ENGS/QBS 108 Fall 2017 Assignment 4b

Due November 14, 2017

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This problem involves a Frozen Lake-type dynamic programming problem
The Canvas folder Assignments/hm4b contains 4 files.

- *Assignment4b1.mat, Assignment4b2.mat, and Assignment4b3.mat* describe three different Frozen Lake problems.
- After loading one of these files, run the *FrozenLake.m* to create two arrays: `FL` and `FLCost`.
- `FL` is a 4 dimensional array as follows. `FL(r,s,t,u)` is the probability of going in the direction specified by `u` given that the control/action is to move in the direction `t` when you are in cell `i,j`.
- `t` and `u` vary from 1 through 4 with the meaning that 1 is up, 2 is right, 3 is down and 4 is left.
- So entry `FL(2,5,3,2)` is the probability you move right given that your control/action is to move down. Note: If you are in the top row, you cannot move higher although you might select that action. If you are in the left column, you cannot move left although you might select that action.
- `FLCost` is an array of costs. You start in cell 1,1 and need to move to cell `n,n`. There is a large reward for arriving at `n,n`. Holes in the lake have large negative rewards (costs).
- Each of *Assignment4b1.mat, Assignment4b2.mat, and Assignment4b3.mat* include a seed for the random number generator so that all your generated problems are the same.

The problem is to find a optimal cost policy (highest reward) for going from 1,1 to `n,n`. Do not use any discount factor.

Your solutions will be submitted as policies so that for an `n` by `n` problem, you will submit an `n` by `n` array of integers between 1 and 4 called `yourname4b1.mat`, etc. That mat file should contain an array called '`policy` that is your solution.

There are no moves possible in cell `n,n`, just accumulating the large reward for getting there.

There are a variety of possible solution approaches. You can use any approach but implementing a Q-Learning approach using Tensorflow is worthwhile to learn how to use that technology.