

Module 3: Running Experiments and Training Models

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Agenda



Introduction to Experiments



Training and Registering Models

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Introduction to Experiments

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What is an Experiment?



An executable process that is run one or more times – often a script Each run generates metrics and output files

Metadata and events are recorded in log files

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Running an Experiment Inline



Running a Script as an Experiment



Control code (to initiate and monitor experiment run):



Using MLflow

Using MLflow Inline



Using MLflow with Scripts

Script:

Control code:



Lab: Run Experiments



- 1. View the lab instructions at <u>https://aka.ms/mslearn-dp100</u>
- 2. Complete the **Run experiments** exercise

Training and Registering Models

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Training a Model in a Script

Script:

```
from azureml.core import Run
import joblib
from sklearn.linear_model import LogisticRegression
...
joblib.dump(value=model, filename='outputs/model.pkl')
Save trained model
in outputs folder to
record is in
experiment run
```

Control code:

```
from azureml.core import Workspace, Experiment, ScriptRunConfig,
                           Environment, CondaDependencies
env = Environment('training env')
deps = CondaDependencies.create(pip packages=['scikit-learn','azureml-defaults'])
env.python.conda dependencies = deps
script config = ScriptRunConfig(source directory='my dir',
                                                                                      Run script in an
                                                                                     environment that
                                  script='script.py',
                                                                                    includes required ML
                                  environment=env)
                                                                                       framework
experiment = Experiment(workspace=ws, name='my-script-experiment')
                                                                                     Scikit-Learn, PyTorch,
run = experiment.submit(config=script config)
                                                                                        TensorFlow, ...
```

Using Script Arguments



Registering a Model

Register from training run:



Register from local file(s)



Lab: Train Models



- 1. View the lab instructions at <u>https://aka.ms/mslearn-dp100</u>
- 2. Complete the **Train models** exercise

Knowledge check



You are using the Azure Machine Learning Python SDK to write code for an experiment. You must log metrics from each run of the experiment and be able to retrieve them easily from each run. What should you do?

- □ Add **print** statements to the experiment code to print the metrics.
- **W** Use the **log*** methods of the **Run** class to record named metrics
- □ Save the experiment data in the **outputs** folder



You want to use a script-based experiment to train a PyTorch model, setting the batch size and learning rate hyperparameters to different values each time the experiment runs. What should you do?

- □ Create multiple script files one for each batch size and learning rate combination you want to use.
- □ Set the **batch_size** and **learning_rate** properties of the **ScriptRunConfig** before running the experiment.
- Add arguments for batch size and learning rate to the script, and set them in the **arguments** property of the **ScriptRunConfig**

References

Microsoft Learn: Introduction to Azure Machine Learning https://docs.microsoft.com/learn/modules/intro-to-azure-machine-learning-service

Microsoft Learn: Train a machine learning model with Azure Machine Learning https://docs.microsoft.com/learn/modules/train-local-model-with-azure-mls

Azure Machine Learning training run documentation

https://docs.microsoft.com/azure/machine-learning/how-to-set-up-training-targets



