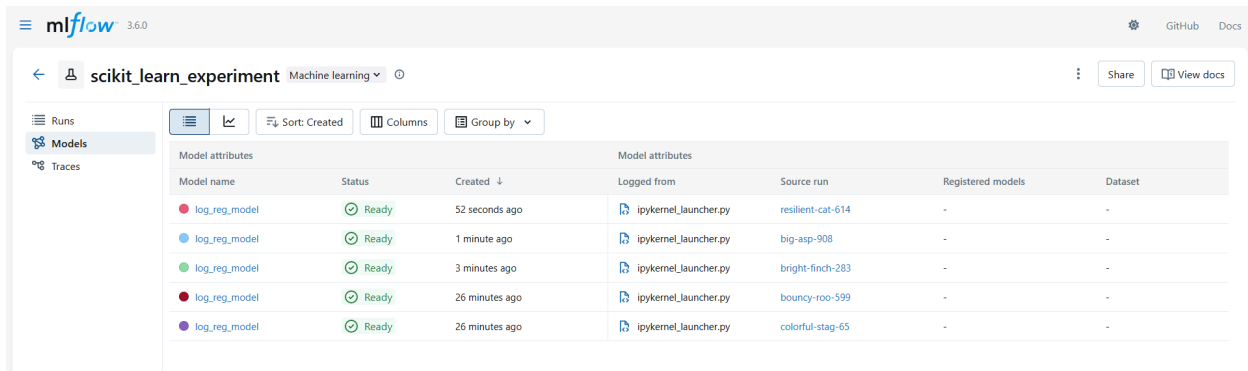
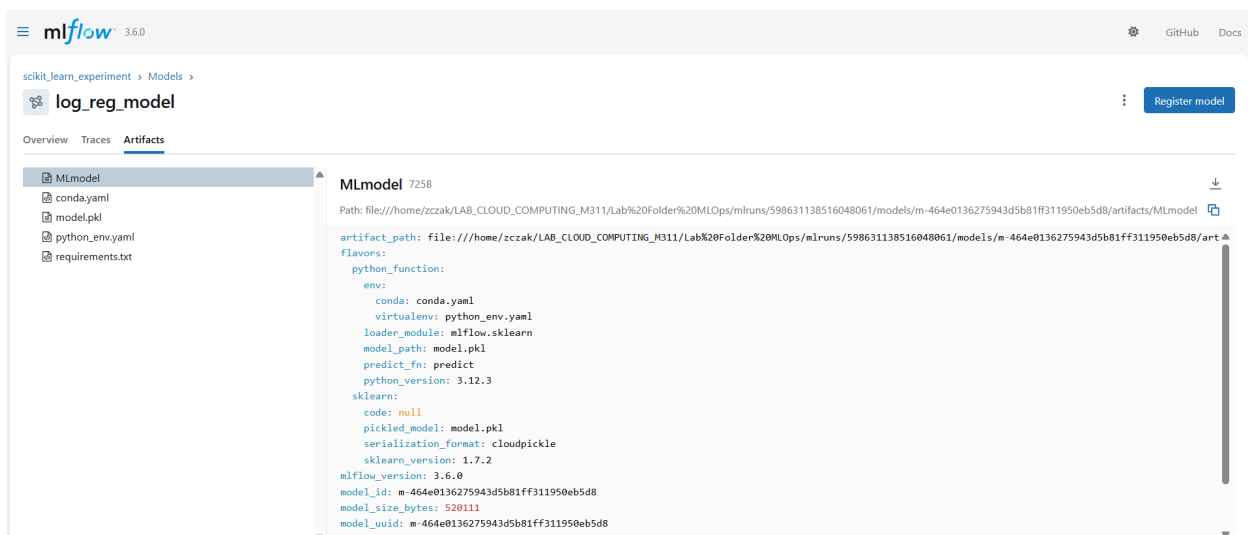


Lab MLFlow - Cloud Computing - M311



The screenshot shows the MLFlow web interface for the 'scikit_learn_experiment'. The left sidebar has tabs for 'Runs', 'Models', and 'Traces'. The 'Runs' tab is active, displaying a table of runs. The table has columns for 'Model name', 'Status', 'Created', 'Logged from', 'Source run', 'Registered models', and 'Dataset'. All runs are in a 'Ready' status.

Model name	Status	Created	Logged from	Source run	Registered models	Dataset
log_reg_model	Ready	52 seconds ago	ipykernel_launcher.py	resilient-cat-614	-	-
log_reg_model	Ready	1 minute ago	ipykernel_launcher.py	big-asp-908	-	-
log_reg_model	Ready	3 minutes ago	ipykernel_launcher.py	bright-finch-283	-	-
log_reg_model	Ready	26 minutes ago	ipykernel_launcher.py	bouncy-roo-599	-	-
log_reg_model	Ready	26 minutes ago	ipykernel_launcher.py	colorful-stag-65	-	-



The screenshot shows the 'log_reg_model' artifact details in the MLFlow interface. The left sidebar has tabs for 'Overview', 'Traces', and 'Artifacts'. The 'Artifacts' tab is active, displaying the artifact's path, flavors, and other metadata.

