Unit 6 - Week 4

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Assignment 4

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-08-28, 23:59 IST.

1) Given a set of real values, called $x_1, x_2, \dots \dots . x_n$. Each sampled from probability density function, $p(x)$ which has the following form: $p(x) = \begin{cases} \alpha\, e^{-\alpha x}, if\ x \geq 0 \\ 0, \quad otherwise \end{cases}$

Where α is an unknown parameter. Which of the following expressions is the maximum likelihood estimation of α ? (Assume that in our sample, all x_i are large than 1)

1 point

a) $\frac{\sum_{i=1}^{n} \log x_i}{n}$
b) $\frac{n}{\sum_{i=1}^{n} x_i}$
c) $\frac{\sum_{i=1}^{n} x_i}{n}$
d) $\frac{n}{\sum_{i=1}^{n} \log x_i}$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
b)

2) Incase of 2 class problem, where the feature vectors are $\boldsymbol{X} = [x_1, x_2, \dots \dots x_d]^t$, $x_i = 0/1, P_i = Pr[x_i = 1|\omega_1]$, $q_i = Pr[x_i = 1|\omega_2]$, the likelihood ratio can be expressed as?

1 point

a) $\frac{P(X|\omega_1)}{P(X|\omega_2)} = \prod_{i=1}^{d} \left(\frac{p_i}{q_i}\right)^{2x_i} \left(\frac{1-q_i}{1-p_i}\right)^{1-x_i}$
b) $\frac{P(X|\omega_1)}{P(X|\omega_2)} = \prod_{i=1}^{d} \left(\frac{p_i}{q_i}\right)^{x_i} \left(\frac{1-p_i}{1-q_i}\right)^{1-x_i}$
c) $\frac{P(X|\omega_2)}{P(X|\omega_1)} = \prod_{i=1}^{d} \left(\frac{2p_i}{q_i}\right)^{1-x_i} \left(\frac{q_i}{p_i}\right)^{x_i}$
d) $\frac{P(X|\omega_2)}{P(X|\omega_1)} = \prod_{i=1}^{d} \left(\frac{p_i}{2q_i}\right)^{1-x_i} \left(\frac{q_i}{p_i}\right)^{x_i}$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
b)

3) Find the maximum likelihood estimate of the of univariate Gaussian Density Function, $p(x_k|\theta) = \frac{1}{\sqrt{2\pi\theta_2}} \exp\left[-\frac{(x_k-\theta_1)^2}{2\sigma^2}\right]$ with respect to the parameter vector θ_1.

1 point

a) $\hat{\theta}_1 = \sum_{k=1}^{n} x_k$
b) $\hat{\theta}_1 = \sum_{k=1}^{n} {x_k}^2$
c) $\hat{\theta}_1 = \frac{1}{n}\sum_{k=1}^{n} x_k$
d) $\hat{\theta}_1 = \frac{1}{n}\sum_{k=1}^{n} ln\ x_k$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
c)

4) Find the maximum likelihood estimate in Q-4 with respect to the parameter vector θ_2.

1 point

a) $\hat{\theta}_2 = \sum_{k=1}^{n} (x_k - \hat{\theta}_1)^2$
b) $\hat{\theta}_2 = \sum_{k=1}^{n} x_k - \hat{\theta}_1$
c) $\hat{\theta}_2 = \frac{1}{n}\sum_{k=1}^{n} (x_k - \hat{\theta}_1)^2$
d) $\hat{\theta}_2 = \frac{1}{n}\sum_{k=1}^{n} ln\ (x_k - \hat{\theta}_1)^2$

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
c)

5) Technique/(s) for probability density function estimation includes?

1 point

a) Histogram technique
b) Kernel based estimation
c) Both (a) and (b) are correct.
d) Neither (a) nor (b) are correct

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
c)

6) Parametric representation of Gaussian probability density function is given by?

1 point

a) radius and center
b) mean and variance
c) standard deviation
d) centroid and height

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
b)

7) Exponential distribution $p(x) = \begin{cases} \lambda\, e^{-\lambda x}, if\ x \geq 0 \\ 0, \quad if\ x < 0 \end{cases}$ is defined by the parameter/(s)?

1 point

a) only λ
b) only e
c) both λ and e
d) neither λ nor e

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a)

8) The shape of Poisson probability distribution function $p(k, \lambda) = \frac{\lambda^k e^{-\lambda}}{k!}$ is internally defined by the parameter?

1 point

a) λ , k and e
b) λ and k
c) only λ
d) both λ and e

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
c)

9) Kernel based technique is used for

1 point

a) weight adjustment
b) probability density function estimation
c) both (a) and (b)
d) neither (a) nor (b)

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
b)

10) The log-normal distribution is given as-

1 point

a) $p(x) = \frac{1}{2\sigma\sqrt{2\pi}} exp\left[-\frac{(ln\, x-\mu)^2}{2\sigma^2}\right]$
b) $p(x) = \frac{1}{2\sigma\sqrt{2\pi}} exp\left[-\frac{(ln\, x-\mu)^2}{2}\right]$
c) $p(x) = \frac{1}{2\sqrt{2\pi}} exp\left[-\frac{(ln\, x-\mu)^2}{\sigma}\right]$
d) None of these

- a)
- b)
- c)
- d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a)