| | |
|---|---|
| **Started on** | Friday, 23 August 2024, 3:17 PM |
| **State** | Finished |
| **Completed on** | Friday, 23 August 2024, 3:27 PM |
| **Time taken** | 9 mins 57 secs |

**Question 1**

Complete

Marked out of 2.00

Which of the following is/are **not true** about the learning model of perceptron?

- [x] a. For the activation of the perceptron, a simple weighted algebraic sum of the incoming input activations is performed.
- [ ] b. If the weighted sum obtained in the perceptron is below a threshold, the perceptron is active.
- [x] c. The incoming input activations of the perceptron have associated weights on their respective connections.
- [ ] d. If the output activation is same as the true label then the weights and threshold are increased by a non-zero quantity.
- [x] e. The perceptron's output activation can take an arbitrary real value.

Question **2**

Complete

Marked out of 4.00

Assume that a perceptron is trained on a data set $D$ where at each round $t$, a sample $(x^t, y^t)$ is processed, such that $x^t \in \mathbb{R}^d$, $y^t \in \{+1, -1\}$. Assume that at round $t$, the weights associated with the perceptron are denoted by $w^t$. Assume that the perceptron's output for $x^t$ is $\hat{y}^t$.

Also assume that $D$ satisfies linear separability assumption where $w^*$ is the normal vector to the the linear separator and $\gamma$ is the associated margin.

Which of the following is/are **true** during the training of the perceptron?

- [x] a. When a mistake is made by the perceptron at round $t$, and $y^t = -1$, then the update is $w^{t+1} = w^t - x^t$.
- [ ] b. When no mistake is made by the perceptron at round $t$, $y^t \langle w^t, x^t \rangle \geq 0$ holds.
- [x] c. For a sample with $y^t = -1$, $\langle w^t, x^t \rangle < -\gamma$ always holds.
- [ ] d. When a mistake is made by the perceptron at round $t$, $y^t \langle w^*, x^t \rangle < -\gamma$ holds.
- [x] e. When no mistake is made by the perceptron at round $t$, $y^t \langle w^*, x^t \rangle = y^t \langle w^t, x^t \rangle$ holds.

Question **3**

Complete

Marked out of 1.00

Consider $x, z$ as binary variables which can take values from set $\{0, 1\}$.

Which of the following functions is/are linearly separable in 2 dimensions?

- [ ] a. $\mathrm{f}(x, z) = +1$ when either $x$ or $z$ is $1$ or when both are $1$ and $\mathrm{f}(x, z) = -1$ when both $x$ and $z$ are $0$.
- [ ] b. $\mathrm{f}(x, z) = -1$ when $x = z$ and $\mathrm{f}(x, z) = +1$ otherwise.
- [x] c. $\mathrm{f}(x, z) = +1$ regardless of the values of $x$ and $z$.

**Question 4**

Complete

Marked out of 3.00

Which of the following is/are **true** regarding multi-layer perceptron (MLP)?

- [ ] a. There are connections from layer $\ell$ to $\ell+1$ and there are connections from layer $\ell-1$ to $\ell+1$ where $\ell \in \{0,1,2,\ldots,L\}$.
- [x] b. The weight matrix connecting a layer $\ell$ with $n_\ell$ neurons to a layer $\ell+1$ with $n_{\ell+1}$ neurons is of size $n_{\ell+1} \times n_\ell$. (Assume notations discussed in class).
- [x] c. The neurons within the same layer are not connected with each other.
- [ ] d. The vector of dot-products at the neurons at layer $\ell > 1$ denoted by $z^\ell$ is computed as $\phi(W^\ell a^{\ell-1})$ where $\phi$ is a suitable activation function.
- [x] e. If the number of neurons in layer $\ell$ and $\ell+1$ are same for each layer except possibly the output layer, and if the activation function is such that $\phi(q) = q$ for any real number $q$, then one can obtain the the activations $a^\ell$ at layer $\ell$ from dot products at layer $\ell+1$ denoted by $z^{\ell+1}$ using: $a^\ell = (W^{\ell+1})^{-1} z^{\ell+1}$ provided that $W^{\ell+1}$ is invertible.

Jump to...

‹ Previous Activity

Next Section ›