

# THAPELO LENZI

MLOps: Deploying Azure ML Model

12/06/2024

# Using JupyterLab

## Step 1

### Create AIML Workspace

The screenshot shows the Microsoft Azure Portal interface. The browser tab is titled "TeeSquare - Microsoft Azure". The URL in the address bar is "portal.azure.com/#@nompumelelo4029gmail.onmicrosoft.com/resource/subscriptions/724de22f-2491-47e...". The main content area displays the "TeeSquare" Azure Machine Learning workspace. The workspace name is "TeeSquare" with a star icon and three dots. Below it, it says "Azure Machine Learning workspace". There are two buttons: "Download config.json" and "Delete". A "JSON View" button is located in the top right corner of the workspace details. The left sidebar has a collapsed "Essentials" section. The main pane lists several configuration items with their corresponding URLs:

| Setting              | Value  |
|----------------------|--|
| Resource group       | <a href="https://ml.azure.com?tid=5ee847be-c9c1-4aa4-bd50-629de16689ba&amp;...">Studio web URL</a> |
| Location             | West Central US  |
| Subscription         | <a href="#">Azure Pass - Sponsorship</a>   |
| Storage              | <a href="#">teesquare9597453236</a>  |
| Key Vault            | <a href="#">teesquare8874899762</a>  |
| Application Insights | <a href="#">teesquare5558955547</a>  |
| MLflow tracking URI  |  |

The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators.

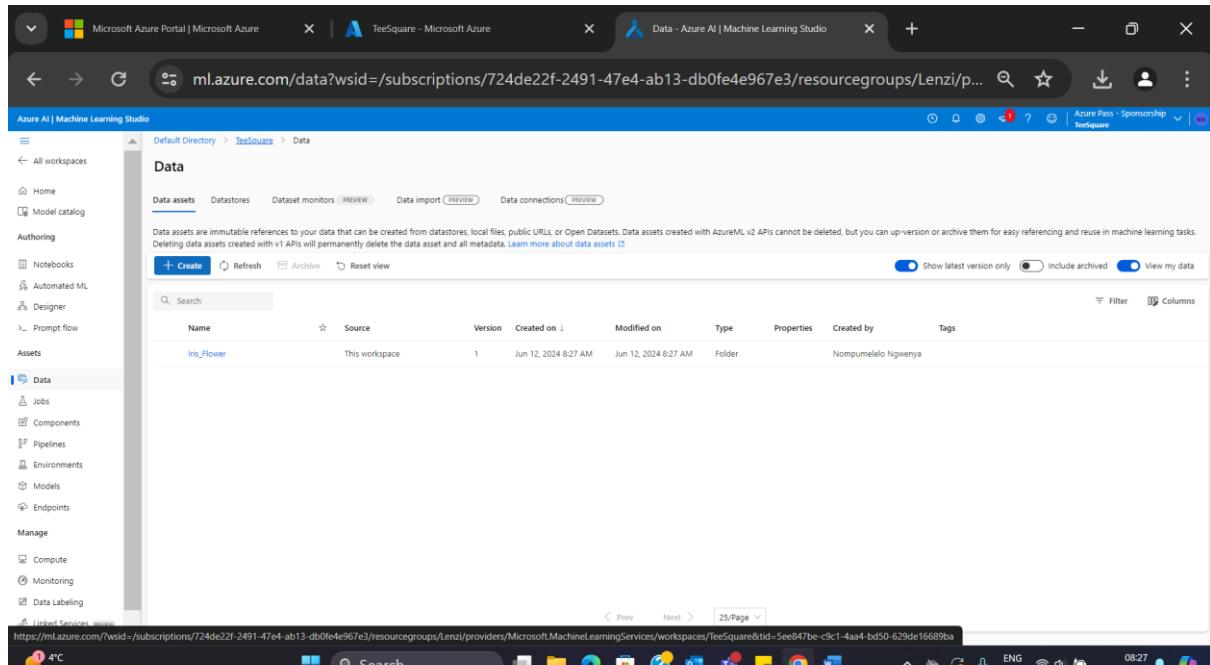
## Step 2

Open the workspace studio

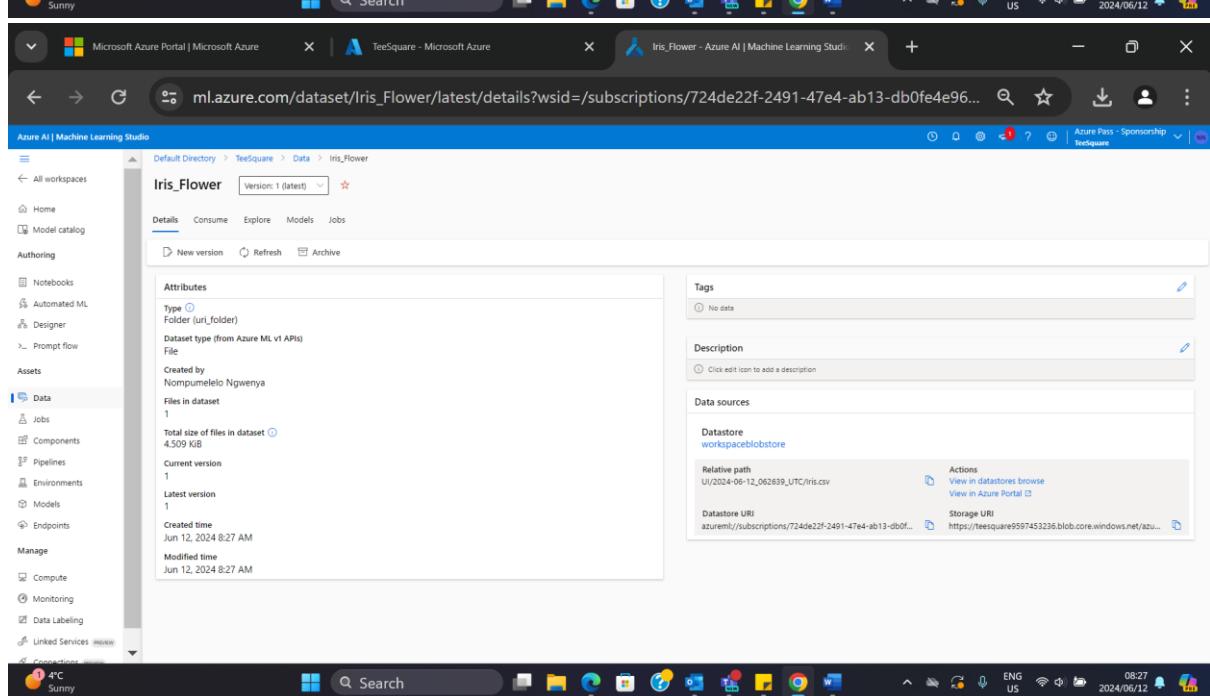
The screenshot shows a Microsoft Edge browser window with the Microsoft Azure Portal address bar at the top. The URL is `portal.azure.com/#@nompumelelo4029@gmail.onmicrosoft.com/resource/subscriptions/724de22f-2491-47e4-a...`. The main content area displays the 'TeeSquare' workspace studio. It features a large central icon of a stylized funnel or flowchart. Below the icon, the text 'Work with your models in Azure Machine Learning Studio' is displayed. A sub-section titled 'Generative AI with Prompt flow ...' contains five cards: 'Multi-Round Q&A on Your Data', 'Q&A on Your Data', 'Web Classification', 'Chat with Wikipedia', and 'Use GPT Function'. Another section titled 'Generative AI models ...' lists several pre-trained models: '00 Llama-2-7b' (Train generation), '00 Meta-Llama-3-8B-Instruct' (Chat completion), '00 Meta-Llama-3-70B-Instruct' (Chat completion), 'mistralai-Mistral-8x7B-Instr...' (Chat completion), and 'mistralai-Mistral-1...'. The left sidebar of the studio interface includes sections for Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, Jobs, Components, Pipelines, Environments, Models), Endpoints, Manage (Compute, Monitoring, Data Labeling, Linked Services), and Connections.

### Step 3

Upload the Iris dataset under Data component within the workspace.



