MDP

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This programming assignment was completed using Python v3.4 and PyQt v5.

Upon first running the program you will be given a screen like the one seen below.

This allows the user to customize the board, horizon, and gamma values. The horizon will accept values between -1 and 1000, where -1 represents solving for the infinite solution. You may edit the board values directly onto the board, any unexpected input will be ignored and the previous value that was registered to a given board position will be used. When the values have been set accordingly the user will click the 'Solve Current Puzzle' button. This is cause the screen shown below to appear.

This top third of this window shows what the board that drove the results looked like. The middle section gives the best possible direction to take once you are at a certain point. The bottom section gives the results of the value iteration function in each of the positions.

I have shown the values for the default board, horizon set to 7 and gamma = 1.00 below.

Expected Direction

Value Function

444.48	439.4	346.9	326.66
417.98	415.91	356.49	239.4
410.17	413.88	420.20	193.00
413.63	423.45	316.00	155.00

The results for infinite horizon and gamma = 0.95 are shown below.

Expected Direction

Value Function

2330.58	2453.18	2459.41	2578.44
2432.2	2562.44	2612.05	2644.49
2570.50	2711.14	2852.06	2779.49
2729.67	2882.28	2924.55	2936.82

This assignment has given me a great insight into way in which uncertain choices can be modeled and given a finite value for which to be a decision.

My favorite thing about this semester was the different style of class presentation and structure. I liked that every homework assignment was a programming assignment. I feel like when I do this I gain a much more complete understanding of how the algorithm works. I also appreciate the acknowledgement of other classes having large assignments due and being will to be flexible with due dates to work around any issues.

Sources:

Blackboard discussion board

http://isites.harvard.edu/fs/docs/icb.topic540049.files/cs181_lec03_handout.pdf, 11/25/14

http://ai.stanford.edu/~ang/papers/uai00-pegasus.pdf , 11/25/14

http://stackoverflow.com/questions/8337417/markov-decision-process-value-iteration-how-does-it-work 11/25/14