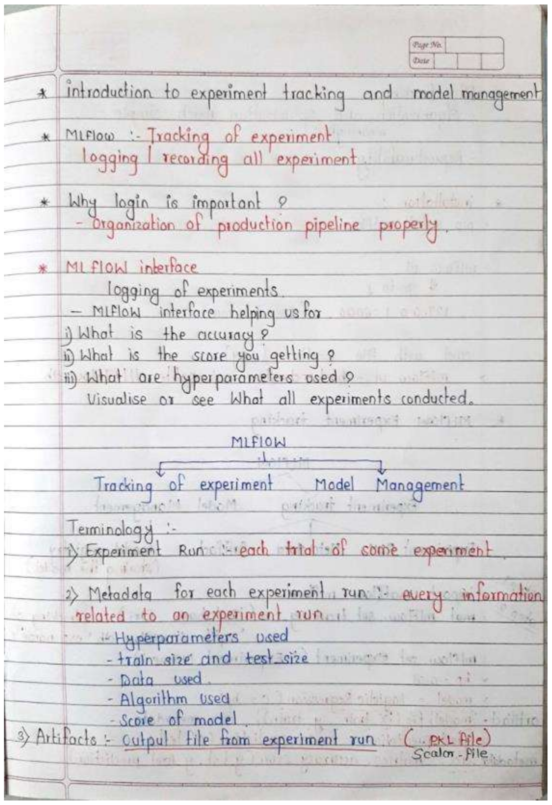
Experiment Tracking and Model Management



Page No. Date

* introduction to experiment tracking and model management

* MLFlow :- Tracking of experiment.
logging / recording all experiment.

* Why login is important ?
- Organization of production pipeline properly.

* ML FlOW interface
logging of experiments.
– MLFlow interface helping us for
i) What is the accuracy ?
ii) What is the score you getting ?
iii) What are hyperparameters used ?
Visualise or see What all experiments conducted.

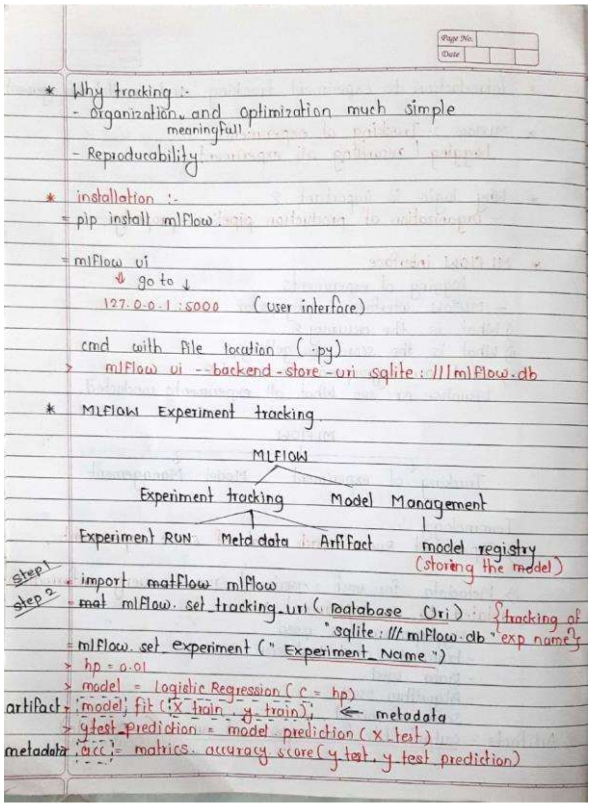
MLFlOW

Tracking of experiment   Model Management

Terminology :-
1) Experiment Run :- each trial of some experiment.

2) Metadata for each experiment run :- every information related to an experiment run.
- Hyperparameters used
- train_size and test_size
- Data used.
- Algorithm used
- Score of model.

3) Artifacts :- Output file from experiment run (.PKL file)
Scalar - file



Page No. Date

* Why tracking :-
- Organization. and optimization much simple
meaningfull
- Reproducability

* installation :-
= pip install mlFlow.

