Top 30 Most Frequent Machine Learning Interview Questions

1. What is Machine Learning?

Machine Learning is a branch of AI that enables systems to learn and improve from experience without explicit programming.

2. What are the types of Machine Learning?

Supervised Learning, Unsupervised Learning, and Reinforcement Learning.

3. What is Overfitting in ML?

Overfitting occurs when a model learns the training data too well, capturing noise instead of patterns, leading to poor generalization.

4. How can you prevent Overfitting?

Using more training data, regularization techniques like L1/L2, dropout, and cross-validation.

5. What is Underfitting?

Underfitting occurs when a model is too simple and fails to capture the underlying data patterns, leading to high bias.

6. What is the difference between Classification and Regression?

Classification predicts categorical labels, while Regression predicts continuous numerical values.

7. What is a Confusion Matrix?

A confusion matrix is a table used to evaluate a classification models performance by showing True Positives, False Positives, True Negatives, and False Negatives.

8. What is Precision and Recall?

Precision measures how many selected items are relevant, while Recall measures how many relevant items are selected.

9. What is the Bias-Variance Tradeoff?

A model with high bias oversimplifies data (underfitting), while high variance captures noise (overfitting). The goal is to balance bias and variance.

10. What is Cross-Validation?

Cross-validation is a technique used to evaluate models by splitting data into training and validation sets multiple times.

11. What is Feature Engineering?

Feature Engineering is the process of selecting, transforming, and creating new features to improve model performance.

12. What are Hyperparameters?

Hyperparameters are external configurations set before training a model, such as learning rate, batch size, and number of layers in a neural network.

13. What is the difference between Bagging and Boosting?

Bagging reduces variance by training multiple models in parallel, while Boosting reduces bias by training models sequentially to correct errors.

14. What is PCA (Principal Component Analysis)?

PCA is a dimensionality reduction technique that transforms features into a smaller set of orthogonal components while retaining variance.

15. What is the Curse of Dimensionality?

The Curse of Dimensionality occurs when an increase in feature dimensions leads to data sparsity, making models less effective.

16. What is the Difference Between Parametric and Non-Parametric Models?

Parametric models assume a fixed number of parameters, while non-parametric models can adapt their complexity based on data.

17. What is Gradient Descent?

Gradient Descent is an optimization algorithm used to minimize the cost function by updating model parameters iteratively.

18. What is Stochastic Gradient Descent (SGD)?

SGD updates model parameters using a single data point at a time, making it faster for large datasets but noisier than batch gradient descent.

19. What is L1 and L2 Regularization?

L1 Regularization (Lasso) encourages sparsity, while L2 Regularization (Ridge) prevents large weights by penalizing squared coefficients.

20. What is an Activation Function in Neural Networks?

Activation functions introduce non-linearity, allowing neural networks to learn complex patterns. Examples include ReLU, Sigmoid, and Tanh.

21. What is the difference between CNN and RNN?

CNNs are used for spatial data like images, while RNNs handle sequential data like text and time

series.

22. What is a Loss Function?

A loss function measures the difference between predicted and actual values, guiding the model to improve during training.

23. What is Transfer Learning?

Transfer Learning is the technique of using a pre-trained model on a new task to leverage knowledge from large datasets.

24. What is the F1-Score?

The F1-score is the harmonic mean of Precision and Recall, used to evaluate imbalanced classification models.

25. What is a Kernel in SVM?

A kernel is a function that transforms input data into a higher-dimensional space to make non-linearly separable data linearly separable.

26. What is Reinforcement Learning?

Reinforcement Learning is a type of ML where an agent learns by interacting with the environment and receiving rewards or penalties.

27. What is an Autoencoder?

An Autoencoder is a type of neural network used for unsupervised learning that compresses and reconstructs data efficiently.

28. What is Explainable AI (XAI)?

Explainable AI (XAI) aims to make ML models interpretable, helping users understand and trust model decisions.

29. What is an Ensemble Learning Technique?

Ensemble Learning combines multiple models (e.g., Bagging, Boosting, Stacking) to improve prediction accuracy.

30. What is the difference between AI, ML, and Deep Learning?

AI is a broad field of intelligent systems, ML is a subset that enables learning from data, and Deep Learning is a subset of ML using neural networks.