

C3 PGP AI/ML - Classification

Assignment 4

Support Vector Machines

1. **Data:** [2 marks]
 - Load the breast cancer classification dataset and do elementary data analysis and preprocessing
2. **Linear SVM:** [2 marks]
 - Implement a linear SVM model using Scikit-learn.
 - Train the model on the training set.
 - Evaluate the model on the testing set using accuracy and confusion matrix
3. **Soft Margin SVM:** [1 mark]
 - Implement a soft margin SVM model with 2 different values of the regularization parameter (C).
 - Compare and analyze the results.
4. **Non-Linear SVM:** [1 mark]
 - Implement a non-linear SVM using a kernel function (e.g., Radial Basis Function - RBF).
5. **Hyperparameter Tuning and Performance Metrics:** [2 marks]
 - Experiment with different hyperparameter values (C, kernel type, gamma) to observe their effects on model performance and compare metrics such as accuracy, precision, recall, and F1-score for different SVM models.
6. **Visualization** [1 mark]
 - Visualize decision boundaries for linear and non-linear SVMs.