Day 12 - MLflow Basics

What is MLflow?

- *MLflow is an open-source platform for managing ML lifecycle*
- *Helps track:*
  - *Experiments*
  - *Models*
  - *Parameters & metrics*
- *Widely used with Databricks*

Core MLflow Components

- *MLflow Tracking*
  → *Logs parameters, metrics, artifacts*
- *MLflow Models*
  → *Standard format to package ML models*
- *MLflow Model Registry*
  → *Central place to manage model versions*

Why MLflow Components Matter

- *Keeps experiments organized*
- *Makes models reproducible*
- *Enables easy comparison & deployment*
- *Essential for real-world ML projects*

What is Experiment Tracking?

- *Tracking different ML runs systematically*
- *Each run stores:*
  - *Parameters*
  - *Metrics*
  - *Artifacts*
- *Helps answer:*

👉 *Which model performed best?*

What We Track in MLflow

- *Parameters → learning rate, epochs, features*
- *Metrics → RMSE, accuracy, R^2*
- *Artifacts → model files, plots, logs*

Benefits of Experiment Tracking

- *Compare multiple runs easily*
- *Avoid losing results*
- *Improves collaboration*
- *Saves time during model tuning*

What is Model Logging?

- *Storing trained models in MLflow*
- *Models are saved as artifacts*
- *Supports:*
  - *sklearn*
  - *pytorch*
  - *tensorflow*

What Happens When We Log a Model

- *Model file is stored*
- *Model metadata is recorded*
- *Can reload model anytime*
- *Enables version control*

Why Model Logging is Important

- *No need to retrain models again*
- *Easy model reuse*
- *Smooth transition from training → production*
- *Supports MLOps workflows*

What is MLflow UI?

- *Web interface to visualize experiments*
- *Shows:*
  - *Runs*
  - *Metrics*
  - *Parameters*
- *Very user-friendly*

What You Can Do in MLflow UI

- *View experiment history*
- *Compare multiple runs*
- *Download artifacts*
- *Inspect model performance visually*

Why MLflow UI is Powerful

- *Makes ML transparent*
- *Easy performance comparison*
- *Helps in decision-making*
- *Ideal for teams & reviews*