MLmodel 7258

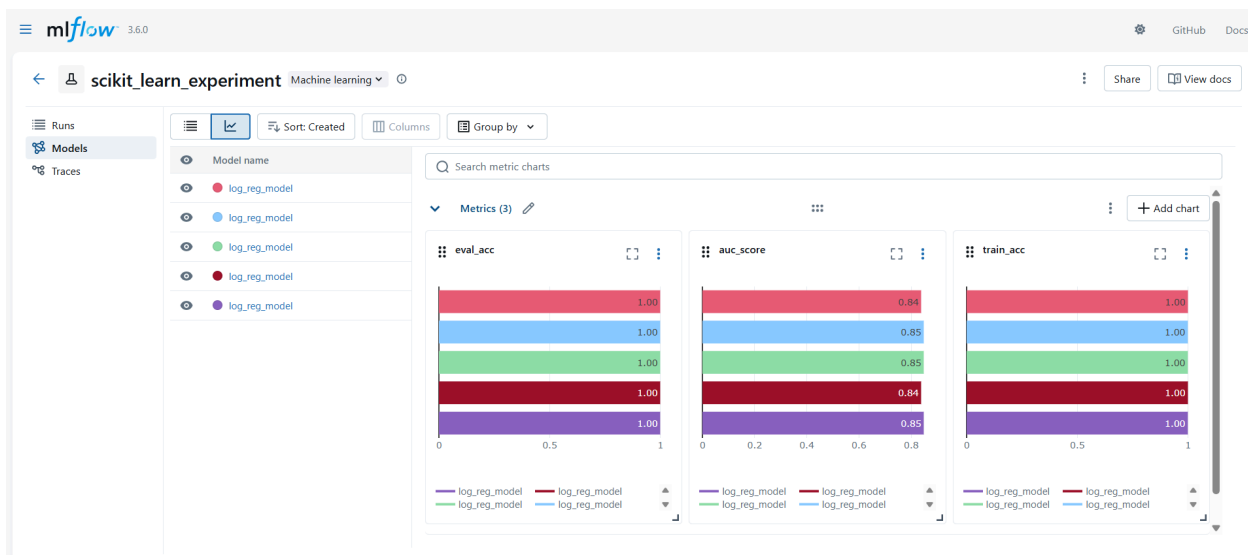
Path: file:///home/zczak/LAB_CLOUD_COMPUTING_M311/Lab%20Folder%20MLOps/mlruns/598631138516048061/models/m-464e0136275943d5b81ff311950eb5d8/artifacts/MLmodel

artifact_path: file:///home/zczak/LAB_CLOUD_COMPUTING_M311/Lab%20Folder%20MLOps/mlruns/598631138516048061/models/m-464e0136275943d5b81ff311950eb5d8/art

flavors:

```
python_function:
  env:
    conda: conda.yaml
    virtualenv: python_env.yaml
  loader_module: mlflow.sklearn
  model_path: model.pkl
  predict_fn: predict
  python_version: 3.12.3
sklearn:
  code: null
  pickled_model: model.pkl
  serialization_format: cloudpickle
  sklearn_version: 1.7.2
mlflow_version: 3.6.0
model_id: m-464e0136275943d5b81ff311950eb5d8
model_size_bytes: 520111
model_uuid: m-464e0136275943d5b81ff311950eb5d8
params: null
```

Comparing metrics



Loading a logged model

Loading a logged model

Cliquez sur un run et copiez le run ID en haut et exécutez le code suivant avec l'id de votre RUN

1

loaded_model = mlflow.sklearn.load_model("runs:/426d47f594c445a9ab8709e23c0b9b13/log_reg_model")

Python

1

loaded_model.score(x_test, y_test)

Python

0.9987732641687989

Hyperparameter tuning

fold 5

Anomaly Weight: 15

AUC: 0.8813861631838532

eval_acc: 0.997371188229233

2025/11/15 12:03:03 WARNING mlflow.models.model: Model logged without a signature and input example. Please set

Averages:

Accuracy: 0.9978970181373118

AUC: 0.9212283479853886

Best:

Accuracy: 0.998422712933754

AUC: 0.9751350672194998

Sort by AUC score

creditcard_broad_search

Machine learning

Share

View docs

metrics.rmse < 1 and params.model = "tree"

Time created

State: Active

Datasets

Sort: auc_score

New run

Columns

Group by

	Run Name	Created	Dataset	Duration	Source	Models	Metrics
							auc_score
	righteous-hare-4	24 minutes ago	-	2.3s	ipykerne...	anom_weight_5_fold_2	0.975398919...
	gaudy-wolf-538	24 minutes ago	-	2.5s	ipykerne...	anom_weight_10_fold_2	0.975310968...
	unique-bat-754	24 minutes ago	-	3.0s	ipykerne...	anom_weight_15_fold_2	0.975135067...
	rebellious-robin-273	24 minutes ago	-	2.3s	ipykerne...	anom_weight_5_fold_3	0.931466316...
	sassy-cod-652	24 minutes ago	-	2.7s	ipykerne...	anom_weight_10_fold_3	0.931378350...
	brawny-tern-973	24 minutes ago	-	4.2s	ipykerne...	anom_weight_15_fold_3	0.931290384...
	omniscient-stork-139	24 minutes ago	-	2.7s	ipykerne...	anom_weight_10_fold_1	0.924384561...
	clumsy-rook-730	24 minutes ago	-	2.7s	ipykerne...	anom_weight_15_fold_1	0.924296641...
	burly-awk-81	24 minutes ago	-	2.4s	ipykerne...	anom_weight_10_fold_4	0.894385162...
	wise-vole-948	24 minutes ago	-	2.8s	ipykerne...	anom_weight_5_fold_4	0.894385162...
	exultant-geese-965	23 minutes ago	-	3.8s	ipykerne...	anom_weight_15_fold_4	0.894033483...

20 matching runs

metrics.auc_score >= 0.9 and params.anomaly_weight = "5"

metrics.auc_score >= 0.9 and params.anomaly_weight = "5"

Time created

State: Active

Datasets

Sort: anomaly_weight

New run

Columns

Group by

	Run Name	Created	Dataset	Duration	Source	Models	Metrics	Parameters
							auc_score	anomaly_weight
	rebellious-robin-273	50 minutes ago	-	2.3s	ipykerne...	anom_weight_5_fold_3	0.931466316...	5
	righteous-hare-4	50 minutes ago	-	2.3s	ipykerne...	anom_weight_5_fold_2	0.975398919...	5

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metrics.auc_score >= 0.95 and params.anomaly_weight = "5"

Run Name	Created	Dataset	Duration	Source	Models	Metrics	Parameters
righteous-hare-4	50 minutes ago	-	2.3s	ipykerne...	anom_weight_5_fold_2	0.975398919...	5

metrics.auc_score >= 0.95 and params.anomaly_weight = "10"

Run Name	Created	Dataset	Duration	Source	Models	Metrics	Parameters
gaudy-wolf-538	50 minutes ago	-	2.5s	ipykerne...	anom_weight_10_fold_2	0.975310968...	10

metrics.auc_score >= 0.95 and params.anomaly_weight = "15"

Run Name	Created	Dataset	Duration	Source	Models	Metrics	Parameters
unique-bat-754	50 minutes ago	-	3.0s	ipykerne...	anom_weight_15_fold_2	0.975135067...	15

