**Assignment 3**

**Assignment on Model Evaluation**

**Objective**

To test your understanding of various model evaluation techniques used in machine learning, including accuracy metrics, confusion matrix interpretation, ROC/AUC, and cross-validation.

**Tasks and Questions**

1. **Accuracy Metrics Calculation**
   * **Task**: Train a classification model on a dataset of your choice and calculate the following metrics on the test set:
     + Accuracy
     + Precision
     + Recall
     + F1-Score
   * **Question**: What are the calculated values for accuracy, precision, recall, and F1-score? What do these metrics tell you about your model's performance?
2. **Confusion Matrix Interpretation**
   * **Task**: Create a confusion matrix for your classification model on the test set.
   * **Question**: Present the confusion matrix and explain what each value represents. How does the confusion matrix help in understanding the model's performance?
3. **ROC/AUC Calculation**
   * **Task**: Plot the ROC curve and calculate the AUC for your classification model on the test set.
   * **Question**: What does the ROC curve look like? What is the AUC value? How do these metrics help in evaluating your model's performance?
4. **Cross-Validation Reporting**
   * **Task**: Perform k-fold cross-validation (e.g., k=5) for your classification model and report the mean and standard deviation of the accuracy.
   * **Question**: What are the mean and standard deviation of the cross-validation accuracy? Why is cross-validation important in model evaluation?

Submission Guidelines

GitHub Upload: Implement the tasks in a Jupyter/ Colab Notebook and upload it to a GitHub repository.

Hard Copy Submission: Print the hard copy of your notebook and submit it.

GitHub Link: Share the GitHub repository link for review.

The assignment is due on 10 June 2024 (Online Submission) & 11 June 2024 (Hard copy Submission). Late submissions will be penalized.