1. Neurons in neural networks are inspired by:

a) Biological neurons

b) Electrical circuits

c) Computer processors

d) Mechanical gears

Answer: a) Biological neurons

Explanation: Neurons in neural networks are artificial representations of the neurons found in the human brain.

2. Which of the following is not a type of neural network?

a) Feedforward Neural Network

b) Recurrent Neural Network

c) Convolutional Neural Network

d) Logical Neural Network

Answer: d) Logical Neural Network

Explanation: Logical Neural Network is not a commonly known type of neural network.

3. The perceptron is a type of neural network used for:

a) Image classification

b) Text summarization

c) Binary classification

d) Speech recognition

Answer: c) Binary classification

Explanation: The perceptron is a simple type of neural network used for binary classification tasks.

4. In a multi-layer perceptron (MLP), the information flows:

a) Only in one direction

b) In both forward and backward directions

c) In a random direction

d) None of the above

Answer: a) Only in one direction

Explanation: In an MLP, the information flows only in the forward direction, from the input layer to the output layer.

5. Forward propagation in neural networks involves:

a) Updating the weights based on the error

b) Calculating the output given the input and current weights

c) Adjusting the learning rate during training

d) Evaluating the performance of the model

Answer: b) Calculating the output given the input and current weights

Explanation: Forward propagation calculates the output of a neural network given the input and current weights.

6. Back propagation is a process used for:

a) Calculating the gradients of the loss function with respect to the model parameters

b) Adjusting the learning rate during training

c) Regularizing the model to prevent overfitting

d) Optimizing the model parameters to minimize the loss

Answer: a) Calculating the gradients of the loss function with respect to the model parameters

Explanation: Back propagation calculates the gradients of the loss function with respect to the model parameters, which are then used to update the weights during training.

7. The chain rule is used in neural networks to:

a) Calculate the gradients during back propagation

b) Perform forward propagation efficiently

c) Regularize the model parameters

d) Normalize the input data

Answer: a) Calculate the gradients during back propagation

Explanation: The chain rule is used to calculate the gradients of the loss function with respect to the model parameters during back propagation.

8. Loss functions in neural networks are used to:

a) Measure the performance of the model

b) Regularize the model parameters

c) Adjust the learning rate during training

d) Control the sparsity of the activations

Answer: a) Measure the performance of the model

Explanation: Loss functions quantify the discrepancy between the predicted output of a neural network and the desired output, allowing us to measure the performance of the model.

9. Optimizers in neural networks are used to:

a) Find the global minimum of the loss function

b) Speed up the training process and improve convergence

c) Regular

ize the model parameters

d) Perform feature selection

Answer: b) Speed up the training process and improve convergence

Explanation: Optimizers in neural networks are used to speed up the training process and improve convergence by adjusting the model parameters based on the gradients of the loss function.

10. Exploding gradient refers to:

a) The gradients becoming too large during training

b) The gradients becoming too small during training

c) The loss function reaching a high value

d) The loss function reaching a low value

Answer: a) The gradients becoming too large during training

Explanation: Exploding gradient refers to the situation where the gradients in a neural network become very large, which can lead to unstable training.

11. Vanishing gradient refers to:

a) The gradients becoming too large during training

b) The gradients becoming too small during training

c) The loss function reaching a high value

d) The loss function reaching a low value

Answer: b) The gradients becoming too small during training

Explanation: Vanishing gradient refers to the situation where the gradients in a neural network become very small, which can result in slow convergence and difficulties in training deeper networks.

12. Regularization in neural networks is used to:

a) Control the complexity of the model and prevent overfitting

b) Adjust the learning rate during training

c) Speed up the training process

d) Ensure the outputs are within a desired range

Answer: a) Control the complexity of the model and prevent overfitting

Explanation: Regularization techniques in neural networks are used to control the complexity of the model and prevent overfitting by adding a penalty term to the loss function.

13. Normalization in neural networks is used to:

a) Scale the input features to a similar range

b) Prevent overfitting of the model

c) Adjust the learning rate during training

d) Regularize the model parameters

Answer: a) Scale the input features to a similar range

Explanation: Normalization techniques in neural networks are used to scale the input features to a similar range, which helps in improving the convergence of the training process and preventing some features from dominating others.

14. The activation function of a neuron is responsible for:

a) Calculating the output of the neuron

b) Adjusting the learning rate during training

c) Regularizing the model parameters

d) Normalizing the input features

Answer: a) Calculating the output of the neuron

Explanation: The activation function of a neuron determines the output of the neuron based on the weighted sum of its inputs and a bias term.

15. Which of the following is not a type of neural network activation function?

a) Sigmoid

b) ReLU

c) Tanh

d) Gradient

Answer: d) Gradient

Explanation: Gradient is not a type of neural network activation function. The commonly used activation functions are sigmoid, ReLU, and tanh.

16. Which loss function is commonly used for binary classification tasks?

a) Mean Squared Error (MSE)

b) Mean Absolute Error (MAE)

c) Binary Cross-Entropy

d) Categorical Cross-Entropy

Answer: c) Binary Cross-Entropy

Explanation: Binary Cross-Entropy is commonly used as the loss function for binary classification tasks, where the output is a single probability value.

17. Which loss function is commonly used for multi-class classification tasks?

a) Mean Squared Error (MSE)

b) Mean Absolute Error (MAE)

c) Binary Cross-Entropy

d) C

ategorical Cross-Entropy

Answer: d) Categorical Cross-Entropy

Explanation: Categorical Cross-Entropy is commonly used as the loss function for multi-class classification tasks, where the output is a probability distribution over multiple classes.

18. Which optimizer adjusts the learning rate adaptively based on the gradients?

a) Stochastic Gradient Descent (SGD)

b) Adam

c) AdaGrad

d) RMSprop

Answer: b) Adam

Explanation: Adam optimizer adjusts the learning rate adaptively based on the estimated first and second moments of the gradients.

19. Which optimizer is known for its ability to handle sparse gradients efficiently?

a) Stochastic Gradient Descent (SGD)

b) Adam

c) AdaGrad

d) RMSprop

Answer: c) AdaGrad

Explanation: AdaGrad optimizer is known for its ability to handle sparse gradients efficiently by adapting the learning rate individually for each parameter based on the history of gradients.

20. Regularization techniques like L1 and L2 regularization are used to:

a) Prevent overfitting by adding a penalty term to the loss function

b) Speed up the training process

c) Adjust the learning rate during training

d) Normalize the input features

Answer: a) Prevent overfitting by adding a penalty term to the loss function

Explanation: Regularization techniques like L1 and L2 regularization are used to prevent overfitting by adding a penalty term to the loss function, which encourages the model to have smaller weights.