

Reinforcement Learning Assignment 3 Report

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The code is solving the Mountain Car issue using Sarsa Lambda and function approximation. It runs a simulation using a pre-computed weights, then it computes weights for the current run and outputs a plot of the reward as function on the steps.

Important Note about our features:

We started from "logical" features – but the model didn't converge well.

We've implemented a random search over the possible range of centers for our features.

The features that we are using came out the best from our random search.

Main methods:

sarsa_lambda: This function returns W, the best weights that it found, and policy evaluations along checkpoints.

For each episode we will initialize E, go to the initial state, and pick a first action. Then, for every step we will execute the action, and select a new action (that will be executed in the next step) using epsilon greedy policy. Then we will compute the delta of the error and update W accordingly. We will also update E because we have done a step. If the environment told us that we got to a terminal state, we will finish this episode and go to the next one. At every checkpoint we will call policy_eval function to evaluate the policy.

eps_greedy_policy: generates a random number. If it's below epsilon, do a random action. Else, do the best action given Q.

policy_eval: Evaluate the policy greedily and not epsilon greedily. This is very important – because we do not want to explore new actions while evaluating. The evaluation is the mean of the rewards over 100 runs.

get_features: Returns the vector of the value of features given a state. $\phi[i]$ is the value of the i-th feature given a state.

