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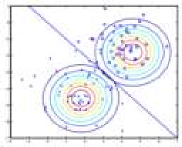
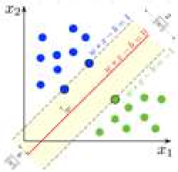
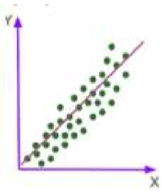
Q1

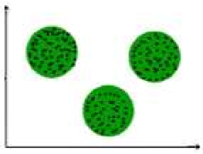
1.0/1.0 point (graded)

Which of the following images shows a support vector machine?









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Q2

1.0/1.0 point (graded)

General structure of a hyperplane is

- $\bar{\mathbf{x}}^T\bar{\mathbf{x}} = b$
- $\bar{\mathbf{a}}^T\bar{\mathbf{x}} = b$
- $\bar{\mathbf{x}}^T\bar{\mathbf{x}} \leq b$
- $\bar{\mathbf{a}}^T\bar{\mathbf{x}} \geq b$

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Q3

1.0/1.0 point (graded)

General structure of a halfspace is

- $\bar{\mathbf{x}}^T\bar{\mathbf{x}} = b$

- ( ) $\bar{\mathbf{a}}^T \bar{\mathbf{x}} = b$
- ( ) $\bar{\mathbf{x}}^T \bar{\mathbf{x}} \leq b$
- (•) $\bar{\mathbf{a}}^T \bar{\mathbf{x}} \geq b$

✔

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Q4

0.0/1.0 point (graded)

The modified optimization problem for linear classification

- ( ) Separates both classes by a **slab**
- ( ) Separates both classes by a **sphere**
- ( ) Separates both classes by a **ellipsoid**
- (•) Separates both classes by a **hyperplane**

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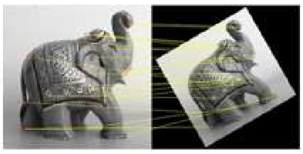
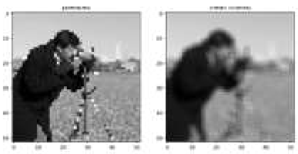
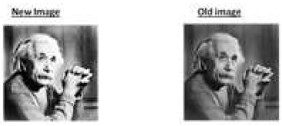
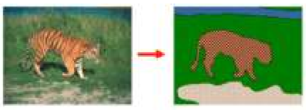
Q5

1.0/1.0 point (graded)

Which for the following shows image segmentation

- ( ) 
- ( ) 
- ( ) 

- (•) 

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Q6

1.0/1.0 point (graded)

What is the margin between two hyperplanes?

$$\bar{\mathbf{a}}^T \bar{\mathbf{x}} = c_1$$
$$\bar{\mathbf{a}}^T \bar{\mathbf{x}} = c_2$$

- ( ) $\frac{||\bar{\mathbf{a}}||}{|c_1 - c_2|}$
- ( ) $\frac{|c_1^2 - c_2^2|}{||\bar{\mathbf{a}}||}$
- ( ) $\frac{|c_1 - c_2|}{||\bar{\mathbf{a}}||^2}$
- (•) $\frac{|c_1 - c_2|}{||\bar{\mathbf{a}}||}$

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Q7

1.0/1.0 point (graded)

What is the distance between the two hyperplanes given below

$$x_1 + \sqrt{2}x_2 + \sqrt{3}x_3 + \cdots + \sqrt{N}x_N = 1$$
$$x_1 + \sqrt{2}x_2 + \sqrt{3}x_3 + \cdots + \sqrt{N}x_N = -1$$

- ( ) $\frac{2}{\sqrt{N(N+1)}}$
- (•) $\frac{2\sqrt{2}}{\sqrt{N(N+1)}}$
- ( ) $\frac{2}{\sqrt{\frac{N(N+1)(2N+1)}{6}}}$
- ( ) $\frac{1}{2\sqrt{\frac{N(N+1)(2N+1)}{6}}}$

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Q8

1.0/1.0 point (graded)

SVM can be imported for classification in PYTHON as

- ( ) from sklearn.svm import SVM
- ( ) from sklearn import SVC
- (•) from sklearn.svm import SVC
- ( ) from sklearn import SVM

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Q9

1.0/1.0 point (graded)

Kernel SVM with sigmoid kernel can be loaded in PYTHON as

- ( ) ksvmc = SVM(kernel = 'sigmoid', random_state = 0)
- ( ) ksvmc = support_vector_machine(sigmoid, random_state = 0)
- (●) ksvmc = SVC(kernel = 'sigmoid', random_state = 0)
- ( ) ksvmc = support_vector_classifier(sigmoid, random_state = 0)

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Q10

1.0/1.0 point (graded)

The optimization problem to determine the support vector classifier is

- ( ) $$\min \frac{1}{\|\bar{\mathbf{a}}\|_2}$$
  $$\mathcal{C}_0 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \geq 1,\ 1 \leq i \leq M$$
  $$\mathcal{C}_1 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \leq -1,\ M+1 \leq i \leq 2M$$
- ( ) $$\min \|\bar{\mathbf{a}}\|_2$$
  $$\mathcal{C}_0 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \leq 1,\ 1 \leq i \leq M$$
  $$\mathcal{C}_1 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \geq -1,\ M+1 \leq i \leq 2M$$
- (●) $$\min \|\bar{\mathbf{a}}\|_2$$
  $$\mathcal{C}_0 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \geq 1,\ 1 \leq i \leq M$$
  $$\mathcal{C}_1 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \leq -1,\ M+1 \leq i \leq 2M$$
- ( ) $$\min \frac{1}{\|\bar{\mathbf{a}}\|_2}$$
  $$\mathcal{C}_0 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \leq 1,\ 1 \leq i \leq M$$
  $$\mathcal{C}_1 : \bar{\mathbf{a}}^T \bar{\mathbf{x}}_i + b \geq -1,\ M+1 \leq i \leq 2M$$

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