

# EE466000 introduction to reinforcement learning

## Homework 2: Gridworld

Due: April 11, 2021 23:59

### Goal

The goal of this assignment helps you understand bellman equation.

### Todo

- Implement two algorithms:
  - ✓ bellman equation for  $v_{\pi}(s)$
  - ✓ optimal value function.

### Details

- File description
  - `hw2_ipynb.ipynb`: You'll implement two algorithms in the file.
- Gridworld environment

### Example Gridworld

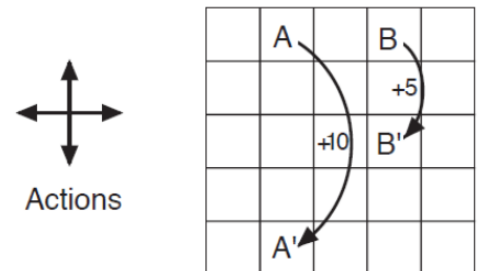
- State: cell of the grid
- Action: north, south, east, and west
- Reward:

Actions take the agent off the grid  $\rightarrow R=-1$  and its location unchanged

Actions move the agent out of A or B  $\rightarrow R= 10$  or  $5$ ,

its location is relocated to A' or B'

Other actions  $\rightarrow R=0$



3.3	8.8	4.4	5.3	1.5
1.5	3.0	2.3	1.9	0.5
0.1	0.7	0.7	0.4	-0.4
-1.0	-0.4	-0.4	-0.6	-1.2
-1.9	-1.3	-1.2	-1.4	-2.0

22.0	24.4	22.0	19.4	17.5
19.8	22.0	19.8	17.8	16.0
17.8	19.8	17.8	16.0	14.4
16.0	17.8	16.0	14.4	13.0
14.4	16.0	14.4	13.0	11.7

tables of two algorithms.

## Requirements and Installation

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- Python version: 3.6
- pip install matplotlib
- pip install numpy

## Report

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- **Title, name, student ID**
- **Implementation**
  - ✓ Briefly describe your implementation.
- **Experiments and Analysis**
  - ✓ Plot tables of two algorithms. (As example above)
  - ✓ Whether state values are reasonable?
  - ✓ Vary the discount rate( $\gamma$ ), what happens? please plot it.

## Reminder

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- Please upload your code main.py and report.pdf to iLMS before 4/11 (Sat.) 23:59. **No late submission allowed.**
- DO NOT zip your code into a single file.
- Please do not copy&paste the code from your classmates.
- Please **write a README file** to explain how to run your code if you implemented extra functions.