

Your grade: 97.36%

Your latest: 97.36% • Your highest: 97.36% • To pass you need at least 80%. We keep your highest score.

1. Which of the following are fundamental concepts of machine learning and artificial intelligence?

1 / 1 point

 Supervised learning **Correct**
Correct! Supervised learning is a key concept in machine learning. Data visualization Web scraping Convolutional Neural Networks **Correct**
Correct! Convolutional Neural Networks are a fundamental concept in AI and machine learning. Reinforcement learning **Correct**
Correct! Reinforcement learning is a vital concept in AI and machine learning.

2. Which of the following best describes the process of developing a machine learning model?

1 / 1 point

-
- It involves data collection, data preprocessing, model training, and model evaluation.
-
-
- It starts with model evaluation and ends with data collection.
-
-
- It is solely focused on collecting data and training the model.
-
-
- It only involves data preprocessing and model training.

 **Correct**
Correct! This is a high-level overview of the steps involved in developing a machine learning model.

3. Select all the correct statements about the process of gradient descent and the impact of learning rate on the optimization process in deep learning models.

1 / 1 point

 Gradient descent aims to minimize the loss function by iteratively adjusting model parameters.
 **Correct**
Correct! Gradient descent minimizes the loss function by making iterative adjustments to the model parameters. The optimal learning rate is the same for all types of neural network architectures. Gradient descent updates model parameters in the direction of the gradient of the loss function with respect to the parameters. **Correct**
Correct! Gradient descent updates model parameters in the direction of the gradient of the loss function with respect to the parameters. A very low learning rate can slow down the optimization process, potentially causing it to get stuck in local minima. **Correct**
Correct! A very low learning rate can indeed slow down the optimization process and cause it to get stuck in local minima. Gradient descent is only used in deep learning and not in other machine learning algorithms. A very high learning rate can cause the optimization process to overshoot the minimum of the loss function. **Correct**
Correct! A very high learning rate can indeed cause the optimization process to overshoot the minimum. The learning rate does not affect the convergence speed of the gradient descent algorithm.

4. What is the primary role of an optimizer in training a deep learning model?

1 / 1 point

-
- Increase the number of layers in the model
-
-
- Minimize the loss function
-
-
- Reduce overfitting by adding regularization
-
-
- Select the appropriate activation function

 **Correct**
Correct! The primary role of an optimizer is to minimize the loss function by adjusting the model parameters.

5. Select all components of a Perceptron and their contributions to the functioning of a neural network.

1 / 1 point

 Learning Rate
 Weights **Correct**
Correct! Weights are learned during training and are used to make predictions. Optimizer Loss Function Activation Function **Correct**
Correct! The activation function determines if a neuron should be activated or not. Bias **Correct**
Correct! Bias helps to shift the activation function to better fit the data.

6. Which of the following activation functions is most likely to cause the vanishing gradient problem in deep neural networks?

1 / 1 point

 Tanh ReLU Sigmoid Softmax **Correct**
Correct! Sigmoid activation functions can cause the vanishing gradient problem because their gradients tend to be very small for large input values.

7. Which factor has significantly contributed to the recent popularity and improvement of deep learning?

1 / 1 point

 Advancements in classical machine learning algorithms Development of new programming languages Increased computational power Introduction of microservices architecture

 **Correct**
Correct! Increased computational power, especially with GPUs, has significantly contributed to the improvement and popularity of deep learning.

8. Which of the following are advantages of K-fold Cross-Validation? 1 / 1 point

Provides a more reliable estimate of model performance.

 **Correct**
Correct! By averaging results from multiple folds, it gives a better estimate of model performance.

Increases the complexity of the model by using more parameters.

Eliminates the need for a separate test set.

Reduces the risk of overfitting by testing the model on multiple data sets.

 **Correct**
Correct! K-fold Cross-Validation helps in assessing how the model generalizes to an independent data set.

9. Which of the following steps are involved in the training loop of a neural network? 1 / 1 point

Backward pass

 **Correct**
Correct! The backward pass is performed to calculate gradients and update the model's parameters.

Preprocessing data

Forward pass

 **Correct**
Correct! The forward pass is a key step in the training loop to compute the network's predictions.

Hyperparameter tuning

Updating weights

 **Correct**
Correct! Updating the weights is part of the training loop, based on calculated gradients.

10. Why is the derivative of the Sigmoid function significant during the neural network's forward pass? 1 / 1 point

It improves the computational efficiency of the forward pass.

