Evaluation:

**Recall, precision, AUC (Area Under the Curve), and accuracy are common metrics used to evaluate the performance of classification models.**

**1. \*\*Accuracy\*\*:**

**- \*\*Definition\*\*: Accuracy measures the fraction of predictions our model got right. It is the number of correct predictions divided by the total number of predictions.**

**- \*\*Formula\*\*: \( \text{Accuracy} = \frac{\text{Number of Correct Predictions}}{\text{Total Number of Predictions}} \)**

**- \*\*Use Case\*\*: Useful when the target classes are well balanced.**

**2. \*\*Recall (Sensitivity or True Positive Rate)\*\*:**

**- \*\*Definition\*\*: Recall measures the ability of a classifier to find all the positive instances. It answers the question, "Of all the actual positives, how many did we correctly identify?"**

**- \*\*Formula\*\*: \( \text{Recall} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Negatives}} \)**

**- \*\*Use Case\*\*: Particularly important in situations where False Negatives are more concerning than False Positives (e.g., medical diagnosis).**

**3. \*\*Precision\*\*:**

**- \*\*Definition\*\*: Precision measures the ability of a classifier not to label a negative sample as positive. It answers the question, "Of all the items labeled as positive, how many truly belong to the positive class?"**

**- \*\*Formula\*\*: \( \text{Precision} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Positives}} \)**

**- \*\*Use Case\*\*: Crucial in scenarios where False Positives are a bigger concern than False Negatives.**

**4. \*\*AUC - ROC Curve\*\*:**

**- \*\*Definition\*\*: The Area Under the Receiver Operating Characteristic (ROC) Curve (AUC - ROC Curve) is a performance measurement for the classification problems at various threshold settings. The ROC is a probability curve, and AUC represents the degree or measure of separability. A higher AUC indicates a better model at distinguishing between the positive and negative classes.**

**- \*\*Formula\*\*: It's the area under the ROC curve, a plot of True Positive Rate (Recall) against False Positive Rate.**