BIN2023R01 – INTRODUCTION TO DATAMINING & MACHINE LEARNING FOR BIOINFORMATICS

Lab Exercise 8- Classification with Support Vector Machine

Aim: To construct a support vector machine model that can classify and predict the given dataset.

Procedure:

1. Import necessary packages for model construction.
2. Perform data preprocessing and feature selection.
3. Initialize and build the support vector machine model for all available kernels.
4. Evaluate the model's performance for each kernel and determine which kernel yields the best performance. Display the classification report accordingly.
5. Generate predictions for user-defined data.
6. Compare the performance metrics of the SVM with other classification models and identify the model with superior accuracy.

Questions:

1. What is a Support Vector Machine (SVM) and what is its primary objective in machine learning?
2. How does an SVM handle classification tasks? Explain the concept of maximal marginal hyperplane in SVM.
3. What are support vectors in SVM, and why are they important?
4. Explain the concept of the margin in SVMs. How does maximizing the margin lead to better generalization?
5. Compare and contrast linear SVMs with non-linear SVMs.
6. What is the kernel trick in SVMs? How does it allow SVMs to handle non-linear decision boundaries?
7. How do you handle imbalanced datasets in SVMs? What techniques can be employed?
8. How does SVM handle multi-class classification tasks? Discuss common strategies.
9. What are some common challenges or limitations of SVMs? How can these challenges be mitigated?
10. Can SVMs handle noisy data well? Explain your answer.
11. How do you interpret the decision boundary learned by an SVM model?
12. Report which kernel achieves higher accuracy compared to others and explain.
13. Interpret the performance of the SVM model while comparing it with other classifier models.

Soft copy deadline: March 18th, 11:59PM
Hard copy deadline: March 19th, 3:15PM