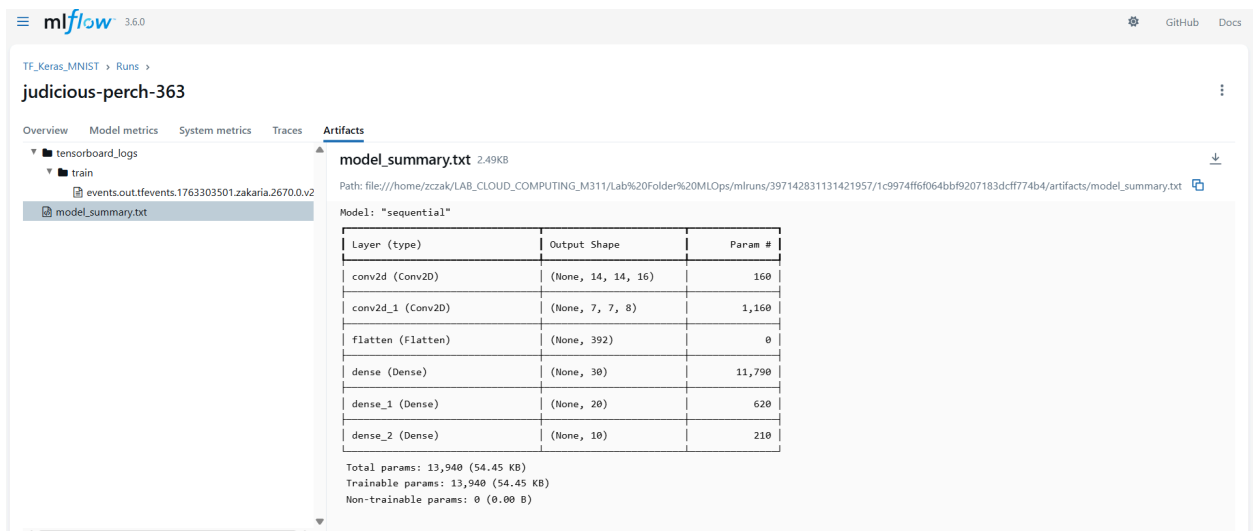
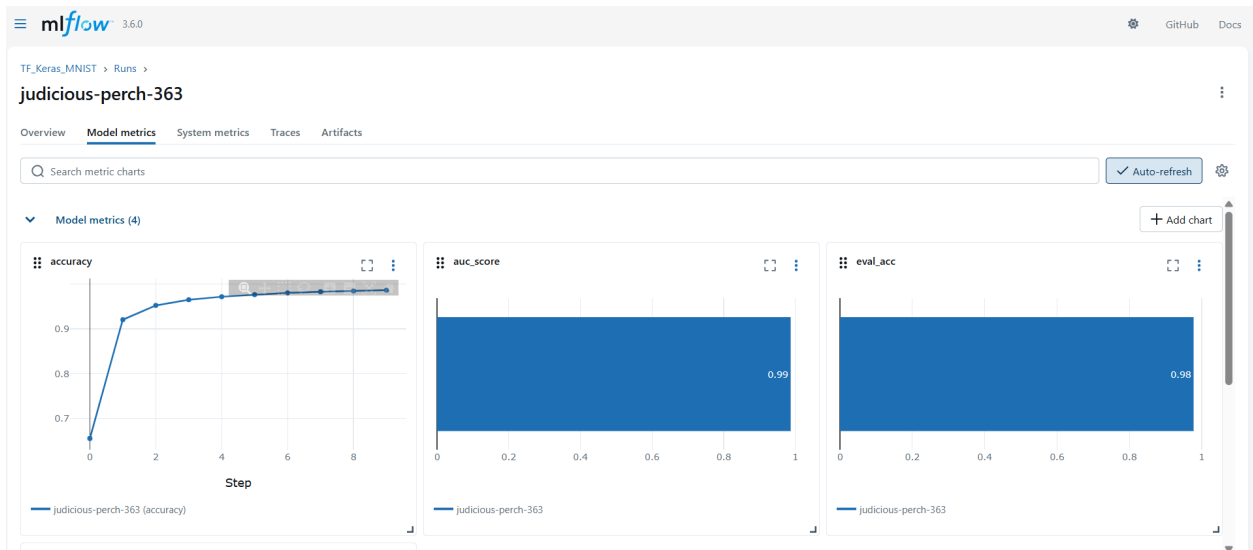
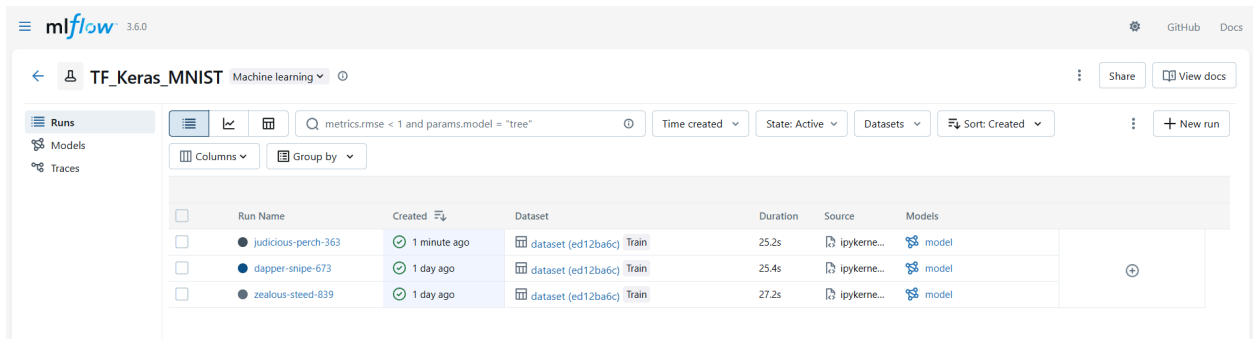
Le meilleur interval est de [5, 10]

