MLflow Tutorial

Objective : run a project on MLflow. Define and record all the steps necessary (manual, automatic and semi-automatic) to transform a GitHub repository to use MLflow.

Get Started on Ubuntu

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1. pip install mlflow

```
(base) wizkod@ubuntu:~$ pip install mlflow
```

2. Install Anaconda3-2019
cd /tmp
curl -O https://repo.anaconda.com/archive/Anaconda3-2019.03-Linux-x86_64.sh
This tutorial shows step by step how to install conda on Ubuntu.

3. Clone mlflow projects examples
```
$ git clone https://github.com/mlflow/mlflow.git
```

4.(if necessary) check if any mlflow server is running (ps -aef | grep mlflow)
        (if yes) -- kill process (killall -r mlflow)

```
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow$ ps -aef | grep mlflow
wizkod     56676   56633  0 23:44 pts/1    00:00:00 grep --color=auto mlflow
```

5.start the mlflow server (mlflow server --host 0.0.0.0 &)

```
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow$ mlflow server --host 0.0.0.0 &
[1] 56686
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow$ [2020-11-13 23:45:50 -0800] [56692] [INFO] Startin
g gunicorn 20.0.4
[2020-11-13 23:45:50 -0800] [56692] [INFO] Listening at: http://0.0.0.0:5000 (56692)
[2020-11-13 23:45:50 -0800] [56692] [INFO] Using worker: sync
[2020-11-13 23:45:50 -0800] [56695] [INFO] Booting worker with pid: 56695
[2020-11-13 23:45:50 -0800] [56696] [INFO] Booting worker with pid: 56696
[2020-11-13 23:45:50 -0800] [56697] [INFO] Booting worker with pid: 56697
[2020-11-13 23:45:51 -0800] [56698] [INFO] Booting worker with pid: 56698
```

6. Project is to do Model Training
        look into /mlflow/examples/sklearn_elasticnet_wine
                - enter more MLproject to get the entry points of the concern projects

<p align="center">- find parameters and metrics {alpha}</p>

```
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow/mlflow/examples/sklearn_elasticnet_wine$ more MLproject
name: tutorial

conda_env: conda.yaml

entry_points:
  main:
    parameters:
      alpha: {type: float, default: 0.5}
      l1_ratio: {type: float, default: 0.1}
    command: "python train.py {alpha} {l1_ratio}"
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow/mlflow/examples/sklearn_elasticnet_wine$
```

7. launch it run (`mlflow run sklearn_elasticnet_wine -P alpha=0.5`) on /mlflow/examples/sklearn_elasticnet_wine and it would generate the model and create some runs

    --conda env is created
    --capture7 the model is generated RMSE, MAE ,R2 are matrix

```
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow/mlflow/examples$ mlflow run
sklearn_elasticnet_wine -P alpha=0.5
2020/11/16 18:38:19 INFO mlflow.projects.utils: === Created directory /tmp/tmp19pi
uqb3 for downloading remote URIs passed to arguments of type 'path' ===
2020/11/16 18:38:19 INFO mlflow.projects.backend.local: === Running command 'sourc
e /home/wizkod/anaconda3/bin/../etc/profile.d/conda.sh && conda activate mlflow-62
84a367a61b51ccdf445333a216776597fb4efc 1>&2 && python train.py 0.5 0.1' in run wit
h ID '0513cffedb264a24bb119458dfa7ccc2' ===
Elasticnet model (alpha=0.500000, l1_ratio=0.100000):
  RMSE: 0.7460550348172179
  MAE: 0.576381895873763
  R2: 0.21136606570632266
2020/11/16 18:38:34 INFO mlflow.projects: === Run (ID '0513cffedb264a24bb119458dfa
7ccc2') succeeded ===
```

8. Tracking the UI
   - `http://127.0.0.1:5000/#/` on the browser or enter manually `mlflow ui`

```
(base) wizkod@ubuntu:~/Documents/MLOps Project/MLflow/mlflow$ mlflow ui
[2020-11-15 11:14:41 -0800] [4017] [INFO] Starting gunicorn 20.0.4
[2020-11-15 11:14:41 -0800] [4017] [INFO] Listening at: http://127.0.0.1:5000
(4017)
[2020-11-15 11:14:41 -0800] [4017] [INFO] Using worker: sync
[2020-11-15 11:14:41 -0800] [4020] [INFO] Booting worker with pid: 4020
[2020-11-15 11:25:00 -0800] [4017] [INFO] Handling signal: winch
[2020-11-15 11:25:00 -0800] [4017] [INFO] Handling signal: winch
```

9. Model Serving
There is our model created, we can observe on the ui some parameters and metrics of the model generated.

10. Make Predictions

Unfortunately we can't make predictions because generated artifacts don't show on the UI locally. refer this [forum](#) for more explanations.