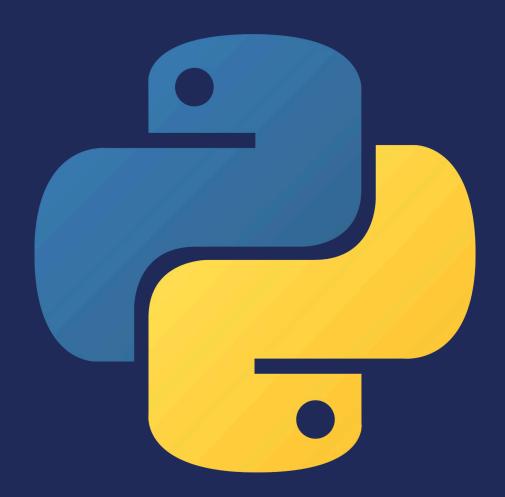
SVM & Naive bayes

Assignment Questions





Theoretical

- 1. What is a Support Vector Machine (SVM)?
- 2. What is the difference between Hard Margin and Soft Margin SVM?
- 3. What is the mathematical intuition behind SVM?
- 4. What is the role of Lagrange Multipliers in SVM?
- 5. What are Support Vectors in SVM?
- 6. What is a Support Vector Classifier (SVC)?
- 7. What is a Support Vector Regressor (SVR)?
- 8. What is the Kernel Trick in SVM?
- 9. Compare Linear Kernel, Polynomial Kernel, and RBF Kernel.
- 10. What is the effect of the C parameter in SVM?
- 11. What is the role of the Gamma parameter in RBF Kernel SVM?
- 12. What is the Naïve Bayes classifier, and why is it called "Naïve"?
- 13. What is Bayes' Theorem?
- 14. Explain the differences between Gaussian Naïve Bayes, Multinomial Naïve Bayes, and Bernoulli Naïve Bayes.
- 15. When should you use Gaussian Naïve Bayes over other variants?
- 16. What are the key assumptions made by Naïve Bayes?
- 17. What are the advantages and disadvantages of Naïve Bayes?
- 18. Why is Naïve Bayes a good choice for text classification?
- 19. Compare SVM and Naïve Bayes for classification tasks.
- 20. How does Laplace Smoothing help in Naïve Bayes?

Practical

- 21. Write a Python program to train an SVM Classifier on the Iris dataset and evaluate accuracy.
- 22. Write a Python program to train two SVM classifiers with Linear and RBF kernels on the Wine dataset, then compare their accuracies.
- 23. Write a Python program to train an SVM Regressor (SVR) on a housing dataset and evaluate it using Mean Squared Error (MSE).
- 24. Write a Python program to train an SVM Classifier with a Polynomial Kernel and visualize the decision boundary.
- 25. Write a Python program to train a Gaussian Naïve Bayes classifier on the Breast Cancer dataset and evaluate accuracy.
- 26. Write a Python program to train a Multinomial Naïve Bayes classifier for text classification using the 20 Newsgroups dataset.



- 27. Write a Python program to train an SVM Classifier with different C values and compare the decision boundaries visually.
- 28. Write a Python program to train a Bernoulli Naïve Bayes classifier for binary classification on a dataset with binary features.
- 29. Write a Python program to apply feature scaling before training an SVM model and compare results with unscaled data.
- 30. Write a Python program to train a Gaussian Naïve Bayes model and compare the predictions before and after Laplace Smoothing.
- 31. Write a Python program to train an SVM Classifier and use GridSearchCV to tune the hyperparameters (C, gamma, kernel).
- 32. Write a Python program to train an SVM Classifier on an imbalanced dataset and apply class weighting and check it improve accuracy.
- 33. Write a Python program to implement a Naïve Bayes classifier for spam detection using email data.
- 34. Write a Python program to train an SVM Classifier and a Naïve Bayes Classifier on the same dataset and compare their accuracy.
- 35. Write a Python program to perform feature selection before training a Naïve Bayes classifier and compare results.
- 36. Write a Python program to train an SVM Classifier using One-vs-Rest (OvR) and One-vs-One (OvO) strategies on the Wine dataset and compare their accuracy.
- 37. Write a Python program to train an SVM Classifier using Linear, Polynomial, and RBF kernels on the Breast Cancer dataset and compare their accuracy.
- 38. Write a Python program to train an SVM Classifier using Stratified K-Fold Cross-Validation and compute the average accuracy.
- 39. Write a Python program to train a Naïve Bayes classifier using different prior probabilities and compare performance.
- 40. Write a Python program to perform Recursive Feature Elimination (RFE) before training an SVM Classifier and compare accuracy.
- 41. Write a Python program to train an SVM Classifier and evaluate its performance using Precision, Recall, and F1-Score instead of accuracy.
- 42. Write a Python program to train a Naïve Bayes Classifier and evaluate its performance using Log Loss (Cross-Entropy Loss).
- 43. Write a Python program to train an SVM Classifier and visualize the Confusion Matrix using seaborn.
- 44. Write a Python program to train an SVM Regressor (SVR) and evaluate its performance using Mean Absolute Error (MAE) instead of MSE.
- 45. Write a Python program to train a Naïve Bayes classifier and evaluate its performance using the ROC-AUC score.
- 46. Write a Python program to train an SVM Classifier and visualize the Precision-Recall Curve.