The screenshot shows the Azure AI Machine Learning Studio interface. The left sidebar is collapsed, and the main area is titled "Data". Under "Data assets", there is a single entry: "Iris\_Flower" (This workspace, Version 1, Jun 12, 2024 8:27 AM, Modified on Jun 12, 2024 8:27 AM, Type Folder, Created by Nonpumelelo Ngwenya). Below the table are buttons for "Create", "Refresh", "Archive", and "Reset view". At the bottom, there are filters for "Show latest version only", "Include archived", and "View my data". The URL in the address bar is <https://ml.azure.com/data?wsid=/subscriptions/724de22f-2491-47e4-ab13-db0fe4e967e3/resourcegroups/Lenzi/providers/Microsoft.MachineLearningServices/workspaces/TeeSquare&tid=5ee847be-c3c1-4aa4-bd50-629de16689ba>.

The screenshot shows the "Details" tab for the "Iris\_Flower" dataset. The left sidebar is collapsed. The main area displays dataset attributes: Type (Folder), Dataset type (File), Created by (Nonpumelelo Ngwenya), Files in dataset (1), Total size of files in dataset (4.509 kB), Current version (1), Latest version (1), Created time (Jun 12, 2024 8:27 AM), and Modified time (Jun 12, 2024 8:27 AM). To the right, there are sections for "Tags" (No data), "Description" (Click edit icon to add a description), and "Data sources". Under "Data sources", it shows "Datashore workspaceblobstore" with a relative path (UI/2024-06-12\_062639\_UTC/iris.csv), actions (View in datashores browse, View in Azure Portal), and a "Storage URI" (https://teesquare9597453239.blob.core.windows.net/azu...). The URL in the address bar is [https://ml.azure.com/dataset/Iris\\_Flower/latest/details?wsid=/subscriptions/724de22f-2491-47e4-ab13-db0fe4e967e3/resourcegroups/Lenzi/providers/Microsoft.MachineLearningServices/workspaces/TeeSquare&tid=5ee847be-c3c1-4aa4-bd50-629de16689ba](https://ml.azure.com/dataset/Iris_Flower/latest/details?wsid=/subscriptions/724de22f-2491-47e4-ab13-db0fe4e967e3/resourcegroups/Lenzi/providers/Microsoft.MachineLearningServices/workspaces/TeeSquare&tid=5ee847be-c3c1-4aa4-bd50-629de16689ba).

## Step 4

Create the compute instance and open the Jupyter Lab

The screenshot shows two browser windows side-by-side.

The top window is titled "Compute - Azure AI | Machine Learning Studio". It displays a list of "Compute Instances" under the "Compute" category. One instance, "nompumelelo40291", is listed as "Running". The bottom window is titled "JupyterLab". It shows a launcher with various kernel options: Python 3.8 - AzureML, Python 3 (ipykernel), Python 3.10 - SDK v2, Python 3.8 - Pytorch and, and R. The status bar at the bottom of the JupyterLab window indicates "Mem: 99.30 / 32095.54 MB".

## Step 5

Use the python 3.8 Azure ML

Import the necessary packages and libraries

The screenshot shows a Jupyter Notebook titled "TeeWednesday.ipynb". The code cell [2] contains the following imports:

```
from azureml.core.workspace import Workspace
from azureml.core.dataset import Dataset
from azureml.core.experiment import Experiment
from azureml.train.automl import AutoMLConfig
from azureml.widgets import RunDetails
from sklearn.model_selection import train_test_split
```

Output from the previous cell shows the successful installation of the "sprinkles" package and its dependencies.

## Step 6

Connect to your workspaces

The screenshot shows a Jupyter Notebook titled "TeeWednesday.ipynb". The code cell [8] contains the following code to connect to a workspace:

```
ws = Workspace.from_config()
```

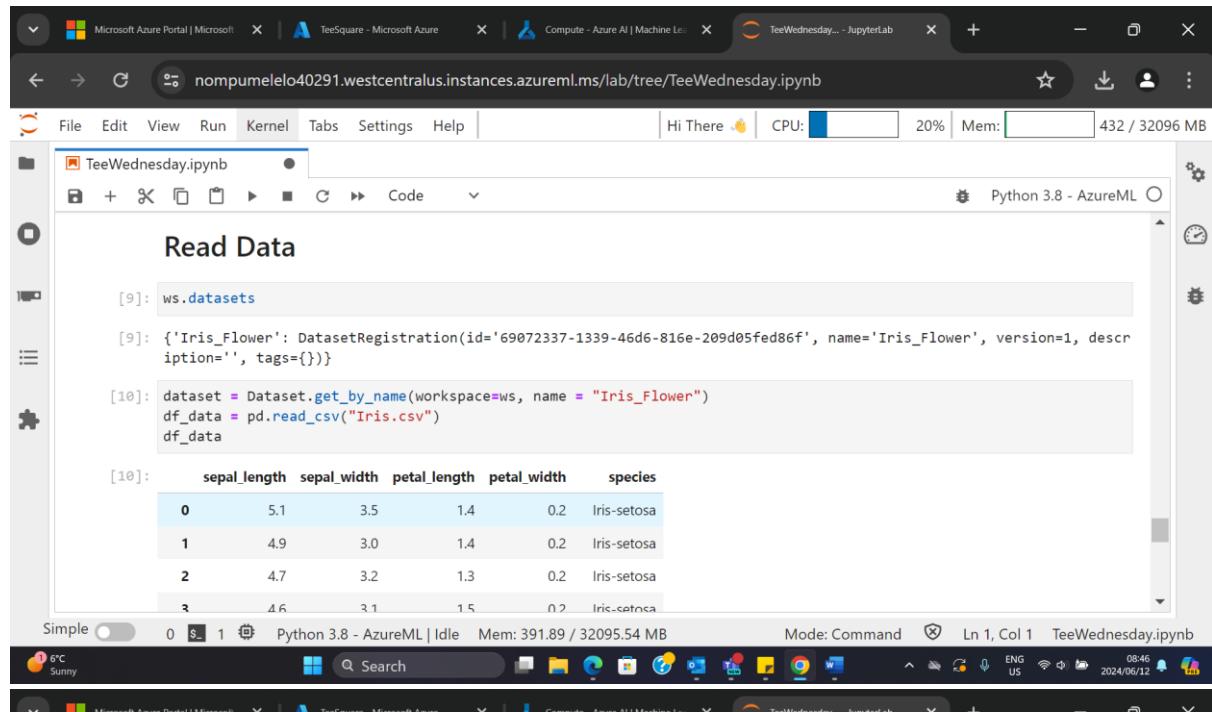
The code cell [9] shows the output of the workspace connection:

```
{'Iris_Flower': DatasetRegistration(id='69072337-1339-46d6-816e-209d05fed86f', name='Iris_Flower', version=1, description='', tags={})}
```

Below the code cells, sections titled "Connect to Workspace" and "Read Data" are visible.

## Step 7

Work with the datasets and read your data.



The screenshot shows a Jupyter Notebook interface in a Microsoft Azure portal. The notebook is titled 'TeeWednesday.ipynb'. In cell [9], the user runs the command `ws.datasets`, which returns a registration for the 'Iris\_Flower' dataset. In cell [10], the user runs `dataset = Dataset.get_by_name(workspace=ws, name = "Iris_Flower")`, `df_data = pd.read_csv("Iris.csv")`, and `df_data`. The resulting DataFrame is displayed as a table:

|   | sepal_length | sepal_width | petal_length | petal_width | species     |
|---|--------------|-------------|--------------|-------------|-------------|
| 0 | 5.1          | 3.5         | 1.4          | 0.2         | Iris-setosa |
| 1 | 4.9          | 3.0         | 1.4          | 0.2         | Iris-setosa |
| 2 | 4.7          | 3.2         | 1.3          | 0.2         | Iris-setosa |
| 3 | 4.6          | 3.1         | 1.5          | 0.2         | Iris-setosa |

