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Quiz 3

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1

1.0/1.0 point (graded)

Three urns contain 6 red, 4 black; 4 red, 6 black, and 5 red, 5 black balls respectively. One of the urns is selected at random and a ball is drawn from it. If the ball drawn is red, find the probability that it is drawn from the first urn

- ● $\frac{2}{5}$
- ○ $\frac{1}{5}$
- ○ $\frac{3}{5}$
- ○ $\frac{1}{3}$

✓

Submit

2

1.0/1.0 point (graded)

The Naïve Bayes assumption can be verbally expressed as

- ○ The features are independent
- ● The features are conditionally independent given the label
- ○ The labels are independent
- ○ The labels are conditionally independent given the feature

✓

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3

1.0/1.0 point (graded)

The probability $p(y = 1)$ can be evaluated as

- ○ $1 - \frac{\sum_{i=1}^{M} 1(y(i)=1)}{N}$
- ○ $\frac{\sum_{i=1}^{M} 1(y(i)=0)}{M}$
- ○ $\frac{\sum_{i=1}^{M} 1(x_j(i)=1, y(i)=1)}{N}$
- ● $1 - \frac{\sum_{i=1}^{M} 1(y(i)=0)}{M}$

✓

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4

1.0/1.0 point (graded)

Given a new observation $\bar{\mathbf{x}} = \bar{\mathbf{v}}$, it can be labeled as belonging to the class $y = 1$ if

○ $\prod_{j=1}^{N} p(x_j = v_j | y = 1) > \prod_{j=1}^{N} p(x_j = v_j | y = 0)$

● $\frac{\prod_{j=1}^{N} p(x_j=v_j|y=1)\times p(y=1)}{p(\bar{\mathbf{x}}=\bar{\mathbf{v}})} > \frac{\prod_{j=1}^{N} p(x_j=v_j|y=0)\times p(y=0)}{p(\bar{\mathbf{x}}=\bar{\mathbf{v}})}$

○ $\frac{\prod_{j=1}^{N} p(x_j=v_j|y=1)}{p(y=1)} > \frac{\prod_{j=1}^{N} p(x_j=v_j|y=0)}{p(y=0)}$

○ $\frac{p(y=1)}{\prod_{j=1}^{N} p(x_j=v_j|y=1)} > \frac{p(y=0)}{\prod_{j=1}^{N} p(x_j=v_j|y=0)}$

✓

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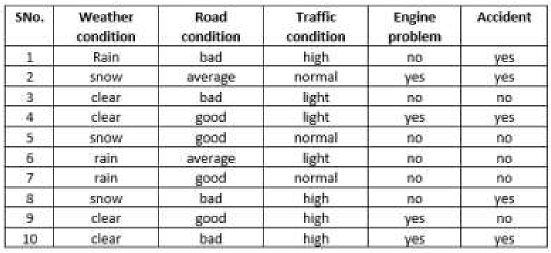
5

1.0/1.0 point (graded)

Compute $Q1$ for accident occurring with rainy weather over a bad road with high traffic and no engine problem



SNo.	Weather condition	Road condition	Traffic condition	Engine problem	Accident
1	Rain	bad	high	no	yes
2	snow	average	normal	yes	yes
3	clear	bad	light	no	no
4	clear	good	light	yes	yes
5	snow	good	normal	no	no
6	rain	average	light	no	no
7	rain	good	normal	no	no
8	snow	bad	high	no	yes
9	clear	good	high	yes	no
10	clear	bad	high	yes	yes

○ $\frac{12}{1250}$

● $\frac{18}{1250}$

○ $\frac{18}{2500}$

○ $\frac{12}{2500}$

✓

Submit

6

1.0/1.0 point (graded)

Unsupervised learning

● Requires data, but NO labels

○ Both data and labels

○ Neither data nor labels

○ Labels but not data

✓

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7

1.0/1.0 point (graded)

The cluster assignment indicators $\alpha_i(j)$ for K-means satisfy

○ $\sum_{i=1}^{K} \alpha_i(j) = 1, 0 \leq \alpha_i(j) \leq 1$

○ $\sum_{j=1}^{M} \alpha_i(j) = 1, 0 \leq \alpha_i(j) \leq 1$

● $\sum_{i=1}^{K} \alpha_i(j) = 1, \alpha_i(j) \in \{0,1\}$

○ $\sum_{j=1}^{M} \alpha_i(j) = 1, \alpha_i(j) \in \{0,1\}$

✓

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8

1.0/1.0 point (graded)

The K-means algorithm is imported in PYTHON as

○ from sklearn.algorithms import KMeans

○ from sklearn import KMeans

○ from sklearn.datasets import KMeans

● from sklearn.cluster import KMeans

✓

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9

1.0/1.0 point (graded)

Given the data below, determine the **centroids**

$$\bar{\mathbf{x}}(1) = \begin{bmatrix}-2\\-4\end{bmatrix}, \bar{\mathbf{x}}(2) = \begin{bmatrix}-4\\-2\end{bmatrix} \in \mathcal{C}_0$$

$$\bar{\mathbf{x}}(3) = \begin{bmatrix}4\\1\end{bmatrix}, \bar{\mathbf{x}}(4) = \begin{bmatrix}2\\3\end{bmatrix} \in \mathcal{C}_1$$

○ $\bar{\boldsymbol{\mu}}_1 = \begin{bmatrix}1\\-\frac{3}{2}\end{bmatrix}, \bar{\boldsymbol{\mu}}_0 = \begin{bmatrix}-1\\\frac{1}{2}\end{bmatrix}$

● $\bar{\boldsymbol{\mu}} = \begin{bmatrix}-3\end{bmatrix}, \bar{\boldsymbol{\mu}} = \begin{bmatrix}3\end{bmatrix}$

$\bar{\mu}_1 = \begin{bmatrix} \\ -3 \end{bmatrix}, \bar{\mu}_0 = \begin{bmatrix} \\ 2 \end{bmatrix}$

○ $\bar{\mu}_0 = \begin{bmatrix} -2 \\ -3 \end{bmatrix}, \bar{\mu}_1 = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$

○ $\bar{\mu}_0 = \begin{bmatrix} -6 \\ -6 \end{bmatrix}, \bar{\mu}_1 = \begin{bmatrix} 6 \\ 4 \end{bmatrix}$

✓

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10

1.0/1.0 point (graded)

Given the data $\bar{\mathbf{x}}(1) = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$, and centroids below

$$\bar{\mu}_0 = \begin{bmatrix} -2 \\ -1 \end{bmatrix}, \bar{\mu}_1 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

It follows that

○ $\alpha_0(0) = 0, \alpha_1(0) = 1$

● $\alpha_0(1) = 0, \alpha_1(1) = 1$

○ $\alpha_0(1) = 1, \alpha_1(1) = 0$

○ $\alpha_0(0) = 1, \alpha_1(0) = 0$

✓

Submit

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