creditcard_broad_search_2 Machine learning

Run Name	Created	Duration	Source	Models	Metrics	Parameters
suave-snake-606	16 minutes ago	1.8s	ipykerne...	anom_weight_5_fold_2	0.975398919...	5
awesome-goat-152	16 minutes ago	1.9s	ipykerne...	anom_weight_5_fold_3	0.931466316...	5
upset-yak-956	16 minutes ago	1.9s	ipykerne...	anom_weight_3_fold_2	0.927867822...	3
puzzled-bee-12	16 minutes ago	1.9s	ipykerne...	anom_weight_4_fold_2	0.927779871...	4
nosy-gull-609	16 minutes ago	2.0s	ipykerne...	anom_weight_4_fold_3	0.908739044...	4
upset-frog-969	16 minutes ago	1.9s	ipykerne...	anom_weight_2_fold_2	0.904234200...	2
bustling-flea-833	16 minutes ago	1.9s	ipykerne...	anom_weight_2_fold_4	0.894561002...	2
painted-bug-423	16 minutes ago	1.9s	ipykerne...	anom_weight_5_fold_4	0.894385162...	5
salty-sow-810	16 minutes ago	1.9s	ipykerne...	anom_weight_4_fold_4	0.894385162...	4
nimble-goat-762	16 minutes ago	1.9s	ipykerne...	anom_weight_3_fold_4	0.894385162...	3
shivering-fly-867	16 minutes ago	1.9s	ipykerne...	anom_weight_3_fold_3	0.886099737...	3

Même si on essaie avec [1, 2, 3, 4, 5] le meilleur weight reste 5.

2- MLFlow with Tensorflow



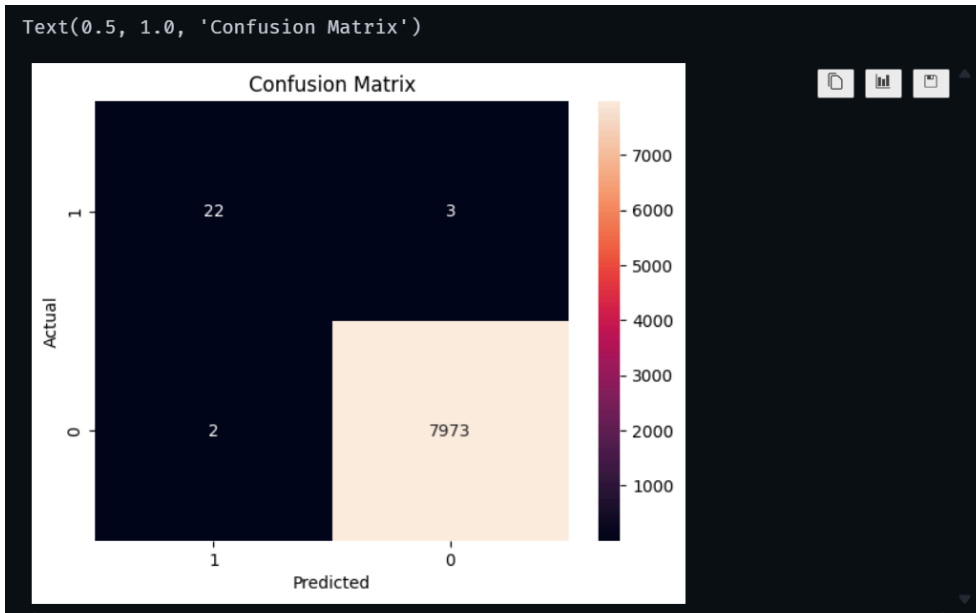
4- Local model serving - deployment

```
> mlflow models serve --model-uri runs:/426d47f594c445a9ab8709e23c0b9b13/log_reg_model -p 1235
/home/zczak/LAB_CLOUD_COMPUTING_M311/Lab Folder MLOps/venv/lib/python3.12/site-packages/mlflow/tracking/_tracking_service
e/utis.py:140: FutureWarning: Filesystem tracking backend (e.g., '.mlruns') is deprecated. Please switch to a database
backend (e.g., 'sqlite:///mlflow.db'). For feedback, see: https://github.com/mlflow/mlflow/issues/18534
    return FileStore(store_uri, store_uri)
2025/11/16 15:38:24 INFO mlflow.models.flavor_backend_registry: Selected backend for flavor 'python3_environment'
2025/11/16 15:38:24 INFO mlflow.utils.virtualenv: Environment /home/zczak/.mlflow/envs/mlflow-567b28edbc31fa1f5c709f93f0
266fa290dea436 already exists
2025/11/16 15:38:24 INFO mlflow.utils.environment: == Running command ['bash', '-c', 'source /home/zczak/.mlflow/envs/
mlflow-567b28edbc31fa1f5c709f93f0266fa290dea436/bin/activate && python -c ""']
2025/11/16 15:38:24 INFO mlflow.utils.environment: == Running command ['bash', '-c', 'source /home/zczak/.mlflow/envs/
mlflow-567b28edbc31fa1f5c709f93f0266fa290dea436/bin/activate && exec uvicorn --host 127.0.0.1 --port 1235 --workers 1 ml
flow.pyfunc.scoring_server.app:app']
/home/zczak/LAB_CLOUD_COMPUTING_M311/Lab Folder MLOps/venv/lib/python3.12/site-packages/mlflow/tracking/_tracking_servic
e/utis.py:140: FutureWarning: Filesystem tracking backend (e.g., '.mlruns') is deprecated. Please switch to a database
backend (e.g., 'sqlite:///mlflow.db'). For feedback, see: https://github.com/mlflow/mlflow/issues/18534
    return FileStore(store_uri, store_uri)
INFO: Started server process [5221]
INFO: Waiting for application startup.
INFO: Application startup complete.
INFO: Uvicorn running on http://127.0.0.1:1235 (Press CTRL+C to quit)
```

