming provides the foundational optimization structure.

The project will use Python as a primary coding tool and TensorFlow for some additional frameworks if needed.