Experiment No. 4

Aim: ML Modeling & Experiment Tracking

Objective: Build ML pipeline, tune hyperparameters, track experiments with MLflow.

Detailed Steps

1. **Dataset Preparation**

   - Split data into train/test

2. **Baseline Model Training**

   - Train a few baseline models
   - Evaluate using accuracy (classification) or RMSE (regression).

3. **Hyperparameter Tuning**

   -Apply **GridSearchCV** or **RandomizedSearchCV** on one/two selected models.

   -Compare tuned vs. baseline performance.

4. **Experiment Tracking with MLflow**

   -Initialize MLflow run (`mlflow.start_run()`).
   -Log hyperparameters, metrics, and model artifacts (`mlflow.log_param()`, `mlflow.log_metric()`, `mlflow.sklearn.log_model()`).

   -View experiment results on MLflow UI dashboard.

5. **Model Selection & Saving**
   -Select the best-performing model.

   -Save as a serialized artifact (`.pkl` or MLflow model format).

Open-Source Tools

Scikit-learn, MLflow, Jupyter Notebook

Deliverables

-Trained ML models.
-Comparative analysis of baseline vs. tuned models.
-MLflow dashboard logs (runs, metrics, artifacts).

Conclusion