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Curated list of top interview questions in Machine Learning and Deep Learning (sourced from publicly available online materials)

Machine Learning

1. What Are the Different Types of Machine Learning?
2. What is Overfitting, and How Can You Avoid It?
3. What is 'training Set' and 'test Set' in a Machine Learning Model? How Much Data Will You Allocate for Your Training, Validation, and Test Sets?
4. How Do You Handle Missing or Corrupted Data in a Dataset?
5. How Can You Choose a Classifier Based on a Training Set Data Size?
6. Explain the Confusion Matrix with Respect to Machine Learning Algorithms.
7. What Is a False Positive and False Negative and How Are They Significant?
8. What Are the Three Stages of Building a Model in Machine Learning?
9. What is Deep Learning?
10. What Are the Differences Between Machine Learning and Deep Learning?
11. What Are the Applications of Supervised Machine Learning in Modern Businesses?
12. What is Semi-supervised Machine Learning?
13. What Are Unsupervised Machine Learning Techniques?
14. What is the Difference Between Supervised and Unsupervised Machine Learning?
15. What is the Difference Between Inductive Machine Learning and Deductive Machine Learning?
16. Compare K-means and KNN Algorithms.
17. What Is 'naive' in the Naive Bayes Classifier?
18. Explain How a System Can Play a Game of Chess Using Reinforcement Learning.
19. How Will You Know Which Machine Learning Algorithm to Choose for Your Classification Problem?

20. How is Amazon Able to Recommend Other Things to Buy? How Does the Recommendation Engine Work?
21. When Will You Use Classification over Regression?
22. How Do You Design an Email Spam Filter?
23. What is a Random Forest?
24. Considering a Long List of Machine Learning Algorithms, given a Data Set, How Do You Decide Which One to Use?
25. What is Bias and Variance in a Machine Learning Model?
26. What is the Trade-off Between Bias and Variance?
27. Define Precision and Recall.
28. What is a Decision Tree Classification?
29. What is Pruning in Decision Trees, and How Is It Done?
30. Briefly Explain Logistic Regression.
31. Explain the K Nearest Neighbor Algorithm.
32. What is a Recommendation System?
33. What is Kernel SVM?
34. What Are Some Methods of Reducing Dimensionality?
35. What is Principal Component Analysis?
36. What do you understand by the F1 score?
37. What do you understand by Type I vs Type II error?
38. Explain Correlation and Covariance?
39. What are Support Vectors in SVM?
40. What is Ensemble learning?
41. What is Cross-Validation?
42. What are the different methods to split a tree in a decision tree algorithm?
43. How does the Support Vector Machine algorithm handle self-learning?
44. What are the assumptions you need to take before starting with linear regression?
45. What is the difference between Lasso and Ridge regression?

Deep Neural Networks

46. What are autoencoders? Explain the different layers of autoencoders and mention three practical usages of them?
47. What is an activation function and discuss the use of an activation function? Explain three different types of activation functions?

48. You are using a deep neural network for a prediction task. After training your model, you notice that it is strongly overfitting the training set and that the performance on the test isn't good. What can you do to reduce overfitting?
49. Why should we use Batch Normalization?
50. How to know whether your model is suffering from the problem of Exploding Gradients?
51. Can you name and explain a few hyperparameters used for training a neural network?
52. Can you explain the parameter sharing concept in deep learning?
53. Describe the architecture of a typical Convolutional Neural Network (CNN)?
54. What is the Vanishing Gradient Problem in Artificial Neural Networks and How to fix it?
55. When it comes to training an artificial neural network, what could be the reason why the loss doesn't decrease in a few epochs?
56. Why Sigmoid or Tanh is not preferred to be used as the activation function in the hidden layer of the neural network?
57. Discuss in what context it is recommended to use transfer learning and when it is not.
58. Discuss the vanishing gradient in RNN and How they can be solved.
59. What are the main gates in LSTM and what are their tasks?
60. Is it a good idea to use CNN to classify 1D signals?
61. How does L1/L2 regularization affect a neural network?
62. How would you change a pre-trained neural network from classification to regression?
63. What might happen if you set the momentum hyperparameter too close to 1 (e.g., 0.9999) when using an SGD optimizer?
64. What are the hyperparameters that can be optimized for the batch normalization layer?
65. What is the effect of dropout on the training and prediction speed of your deep learning model?
66. What is the advantage of deep learning over traditional machine learning?
67. What is a depthwise Separable layer and what are its advantages?

Natural Language Processing

68. What is a transformer architecture, and why is it widely used in natural language processing tasks?
69. Explain the key components of a transformer model.
70. What is self-attention, and how does it work in transformers?
71. What are the advantages of transformers over traditional sequence-to-sequence models?
72. How does the attention mechanism help transformers capture long-range dependencies in sequences?
73. What are the limitations of transformers, and what are some potential solutions?
74. How are transformers trained, and what is the role of pre-training and fine-tuning?
75. What is BERT (Bidirectional Encoder Representations from Transformers), and how does it improve language understanding tasks?
76. Describe the process of generating text using a transformer-based language model.
77. What are some challenges or ethical considerations associated with large language models?
78. Explain the concept of transfer learning and how it can be applied to transformers.
79. How can transformers be used for tasks other than natural language processing, such as computer vision?

Computer Vision

80. What is computer vision, and why is it important?
81. Explain the concept of image segmentation and its applications.
82. What is object detection, and how does it differ from image classification?
83. Describe the steps involved in building an image recognition system.
84. What are the challenges in implementing real-time object tracking?
85. Can you explain the concept of feature extraction in computer vision?
86. What is optical character recognition (OCR), and what are its main applications?

87. How does a convolutional neural network (CNN) differ from a traditional neural network in the context of computer vision?
88. What is the purpose of data augmentation in computer vision, and what techniques can be used?
89. Discuss some popular deep learning frameworks or libraries used for computer vision tasks.