SIT796 Reinforcement Learning

Pass Task 2.1: AI powered cleaning robot and value computation

Overview

1. You have learnt about the differences between reinforcement learning, supervised learning and unsupervised learning. In this task, consider a futuristic AI-powered cleaning robot for household cleaning chores. Discuss features you would incorporate into it. Discuss each feature and describe whether it would use supervised, unsupervised or reinforcement learning to achieve it. Make sure you include at least 1 feature for each learning type (i.e., at least 1 for supervised, 1 for unsupervised and 1 for reinforcement learning).
2. For each of these figures, the red arrows indicate the policy π. The optimal policy (which may or may not be indicated is denoted by π^*. Assuming a discount factor of $\gamma = 0.9$, find the discounted and undiscounted values of state 's' under the indicated policies. The reward for the treasure state is $r_T = 1$, and for every other state, it is $r_{other} = -0.1$.
   a) In Fig 1, what are the discounted and undiscounted values $V_\pi(s)$ and $V_{\pi^*}(s)$?

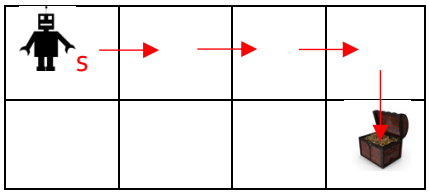

Fig 1.

   b) In Fig 2, what are the discounted and undiscounted values $V_\pi(s)$ and $V_{\pi^*}(s)$?

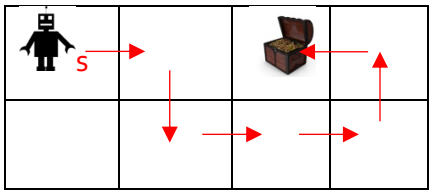

Fig 2.

Submission Details

For 1., feel free to be creative with regards to your robot's features. Aim to keep your submitted essay to at the most **500 words** in length. For 2., along with the final values, please also show how you worked out your values. You may refer to slide 35 of week 1 lecture notes for some clues.