1. How are strong AI and weak AI different?

Ans. Strong AI is a system with the cognitive abilities of humans while Weak AI is designed to perform a specific task and does not possess the general intelligence.

2. What happens in a neural network?

Ans. A neural network has multiple layers with each layer having interconnected nodes (neurons). In this, each link has its own weight, and learning occurs through adjusting such weights so as to minimize the difference between actual outputs and predicted ones.

3. What is backpropagation in neural networks?

Ans. Backpropagation is an optimization algorithm that trains neural networks by propagating errors backwards through the network to adjust weights with the aim of minimizing the difference between predicted outputs and actual ones.

4. What is vanishing gradient problem in deep learning?

Ans. The gradients become very small during backpropagation hence slowing or completely halting learning in deep neural networks; this problem frequently arises when working with deep architectures or some activation functions.

5. What do you mean by Reinforcement Learning?

Ans. Reinforcement Learning refers to one kind of machine learning where an agent learns to choose actions depending on a situation it finds itself in while interacting with its environment; this feedback comes either as rewards or punishments thus helping it learn

optimal strategies.

6. Explain what transfer learning is and how it could be useful for AI.

Ans. Transfer learning involves improving performance on a related task using skills gained from one job to another; this can be applied in AI where pre-learned lessons can be used in models, reducing the amount of training data needed.

7. How does supervised differ from unsupervised learning algorithms?

Ans. When supervised learning is used, there is labeled data which gives known outputs for the machine, whereas unsupervised learning tries to model data without any known output information.

8. What are convolutional layers used for in Convolutional Neural Networks(CNN)?

Ans. Convolutional layers in CNNs are meant to learn spatial hierarchies of features from the input data in a way that is automatic and adaptive. They find common use in tasks like image recognition.

9. What are recurrent neural networks (RNNs) and how are they used?

Ans. RNNs are networks with loops, which means they can maintain information regarding previously inputted data; therefore, sequential data such as sentences or time series analysis can be processed by them.

10. What is an activation function and what role does it play in a neural network?

Ans. Activation functions enable neural networks to learn complicated patterns since they introduce non-linearity into these systems. Some of the most commonly used activation functions include sigmoid, tanh, and ReLU (Rectified Linear Unit).

11. What is the curse of dimensionality, and how does it affect machine learning algorithms?

Ans. The curse of dimensionality, which refers to data becoming more complex and sparse with an increase in the number of features or dimensions, can lead to higher computational efforts and more data required for developing accurate models.

12. Explain the term ‘dropout’ in the context of neural networks.

Ans. In neural networks, what does ‘dropout’ mean? Dropout is a regularization technique used mainly in neural networks to address overfitting. Some neurons are dropped-out randomly during training, causing the network to learn robust features.

13. What are GANs (Generative Adversarial Networks), and how do they work?

Ans. “What are GANs (Generative Adversarial Networks) and how do they work?” GANs include a generator as well as a discriminator network which are both concurrently trained using adversarial training for this purpose. The main aim of a generator is to produce realistic data while the discriminator tries to distinguish between real and generated data.

14. What is the difference between bagging and boosting in ensemble learning?

Ans. How does bagging differ from boosting when talking about ensemble learning? Bagging (Bootstrap Aggregating) individuals receive independent training before their outputs get combined; however, boosting builds models sequentially; additionally, each next model pays extra attention to misclassified instances.

15. Explain the concept of attention mechanism in deep learning.

Ans.What does attention mechanism imply in deep learning? Attention mechanisms allow neural networks to focus on specific parts of input data by giving different importance weights for different elements frequently applied in tasks related to natural language processing.

16. What is the significance of hyperparameters in machine learning models?

Ans. Why are hyperparameters important in machine learning models? These parameters play a significant role because they need to be set prior to training process commencement since they determine overall performance of the model.

17. Explain the term ‘bias-variance tradeoff’ in the context of machine learning.

Ans. “Can you explain what is meant by ‘bias-variance tradeoff’ in machine learning?” The best way to balance simple models with complex models is bias-variance tradeoff. It combines high bias (underfitting) and high variance (overfitting) so as to enhance optimal

model’s performance.

18. What is the purpose of regularization in machine learning?

Ans. In machine learning, when we talk about regularization, what does it mean? Regularization techniques such as L1-regularization and L2-regularization aim at penalizing complex models with an intention of preventing over-fitting and improving their generalization on unseen data.

19. What are decision trees, and how do they work?

Ans. Decision trees are a kind of supervised learning algorithm used for classification and regression analysis. They recursively break down the data into smaller datasets based on certain features forming a tree-like structure.

20. Explain the concept of natural language processing (NLP) and its applications.

Ans. What is natural language processing (NLP) and what does it involve? There are numerous applications like sentiment analysis, language translation, chatbots used in this area, among others that help computers interact with human languages using various methods including extracting information from text data which is also known as information retrieval.

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