Started on	Friday, 4 June 2021, 11:24 AM
State	Finished
Completed on	Saturday, 5 June 2021, 12:41 AM
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Grade	**6.33** out of 10.00 (**63**%)

Question **1**

Correct

Mark 3.00 out of 3.00

Suppose you want to apply the k-means algorithm with k = 2 to the dataset below consisting of 2D points. The initial cluster centres are $\mu_1 = (0.5, 0.3)$ and $\mu_2 = (0.8, 0.4)$.

x_1	x_2
0.2	0.4
0.7	0.3
0.3	0.6
0.6	0.1

Compute one iteration of the k-means algorithm and give the new cluster centres.

Select one:

- a. $\mu_1 = (0.2, 0.4)$ and $\mu_2 = (0.53, 0.33)$
- b. $\mu_1 = (0.37, 0.37)$ and $\mu_2 = (0.7, 0.3)$ ✔
- c. $\mu_1 = (0.45, 0.35)$ and $\mu_2 = (0.45, 0.35)$
- d. $\mu_1 = (0.37, 0.37)$ and $\mu_2 = (0.8, 0.4)$
- e. $\mu_1 = (0.5, 0.3)$ and $\mu_2 = (0.8, 0.4)$
- f. $\mu_1 = (0.4, 0.25)$ and $\mu_2 = (0.5, 0.45)$
- g. $\mu_1 = (0.4, 0.43)$ and $\mu_2 = (0.6, 0.1)$
- h. $\mu_1 = (0.25, 0.5)$ and $\mu_2 = (0.65, 0.2)$

Question **2**

Incorrect

Mark 0.00 out of 3.00

Consider the 3D data given in the table below:

x1	x2	x3
4.39	1.59	4.54
3.82	1.82	3.99
7.66	2.95	7.29
7.95	2.55	7.22
1.87	0.68	2.50
4.90	1.97	5.38
4.46	2.30	5.07
6.46	2.28	5.65
7.09	2.71	6.41
7.55	2.49	6.52

Apply PCA to this data. Select the principal eigenvector below.

Note: some implementations give negative eigenvectors and others positive. In this case if your answer is v, then -v is also valid.

Select one:

- a. (0.70, 0.26, 0.67)
- b. (-0.42, 0.62, 0.67)
- c. (0.24, 0.22, 0.41, 0.41, 0.12, 0.28, 0.26, 0.33, 0.37, 0.38)
- d. (0.91, 0.33, 0.26)
- e. (0.06, -0.71, 0.70) ✖
- f. (-0.16, -0.27, -0.03, 0.27, -0.34, -0.38, -0.56, 0.27, 0.14, 0.40)
- g. (-0.21, -0.30, 0.37, 0.38, -0.64, -0.08, -0.14, 0.10, 0.24, 0.28)
- h. (0.24, 0.58, 0.78)
- i. (0.78, 0.24, 0.58)
- j. (-0.71, 0.33, 0.62)
- k. (0.06, 0.91, -0.41)

Question **3**

Correct

Mark 2.00 out of 2.00

Consider the following confusion matrix given by a classifier:

		Predicted	
		X	**Not X**
Really	**X**	16	7
	Not X	12	35

Choose the correct answers for the accuracy A and recall R of this classifier.

Select one or more:

- a. A = 0.33
- b. A = 0.70
- c. R = 0.26
- d. A = 0.40
- e. R = 0.57
- f. R = 0.30
- g. A = 0.73 ✔
- h. R = 0.70 ✔

Question **4**

Partially correct

Mark 1.33 out of 2.00

Select all the statements below about reinforcement learning that are TRUE.

Select one or more:

- a. TD learning involves updating an estimate of the value of the state every time you visit that state. ✔
- b. Value iteration is useful for solving MDPs when the transition dynamics and reward function are unknown.
- c. Discounting is important to ensure convergence of rewards in non-terminating trajectories.
- d. A policy is any way to choose actions in states that gives you the maximum rewards.
- e. The Bellman equation allows us to define a recursive relationship between the values of different states. ✔
- f. ϵ-greedy action selection reduces the chance of you choosing a bad action at each step while learning.

◄ Quiz 2: Linear and logistic regression, and neural networks

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Quiz 4: Whole course ►