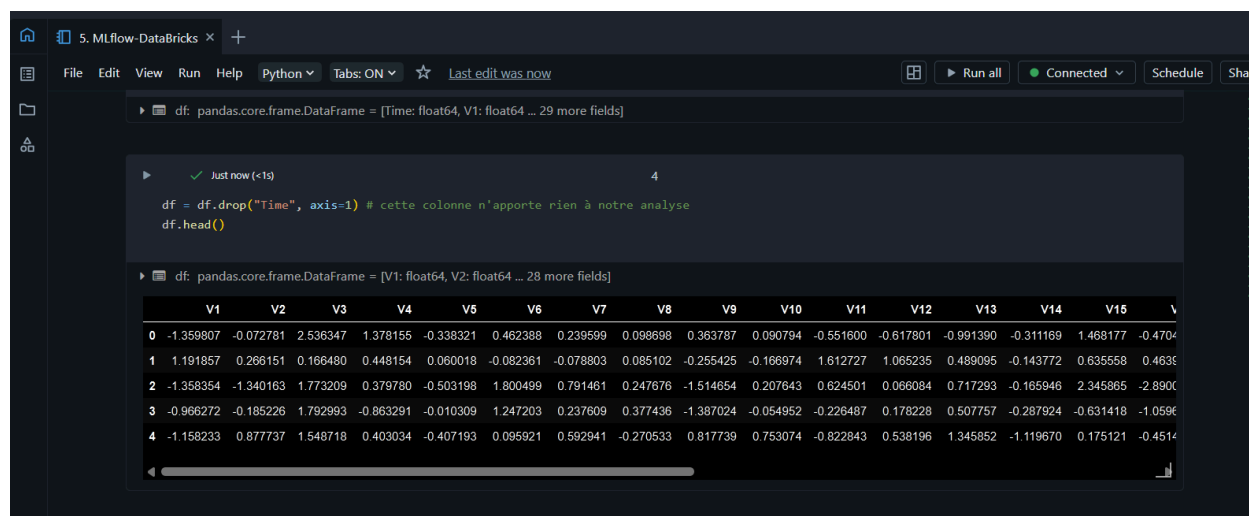
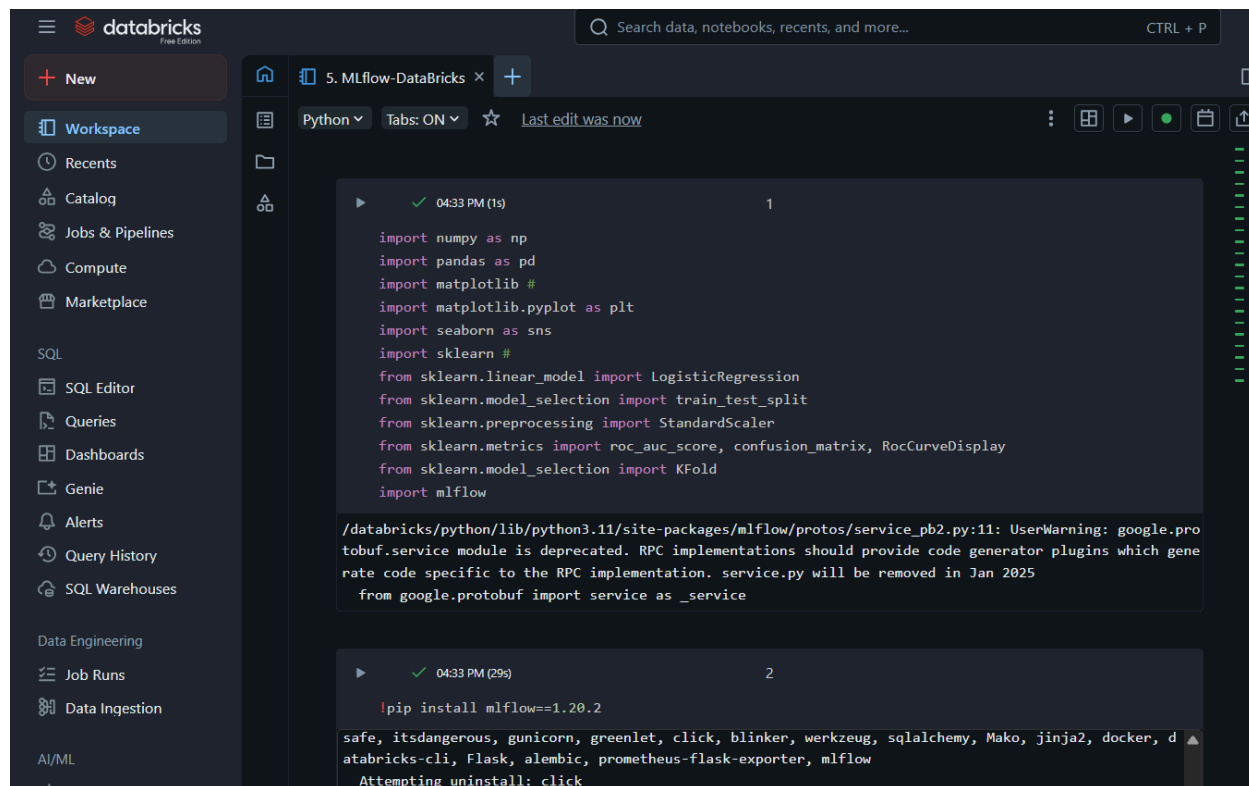
- Interrogation en utilisant requests

```
1 import requests
2
3 host = '127.0.0.1'
4 port = '1235'
5
6 url = f'http://{host}:{port}/invocations'
7
8 headers = {
9     ... 'Content-Type': 'application/json',
10 }
11 r = requests.post(url=url, headers=headers, data=input_json)
12
13 preds_dict = r.json()
14 print(f'Predictions: {preds_dict["predictions"]}')
[20] ✓ 0.0s Python
```

Predictions: [0, 0]



