Google

1. What is the difference between Mac... 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

6. What are activation functions?

Activation functions are entities in Deep Learning that are used to translate puts 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 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 is a Boltzmann machine?

A Boltzmann machine is a type of recurrent neural network that uses binary decisions, alongside biases, to function. These neural networks can be hooked up together to create deep belief networks, which are very sophisticated and used to solve the most complex problems out there.

9.What are some of the advantages of using TensorFlow?

TensorFlow has numerous advantages, and some of them are as follows:

* High amount of flexibility and platform independence
* Trains using CPU and GPU
* Supports auto differentiation and its features
* Handles threads and asynchronous computation easily
* Open-source
* Has a large community

10.What is a computational graph in Deep Learning?

* A computation graph is a series of operations that are performed to take inputs and arrange them as nodes in a graph structure. It can be considered as a way of implementing mathematical calculations into a graph. This helps in parallel processing and provides high performance in terms of computational capability.

11.What is a CNN? CNNs are convolutional neural networks that are used to perform analysis on images and visuals. These classes of neural networks can

12.What are the various layers present in a CNN?

There are four main layers that form a convolutional neural network:

* Convolution: These are layers consisting of entities called filters that are used as parameters to train the network.
* ReLu: It is used as the activation function and is always used with the convolution layer.
* Pooling: Pooling is the concept of shrinking the complex data entities that form after convolution and is primarily used to maintain the size of an image after shrinkage.
* Connectedness: This is used to ensure that all of the layers in the neural network are fully connected and activation can be computed using the bias easily.

13.What is an RNN in Deep Learning?

RNNs stand for recurrent neural networks, which form to be a popular type of artificial neural network. They are used to process sequences of data, text, genomes, handwriting, and more. RNNs make use of backpropagation for the training requirements.

14.What is a vanishing gradient when using RNNs?

Vanishing gradient is a scenario that occurs when we use RNNs. Since RNNs make use of backpropagation, gradients at every step of the way will tend to get smaller as the network traverses through backward iterations. This equates to the model learning very slowly, thereby, causing efficiency problems in the network.

15.What is exploding gradient descent in Deep Learning?

Exploding gradients are an issue causing a scenario that clumps up the gradients. This creates a large number of updates of the weights in the model when training.

The working of gradient descent is based on the condition that the updates are small and controlled. Controlling the updates will directly affect the efficiency of the model.

16.What is the use of LSTM?

LSTM stands for long short-term memory. It is a type of RNN that is used to sequence a string of data. It consists of feedback chains that give it the ability to perform like a general-purpose computational entity.

17.Where are autoencoders used?

Autoencoders have a wide variety of usage in the real world. The following are some of the popular ones:

* Adding color to black–white images
* Removing noise from images
* Dimensionality reduction
* Feature removal and variation

18.What are the types of autoencoders?

There are four main types of autoencoders:
* Deep autoencoders
* Convolutional autoencoders
* Sparse autoencoders
* Contractive autoencoders

19.What is a Restricted Boltzmann Machine?

A Restricted Boltzmann Machine, or RBM for short, is an undirected graphical model that is popularly used in Deep Learning today. It is an algorithm that is used to perform:
* Dimensionality reduction
* Regression
* Classification
* Collaborative filtering
* Topic modeling

20.What are some of the limitations of Deep Learning?

There are a few disadvantages of Deep Learning as mentioned below:
* Networks in Deep Learning require a huge amount of data to train well.
* Deep Learning concepts can be complex to implement sometimes.
* Achieving a high amount of model efficiency is difficult in many cases.

These are some of the vital advanced deep learning interview questions that you have to know about!

21.What are the variants of gradient descent?

There are three variants of gradient descent as shown below:
* Stochastic gradient descent: A single training example is used for the calculation of gradient and for updating parameters.
* Batch gradient descent: Gradient is calculated for the entire dataset, and parameters are updated at every iteration.
* Mini-batch gradient descent: Samples are broken down into smaller-sized batches and then worked on as in the case of stochastic gradient descent.

22.Why is mini-batch gradient descent so popular?

Mini-batch gradient descent is popular as:
* It is more efficient when compared to stochastic gradient descent.
* Generalization is done by finding the flat minima

23.What are deep autoencoders?

Deep autoencoders are an extension of the regular autoencoders. Here, the first layer is responsible for the first-order function execution of the input. The second layer will take care of the second-order functions, and it goes on.

Usually, a deep autoencoder is a combination of two or more symmetrical deep-belief networks where:

* The first five shallow layers consist of the encoding part
* The other layers take care of the decoding part

24.Why is the Leaky ReLU function used in Deep Learning?

Leaky ReLU, also called LReL, is used to manage a function to allow the passing of small-sized negative values if the input value to the network is less than zero.