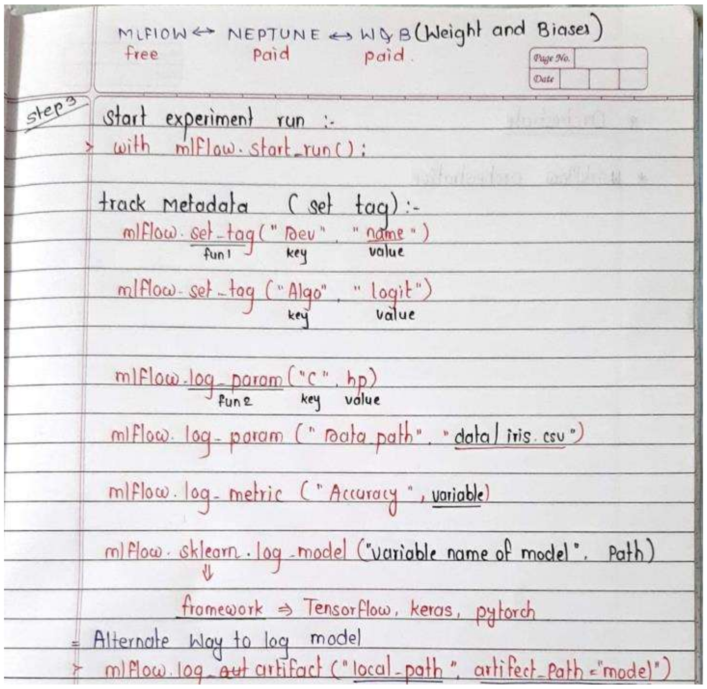
= mlFlow ui
⇓ go to ↓
127.0.0.1 :5000 (user interface)

cmd with file location (.py)
> mlFlow ui --backend-store-uri sqlite:///mlFlow.db

* MLFlOW Experiment tracking.

MLFlOW
Experiment tracking   Model Management
Experiment RUN   Meta data   Artifact   model registry (storing the model)

step 1 - import ~~matflow~~ mlflow
step 2 - ~~mat~~ mlFlow. set_tracking_uri(Database Uri) {tracking of exp name}
"sqlite:///mlFlow.db"
= mlFlow. set_experiment (" Experiment_Name ")
> hp = 0.01
> model = Logistic Regression (C = hp)
artifact > model. fit (X_train, y_train); ← metadata
> ytest_prediction = model. prediction (X_test)
metadata acc = matrics. accuracy score(y_test, y_test_prediction)



MLFlOW ↔ NEPTUNE ↔ W&B (Weight and Biases)
free   Paid   paid.

Page No. Date

step 3 Start experiment run :-
> with mlFlow. start_run():

track Metadata (set tag):-
mlFlow. set_tag(" Dev ", " name ")
fun1   key   value

mlFlow. set_tag ("Algo", " logit")
key   value

mlFlow.log_param("C", hp)
fun2   key   value

mlFlow. log_param (" Data path", "data/iris.csv")

mlFlow. log_metric (" Accuracy ", variable)

mlFlow. sklearn. log_model ("variable name of model", Path)
⇓
framework ⇒ Tensorflow, keras, pytorch

= Alternate Way to log model
> mlFlow. log_~~out~~ artifact ("local_path", artifect_Path ="model")

Step 1 - Import MLFlow

```
import mlflow
```

Step 2 - Set the tracker and experiment

```
mlflow.set_tracking_uri(DATABASE_URI)
mlflow.set_experiment("EXPERIMENT_NAME")
```

Step 3 - Start a experiment run

```
with mlflow.start_run():
```

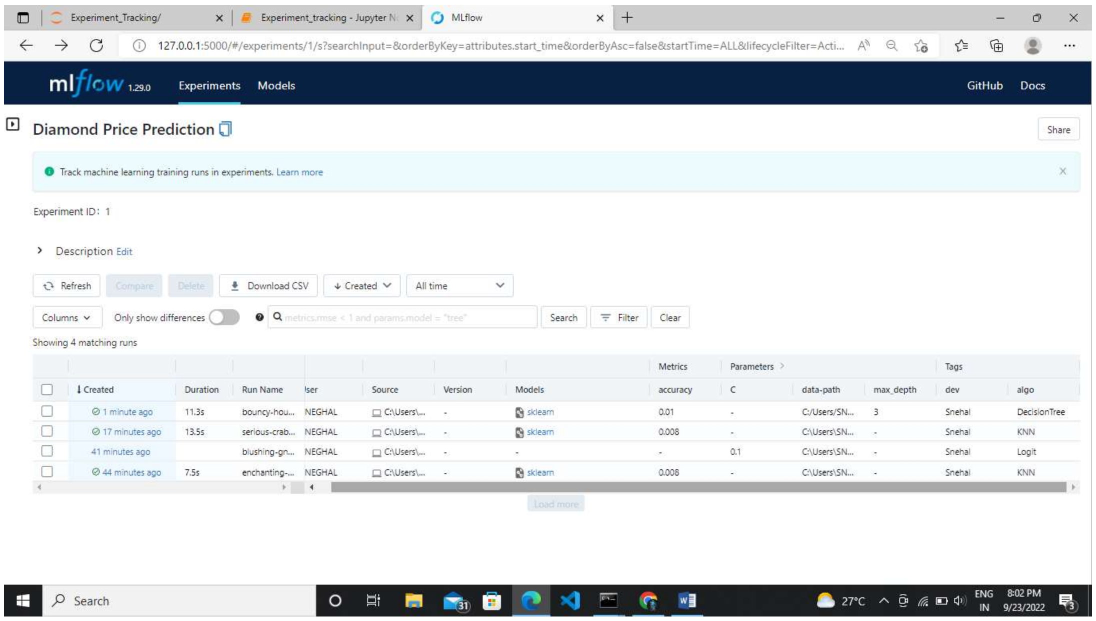
Step 4 - Logging the metadata

```
mlflow.set_tag(KEY, VALUE)

mlflow.log_param(KEY, VALUE) mlflow.log_metric(KEY, VALUE)
```