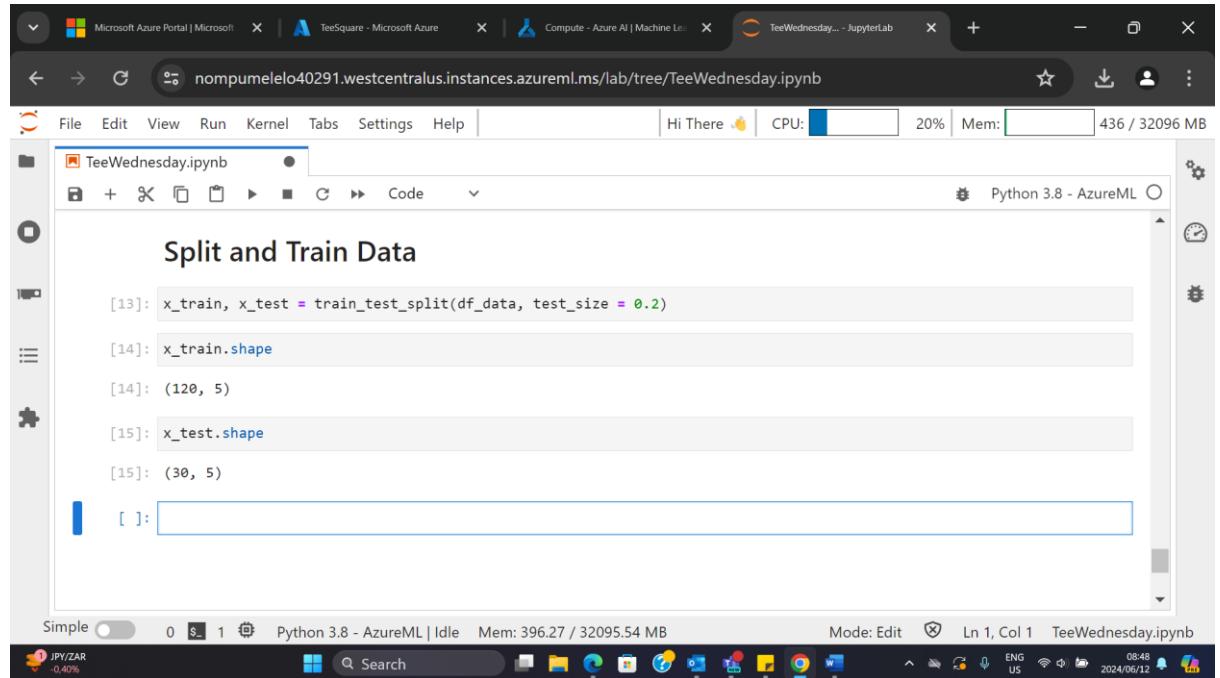
Cell [12] contains the same code as cell [10]. Cell [11] shows the columns of the DataFrame:

```
[11]: df_data.columns
```

```
[11]: Index(['sepal_length', 'sepal_width', 'petal_length', 'petal_width', 'species'], ...)
```

## Step 8

Train and split your data



```
[13]: x_train, x_test = train_test_split(df_data, test_size = 0.2)

[14]: x_train.shape

[14]: (120, 5)

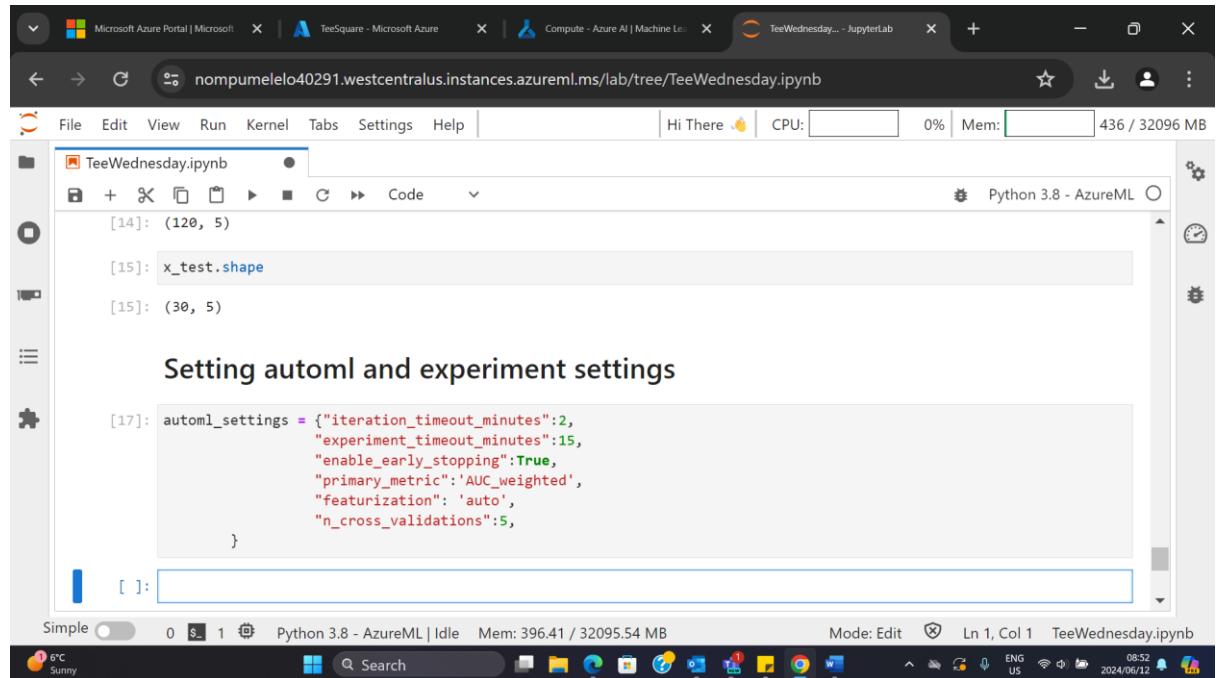
[15]: x_test.shape

[15]: (30, 5)

[ ]:
```

## Step 9

Set up your automl and your experiments settings



```
[14]: (120, 5)

[15]: x_test.shape

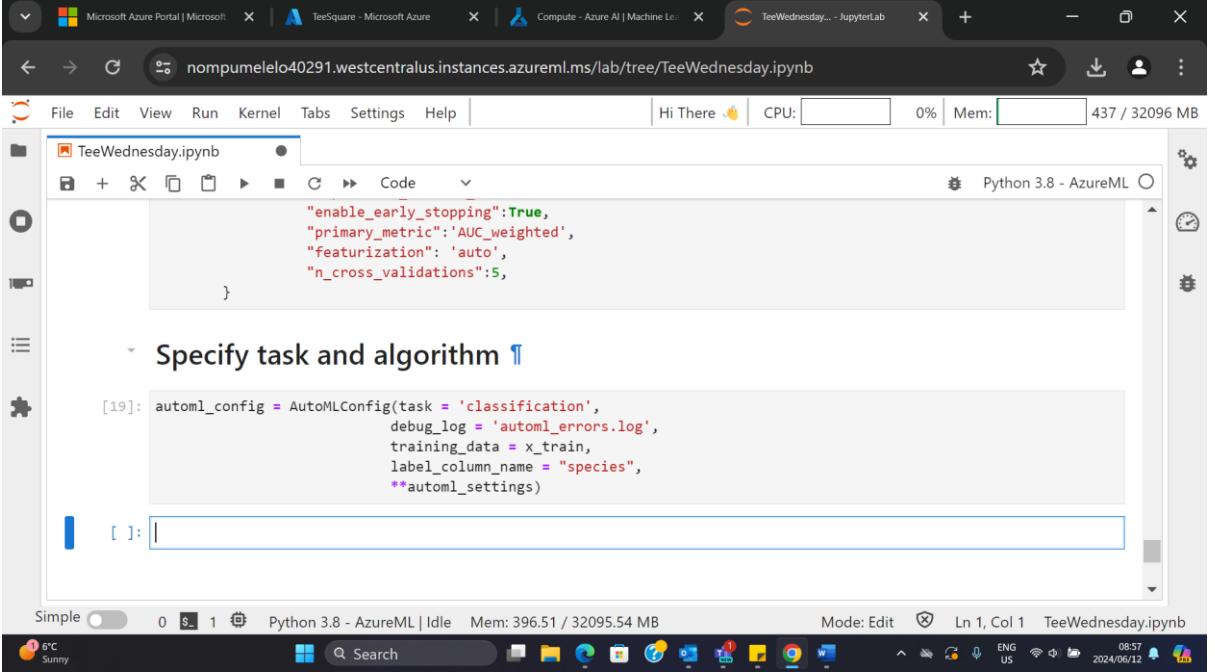
[15]: (30, 5)

Setting automl and experiment settings

[17]: automl_settings = {"iteration_timeout_minutes":2,
                        "experiment_timeout_minutes":15,
                        "enable_early_stopping":True,
                        "primary_metric":'AUC_weighted',
                        "featurization": 'auto',
                        "n_cross_validations":5,
                      }
```

## Step 10

Specify the task and algorithm to use and the specie column as your label (dependent variable)



The screenshot shows a Jupyter Notebook interface running on an Azure ML compute instance. The notebook file is named 'TeeWednesday.ipynb'. The code cell at the top defines a dictionary for AutoML settings:

```
"enable_early_stopping":True,  
"primary_metric":"AUC_weighted",  
"featurization": "auto",  
"n_cross_validations":5,  
}
```

Below this, a section titled 'Specify task and algorithm' is expanded, showing the following code:

```
[19]: automl_config = AutoMLConfig(task = 'classification',  
                                 debug_log = 'automl_errors.log',  
                                 training_data = x_train,  
                                 label_column_name = "species",  
                                 **automl_settings)
```

The code cell below it is currently empty, indicated by '[ ]:'.

