

c166f19.quiz3.HMM- Requires Respondus LockDown Browser

Due No due date **Points** 20 **Questions** 10

Available Nov 19 at 11am - Nov 19 at 12:30pm about 2 hours

Time Limit None

Requires Respondus LockDown Browser

This quiz was locked Nov 19 at 12:30pm.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	44 minutes	10 out of 20

❗ Correct answers are hidden.

Score for this quiz: **10** out of 20

Submitted Nov 19 at 11:48am

This attempt took 44 minutes.

Incorrect

Question 1

2 / 2 pts

Given the following HMM:

X	P(X)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1		

1

0.6

0.4

If no sensor data was received, calculate the stationary distribution, and provide the value to two decimal points for $P(X_{\infty}=0)$:

0.88

Question 2

2 / 2 pts

Given the following HMM:

X	P(X)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

If no sensor data was received, calculate the stationary distribution, and provide the value to two decimal points for $P(X_{\infty}=1)$:

0.11

Question 3

2 / 2 pts

Given the following HMM:

X	P(x_0)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

Calculate the following probability for time step 1 before seeing any evidence to 2 decimal places:

$$P(X_1=0) =$$

Question 4

2 / 2 pts

Given the following HMM:

X	P(x_0)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)

0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

Calculate the following probability for time step 1 before seeing any evidence to 2 decimal places:

$$P(X_1=1) =$$

Incorrect

Question 5

0 / 2 pts

Given the following HMM:

X	P(x_0)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

If our sensor detects $E=1$ at time step 1, what is our belief vector for time step 1 to three decimal points:

$$P(X_1=0) =$$

Incorrect

Question 6

0 / 2 pts

Given the following HMM:

X	P(x_0)
0	0.1
1	0.9

X	P($X'=0 X$)	P($X'=1 X$)
0	0.9	0.1
1	0.8	0.2

X	P($E=0 X$)	P($E=1 X$)
0	0.9	0.1
1	0.6	0.4

If our sensor detects $E=1$ at time step 1, what is our belief vector for time step 1 to three decimal points:

$$P(X_1=1) =$$

Incorrect

Question 7

0 / 2 pts

Given the following HMM and a random number generator that generates the random sequence as listed in table, use the Particle Filtering Algorithm process to update the following particles assuming that no evidence is seen, then provide the new state value for Particle 1.

HMM

X	P(X)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

PARTICLES

Particle #	Particle Old Value	Random Number	Particle New Value
1	0	0.45	
2	1	0.10	
3	0	0.50	
4	0	0.95	
5	1	0.85	

Provide the new state value for Particle 1:

Question 8**2 / 2 pts**

Given the following HMM and a random number generator that generates the random sequence as listed in table, use the Particle Filtering Algorithm process to update the following particles assuming that no evidence is seen, then provide the new state value for Particle 1.

HMM

X	P(X)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

PARTICLES

Particle #	Particle Old Value	Random Number	Particle New Value
1	0	0.45	
2	1	0.10	
3	0	0.50	
4	0	0.95	
5	1	0.85	

Provide the new state value for Particle 5:

0

Incorrect

Question 9**0 / 2 pts**

Given the following HMM and a random number generator that generates the random sequence as listed in table, use the Particle Filtering Algorithm process to update the following particles given the evidence seen at time step 1 is $E=1$, then provide the new weight value for Particle 1 before resampling.

HMM

X	P(X)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

PARTICLES

Particle #	Particle Old Value	Random Number	Particle New Value	New Particle Weight
1	0	0.45		
2	1	0.10		
3	0	0.50		
4	0	0.95		
5	1	0.85		

Provide the weight for the new particle 1:

Incorrect

Question 10

0 / 2 pts

Given the following HMM and a random number generator that generates the random sequence as listed in table, use the Particle Filtering Algorithm process to update the following particles given the evidence seen at time step 1 is $E=1$, then provide the new weight value for Particle 5 before resampling.

HMM

X	P(X)
0	0.1
1	0.9

X	P(X'=0 X)	P(X'=1 X)
0	0.9	0.1
1	0.8	0.2

X	P(E=0 X)	P(E=1 X)
0	0.9	0.1
1	0.6	0.4

PARTICLES

Particle #	Particle Old Value	Random Number	Particle New Value	New Particle Weight
1	0	0.45		
2	1	0.10		
3	0	0.50		
4	0	0.95		
5	1	0.85		

Provide the weight for the new particle 5:

Quiz Score: **10** out of 20