Step 5 - Logging the model and other files (2 ways)

```
Way 1 -  mlflow.<FRAMEWORK>.log_model(MODEL_OBJECT, artifact_path="PATH")

Way 2 -  mlflow.log_artifact(LOCAL_PATH, artifact_path="PATH")
```

MLFlow Interface for Tracking Experiments



127.0.0.1:5000/#/experiments/1/s?searchInput=&orderByKey=attributes.start_time&orderByAsc=false&startTime=ALL&lifecycleFilter=Acti...

Diamond Price Prediction

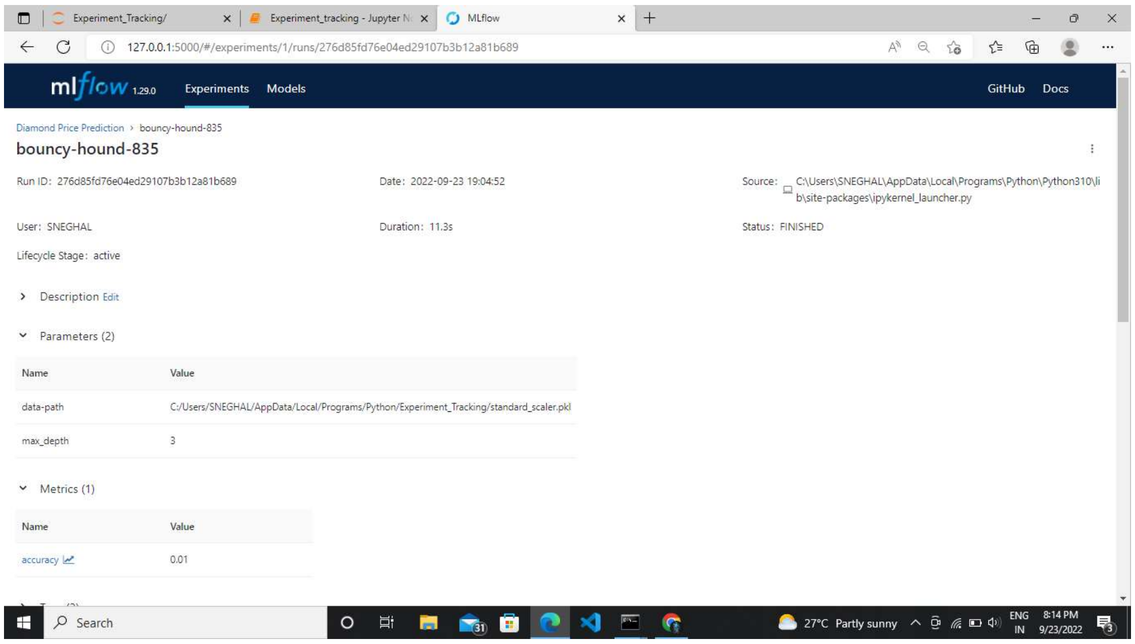
Track machine learning training runs in experiments. Learn more

Experiment ID: 1

Description Edit

Showing 4 matching runs

							Metrics	Parameters			Tags	
Created	Duration	Run Name	ser	Source	Version	Models	accuracy	C	data-path	max_depth	dev	algo
1 minute ago	11.3s	bouncy-hou...	NEGHAL	C:\Users\...	-	sklearn	0.01	-	C:/Users/SN...	3	Snehal	DecisionTree
17 minutes ago	13.5s	serious-crab...	NEGHAL	C:\Users\...	-	sklearn	0.008	-	C:\Users\SN...	-	Snehal	KNN
41 minutes ago		blushing-gn...	NEGHAL	C:\Users\...	-	-	-	0.1	C:\Users\SN...	-	Snehal	Logit
44 minutes ago	7.5s	enchanting-...	NEGHAL	C:\Users\...	-	sklearn	0.008	-	C:\Users\SN...	-	Snehal	KNN



