

Development of Offline Reinforcement Learning Algorithms for Agent Training from Historical Data

Abstract

This project focuses on the development and implementation of Offline Reinforcement Learning (RL) algorithms capable of training intelligent agents using historical datasets without online interaction.

The project aims to design a modular and reproducible framework for training and evaluating offline RL agents using techniques such as Conservative Q-Learning (CQL) and Model-Based Policy Optimization (MBPO). Emphasis will be placed on handling sample inefficiency, hyperparameter sensitivity, and improving the generalization of trained agents to real-world dynamics.

The expected outcome is a reusable Python-based offline RL framework that supports training, evaluation, and comparison of algorithms on benchmark datasets, documentation and scripts providing a foundation for data-driven decision-making and safe control policy development without direct system interaction.

To successfully execute this project, students should have a basic foundation in Machine Learning and Deep Learning concepts, as well as a solid understanding of algorithm design techniques such as Greedy algorithms, Divide and Conquer, Dynamic Programming, and Computational Complexity Theory, which are essential for designing and

Academic Project Requirements:

1) Required No. of student(s) for academic project: 2

2) Name of course with branch/discipline: B.E./B.Tech. Computer Engineering/IT/MCA

3) Academic Project duration:

(a) Total academic project duration: 16 Weeks

(b) Student's presence at IPR for academic project work: 5 Full working Days per week

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