5- MLFlow Databricks

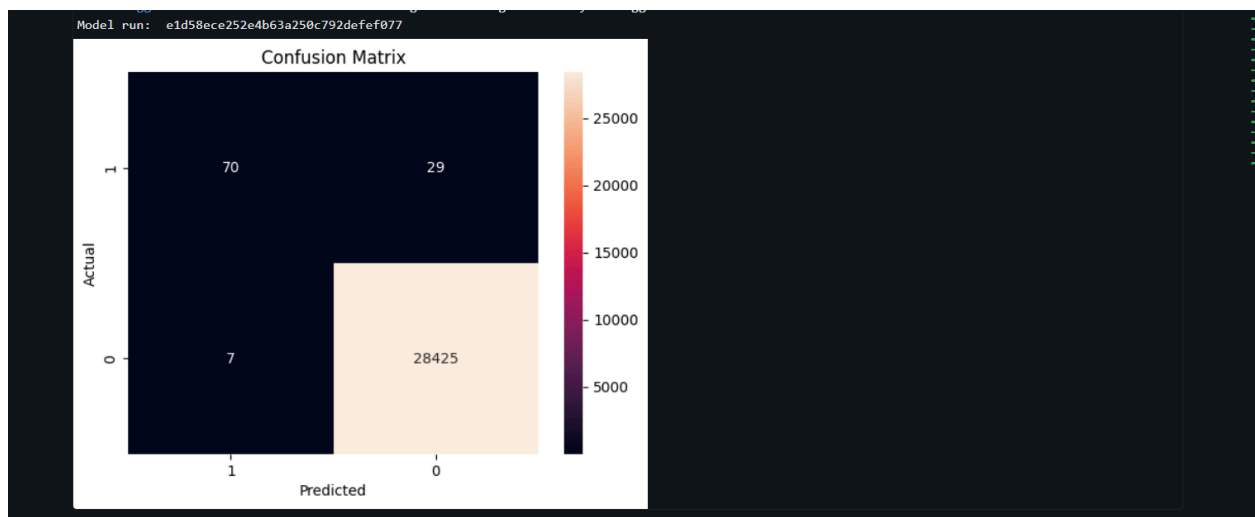
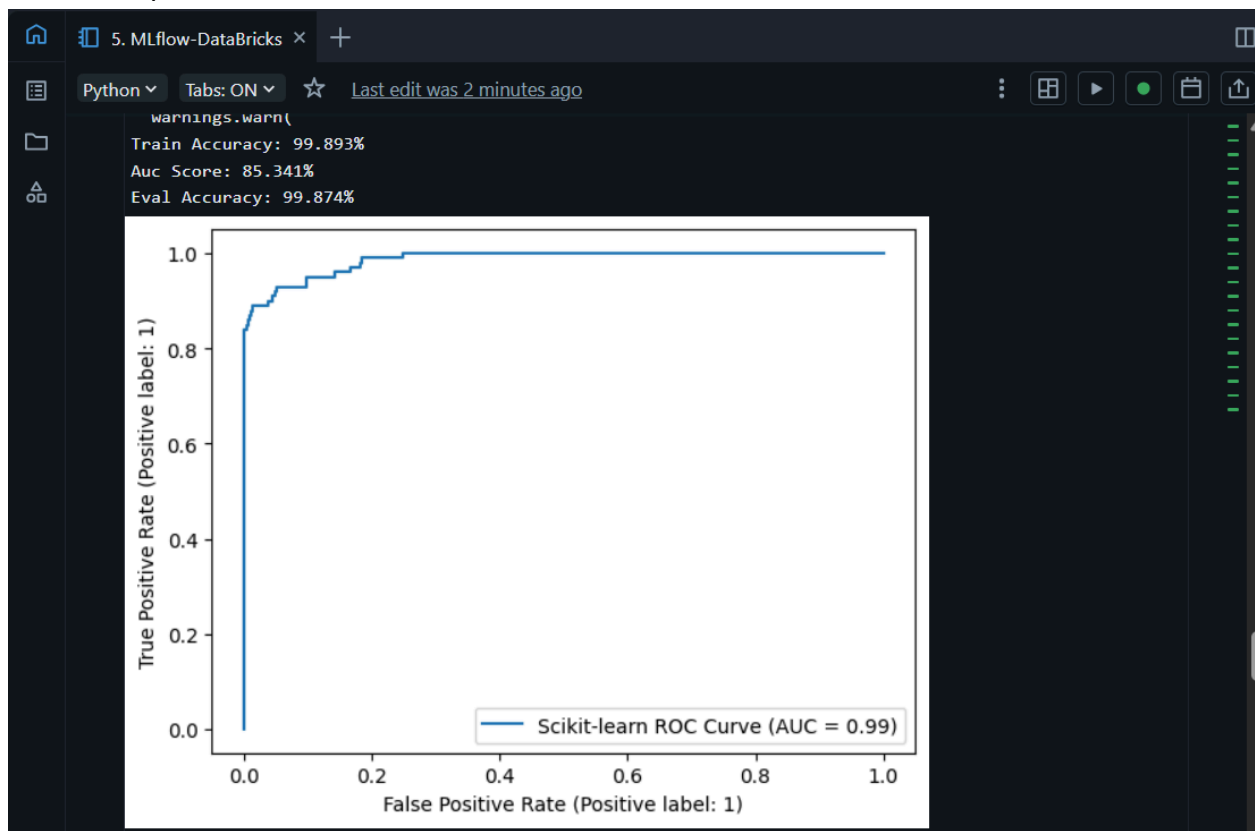


Je configure databricks cli pour pouvoir lancer

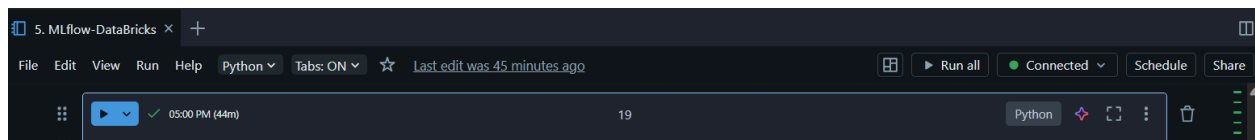
```
> databricks configure --token
Databricks Host (should begin with https://): https://dbc-15fdc886-7696.cloud.databricks.com/
Token:
```

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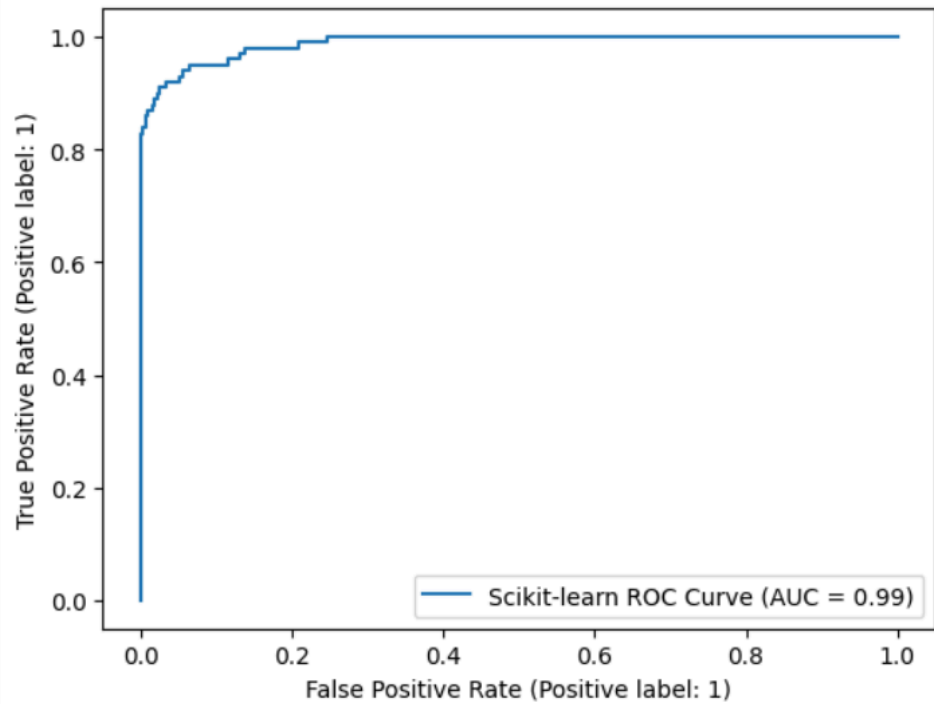
J'ai run l'experiment