## Step 11

*Create your experiment to use for deployment*

File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 0% Mem: 1.18 / 31.34 GB | Python 3.8 - AzureML

## Create Experiment for Deployment

```
[11]: experiment = Experiment(workspace = ws, name = "IrisFlower-Experiment")  
  
[14]: pip install -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt  
  
Requirement already satisfied: adal<=1.2.7 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azur  
Requirement already satisfied: applicationinsights<=0.11.10 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /a  
Requirement already satisfied: arch<=5.3.1 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azur  
Requirement already satisfied: argcomplete<=2.1.2 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/en  
Requirement already satisfied: attrs<=23.1.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/az  
Requirement already satisfied: azure-common<=1.1.28 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/  
Requirement already satisfied: azure-graphrbac<=0.61.1 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-identity<=1.13.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-authorization<=3.0.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r  
Requirement already satisfied: azure-mgmt-containerregistry<=10.1.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r  
Requirement already satisfied: azure-mgmt-core<=1.4.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-keyvault<=10.2.1 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-resource<=20.2.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-storage<=21.0.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-storage-blob<=12.13.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Simple 1 2 3 Python 3.8 - AzureML | Busy Mem: 1.14 / 31.34 GB Mode: Command Ln 1, Col 1 TeeWednesday.ipynb
```

File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 100% Mem: 1.34 / 31.34 GB | Python 3.8 - AzureML

## Create Experiment for Deployment

```
[14]: pip install -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt  
  
Requirement already satisfied: adal<=1.2.7 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azur  
Requirement already satisfied: applicationinsights<=0.11.10 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /a  
Requirement already satisfied: arch<=5.3.1 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azur  
Requirement already satisfied: argcomplete<=2.1.2 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/en  
Requirement already satisfied: attrs<=23.1.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/az  
Requirement already satisfied: azure-common<=1.1.28 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/  
Requirement already satisfied: azure-graphrbac<=0.61.1 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-identity<=1.13.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-authorization<=3.0.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r  
Requirement already satisfied: azure-mgmt-containerregistry<=10.1.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r  
Requirement already satisfied: azure-mgmt-core<=1.4.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-keyvault<=10.2.1 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-resource<=20.2.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-mgmt-storage<=21.0.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Requirement already satisfied: azure-storage-blob<=12.13.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anac  
Simple 1 2 3 Python 3.8 - AzureML | Busy Mem: 1.27 / 31.34 GB Mode: Command Ln 1, Col 1 TeeWednesday.ipynb
```



Microsoft Azure Portal | TeeSquare - Microsoft | Compute - Azure AI | TeeWednesday... - Jupyter Notebook | ChatGPT

nompumelelo40291.westcentralus.instances.azureml.ms/lab/tree/TeeWednesday.ipynb

File Edit View Run Kernel Tabs Settings Help

Terminal 1

```
Requirement already satisfied: tornado<=6.3.2 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt (line 150)) (6.3.2)
Requirement already satisfied: tgdm<=4.65.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt (line 151)) (4.65.0)
Requirement already satisfied: typing-extensions<=4.6.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt (line 152)) (4.6.0)
Requirement already satisfied: urllib3<=1.26.16 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/core/validated_linux_requirements.txt (line 153)) (1.26.16)
Requirement already satisfied: websocket-client<=1.5.2 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/core/validated_linux_requirements.txt (line 154)) (1.5.3)
Requirement already satisfied: zict<=0.0.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt (line 155)) (0.0.0)
Requirement already satisfied: zipp<=3.15.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from -r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt (line 156)) (3.12.0)
Requirement already satisfied: aiofiles<=0.8.0 in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from lightgbm<3.2.1->-r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/core/validated_linux_requirements.txt (line 157)) (0.8.0)
Requirement already satisfied: setuptools in /anaconda/envs/azureml_py38/lib/python3.8/site-packages (from numba<=0.55.2->-r /anaconda/envs/azureml_py38/lib/python3.8/site-packages/azureml/automl/core/validated_linux_requirements.txt (line 158)) (55.6.3)
ERROR: responsibility 0.27.0 has requirement ipykernel<6.8.0, but you'll have ipykernel 6.22.0 which is incompatible.
ERROR: rai-core-flask 1.3.6 has requirement gevent>=21.12.0, but you'll have gevent 1.3.6 which is incompatible.
ERROR: rai-core-flask 0.6.0 has requirement Werkzeug<2.2.3, but you'll have Werkzeug 2.3.4 which is incompatible.
ERROR: nbconvert 7.0.0 has requirement jinja2>>3.0, but you'll have jinja2 2.11.2 which is incompatible.
ERROR: jupyterlab 3.2.4 has requirement jupyter-server<1.4, but you'll have jupyter-server 2.5.0 which is incompatible.
ERROR: jupyterlab 3.2.4 has requirement nbclassic<=0.2, but you'll have nbclassic 1.0.0 which is incompatible.
ERROR: Flask 2.3.2 has requirement Jinja2>=3.1.2, but you'll have Jinja2 2.11.2 which is incompatible.
ERROR: dask-sql 2023.6.0 has requirement pandas<=1.4.0, but you'll have pandas 1.1.5 which is incompatible.
ERROR: azureml-inference-server-http 0.8.4 has requirement flask<2.3.0, but you'll have flask 2.3.2 which is incompatible.
Installing collected packages: MarkupSafe
  Attempting uninstall: MarkupSafe
    Found existing installation: MarkupSafe 2.1.5
    Uninstalling MarkupSafe-2.1.5:
      Successfully uninstalled MarkupSafe-2.1.5
Successfully installed MarkupSafe-2.1.2
```

Simple Python 3.8 - AzureML Busy Mem: 1.57 / 31.34 GB Mode: Command Ln 1, Col 70 09:44 2024/06/12

Microsoft Azure Portal | TeeSquare - Microsoft | Compute - Azure AI | TeeWednesday... - Jupyter Notebook | ChatGPT

nompumelelo40291.westcentralus.instances.azureml.ms/lab/tree/TeeWednesday.ipynb

File Edit View Run Kernel Tabs Settings Help

Terminal 1

```
Requirement already satisfied: jupyter-server<2.1.2, but you'll have jupyter-server 2.2.0 which is incompatible.
ERROR: jupyterlab 3.2.4 has requirement nbclassic<=0.2, but you'll have nbclassic 1.0.0 which is incompatible.
ERROR: Flask 2.3.2 has requirement Jinja2>=3.1.2, but you'll have Jinja2 2.11.2 which is incompatible.
ERROR: dask-sql 2023.6.0 has requirement pandas<=1.4.0, but you'll have pandas 1.1.5 which is incompatible.
ERROR: azureml-inference-server-http 0.8.4 has requirement flask<2.3.0, but you'll have flask 2.3.2 which is incompatible.
Installing collected packages: MarkupSafe
  Attempting uninstall: MarkupSafe
    Found existing installation: MarkupSafe 2.1.5
    Uninstalling MarkupSafe-2.1.5:
      Successfully uninstalled MarkupSafe-2.1.5
Successfully installed MarkupSafe-2.1.2
Note: you may need to restart the kernel to use updated packages.
```

