

DEEP LEARNING BASICE INTERVIEW QUESTIONS

1. What is the difference between Machine Learning and Deep Learning?

Machine Learning forms a subset of Artificial Intelligence, where we use statistics and algorithms to train machines with data, thereby, helping them improve with experience.

Deep Learning is a part of Machine Learning, which involves mimicking the human brain in terms of structures called neurons, thereby, forming **neural networks**.

2. What is a perceptron?

A perceptron is similar to the actual neuron in the human brain. It receives inputs from various entities and applies functions to these inputs, which transform them to be the output.

A perceptron is mainly used to perform binary classification where it sees an input, computes functions based on the weights of the input, and outputs the required transformation.

3. How is Deep Learning better than Machine Learning?

Machine Learning is powerful in a way that it is sufficient to solve most of the problems. However, **Deep Learning** gets an upper hand when it comes to working with data that has a large number of dimensions. With data that is large in size, a Deep Learning model can easily work with it as it is built to handle this.

.

4. What are some of the most used applications of Deep Learning?

Deep Learning is used in a variety of fields today. The most used ones are as follows:

- Sentiment Analysis
- Computer Vision
- Automatic Text Generation
- Object Detection
- Natural Language Processing
- Image Recognition

5. What is the meaning of overfitting?

Overfitting is a very common issue when working with Deep Learning. It is a scenario where the Deep Learning algorithm vigorously hunts through the data to obtain some valid information.

This makes the Deep Learning model pick up noise rather than useful data, causing very high variance and low bias. This makes the model less accurate, and this is an undesirable effect that can be prevented.

6. What are activation functions?

Activation functions are entities in Deep Learning that are used to translate inputs into a usable output parameter. It is a function that decides if a neuron needs activation or not by calculating the weighted sum on it with the bias.

Using an activation function makes the model output to be non-linear. There are many types of activation functions:

- ReLU
- Softmax
- Sigmoid

- Linear
- Tanh

7. Why is the Fourier transform used in Deep Learning?

Fourier transform is an effective package used for analyzing and managing large amounts of data present in a database. It can take in real-time array data and process it quickly. This ensures that high efficiency is maintained and also makes the model more open to processing a variety of signals.

8. What are the steps involved in training a perception in Deep Learning?

There are five main steps that determine the learning of a perceptron:

1. Initialize thresholds and weights
2. Provide inputs
3. Calculate outputs
4. Update weights in each step
5. Repeat steps 2 to 4

9. What is the use of the loss function?

The loss function is used as a measure of accuracy to see if a neural network has learned accurately from the training data or not. This is done by comparing the training dataset to the testing dataset.

The loss function is a primary measure of the performance of the neural network. In Deep Learning, a good performing network will have a low loss function at all times when training.

10. What are some of the Deep Learning frameworks or tools that you have used?

This question is quite common in a Deep Learning interview. Make sure to answer based on the experience you have with the tools.

However, some of the top Deep Learning frameworks out there today are:

- TensorFlow
- Keras
- PyTorch
- Caffe2
- CNTK
- MXNet
- Theano

11. What is the use of the swish function?

The swish function is a self-gated activation function developed by Google. It is now a popular activation function used by many as Google claims that it outperforms all of the other activation functions in terms of computational efficiency.

12. What are autoencoders?

Autoencoders are artificial neural networks that learn without any supervision. Here, these networks have the ability to automatically learn by mapping the inputs to the corresponding outputs.

Autoencoders, as the name suggests, consist of two entities:

- Encoder: Used to fit the input into an internal computation state
- Decoder: Used to convert the computational state back into the output

13. What are the steps to be followed to use the gradient descent algorithm?

There are five main steps that are used to initialize and use the gradient descent algorithm:

- Initialize biases and weights for the network
- Send input data through the network (the input layer)
- Calculate the difference (the error) between expected and predicted values
- Change values in neurons to minimize the loss function
- Multiple iterations to determine the best weights for efficient working

15. What is data normalization in Deep Learning?

Data normalization is a preprocessing step that is used to refit the data into a specific range. This ensures that the network can learn effectively as it has better convergence when performing backpropagation.