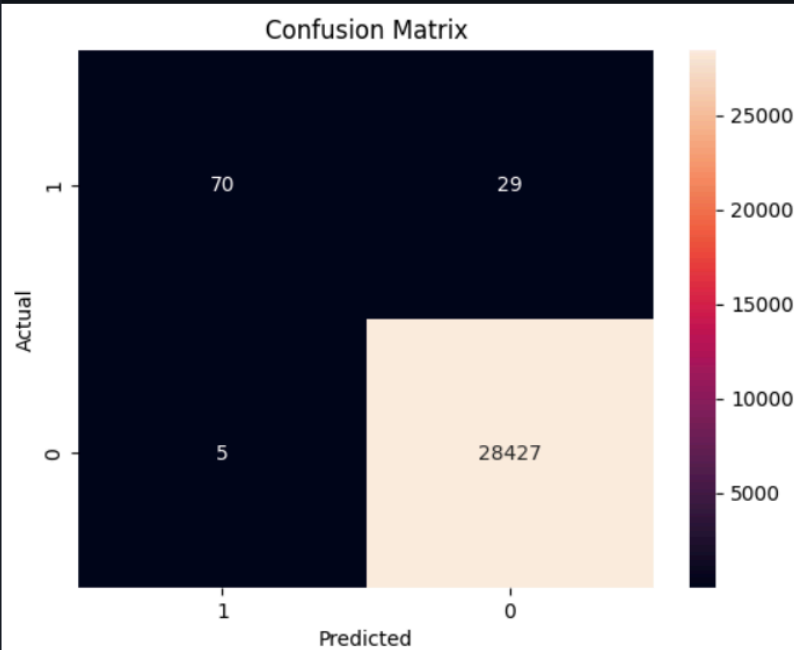
Now for the last process, it took 44 minutes

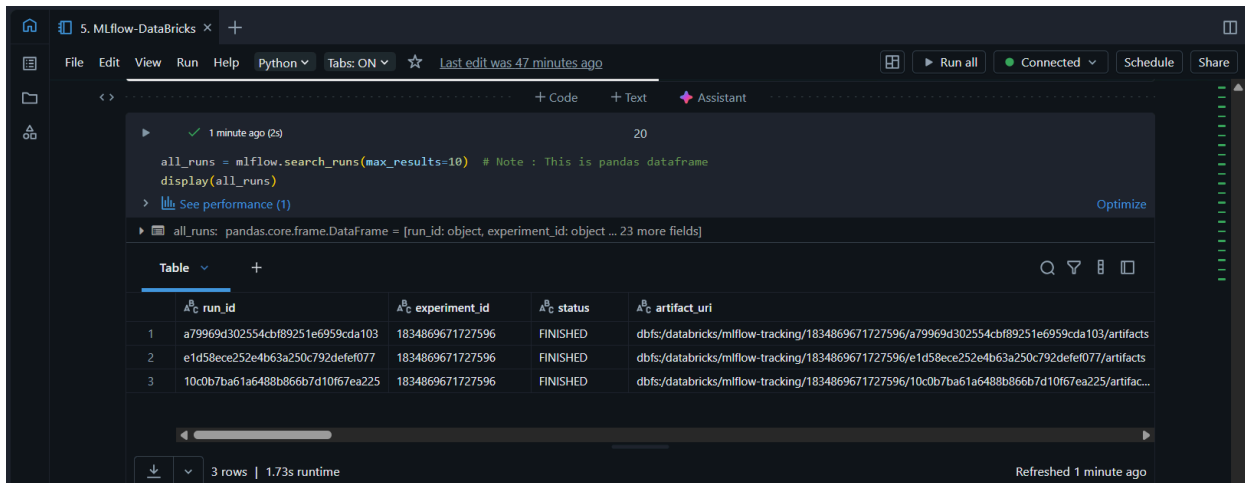


```
Train Accuracy: 99.897%  
Auc Score: 85.345%  
Eval Accuracy: 99.881%
```



Model run: a79969d302554cbf89251e6959cda103





The screenshot shows a Databricks notebook interface. The top menu bar includes File, Edit, View, Run, and Help. The notebook is titled '5. MLflow-Databricks'. The code cell shows a search for MLflow runs with a maximum of 10 results. The output is a pandas DataFrame with 3 rows and 5 columns: run_id, experiment_id, status, artifact_uri, and an unnamed column. The status of all runs is 'FINISHED'.

	run_id	experiment_id	status	artifact_uri
1	a79969d302554cbf89251e6959cda103	1834869671727596	FINISHED	dbfs:/databricks/mlflow-tracking/1834869671727596/a79969d302554cbf89251e6959cda103/artifacts
2	e1d58ece252e4b63a250c792defef077	1834869671727596	FINISHED	dbfs:/databricks/mlflow-tracking/1834869671727596/e1d58ece252e4b63a250c792defef077/artifacts
3	10c0b7ba61a6488b866b7d10f67ea225	1834869671727596	FINISHED	dbfs:/databricks/mlflow-tracking/1834869671727596/10c0b7ba61a6488b866b7d10f67ea225/artifacts

