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Week 4 : Assignment 4

The due date for submitting this assignment has passed.

Due on 2024-08-21, 23:59 IST.

As per our records you have not submitted this assignment.

1) A team has a data set that contains 1000 samples for training a feed-forward neural network. Suppose they decided to use stochastic gradient descent algorithm to update the weights. How many times do the weights get updated after training the network for 5 epochs? ***1 point***

- 1000
- 5000
- 100
- 5

No, the answer is incorrect.
Score: 0
Accepted Answers:
5000

2) What is the primary benefit of using Adagrad compared to other optimization algorithms? ***1 point***

- It converges faster than other optimization algorithms.
- It is more memory-efficient than other optimization algorithms.
- It is less sensitive to the choice of hyperparameters(learning rate).
- It is less likely to get stuck in local optima than other optimization algorithms.

No, the answer is incorrect.
Score: 0
Accepted Answers:
It is less sensitive to the choice of hyperparameters(learning rate).

3) What are the benefits of using stochastic gradient descent compared to vanilla gradient descent? ***1 point***

- [ ] SGD converges more quickly than vanilla gradient descent.
- [ ] SGD is computationally efficient for large datasets.
- [ ] SGD theoretically guarantees that the descent direction is optimal.
- [ ] SGD experiences less oscillation compared to vanilla gradient descent.

No, the answer is incorrect.
Score: 0
Accepted Answers:
SGD converges more quickly than vanilla gradient descent.
SGD is computationally efficient for large datasets.

4) A team has a data set that contains 100 samples for training a feed-forward neural network. Suppose they decided to use the gradient descent algorithm to update the weights. Suppose further that they use line search algorithm for the learning rate as follows, $\eta = [0.01, 0.1, 1, 2, 10]$. How many times do the weights get updated after training the network for 10 epochs? (Note, for each weight update the loss has to decrease) ***1 point***

- ( ) 100
- ( ) 5
- ( ) 500
- ( ) 10
- ( ) 50

No, the answer is incorrect.
Score: 0
Accepted Answers:
10

5) Select the behaviour of the Gradient descent algorithm that uses the following update rule, ***1 point***
$w_{t+1} = w_t - \eta \nabla w_t$
where w is a weight and η is a learning rate.

- [ ] The weight update is tiny at a steep loss surface
- [ ] The weight update is tiny at a gentle loss surface
- [ ] The weight update is large at a steep loss surface
- [ ] The weight update is large at a gentle loss surface

No, the answer is incorrect.
Score: 0
Accepted Answers:
The weight update is tiny at a gentle loss surface
The weight update is large at a steep loss surface

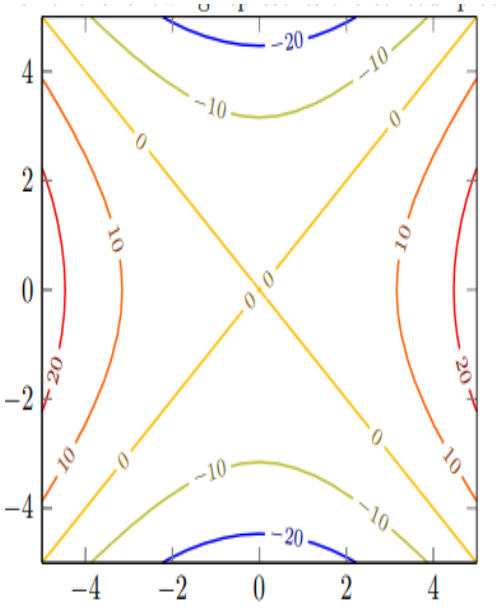
6) In Nesterov accelerated gradient descent, what step is performed before determining the update size? ***1 point***

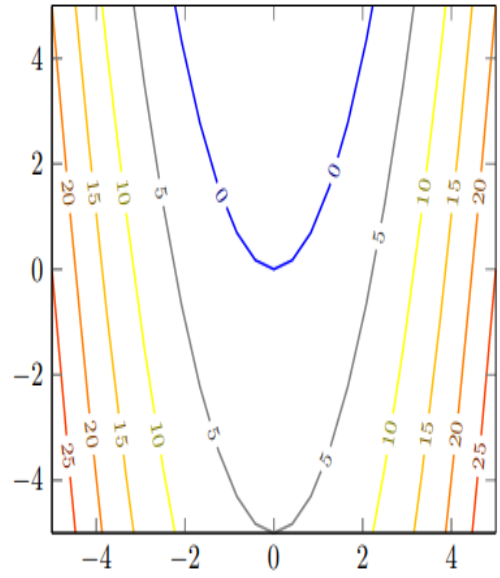
- ( ) Increase the momentum
- ( ) Adjust the learning rate
- ( ) Decrease the step size
- ( ) Estimate the next position of the parameters

