*Understanding Metrics*

* Accuracy: Overall correct predictions/total, Ideal Value: Close to 1.0, Use when classes are balanced and all errors are equally costly.
* Precision: Of all predicted positives, how many are truly positive?, Ideal Value: High(Close to 1.0), Use when False positives are costly (e.g., email spam filter).
* Recall (Sensitivity): Of all actual positives, how many did we correctly identify?, Ideal Value: High (Close to 1.0), Use when False negatives are costly (e.g., detecting cancer, fraud)
* F1-Score: Harmonic mean of precision and recall, Ideal Value: High (Balance of Both), Use when balance between FP and FN matters or class imbalance exists.
* ROC-AUC Score: Probability the model ranks a positive higher than a negative, >0.80 is good, >0.90 is excellent, Use for binary classifiers, especially under imbalance.
* Confusion Matrix: Visual breakdown of TP, FP, TN, FN, Helps understand error types and where the model fails.
* Support: Number of true instances for each class, Just shows how many samples exist per class.
* Balanced Dataset 🡪 Accuracy, F1 Score
* Imbalanced Dataset 🡪 Precision, Recall, F1-Score, ROC-AUC
* Risk-Sensitive Domains (health, finance) 🡪 Prefer Recall
* Alert Systems 🡪 Precision matters (don’t want too many false alarms)