It helps in updating the weights and biases during backpropagation.

It initializes the network's parameters.

It reduces the dimensionality of the input data.

 **Correct**
Correct! The derivative of the Sigmoid function is used in backpropagation to update weights and biases.

11. In the context of training a neural network from scratch, which of the following is a key step in preprocessing the training data for heart attack detection? 1 / 1 point

Scaling the features to a standard range

Removing outliers by deleting rows with missing values

Randomly shuffling the labels

Initializing weights to zero

 **Correct**
Correct! Scaling features helps improve the convergence rate of the training algorithm.

12. During the forward pass of a simple neural network, which mathematical operation is performed between the input features and the weights? 1 / 1 point

Cross product

Dot product

Matrix inversion

Element-wise multiplication

 **Correct**
Correct! The dot product operation is essential for computing the weighted sum of inputs in a neural network.

13. What is the primary role of the optimizer in a neural network? 1 / 1 point

To compute the forward pass outputs

To preprocess input data

To initialize the network's parameters

To update weights and biases based on the calculated derivatives

 **Correct**
Correct! The optimizer modifies the weights and biases to minimize the loss function.

14. Which of the following actions will trigger a backward pass in PyTorch? Select all that apply. 1 / 1 point

Calling the `.backward()` method on a tensor with `requires_grad=True`

 **Correct**
Correct! Calling `.backward()` on such a tensor will initiate the backward pass.

Using the `torch.autograd.grad()` function

 **Correct**
Correct! The `torch.autograd.grad()` function can be used to compute gradients, thus triggering a backward pass.

Applying a non-differentiable function to a tensor

Creating a tensor with the `requires_grad` attribute set to `True`

Performing an in-place operation on a tensor without gradients

15. What is the primary benefit of partitioning data into batches during model training in PyTorch? 1 / 1 point

It speeds up the training process by parallelizing computation.

It enables the use of different optimization algorithms.

It helps in reducing overfitting by using batch normalization.

It increases the model accuracy by using smaller datasets.

 **Correct**
Correct! Partitioning data into batches helps speed up the training process by allowing parallel computation of the batches.

16. In the context of linear regression using PyTorch, what is the primary purpose of the Model class? 1 / 1 point

To define the structure of the linear regression model and its forward pass.

To implement the training loop and loss calculation.

- To save and load the model's parameters.
- To handle data preprocessing steps like normalization and scaling.

Correct

Correct! The primary purpose of the Model class is to define the structure of the linear regression model and its forward pass.

17. Which factors should be considered when experimenting with different hyperparameter values in PyTorch? 0.6666666666666666 / 1 point

Batch size

Correct

Correct! Batch size is also an important hyperparameter to consider.

Model architecture

This should not be selected

Incorrect. While model architecture is important, it is not a hyperparameter.

Type of activation function

Correct

Correct! The type of activation function used can impact the model's performance.

Number of layers in the model

Correct

Correct! The number of layers in the model can significantly affect performance.

Learning rate

Correct

Correct! Learning rate is a critical hyperparameter that impacts model training.

Data normalization technique

This should not be selected

Incorrect. Data normalization technique is a preprocessing step and not a hyperparameter.

18. When setting up a neural network model from scratch in PyTorch, which of the following components is essential to define the architecture of the model? 1 / 1 point

The DataLoader class

The nn.Module class

The torch.nn.functional module

The torch.optim module

Correct

Correct! The nn.Module class is fundamental in PyTorch to define the architecture of your neural network model.

19. Which of the following are steps involved in the training loop of a PyTorch model?

0.03333333333333334 / 1 point

Save the model's state dictionary.

Perform backpropagation to compute gradients.

Correct

Correct! Backpropagation is a key step to compute gradients in the training loop.

Initialize the model's parameters.

Update the model's parameters using the optimizer.

Correct

Correct! Updating the model's parameters using the optimizer is essential in the training loop.

Compute the loss based on the model's predictions and the true labels.

Correct

Correct! Computing the loss is a fundamental step in the training loop.

Set the model to evaluation mode.

You didn't select all the correct answers