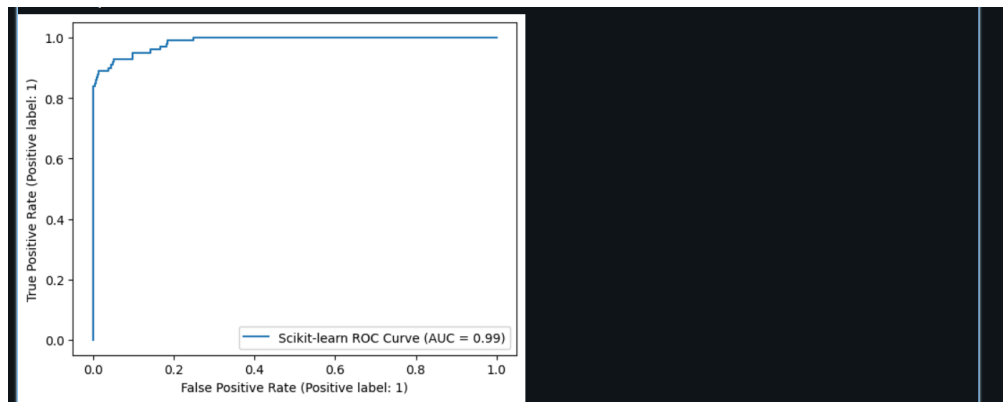
TAF:

1. réexécutez la cellule 18 en utilisant d'autres modèle ML de SKlearn
2. comparez vos résultats en utilisant l'outil de comparaison de MLFlow

```
8 models = [  
9     ("LogisticRegression", LogisticRegression(random_state=None, max_iter=10, solver='newton-cg')),  
10    ("RandomForest", RandomForestClassifier(n_estimators=100, random_state=2020)),  
11    ("SVC", SVC(probability=True, random_state=2020))  
12 ]
```

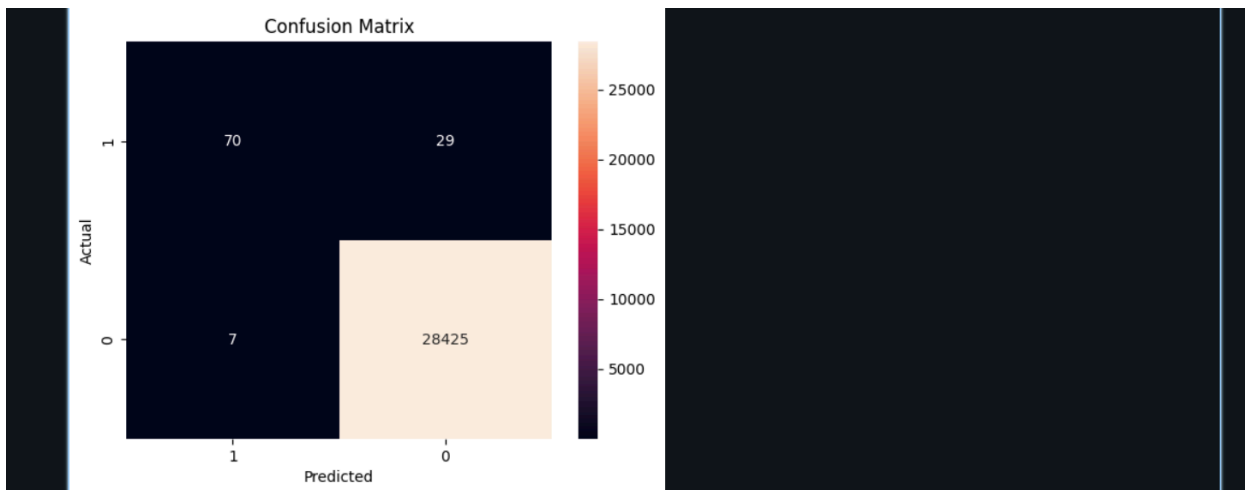
Logistic regression

```
Train Accuracy: 99.893%  
Auc Score: 85.341%  
Eval Accuracy: 99.874%
```

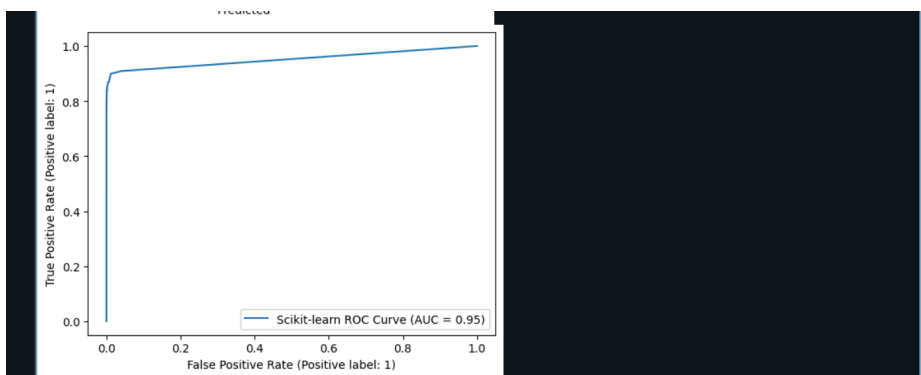


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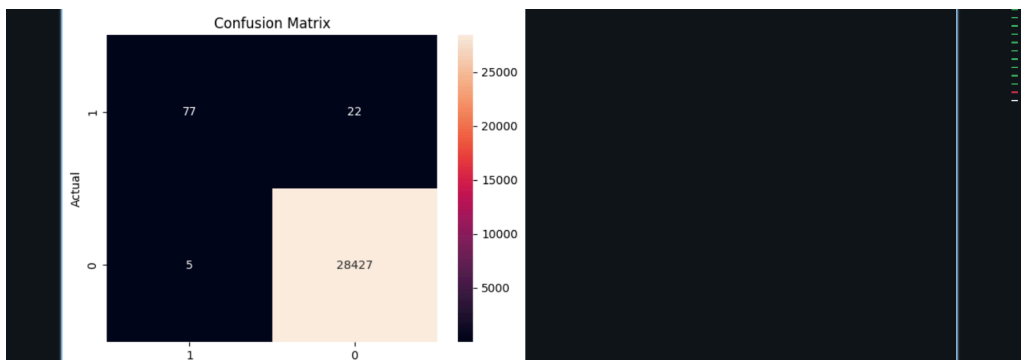
```
Train Accuracy: 100.000%  
Auc Score: 88.880%  
Eval Accuracy: 99.905%
```



Random Forest



```
Train Accuracy: 99.943%  
Auc Score: 83.833%  
Eval Accuracy: 99.877%
```



SVC

