Report

Rolno 1 : 2019101116
Roll no 2 : 2019115007

roll number choosen = 2019101116

$x = 1 - (((2019101116) \% 30 + 1)/100)$

$\boxed{x = 0.93}$

$y = (2019101116) \% 4 + 1$

$\boxed{y = 1}$

formula for pomdp

$$b'(s') = \alpha\, P(e|s') \sum P(s'|s,a) \cdot b(s)$$

α → normalizing; $P(e|s')$ → observational propability; $P(s'|s,a)$ → state movement propab; $b(s)$ → Previous belief; s is states that is assumed s' came from

→ Initial b = [0.33, 0, 0.333, 0, 0, 0.333]

Computing for 1st observation action is Right and observed is Green

for (s1)

$p(e/s') = P(O=G/S=R) = 1-0.95 = 0.05$

$$\Rightarrow Ub'(s'=1) = 0.005 \times \begin{bmatrix} 0.07 \times 1/3 \\ 0.07 \times 0 \\ 0 \times 1/3 \\ 0 \times 0 \\ 0 \times 0 \\ 0 \times 1/3 \end{bmatrix} = 0.0011$$

$$\Rightarrow Ub'[s'=2] = 0.8 \times [0.93 \times 1/3 + 0 \times 0 + 0.07 \times \tfrac{1}{3} + 0 \times 0 + 0 \times 0 + 0 \times \tfrac{1}{3}]$$

$$= 0.267$$

$$Ub[S_3] = 0.05 \times \left[0 \times 0.333 + 0.93 \times 0 + 0 \times \frac{1}{3} + 0.07 \times 0 + 0 \times 0 + 0 \times \frac{1}{3} \right]$$

$$= 0$$

$$Ub[S_4] = 0.8 \times \left[0 \times \frac{1}{3} + 0 \times 0 + 0.93 \times \frac{1}{3} + 0 \times 0 + 0.07 \times 0 + 0 \times \frac{1}{3} \right]$$

$$= 0.248$$

$$Ub[S_5] = 0.8 \times \left[0 \times \frac{1}{3} + 0 \times 0 + 0 \times \frac{1}{3} + 0.93 \times 0 + 0 \times 0 + 0.07 \times \frac{1}{3} \right]$$

$$= 0.019$$

$$Ub[S_6] = 0.05 \times \left[0 \times \frac{1}{3} + 0 \times 0 + 0 \times \frac{1}{3} + 0 \times 0 + 0.93 \times 0 + 0.93 \times \frac{1}{3} \right]$$

$$= 0.016$$

after normalising

$$Ub = \left[\frac{0.001}{0.55}, \frac{0.267}{0.55}, 0, \frac{0.248}{0.55}, \frac{0.019}{0.55}, \frac{0.016}{0.55} \right]$$

$$Ub = [0.0021, 0.4848, 0, 0.45, 0.0339, 0.0281]$$

for action left and Observation Red

$Ub'[S_1] = 0.95 \times [0.93 \times 0.021 + 0.93 \times 0.48 + 0 \times 0 + 0 \times 0.45 + 0 \times 0.03 + 0 \times 0.028]$

$= 0.4302$

$Ub'[S_2] = 0.2 \times [0.07 \times 0.0021 + 0 \times 0.48 + 0.93 \times 0 + 0 \times 0.45 + 0 \times 0.033 + 0 \times 0.282]$

$= 0$

$Ob'[S_3] = 0.95 \times [0 + 0\ 0021 + 0.07 \times 0.48 + 0 \times 0 + 0.93 \times 0.45 + 0 \times 0.03 + 0 \times 0.02]$

$= 0.4306$

$Ub'[S_4] = 0.2 \times [0 \times 0.0021 + 0 \times 0.4848 + 0.07 \times 0 + 0 \times 0.4509 + 0.93 \times 0.033 + 0 \times 0.028]$

$Ub'[S_5] = 0.2 \times [0 \times 0.0021 + 0 \times 0.48 + 0 \times 0 + 0.07 \times 0.45 + 0 \times 0.033 + 0.93 \times 0.028]$

$= 0.0115$

$Ub'[S_6] = 0.95 \times [0 \times 0.02 + 0 \times 0.48 + 0 \times 0 + 0 \times 0.4509 + 0.07 \times 0.03 + 0.07 \times 0.028]$

$= 0.0041$

~~for~~
before normalising

$Ub = [0.43, 0, 0.47, 0.0063, 0.0015, 0.0041]$

after normalising

$b = [0.487, 0, 0.48, 0.007, 0.013, 0.0046]$

For action left and observation Green

$Ub'[S_1] = 0.05 \times (0.93 \times 0.487 + 0.93 \times 0 + 0 \times 0.487 +$
$0.0 \times 0.0072 + 0 \times 0.013 + 0 \times 0.0047)$

$= 0.0226$

$Ub'[S_2] = 0.8 \times [0.07 \times 0.487 + 0 \times 0 + 0.93 \times 0.487$
$+ 0 \times 0.0072 + 0 \times 0.13 + 0 \times 0.0047]$

$= 0.3901$

$Ub'[S_3] = 0.05 \times [0 \times 0.487 + 0.07 \times 0 + 0 \times 0.487 + 0.93 \times 0.0072$
$+ 0 \times 0.0131 + 0 \times 0.0047]$

$= 0.0003$

$Ub'[S_4] = 0.1 \times (0 \times 0.487 + 0 \times 0 + 0.07 \times 0.48 + 0 \times 0.072$
$+ 0.93 \times 0.0131 + 0 \times 0.0047)$

$= 0.037$

$$\omega b'(S_5) = 0.8 \times [0 \times 0.487 + 0 \times 0 + 0 \times 0.487 + 0.007 \times 0.0072 + 0 \times 0.013 + 0.93 \times 0.0047]$$

$$= 0.0038$$

$$\omega b'[S_6] = 0.05 \times [0 \times 0.487 + 0 \times 0 + 0 \times 0.487 + 0 \times 0.0072 + \cancel{0.48}\ 0.07 \times 0.013 + 0.07 \times 0.0047]$$

$$= 0$$

after normalising

$$b = \left[\frac{0.0227}{0.4542}, \frac{0.3902}{0.4542}, \frac{0.0003}{0.4542}, \frac{0.0371}{0.4542}, \frac{0.0037}{0.4542}, \frac{0.0001}{0.4542} \right]$$

$$\Rightarrow b = [0.0498, 0.8591, 0.0007, 0.0815, 0.0085, 0.0001]$$