hw5_rl_q8_feature_based_representation_actions

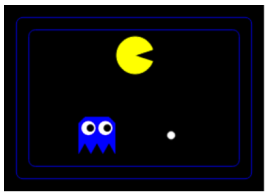
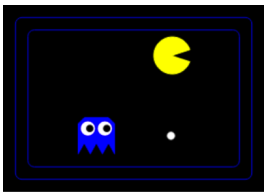
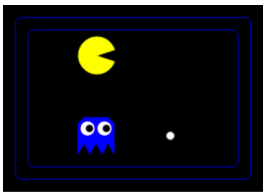
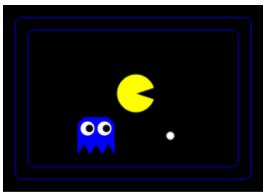
Question 8: Feature-Based Representation: Actions

6.0/6.0 points (graded)

Consider the two Pacman board states presented in two rows below. In each row, the agent considers possible actions to take; these are represented by the images. The agent is using feature-based representation to estimate the $Q(s,a)$ value of taking an action in a state, and the features the agent uses are:

- $f_0 =$ 1/(Manhattan distance to closest food + 1)
- $f_1 =$ 1/(Manhattan distance to closest ghost + 1)

For example, the feature representation $f(s = A, a = \mathbf{STOP}) = [1/4, 1/4]$.

State	a=STOP	a=RIGHT	a=LEFT	a=DOWN
A				
$f(s,a)$	[0.25, 0.25]	[1/3, 0.2]	[0.2, 1/3]	[1/3, 1/3]

The agent picks the action according to $\arg\max_a Q(s,a) = w^T f(s,a) = w_0 f_0(s,a) + w_1 f_1(s,a)$, where the features $f_i(s,a)$ are as defined above, and w is a weight vector. Using the weight vector $w = [0.2, 0.5]$, which action, of the ones shown above, would the agent take from state A?

- STOP

- RIGHT
- LEFT
- DOWN ✔

Using the weight vector $w = [0.2, -1]$, which action, of the ones shown above, would the agent take from state A?

- STOP
- RIGHT ✔
- LEFT
- DOWN ✔

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