16. What is forward propagation?

Forward propagation is the scenario where inputs are passed to the hidden layer with weights. In every single hidden layer, the output of the activation function is calculated until the next layer can be processed. It is called forward propagation as the process begins from the input layer and moves toward the final output layer.

17. What is backpropagation?

Backpropagation is used to minimize the cost function by first seeing how the value changes when weights and biases are tweaked in the neural network. This change is easily calculated by understanding the gradient at every hidden layer. It is called backpropagation as the process begins from the output layer, moving backward to the input layers.

18. What are hyperparameters in Deep Learning?

Hyperparameters are variables used to determine the structure of a neural network. They are also used to understand parameters, such as the learning rate and the number of hidden layers, and more, present in the neural network.

19. How can hyperparameters be trained in neural networks?

Hyperparameters can be trained using four components as shown below:

- **Batch size:** This is used to denote the size of the input chunk. Batch sizes can be varied and cut into sub-batches based on the requirement.
- **Epochs:** An epoch denotes the number of times the training data is visible to the neural network so that it can train. Since the process is iterative, the number of epochs will vary based on the data.
- **Momentum:** Momentum is used to understand the next consecutive steps that occur with the current data being executed at hand. It is used to avoid oscillations when training.
- **Learning rate:** Learning rate is used as a parameter to denote the time required for the network to update the parameters and learn.

20. What is Deep Learning?

Deep learning is a subset of machine learning that is completely based on Artificial Intelligence. It used to teach computers to process data in a way that was inspired by the human brain; it recognized the complex patterns in pictures, text, sounds, and so on.

21. What are Neural Networks?

Neural Network is also known as an Artificial Neural Network. It is a subset of machine learning that consists of interconnected nodes or neurons that process and learn from the data.

22. What are the advantages and disadvantages of neural networks?

Advantages of Neural Networks:

- Neural networks can learn complex models and non-linear relationships.
- It stores all the information on the entire network with the help of nodes.
- Neural networks also can work with unorganized data.
- Neural networks can perform more than one function at a time.
- If one or more than one cell is corrupted, even though the output doesn't have an impact.

Disadvantages of Neural Networks:

- Due to their quick adaptation to the changing requirements, neural networks require heavy machinery and hardware to work.
- Neural networks depend on a lot of training data, which leads to the problem of overfitting.
- Neural networks require lots of computational power because they act like a human brain and are composed of many interconnected nodes, and each node computes based on weights.
- Neural networks are much more complex and hard to explain than other models.
- Neural network models need careful attention in data preparation because it's a crucial step in machine learning and harms the input data.

23. What is the Learning Rate in the context of Neural Network Models?

The learning rate is a hyperparameter that controls the size of the updates that were created by the weights during data training. It also determines the size of each step in each training iteration. The default value of the learning rate is 0.1 or 0.01, and it's represented by the character 'a'.

24. What is a Deep Neural Network?

A deep neural network is a machine learning algorithm that mimics the brain's information processing. It's made up of multiple layers of nodes known as neurons. DNN is used in complex mathematical modeling.

25. What are the different types of Deep Neural Networks?

There are 4 types of deep neural networks:

1. **Feed Forward Neural Network:** The Feed Forward Neural Network is the basic neural network, whose flow control starts from the input layer and moves forward to the output layer. The data will flow only in a single direction; there is no backpropagation mechanism.
2. **Recurrent Neural Network:** A recurrent neural network is another type of deep neural network in which the data will flow in a single direction. In this neural network, each neuron is present in the hidden layer, and they receive the input with a specific delay in time.
3. **Convolutional Neural Network:** A convolutional neural network is a special kind of neural network that we can use for image classification, clustering of images, and so on.
4. **Restricted Boltzmann Machine:** Restricted Boltzmann Machine is another type of Boltzmann Machine where the neurons present in the input layer and the hidden layer are surrounded by symmetric connections. This machine algorithm can be used in filtering, feature learning, and risk detection.

26. Explain Data Normalization. What is the need for it?

Data normalization helps us normalize the neural network nodes into different branches. It works by subtracting the mean and dividing it by the standard deviation.

Data normalization helps to make the data stable because whatever the features are in the dataset, they are not on the same scale, which makes the data difficult to learn.

Next up on this top Deep Learning interview questions and answers blog, let us take a look at the intermediate questions.