**Classification Performance**

The proposed SVM model achieved a classification accuracy of **0.59**, demonstrating moderate predictive performance. A detailed classification report revealed that the **Expert** class had a precision of **0.57**, recall of **0.69**, and F1-score of **0.62**, whereas the **Intermediate** class had a precision of **0.60**, recall of **0.57**, and F1-score of **0.59**. The **Novice** class exhibited a precision of **0.59**, recall of **0.50**, and F1-score of **0.54**. The macro-averaged F1-score was **0.58**, highlighting balanced performance across all classes.

**Metrics Summary**

The overall model metrics are summarized in Table X. Sensitivity and specificity values were **0.59** and **0.79**, respectively, while the Matthew's Correlation Coefficient (MCC) was **0.38**, indicating moderate correlation between predicted and true labels. The Area Under the Curve (AUC) value of **0.76** underscores the model's capability to distinguish between skill levels effectively.

**Table X. Summary of Model Performance Metrics**

| **Metric** | **Score** |
| --- | --- |
| Accuracy | 0.59 |
| Sensitivity | 0.59 |
| Specificity | 0.79 |
| F1-Score | 0.58 |
| MCC | 0.38 |
| AUC | 0.76 |

**Support Vector Machine (SVM) Training and Hyperparameters**

The Support Vector Machine (SVM) model was implemented to classify surgeon skill levels using nonlinear variability measures. The following hyperparameters were used for training:

* **Kernel**: Radial Basis Function (RBF)
* **C (Regularization Parameter)**: Default (1.0)
* **Gamma**: Auto-computed using scale (1 / (n\_features \* X.var()))
* **Probability**: Enabled for probabilistic output
* **Random State**: 42 (to ensure reproducibility)

**Feature Selection**

To enhance classification performance, **Recursive Feature Elimination (RFE)** was applied with the following settings:

* **Estimator**: Linear kernel SVM
* **Number of Features to Select**: 10
* **Step**: 1 (features eliminated iteratively one by one)