[17]: pip install markupsafe==2.0.1

```
Collecting markupsafe==2.0.1
  Downloading MarkupSafe-2.0.1-cp38-cp38-manylinux2010_x86_64.whl (30 kB)
ERROR: werkzeug 2.3.4 has requirement MarkupSafe<=2.1.1, but you'll have markupsafe 2.0.1 which is incompatible.
ERROR: responsibility 0.27.0 has requirement ipykernel<6.8.0, but you'll have ipykernel 6.22.0 which is incompatible.
ERROR: rai-core-flask 0.6.0 has requirement gevent>=21.12.0, but you'll have gevent 1.3.6 which is incompatible.
ERROR: rai-core-flask 0.6.0 has requirement Werkzeug<2.2.3, but you'll have Werkzeug 2.3.4 which is incompatible.
ERROR: nbconvert 7.0.0 has requirement jinja2>>3.0, but you'll have jinja2 2.11.2 which is incompatible.
ERROR: jupyterlab 3.2.4 has requirement jupyter-server<1.4, but you'll have jupyter-server 2.5.0 which is incompatible.
ERROR: jupyterlab 3.2.4 has requirement nbclassic<=0.2, but you'll have nbclassic 1.0.0 which is incompatible.
ERROR: Flask 2.3.2 has requirement Jinja2>=3.1.2, but you'll have Jinja2 2.11.2 which is incompatible.
ERROR: dask-sql 2023.6.0 has requirement pandas<=1.4.0, but you'll have pandas 1.1.5 which is incompatible.
ERROR: azureml-inference-server-http 0.8.4 has requirement flask<2.3.0, but you'll have flask 2.3.2 which is incompatible.
Installing collected packages: markupsafe
  Successfully installed markupsafe-2.0.1
Note: you may need to restart the kernel to use updated packages.
```

[\*]: run = experiment.submit(automl\_config, show\_output=True)

```
No run_configuration provided, running on local with default configuration
Running in the active local environment.
```

Simple Python 3.8 - AzureML Busy Mem: 1.47 / 31.34 GB Mode: Command Ln 1, Col 17 09:45 2024/06/12

Microsoft Azure Portal | TeeSquare - Microsoft | Compute - Azure AI | TeeWednesday... - Jupyter | ChatGPT | File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 0% Mem: 1.28 / 31.34 GB | Python 3.8 - AzureML

[12]: run = experiment.submit(automl\_config, show\_output=True)

No run\_configuration provided, running on local with default configuration  
Running in the active local environment.

| Experiment            | Id  | Type   | Status    | Details Page  | Docs Page                             |
|-----------------------|---|--------|-----------|---|---------------------------------------|
| IrisFlower-Experiment | AutoML_0546dc55-4f9b-4746-ac04-1cc0fa8e09e1 | automl | Preparing | <a href="#">Link to Azure Machine Learning studio</a> | <a href="#">Link to Documentation</a> |

Current status: DatasetEvaluation. Gathering dataset statistics.  
Current status: FeaturesGeneration. Generating Features for the dataset.  
Current status: DatasetFeatureization. Beginning to fit featureizers and featureize the dataset.  
Current status: DatasetFeatureizationCompleted. Completed fit featureizers and featureizing the dataset.  
Current status: DatasetCrossValidationSplit. Generating individually featureized CV splits.  
2024/06/12 07:35:02 WARNING mlflow.sklearn: Model was missing function: predict. Not logging python\_function flavor.

\*\*\*\*\*  
DATA GUARDRAILS:  
\*\*\*\*\*  
TYPE: Class balancing detection  
STATUS: PASSED  
DESCRIPTION: Your inputs were analyzed, and all classes are balanced in your training data.  
Learn more about imbalanced data: <https://aka.ms/AutomatedMLImbalancedData>  
\*\*\*\*\*  
TYPE: Missing feature values imputation  
STATUS: PASSED  
DESCRIPTION: No feature missing values were detected in the training data.  
Learn more about missing value imputation: <https://aka.ms/AutomatedMLFeatureization>  
\*\*\*\*\*

Share this window

Simple 1 2 3 Python 3.8 - AzureML | Idle Mem: 1.24 / 31.34 GB Mode: Command Ln 1, Col 17 TeeWednesday.ipynb 10:12 ENG US 2024/06/12

Microsoft Azure Portal | TeeSquare - Microsoft | Compute - Azure AI | TeeWednesday... - Jupyter | ChatGPT | File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 60% Mem: 1.28 / 31.34 GB | Python 3.8 - AzureML

\*\*\*\*\*  
TYPE: High cardinality feature detection  
STATUS: PASSED  
DESCRIPTION: Your inputs were analyzed, and no high cardinality features were detected.  
Learn more about high cardinality feature handling: <https://aka.ms/AutomatedMLFeatureization>  
\*\*\*\*\*  
Current status: ModelSelection. Beginning model selection.  
\*\*\*\*\*  
ITER: The iteration being evaluated.  
PIPELINE: A summary description of the pipeline being evaluated.  
DURATION: Time taken for the current iteration.  
METRIC: The result of computing score on the fitted pipeline.  
BEST: The best observed score thus far.  
\*\*\*\*\*  
ITER PIPELINE DURATION METRIC BEST  
0 StandardScaler LightGBM 0:00:43 0.9982 0.9982  
1 StandardScaler XGBClassifier 0:00:04 0.9982 0.9982  
2 StandardScaler ExtraTreesClassifier 0:00:43 0.9995 0.9995  
3 StandardScaler RandomForest 0:00:43 0.9947 0.9947  
4 StandardScalerWrapper LightGBM 0:00:42 0.9900 0.9947  
5 StandardScalerWrapper KNN 0:00:41 0.9948 0.9948  
6 SparseImputer XGBoostClassifier 0:00:56 0.9978 0.9978  
7 SparseImputer RandomForest 0:00:44 0.9967 0.9978  
8 RobustScaler KNN 0:00:39 0.9986 0.9978  
9 MinMaxScaler RandomForest 0:00:42 0.9925 0.9978  
10 StandardScalerWrapper LogisticRegression 0:00:41 0.9978 0.9978  
11 StandardScalerWrapper SVM 0:00:43 0.9952 0.9978  
12 StandardScalerWrapper XGBoostClassifier 0:00:57 0.9872 0.9978

Simple 1 2 3 Python 3.8 - AzureML | Idle Mem: 1.24 / 31.34 GB Mode: Command Ln 1, Col 17 TeeWednesday.ipynb 10:13 ENG US 2024/06/12

Microsoft Azure Portal | TeeSquare - Microsoft | Compute - Azure AI | TeeWednesday... - Jupyter | ChatGPT |

File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 20% Mem: 1.28 / 31.34 GB | Python 3.8 - AzureML

**TeeWednesday.ipynb** Terminal 1 Code Python 3.8 - AzureML

```

ITER PIPELINE DURATION METRIC BEST
0 MaxAbsScaler LightGBM 0:00:43 0.9882 0.9882
1 MaxAbsScaler XGBoostClassifier 0:01:04 0.9882 0.9882
2 MaxAbsScaler ExtremeRandomTrees 0:00:42 0.9905 0.9905
3 MaxAbsScaler RandomForest 0:00:42 0.9947 0.9947
4 StandardScalerWrapper LightGBM 0:00:42 0.9900 0.9947
5 StandardScalerWrapper KNN 0:00:41 0.9948 0.9948
6 SparseNormalizer XGBoostClassifier 0:00:56 0.9978 0.9978
7 SparseNormalizer RandomForest 0:00:44 0.9967 0.9978
8 RobustScaler KNN 0:00:39 0.9986 0.9978
9 MinMaxScaler RandomForest 0:00:42 0.9925 0.9978
10 StandardScalerWrapper LogisticRegression 0:00:41 0.9978 0.9978
11 StandardScalerWrapper SVM 0:00:43 0.9952 0.9978
12 StandardScalerWrapper XboostClassifier 0:00:57 0.9872 0.9978
13 SparseNormalizer KNN 0:00:42 0.9944 0.9978
14

2024-06-12:07:46:41,990 WARNING [connectionpool.py:823] Retrying (Retry(total=2, connect=2, read=3, redirect=None, status=None)) after connection broken by 'NewConnectionError('<urllib3.connection.HTTPSConnection object at 0x7f42cc3db0d0>: Failed to establish a new connection: [Errno 111] Connection refused')': /artifact/v2.0/subscriptions/72ade22f-2491-47e4-ab13-db0fe4e957e3/resourceGroups/lenzi/providers/Microsoft.MachineLearningServices/workspaces/teesquare/artifacts/batch/metadata/ExperimentRun/dcld.AutoML_0546dc55-4f98-4746-ac84-1cc6fa8e89e7_1

15 RobustScaler ExtremeRandomTrees 0:00:42 0.9995 0.9995
16 SparseNormalizer XGBoostClassifier 0:00:58 0.9979 0.9995
17 MinMaxScaler ExtremeRandomTrees 0:00:44 0.9979 0.9995
18 MinMaxScaler ExtremeRandomTrees 0:00:43 0.9987 0.9995
19 SparseNormalizer LightGBM 0:00:43 0.9972 0.9995

2024-06-12:07:50:42,313 WARNING [connectionpool.py:823] Retrying (Retry(total=2, connect=2, read=3, redirect=None, status=None)) after connection broken by 'NewConnectionError('<urllib3.connection.HTTPSConnection object at 0x7f42cc3d0310>: Failed to establish a new connection: [Errno 111] Connection refused')': /artifact/v2.0/subscriptions/72ade22f-2491-47e4-ab13-db0fe4e957e3/resourceGroups/lenzi/providers/Microsoft.MachineLearningServices/workspaces/teesquare/artifacts/batch/metadata/ExperimentRun/dcld.AutoML_0546dc55-4f98-4746-ac84-1cc6fa8e89e7_1

2024-06-12:07:50:43,109 WARNING [connectionpool.py:823] Retrying (Retry(total=2, connect=2, read=3, redirect=None, status=None)) after connection broken by 'NewConnectionError('<urllib3.connection.HTTPSConnection object at 0x7f42cc3d0310>: Failed to establish a new connection: [Errno 111] Connection refused')': /artifact/v2.0/subscriptions/72ade22f-2491-47e4-ab13-db0fe4e957e3/resourceGroups/lenzi/providers/Microsoft.MachineLearningServices/workspaces/teesquare/artifacts/batch/metadata/ExperimentRun/dcld.AutoML_0546dc55-4f98-4746-ac84-1cc6fa8e89e7_1

2024-06-12:07:50:43,109 WARNING [connectionpool.py:823] Retrying (Retry(total=2, connect=2, read=3, redirect=None, status=None)) after connection broken by 'NewConnectionError('<urllib3.connection.HTTPSConnection object at 0x7f42cc3d0310>: Failed to establish a new connection: [Errno 111] Connection refused')': /artifact/v2.0/subscriptions/72ade22f-2491-47e4-ab13-db0fe4e957e3/resourceGroups/lenzi/providers/Microsoft.MachineLearningServices/workspaces/teesquare/artifacts/batch/metadata/ExperimentRun/dcld.AutoML_0546dc55-4f98-4746-ac84-1cc6fa8e89e7_1

Simple Python 3.8 - AzureML | Idle Mem: 1.24 / 31.34 GB Mode: Command Ln 1, Col 17 TeeWednesday.ipynb
9°C Sunny Search 10:13 ENG US 2024/06/12
```

