**Lab Overview**

Automated machine learning picks an algorithm and hyperparameters for you and generates a model ready for deployment. There are several options that you can use to configure automated machine learning experiments.

Configuration options available in automated machine learning:

* Select your experiment type: Classification, Regression or Time Series Forecasting
* Data source, formats, and fetch data
* Choose your compute target
* Automated machine learning experiment settings
* Run an automated machine learning experiment
* Explore model metrics
* Register and deploy model

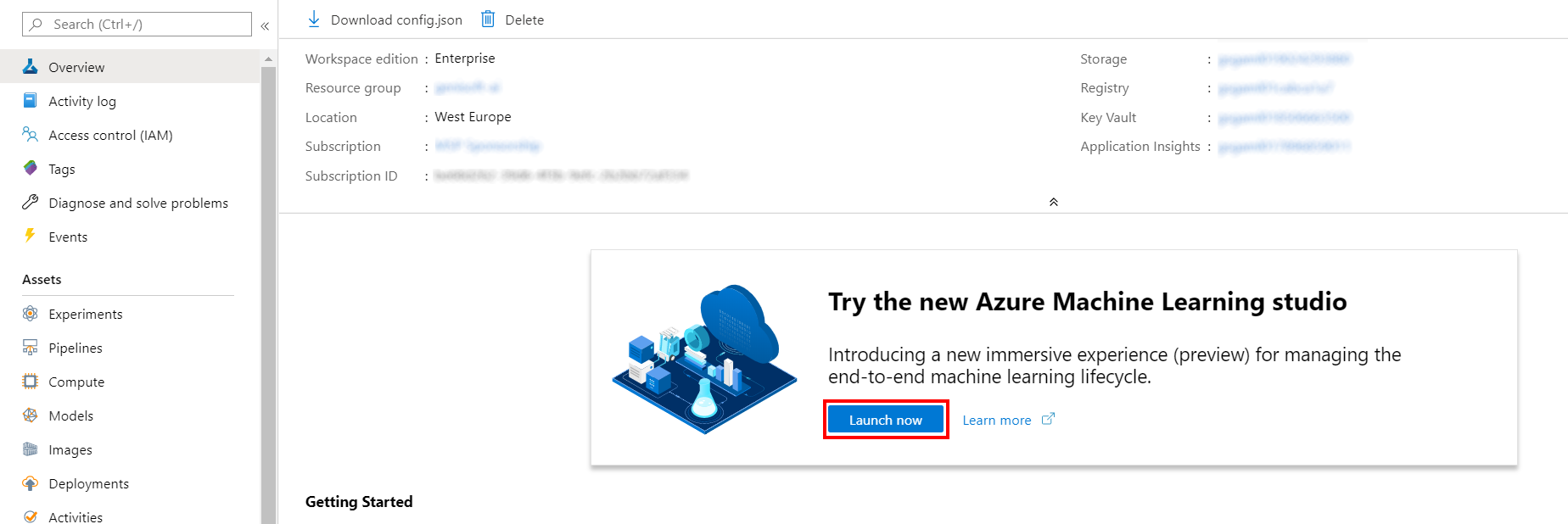
You can create and run automated machine learning experiments in code using the [Azure ML Python SDK](https://docs.microsoft.com/en-us/azure/machine-learning/service/how-to-configure-auto-train) or if you prefer a no code experience, you can also create your automated machine learning experiments in [Azure Machine Learning Studio](https://ml.azure.com/).

In this lab, you learn how to create, run, and explore automated machine learning experiments in the [Azure Machine Learning Studio](https://ml.azure.com/) without a single line of code. As part of this lab, we will be using the Flight Delays data set that is enhanced with the weather data. Based on the enriched dataset, we will use automated machine learning to find the best performing classification model to predict if a particular flight will be delayed by 15 minutes or more.

