ROC Curve & AUC Report – SVM Breast Cancer Classification

The performance of the Support Vector Machine (SVM) classifier was evaluated using the Receiver Operating Characteristic (ROC) curve and the Area Under the Curve (AUC) metric. The ROC curve represents the relationship between the True Positive Rate (Sensitivity) and the False Positive Rate at various threshold settings. It provides a comprehensive evaluation of the model's ability to correctly classify malignant and benign breast cancer cases. The ROC curve for the tuned RBF kernel SVM model lies well above the diagonal reference line, which represents random classification. This indicates strong discriminative performance across different decision thresholds. The Area Under the Curve (AUC) score achieved by the model is high, demonstrating excellent class separability. A higher AUC value confirms that the model is capable of distinguishing malignant tumors from benign ones with high reliability. Overall, the ROC and AUC analysis confirms that the optimized SVM model is robust, reliable, and well-suited for breast cancer classification tasks, particularly in medical diagnostic applications where accurate predictions are critical.