Microsoft Azure Portal | TeeSquare - Microsoft | Compute - Azure AI | TeeWednesday... - Jupyter | ChatGPT |

File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 0% Mem: 1.28 / 31.34 GB | Python 3.8 - AzureML

**TeeWednesday.ipynb** Terminal 1 Markdown Python 3.8 - AzureML

```

19
2024-06-12:07:50:42,313 WARNING [connectionpool.py:823] Retrying (Retry(total=2, connect=2, read=3, redirect=None, status=None)) after connection broken by 'NewConnectionError('<urllib3.connection.HTTPSConnection object at 0x7f42cc3d0310>: Failed to establish a new connection: [Errno 111] Connection refused')': /artifact/v2.0/subscriptions/72ade22f-2491-47e4-ab13-db0fe4e957e3/resourceGroups/lenzi/providers/Microsoft.MachineLearningServices/workspaces/teesquare/artifacts/batch/metadata/ExperimentRun/dcld.AutoML_0546dc55-4f98-4746-ac84-1cc6fa8e89e7_1
9
2024-06-12:07:50:43,109 WARNING [connectionpool.py:823] Retrying (Retry(total=2, connect=2, read=3, redirect=None, status=None)) after connection broken by 'NewConnectionError('<urllib3.connection.HTTPSConnection object at 0x7f42cc3d0310>: Failed to establish a new connection: [Errno 111] Connection refused')': /artifact/v2.0/subscriptions/72ade22f-2491-47e4-ab13-db0fe4e957e3/resourceGroups/lenzi/providers/Microsoft.MachineLearningServices/workspaces/teesquare/artifacts/batch/metadata/ExperimentRun/dcld.AutoML_0546dc55-4f98-4746-ac84-1cc6fa8e89e7_1
9
VotingEnsemble 0:00:46 1.0000 1.0000
20 StackEnsemble 0:00:49 0.9946 1.0000
Stopping criteria reached at iteration 21. Ending experiment.
*****
Current status: BestRunExplainModel. Best run model explanations started
2024-06-12:07:52:41,135 INFO [explanation_client.py:334] Using default datastore for uploads
Current status: Model explanations setup. Model explanations setup completed
Current status: PickSurrogateModel. Choosing LightGBM as the surrogate model for explanations
Current status: EngineeredFeatureExplanations. Computation of engineered features started
Current status: EngineeredFeatureExplanations. Computation of engineered features completed
Current status: RawFeaturesExplanations. Computation of raw features started
Current status: RawFeaturesExplanations. Computation of raw features completed
Current status: BestRunExplainModel. Best run model explanations completed
*****
- The Run Output 1
[13]: best_run, model = run.get_output()
[14]: RunDetails(run).show()

AutoML 0546dc55-4f98-4746-ac04-1cc6fa8e89e7:

```

Simple Python 3.8 - AzureML | Idle Mem: 1.24 / 31.34 GB Mode: Command Ln 1, Col 1 TeeWednesday.ipynb
Air: Severe Now Search 10:13 ENG US 2024/06/12

## Step 12

### Get the run output

The screenshot shows two Jupyter Notebook interfaces. The top interface displays the 'Run Output' section, which includes a status bar at the top indicating 'Hi There CPU: 0% Mem: 1.28 / 31.34 GB'. Below this is a terminal window showing code execution and a table of pipeline runs. The table has columns for Iteration, Pipeline, Iteration metric, Best metric, Status, Duration, Started, and Run Id. The bottom interface shows a performance plot titled 'AutoML Run with metric : AUC\_weighted'. The plot displays a step function representing the metric over 20 iterations, with blue dots indicating individual data points. The x-axis represents iterations from 0 to 20, and the y-axis represents the metric value from 0.988 to 1.0.

File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 0% Mem: 1.28 / 31.34 GB | Python 3.8 - AzureML

[13]: best\_run, model = run.get\_output()  
[14]: RunDetails(run).show()

AutoML\_0546dc55-4f98-4746-ac04-1cc6fa8e89e7:  
Status: Completed

Status -

| Iteration | Pipeline                                  | Iteration metric | Best metric | Status    | Duration | Started              | Run Id |
|-----------|---|------------------|-------------|-----------|----------|----------------------|--------|
| 19        | VotingEnsemble                            | 1                | 1           | Completed | 0:00:46  | Jun 12, 2024 9:50 AM |        |
| 14        | RobustScaler, ExtremeRandomTrees          | 0.9995098        | 0.9995098   | Completed | 0:00:43  | Jun 12, 2024 9:46 AM |        |
| 16        | MinMaxScaler, ExtremeRandomTrees          | 0.9979085        | 0.9995098   | Completed | 0:00:44  | Jun 12, 2024 9:47 AM |        |
| 15        | SparseNormalizer, XGBoostClassifier       | 0.99789605       | 0.9995098   | Completed | 0:00:58  | Jun 12, 2024 9:46 AM |        |
| 10        | StandardScalerWrapper, LogisticRegression | 0.99776377       | 0.99776377  | Completed | 0:00:41  | Jun 12, 2024 9:42 AM |        |

Pages: 1 2 3 4 5 Next Last 5 per page

Simple Python 3.8 - AzureML | Idle Mem: 1.24 / 31.34 GB Mode: Command Ln 1, Col 1 TeeWednesday.ipynb Air: Severe Now 10:13 2024/06/12

File Edit View Run Kernel Tabs Settings Help | Hi There CPU: 19% Mem: 1.28 / 31.34 GB | Python 3.8 - AzureML

AUC\_weighted

AutoML Run with metric : AUC\_weighted

The plot shows the AUC\_weighted metric on the y-axis (ranging from 0.988 to 1.0) against iterations on the x-axis (ranging from 0 to 20). Blue dots represent individual data points, and an orange step line represents the overall trend. The metric starts at approximately 0.988, remains flat until iteration 3, then jumps to about 0.994. It stays flat until iteration 5, then jumps to about 0.998. It remains flat until iteration 10, then jumps to about 0.999. It stays flat until iteration 15, then jumps to about 1.0. The final point at iteration 20 is also at 1.0.

