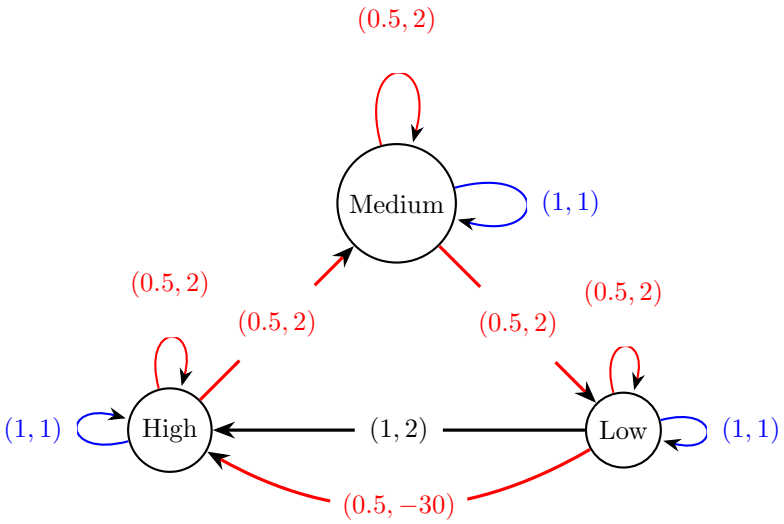
Homework 7

1 CoBot Recordings

Imagine that a CoBot in GHC has been given a new task to record TA office hours in Gates Commons, so we can use the data for insights into student help. It is able to record both audio and video data. Recording video is more useful, but it fills up the on board memory on the CoBot, whereas audio is streamed directly back to us. The three possible states the CoBot can be in, are the storage level remaining, which are High, Medium and Low. If the CoBot overfills its storage, it will lose all recorded data. The diagram below represents the MDP, where each action from any state is annotated with (Probability, Reward). Assume the discount factor we have is $\gamma = 0.9$. Assume all states are initialized to values of 0.

The red arrows represent the action *Take Video*, the blue arrows the action *Take Audio*, and the black arrow (from Low to High) the action ***Send Video***.



a) Perform two iterations of value iteration. Show your work for each iteration and the resulting values for each state.

b) Suppose we have an initial policy that always records audio. Perform one iteration of policy iteration. What is the new policy? Show your work.

2 Programming

Download this zip archive and visit Reinforcement Learning with Pacman for the programming assignment.

Please download the zip file we provide and **not** the one from the Berkeley website, since we make some adjustments to the autograder.

For this assignment, you are responsible for Questions 1, 3, 4, 5 and 7. You will not be graded on questions 2 and 6 (although we encourage you to think about them in any case). Question 8 can be completed for **extra credit**. Please bear this in mind when you run the autograder (without arguments), since it will be including your score for Question 8.

Please post any concerns or issues you encounter, on Piazza.

3 Handin

The files that are needed for handing in are `valueIterationAgents.py`, `qlearningAgents.py`, `analysis.py` as well as your answers to written questions `answers.pdf`. Please create a zip archive with exactly these 4 files, and submit the file via Autolab.