127.0.0.1:5000/#/experiments/1/runs/276d85fd76e04ed29107b3b12a81b689

Diamond Price Prediction › bouncy-hound-835

bouncy-hound-835

Run ID: 276d85fd76e04ed29107b3b12a81b689

Date: 2022-09-23 19:04:52

Source: C:\Users\SNEGHAL\AppData\Local\Programs\Python\Python310\lib\site-packages\ipykernel_launcher.py

User: SNEGHAL

Duration: 11.3s

Status: FINISHED

Lifecycle Stage: active

Description Edit

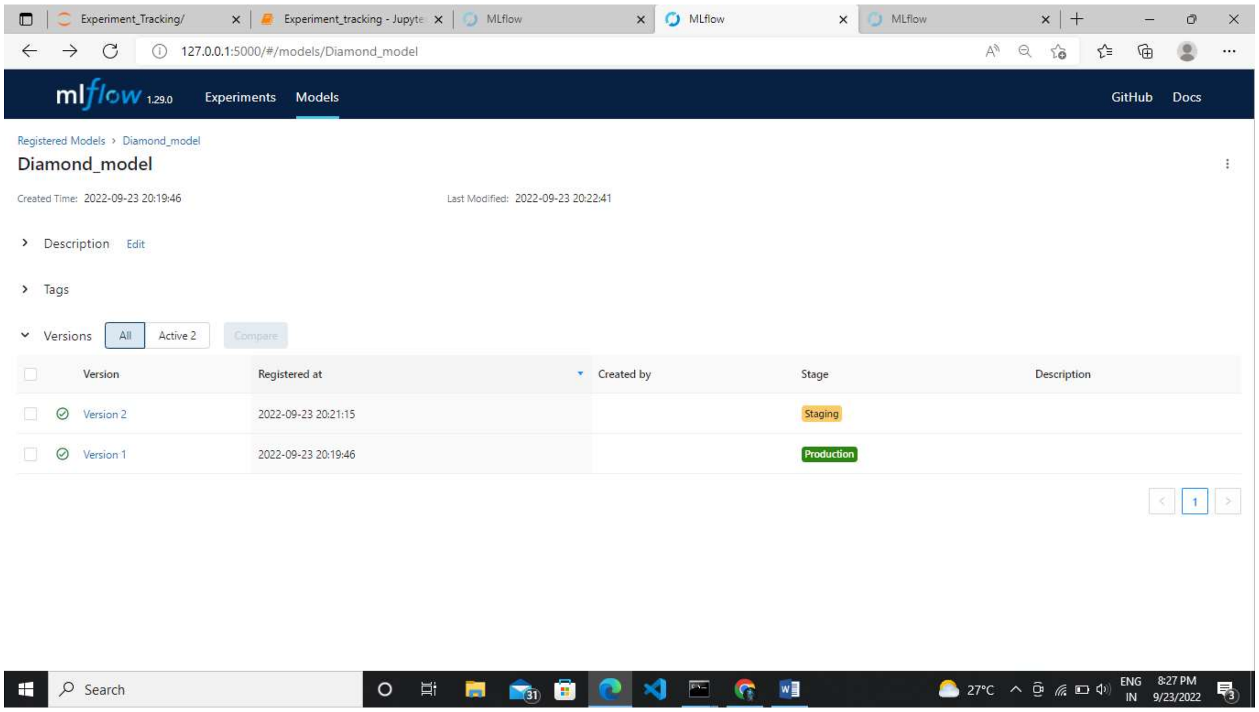
Parameters (2)

Name	Value
data-path	C:/Users/SNEGHAL/AppData/Local/Programs/Python/Experiment_Tracking/standard_scaler.pkl
max_depth	3

Metrics (1)

Name	Value
accuracy	0.01

MLFlow Interface for Model Management



127.0.0.1:5000/#/models/Diamond_model

Registered Models › Diamond_model

Diamond_model

Created Time: 2022-09-23 20:19:46   Last Modified: 2022-09-23 20:22:41

	Version	Registered at	Created by	Stage	Description
	Version 2	2022-09-23 20:21:15		Staging	
	Version 1	2022-09-23 20:19:46		Production	