Click here to see the run in Azure Machine Learning studio

Simple Python 3.8 - AzureML | Idle Mem: 1.24 / 31.34 GB Mode: Command Ln 1, Col 1 TeeWednesday.ipynb Air: Severe Now 10:14 2024/06/12

## Step 13

See the experiment and the scoring file created

The screenshot shows two browser windows side-by-side, both displaying the Azure AI Machine Learning Studio interface.

**Top Window:** The URL is [ml.azure.com/experiments/id/2017af83-3b65-415f-afa7-6abad3dc5125?wsid=/subscriptions/724de22f-2491-47e...](https://ml.azure.com/experiments/id/2017af83-3b65-415f-afa7-6abad3dc5125?wsid=/subscriptions/724de22f-2491-47e...). The page shows a list of completed jobs under the "IrisFlower-Experiment" experiment. One job, "honest\_nail\_051mn11", is highlighted with a green checkmark and labeled "Best". The table includes columns for Display name, Parent job name, Status, Created on, Duration, Created by, Compute target, Job type, and Tags. A "View options" dropdown is open at the top right.

| Display name (1 visualized) | Parent job name       | Status    | Created on           | Duration | Created by        | Compute target | Job type   | Tags                          |
|-----------------------------|-----------------------|-----------|----------------------|----------|-------------------|----------------|------------|-------------------------------|
| honest_nail_051mn11 (21)    |                       | Completed | Jun 12, 2024 9:34 AM | 16m 59s  | Nompumelelo Ng... | local          | Automat... | best_pipeline: VotingEnsemble |
| silver_chain_mvhnem4h       | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:50 AM | 49s      | Nompumelelo Ng... | local          |            |                               |
| bright_yak_01goffhz         | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:50 AM | 46s      | Nompumelelo Ng... | local          |            | model_explanation : true      |
| mango_dolphin_y0n02298      | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:49 AM | 43s      | Nompumelelo Ng... | local          |            |                               |
| orange_ticket_0x2qqy16      | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:48 AM | 43s      | Nompumelelo Ng... | local          |            |                               |
| liquid_parcel_fgypvv1       | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:47 AM | 44s      | Nompumelelo Ng... | local          |            |                               |
| silly_parrot_yhtjkmz        | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:46 AM | 58s      | Nompumelelo Ng... | local          |            |                               |
| musing_octopus_z2yr5m3r     | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:46 AM | 43s      | Nompumelelo Ng... | local          |            |                               |
| boring_parcel_0zx9n13y      | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:45 AM | 42s      | Nompumelelo Ng... | local          |            |                               |
| green_in_kc05t1bs           | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:44 AM | 57s      | Nompumelelo Ng... | local          |            |                               |
| affable_papaya_hyjdfhn7     | AutoML_0546dc55-4f... | Completed | Jun 12, 2024 9:43 AM | 43s      | Nompumelelo Ng... | local          |            |                               |

**Bottom Window:** The URL is [ml.azure.com/experiments/id/2017af83-3b65-415f-afa7-6abad3dc5125/runs/AutoML\\_0546dc55-4f98-4746-ac04-1cc6fa8e9e77wsid=/subscriptions/724de22f-2491-47e4-ab13-db0fe4e967e3/resourcegroups/Lenz/providers/Microsoft.MachineLearningServices/workspace...](https://ml.azure.com/experiments/id/2017af83-3b65-415f-afa7-6abad3dc5125/runs/AutoML_0546dc55-4f98-4746-ac04-1cc6fa8e9e77wsid=/subscriptions/724de22f-2491-47e4-ab13-db0fe4e967e3/resourcegroups/Lenz/providers/Microsoft.MachineLearningServices/workspace...). This window shows the details for a specific run named "honest\_nail\_051mn11". The "Outputs + logs" tab is selected. The "File Explorer" pane on the right displays the contents of the "outputs" folder, which includes files like "conda\_env\_v\_1\_0\_0.yml", "engineered\_feature\_names.json", "env\_dependencies.json", "feature\_selection\_summary.json", "internal\_cross\_validated\_models.pkl", "model.pkl", "pipeline\_graph.json", "run\_id.txt", "scoring\_file\_pbi\_v\_1\_0\_0.py", "scoring\_file\_v\_1\_0\_0.py", "scoring\_file\_v\_2\_0\_0.py", "accuracy\_table", and "confusion\_matrix".

## Step 14

### Create and register your model

The screenshot shows two windows side-by-side. The top window is a Jupyter Notebook titled 'TeeWednesday.ipynb' running in a browser tab. It displays a single code cell with the following Python code:

```
[15]: model_name = best_run.properties["model_name"]
registered_name = run.register_model(model_name = model_name, description="AutoML IrisFlower", tags = None)
```

The bottom window is the 'Models - Azure AI | Machine Learning Studio' interface. The left sidebar shows navigation options like 'All workspaces', 'Home', 'Model catalog', 'Authoring', 'Assets', and 'Manage'. The main area is titled 'Model List' and shows a table with one row of data:

| Name              | Version | Type   | Source         | Experiment            | Job (Run ID)  | Created on            | Tags | Properties |
|-------------------|---------|--------|----------------|-----------------------|---|-----------------------|------|------------|
| AutoML0546dc55419 | 1       | CUSTOM | This workspace | IrisFlower-Experiment | AutoML_0546dc55419-4f98-4746-...<br>Run 12, 2024 10:41 AM | Jun 12, 2024 10:41 AM |      | ...        |

The status bar at the bottom of both windows shows system information such as temperature (11°C), battery level (Sunny), and system time (10:41, 2024/06/12).

## Step 15

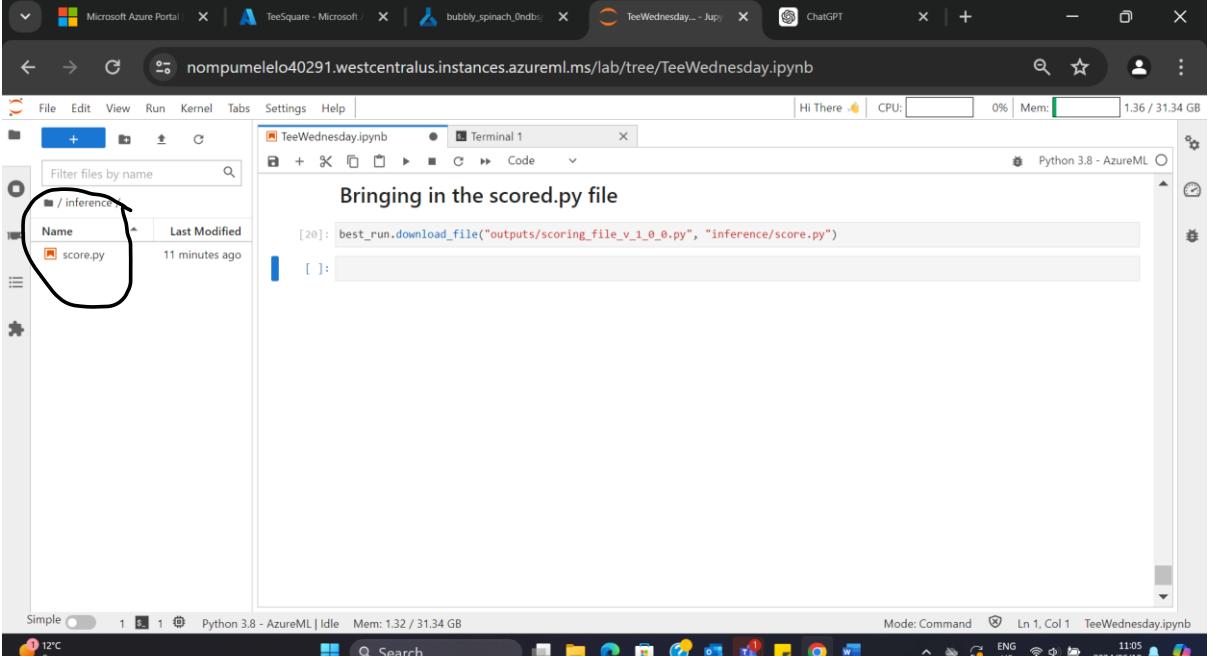
### *Import the packages for deployments*

```
[17]: model_name = best_run.properties["model_name"]
registered_name = run.register_model(model_name, description="AutoML IrisFlower", tags = None)
```

```
[18]: from azureml.core.model import InferenceConfig
from azureml.core.webservice import AciWebservice, Webservice
from azureml.core.model import Model
from azureml.core.environment import Environment
```

