**Day 20 — 16 July 2025 (Wednesday)**

**Topic: Model Comparison & Hyperparameter Tuning**

Today, we compared Naïve Bayes vs Logistic Regression vs SVM (overview only) for spam filtering. We tuned hyperparameters like:

* max\_features in TF-IDF
* Regularization strength in Logistic Regression
* Smoothing parameter in Naïve Bayes (alpha)

We practiced grid-based tuning manually and observed accuracy changes. This session improved my understanding of how performance depends on tuning and not only on algorithm choice.

from sklearn.model\_selection import GridSearchCV

params = {'alpha':[0.1, 0.5, 1.0]}

gs = GridSearchCV(MultinomialNB(), params, cv=5)

gs.fit(X\_train, y\_train)

print(gs.best\_params\_)