40. What are some of the examples of supervised learning algorithms in Deep Learning?

There are three main supervised learning algorithms in Deep Learning:

* Artificial neural networks
* Convolutional neural networks
* Recurrent neural networks

25.What are some of the examples of unsupervised learning algorithms in Deep Learning?

There are three main unsupervised learning algorithms in Deep Learning:

* Autoencoders
* Boltzmann machines
* Self-organizing maps

26.Can we initialize the weights of a network to start from zero?

Yes, it is possible to begin with zero initialization. However, it is not recommended to use because setting up the weights to zero initially will cause all of the neurons to produce the same output and the same gradients when performing backpropagation. This means that the network will not have the ability to learn at all due to the absence of asymmetry between each of the neurons.

Google ML
面试真题

1.What do you understand by Precision and Recall?
Recall is the number of relevant documents retrieved by a search divided by the total number of the existing relevant documents, while precision is the number of relevant documents retrieved by a search divided by the total number of documents retrieved by that search.

2.What is a Confusion Matrix?
The confusion is a 26 by 26 matrix with the probability of each reaction to each stimulus. This explains the name and matches the use in machine learning today.

3.What is the difference between inductive and deductive learning?
The main difference between inductive and deductive reasoning is that inductive reasoning aims at developing a theory while deductive reasoning aims at testing an existing theory. Inductive reasoning moves from the specific observations to broad generalizations, and deductive reasoning the other way around.

4.How is KNN different from K-means clustering?
K-means is an unsupervised learning algorithm used for the clustering problem whereas KNN is a supervised learning algorithm used for classification and regression problem. This is the basic difference between K-means and KNN algorithm. It makes predictions by learning from the past available data.

5.What is ROC curve and what does it represent?
An ROC curve is a graph showing the performance of a classification model at all the classification thresholds. This curve plots two parameters: True Positive Rate. False Positive Rate.

6.What' s the difference between Type I and Type II error?
Type 1 error, in statistical hypothesis testing, is the error caused by rejecting a null hypothesis when it is true. Type II error is the error that occurs when the null hypothesis is accepted when it is not true. Type I error is equivalent to a false positive. Type II error is equivalent to a false negative.

7.Is it better to have too many false positives or too many false negatives? Explain.
In medical testing, false negatives may provide a falsely reassuring message to patients and physicians that the disease is absent, when it
is actually present. This sometimes leads to inappropriate or inadequate treatment of both the patient and their disease. So, it is desired to have too many false positive.

8.Which is more important to you – model accuracy or model performance?
The accuracy extremely critical, even if the models would take minutes or hours to make a prediction. Other applications require the real time performance, even if this comes at a cost of accuracy.

9.What's the trade-off between bias and variance?
The bias-variance tradeoff refers to a decomposition of the prediction error in the machine learning as the sum of a bias and a variance term. An example of the bias-variance tradeoff in practice.

10.What is the difference between supervised and unsupervised machine learning?
Supervised learning algorithms are trained the using labeled data. Unsupervised learning algorithms are trained using unlabeled data. supervised learning, input data is provided to the model along with the output. unsupervised learning, only input data is provided to the model.

11.How is KNN different from k-means clustering?
KNN represents a supervised classification algorithm that will give new data points accordingly to the k number or the closest data points, while k-means clustering is an unsupervised clustering algorithm that gathers and groups data into k number of clusters.

12.Explain how a ROC curve works.
A ROC curve is constructed by plotting the true positive rate against the false positive rate. A discrete classifier that the returns only the predicted class gives a single point on the ROC space.

13.What is Bayes' Theorem? How is it useful in a machine learning context?
Bayes Theorem is a useful tool in applied machine learning. It provides a way of thinking about the relationship between the data and a model. A machine learning algorithm or model is a specific way of thinking about the structured relationships in the data.

14.Why is "Naive" Bayes naive?
Naive Bayes is called the naive because it assumes that the each input variable is independent. This is a strong assumption and unrealistic for real data; however,that the technique is very effective on a large range of complex problems.

15.Explain the difference between L1 and L2 regularization
The main intuitive the difference between the L1 and L2 regularization is that L1 regularization tries to estimate the median of the data while the L2 regularization tries to estimate the mean of the data to avoid overfitting. That value will also be the median of the data distribution mathematically.

16.What's your favorite algorithm, and can you explain it to me in less than a minute?
Hands down logistic regression (with many bells and whistles like stochastic gradient descent, feature hashing and penalties).

17.What's the difference between Type I and Type II error?
Type 1 error, in statistical hypothesis testing, is the error caused by rejecting a null hypothesis when it is true. Type II error is the error that occurs when the null hypothesis is accepted when it is not the true. Type I error is equivalent to false positive. Type II error is equivalent to a false negative.