## Step 16

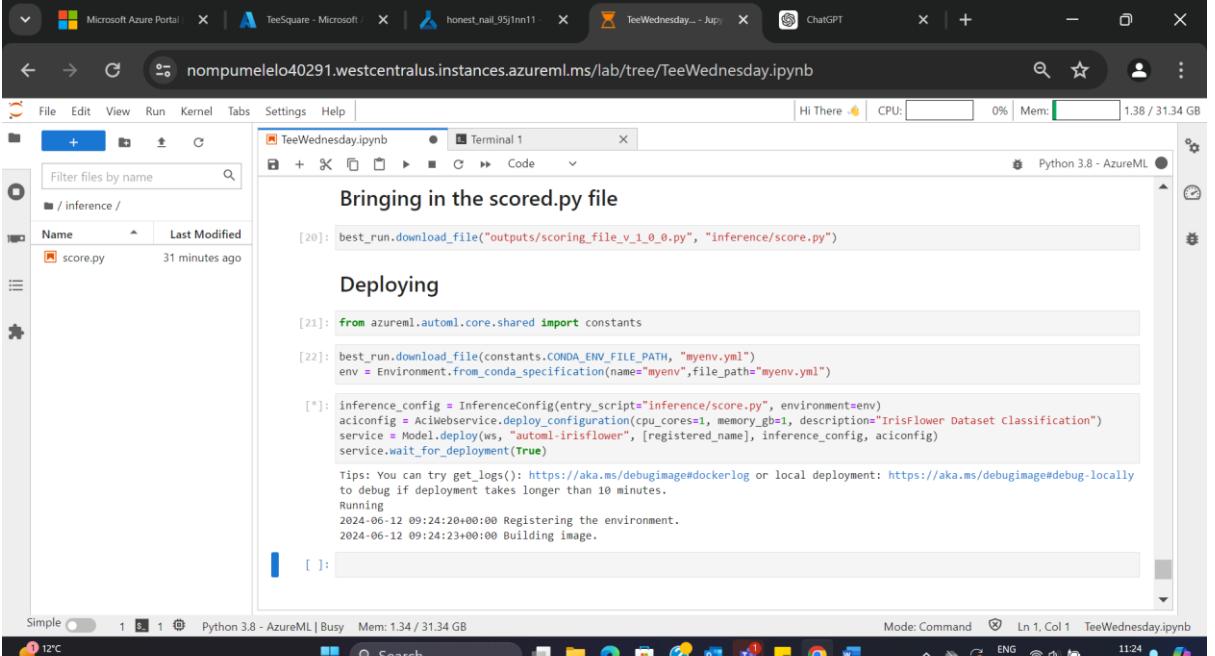
Download and bring in the scored .py file



The screenshot shows a Jupyter Notebook interface with a sidebar containing a file tree. A file named 'score.py' is highlighted in the 'inference' directory. A black oval has been drawn around this file. The main area displays the code: 

```
[20]: best_run.download_file("outputs/scoring_file_v_1_0_0.py", "inference(score.py")
```

## Step 17: Deploying



The screenshot shows a Jupyter Notebook interface with a sidebar containing a file tree. The 'score.py' file is listed in the 'inference' directory. The main area displays the deployment code: 

```
[21]: from azureml.core.shared import constants  
[22]: best_run.download_file(constants.CONDA_ENV_FILE_PATH, "myenv.yml")  
env = Environment.from_conda_specification(name="myenv", file_path="myenv.yml")  
[*]: inference_config = InferenceConfig(entry_script="inference(score.py", environment=env)  
aciconfig = Aciebservice.deploy_configuration(cpu_cores=1, memory_gb=1, description="IrisFlower Dataset Classification")  
service = Model.deploy(ws, "automl-irisflower", [registered_name], inference_config, aciconfig)  
service.wait_for_deployment(True)
```

 Below the code, a note says: *Tips: You can try get\_logs(): <https://aka.ms/debugimage#docke> log or local deployment: <https://aka.ms/debugimage#debug-locally>*. The status bar at the bottom indicates the kernel is Busy.

The screenshot shows a Jupyter Notebook interface within a browser window. The URL in the address bar is `nompumelelo40291.westcentralus.instances.azureml.ms/lab/tree/TeeWednesday.ipynb`. The notebook tab is titled `TeeWednesday.ipynb`. The code cell [20] contains the command `best_run.download_file("outputs/scoring_file_v_1_0_0.py", "inference(score.py")`. The code cell [21] imports constants from `azureml.automl.core.shared`. The code cell [22] uses `best_run.download_file` to download `myenv.yml` from the environment. The code cell [26] creates an inference configuration, sets up an ACI service with a specific configuration, and deploys the model. The deployment log shows the process of registering the environment, generating deployment configuration, submitting the deployment, and finally marking it as succeeded. The status message at the bottom indicates the ACI service creation operation finished successfully.

```

[20]: best_run.download_file("outputs/scoring_file_v_1_0_0.py", "inference(score.py")
```

```

[21]: from azureml.automl.core.shared import constants
```

```

[22]: best_run.download_file(constants.CONDA_ENV_FILE_PATH, "myenv.yml")
env = Environment.from_conda_specification(name="myenv", file_path="myenv.yml")
```

```

[26]: inference_config = InferenceConfig(entry_script="inference(score.py", environment=env)
aciconfig = AcieWebService.deploy_configuration(cpu_cores=1, memory_gb=1, description="IrisFlower Dataset Classification")
service = Model.deploy(ws, "automl-irisflower", [register_name], inference_config, aciconfig)
service.wait_for_deployment(True)
```

Tips: You can try `get_logs()`: <https://aka.ms/debugimage#dockerlog> or local deployment: <https://aka.ms/debugimage#debug-locally>

Running  
2024-06-12 09:24:20+00:00 Registering the environment.  
2024-06-12 09:24:23+00:00 Building image..  
2024-06-12 09:48:53+00:00 Generating deployment configuration.  
2024-06-12 09:48:54+00:00 Submitting deployment to compute..  
2024-06-12 09:49:02+00:00 Checking the status of deployment automl-irisflower..  
2024-06-12 09:52:07+00:00 Checking the status of inference endpoint automl-irisflower.  
Succeeded  
ACI service creation operation finished, operation "Succeeded"

## Step 18

Look at the completed deployment and copy the url link and test it

The screenshot shows the Azure AI | Machine Learning Studio interface. The left sidebar navigation includes Home, Model catalog, Authoring, Assets, and Manage sections. Under the Manage section, the Endpoints sub-section is selected, showing a list of endpoints. One endpoint named `automl-irisflower` is highlighted. The main content area displays the details for this endpoint. The REST endpoint is listed as `http://9edc5ae8-4c9e-4d48-8aed-7c36c15aea6b.westcentralus.azurecontainer.io/score`. The properties pane on the right shows the following settings:

|                    |       |
|--------------------|-------|
| hasInferenceSchema | True  |
| hasHttps           | False |
| authEnabled        | False |

<http://9edc5ae8-4c9e-4d48-8aed-7c36c15aea6b.westcentralus.azurecontainer.io/score>

## Step 19

Test the predicted result

V1 deployment testing not supported  
This deployment is based on v1 API and doesn't support testing on the Studio. To get the key/token and invoke, please use CLI/SDK/REST v1 API. Consider migrating to v2 managed online endpoint.

Learn more about CLI/SDK/REST [\[?\]](#)  
Learn more about v2 managed online endpoint [\[?\]](#)

## Step 20

### Consume the endpoints

```
9     ssl_create_default_https_context = ssl_create_unverified_context
10    # allowSelfSignedHttps(True) # this line is needed if you use self-signed certificate in your scoring service.
11
12    # Request data goes here
13    # The example below assumes JSON formatting which may be updated
14    # depending on the format your endpoint expects.
15    # More information can be found here:
16    # https://docs.microsoft.com/azure/machine-learning/how-to-deploy-advanced-entry-script
17
18    data = {
19        "data": [
20            {
21                "sepal_length": 0.0,
22                "sepal_width": 0.0,
23                "petal_length": 0.0,
24                "petal_width": 0.0
25            }
26        ],
27        "method": "predict"
28    }
29
30    body = str.encode(json.dumps(data))
31
32    url = 'http://9edc5ae8-4c9e-4d48-8aed-7c36c15aea0b.westcentralus.azurecontainer.io/score'
33
34
```