PW SKILLS

Assignment – 3

ML

1. What is regression analysis?
2. Explain the difference between linear and nonlinear regression.
3. What is the difference between simple linear regression and multiple linear regression?
4. How is the performance of a regression model typically evaluated?
5. What is overfitting in the context of regression models?
6. What is logistic regression used for?
7. How does logistic regression differ from linear regression?
8. Explain the concept of odds ratio in logistic regression.
9. What is the sigmoid function in logistic regression?
10. How is the performance of a logistic regression model evaluated?
11. What is a decision tree?
12. How does a decision tree make predictions?
13. What is entropy in the context of decision trees?
14. What is pruning in decision trees?
15. How do decision trees handle missing values?
16. What is a support vector machine (SVM)?
17. Explain the concept of margin in SVM.
18. What are support vectors in SVM?
19. How does SVM handle non-linearly separable data?
20. What are the advantages of SVM over other classification algorithms?
21. What is the Naïve Bayes algorithm?
22. Why is it called "Naïve" Bayes?
23. How does Naïve Bayes handle continuous and categorical features?
24. Explain the concept of prior and posterior probabilities in Naïve Bayes.
25. What is Laplace smoothing and why is it used in Naïve Bayes?
26. Can Naïve Bayes be used for regression tasks?
27. How do you handle missing values in Naïve Bayes?
28. What are some common applications of Naïve Bayes?
29. Explain the concept of feature independence assumption in Naïve Bayes.

30. How does Naïve Bayes handle categorical features with a large number of categories?
31. What is the curse of dimensionality, and how does it affect machine learning algorithms?
32. Explain the bias-variance tradeoff and its implications for machine learning models.
33. What is cross-validation, and why is it used?
34. Explain the difference between parametric and non-parametric machine learning algorithms.
35. What is feature scaling, and why is it important in machine learning?
36. What is regularization, and why is it used in machine learning?
37. Explain the concept of ensemble learning and give an example.
38. What is the difference between bagging and boosting?
39. What is the difference between a generative model and a discriminative model?
40. Explain the concept of batch gradient descent and stochastic gradient descent.
41. What is the K-nearest neighbors (KNN) algorithm, and how does it work?
42. What are the disadvantages of the K-nearest neighbors algorithm?
43. Explain the concept of one-hot encoding and its use in machine learning.
44. What is feature selection, and why is it important in machine learning?
45. Explain the concept of cross-entropy loss and its use in classification tasks.
46. What is the difference between batch learning and online learning?
47. Explain the concept of grid search and its use in hyperparameter tuning.
48. What are the advantages and disadvantages of decision trees?
49. What is the difference between L1 and L2 regularization?
50. What are some common preprocessing techniques used in machine learning?
51. What is the difference between a parametric and non-parametric algorithm? Give examples of each.
52. Explain the bias-variance tradeoff and how it relates to model complexity.
53. What are the advantages and disadvantages of using ensemble methods like random forests?
54. Explain the difference between bagging and boosting.
55. What is the purpose of hyperparameter tuning in machine learning?
56. What is the difference between regularization and feature selection?
57. How does the Lasso (L1) regularization differ from Ridge (L2) regularization?

58. Explain the concept of cross-validation and why it is used.
59. What are some common evaluation metrics used for regression tasks?
60. How does the K-nearest neighbors (KNN) algorithm make predictions?
61. What is the curse of dimensionality, and how does it affect machine learning algorithms?
62. What is feature scaling, and why is it important in machine learning?
63. How does the Naïve Bayes algorithm handle categorical features?
64. Explain the concept of prior and posterior probabilities in Naïve Bayes.
65. What is Laplace smoothing, and why is it used in Naïve Bayes?
66. Can Naïve Bayes handle continuous features?
67. What are the assumptions of the Naïve Bayes algorithm?
68. How does Naïve Bayes handle missing values?
69. What are some common applications of Naïve Bayes?
70. Explain the difference between generative and discriminative models.
71. How does the decision boundary of a Naïve Bayes classifier look like for binary classification tasks?
72. What is the difference between multinomial Naïve Bayes and Gaussian Naïve Bayes?
73. How does Naïve Bayes handle numerical instability issues?
74. What is the Laplacian correction, and when is it used in Naïve Bayes?
75. Can Naïve Bayes be used for regression tasks?
76. Explain the concept of conditional independence assumption in Naïve Bayes.
77. How does Naïve Bayes handle categorical features with a large number of categories?
78. What are some drawbacks of the Naïve Bayes algorithm?
79. Explain the concept of smoothing in Naïve Bayes.
80. How does Naïve Bayes handle imbalanced datasets?