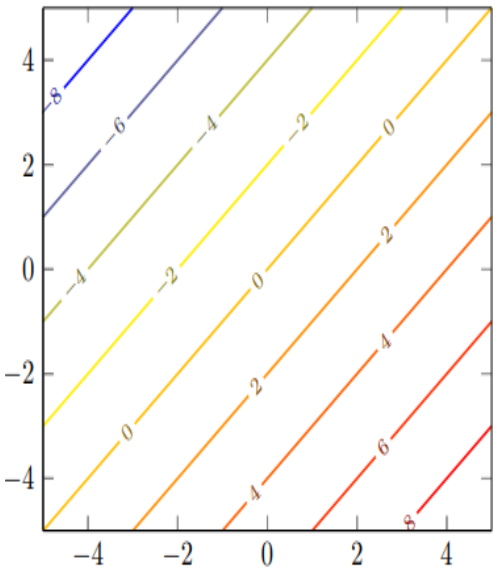
No, the answer is incorrect.
Score: 0

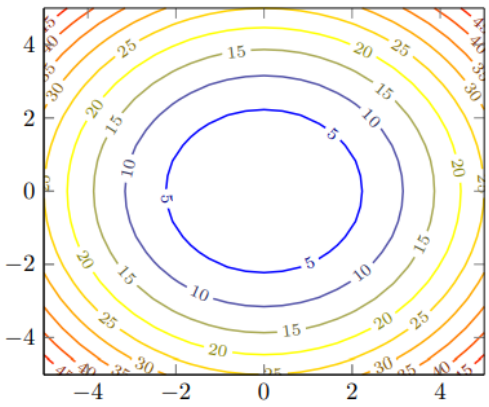
Accepted Answers:
Estimate the next position of the parameters

7) Which of the following represents the contour plot of the function f(x,y) = $x^2 - y^2$? ***1 point***



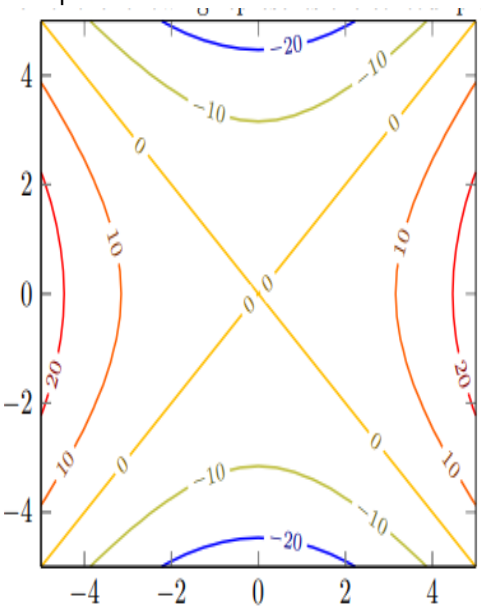






No, the answer is incorrect.
Score: 0

Accepted Answers:



8) Which parameter in vanilla gradient descent determines the step size taken in the direction of the gradient? ***1 point***

- Learning rate
- Momentum

- Gamma
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Learning rate

9) Which of the following is a variant of gradient descent that uses an estimate of the next gradient to update the current position of the parameters? ***1 point***

- Momentum optimization
- Stochastic gradient descent
- Nesterov accelerated gradient descent
- Adagrad

No, the answer is incorrect.
Score: 0

Accepted Answers:
Nesterov accelerated gradient descent

10) What are the two main components of the ADAM optimizer? ***1 point***

- Momentum and learning rate.
- Gradient magnitude and previous gradient.
- Exponential weighted moving average and gradient variance.
- Learning rate and a regularization term.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Exponential weighted moving average and gradient variance.