

SMAI-M20-Lec 20 Review questions

IIIT Hyderabad

September 25, 2020

Review Question - I (one, none or more correct)

1. Consider the following three samples and their labels $((x_1, x_2), y)$:

$$\{((1, 1), +), ((2, 2), -), ((0, 0), +)\}$$

Look at the perceptron update rule with $\eta = 0.1$

$$\mathbf{w}^{k+1} \leftarrow \mathbf{w}^k + \eta \sum_{\mathbf{x}_i \in \mathcal{E}} y_i \mathbf{x}_i$$

Classify as + ve if $\mathbf{w}^T \mathbf{x} \geq 0$ else - ve. Start $\mathbf{w}^0 = [-1, -1, 4]^T$. Find \mathbf{w}^1 ?

- 1.1 \mathbf{w}^1 is independent of η
- 1.2 \mathbf{w}^1 is parallel to \mathbf{w}^0 , but different.
- 1.3 \mathbf{w}^1 will be the same as \mathbf{w}^0
- 1.4 Algorithm has converged. \mathbf{w}^2 will be the same as \mathbf{w}^1
- 1.5 None of the above

Ans: E

Review Question - II (one, none or more correct)

Consider the following three samples and their labels $((x_1, x_2), y)$:

$$\{((1, 1), +), ((2, 2), -), ((0, 0), +)\}$$

Look at the perceptron update rule with $\eta = 0.1$

$$\mathbf{w}^{k+1} \leftarrow \mathbf{w}^k + \eta \sum_{\mathbf{x}_i \in \mathcal{E}} y_i \mathbf{x}_i$$

Classify as + ve if $\mathbf{w}^T \mathbf{x} \geq 0$ else - ve.

Start $\mathbf{w}^0 = [-1, -1, 2]^T$. Find \mathbf{w}^1 ?

1. \mathbf{w}^1 is independent of η
2. \mathbf{w}^1 is parallel to \mathbf{w}^0 , but different.
3. \mathbf{w}^1 will be the same as \mathbf{w}^0
4. \mathbf{w}^2 will be the same as \mathbf{w}^1
5. None of the above

Ans: E

Review Question - III (one, none or more correct)

Consider the following three samples and their labels $((x_1, x_2), y)$:

$$\{((1, 1), +), ((2, 2), -), ((0, 0), +)\}$$

Look at the perceptron update rule with $\eta = 0.1$

$$\mathbf{w}^{k+1} \leftarrow \mathbf{w}^k + \eta \sum_{\mathbf{x}_i \in \mathcal{E}} y_i \mathbf{x}_i$$

Classify as + ve if $\mathbf{w}^T \mathbf{x} \geq 0$ else - ve.

Start $\mathbf{w}^0 = [-1, -1, 1.9]^T$. Find \mathbf{w}^1 ?

1. \mathbf{w}^1 is independent of η
2. \mathbf{w}^1 is parallel to \mathbf{w}^0 , but different.
3. \mathbf{w}^1 will be the same as \mathbf{w}^0
4. \mathbf{w}^2 will be the same as \mathbf{w}^1
5. None of the above

Ans: E

Review Question -IV (one, none or more correct)

Consider the following three samples and their labels $((x_1, x_2), y)$:

$$\{((1, 1), +), ((2, 2), -), ((0, 0), +)\}$$

Look at the perceptron update rule with $\eta = 0.1$

$$\mathbf{w}^{k+1} \leftarrow \mathbf{w}^k + \eta \sum_{\mathbf{x}_i \in \mathcal{E}} y_i \mathbf{x}_i$$

Classify as + ve if $\mathbf{w}^T \mathbf{x} \geq 0$ else - ve.

Start $\mathbf{w}^0 = [1, -1, 0]^T$. Find \mathbf{w}^1 ?

1. \mathbf{w}^1 is independent of η
2. \mathbf{w}^1 is parallel to \mathbf{w}^0 , but different.
3. \mathbf{w}^1 will be the same as \mathbf{w}^0
4. \mathbf{w}^2 will be the same as \mathbf{w}^1
5. None of the above

Ans: ACD

Review Question -V (one, none or more correct)

Consider the following three samples and their labels $((x_1, x_2), y)$:

$$\{((1, 1), +), ((2, 2), -), ((0, 0), +)\}$$

Look at the perceptron update rule with $\eta = 0.1$

$$\mathbf{w}^{k+1} \leftarrow \mathbf{w}^k + \eta \sum_{\mathbf{x}_i \in \mathcal{E}} y_i \mathbf{x}_i$$

Classify as + ve if $\mathbf{w}^T \mathbf{x} \geq 0$ else - ve.

Start $\mathbf{w}^0 = [1, -1, 0]^T$. \mathbf{w}^2 is:

1. $[1, -1, 0]^T$
2. $[1.2, -0.8, 0.1]^T$
3. $[0.8, -1.2, -0.1]^T$
4. $[1.4, -0.6, 0.2]^T$
5. None of the above

Ans: A