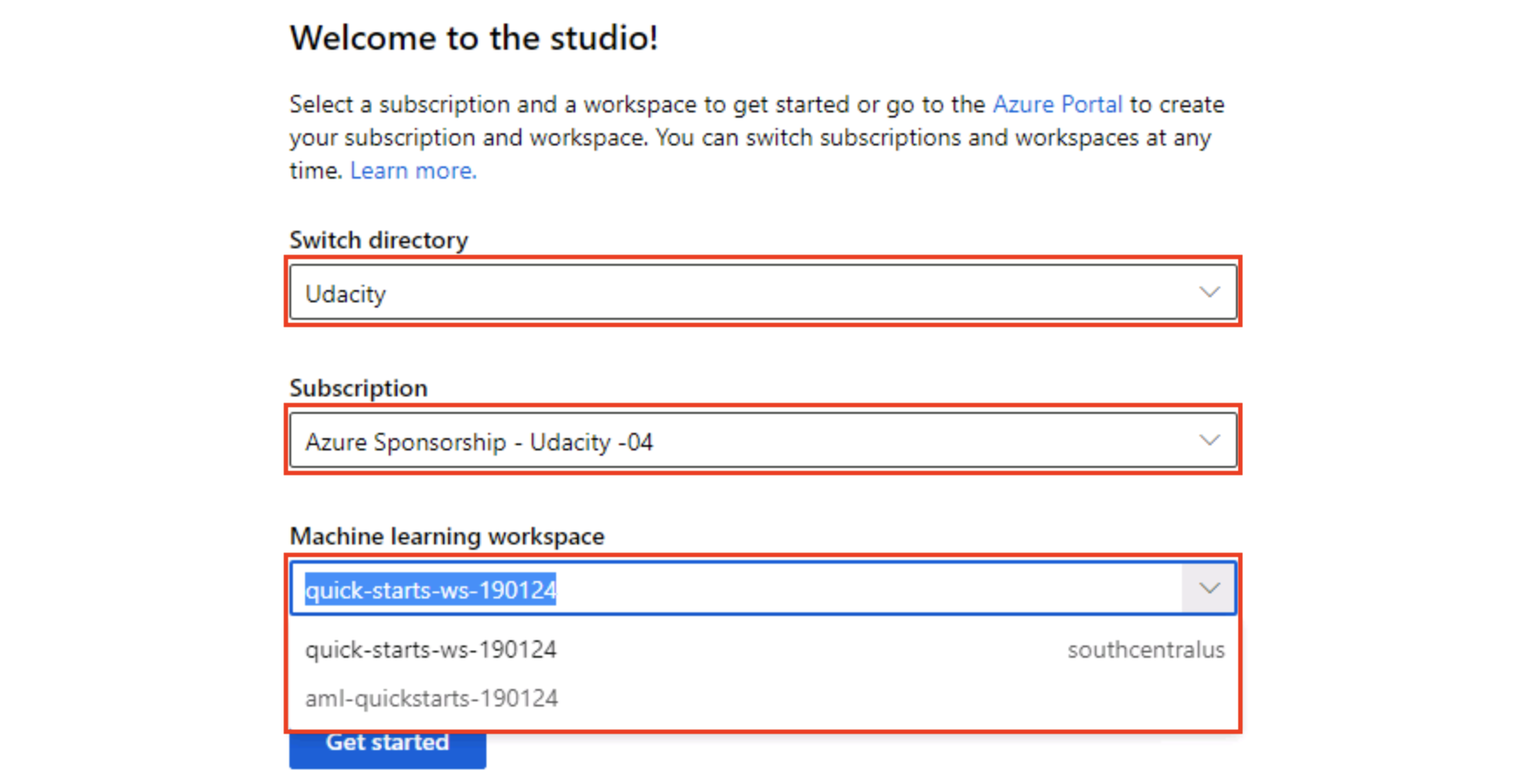
**Exercise 1: Register Dataset with Azure Machine Learning studio**

Task 1: Upload Dataset

1. In [Azure portal](https://portal.azure.com/), open the available machine learning workspace.
2. Select **Launch now** under the **Try the new Azure Machine Learning studio** message.

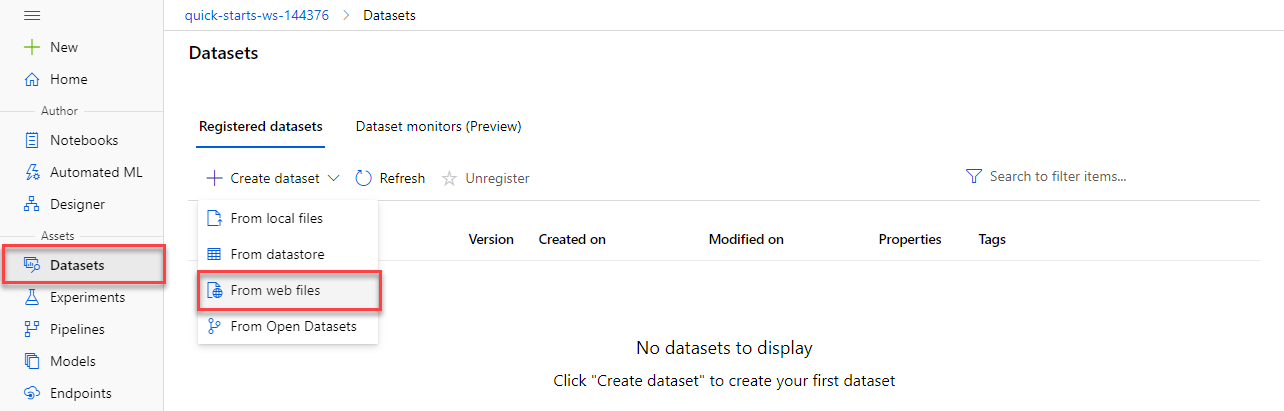


1. When you first launch the studio, you may need to set the directory and subscription. If so, you will see this screen:



For the directory, select **Udacity** and for the subscription, select **Azure Sponsorship**. For the machine learning workspace, you may see multiple options listed. **Select any of these** (it doesn’t matter which) and then click **Get started**.

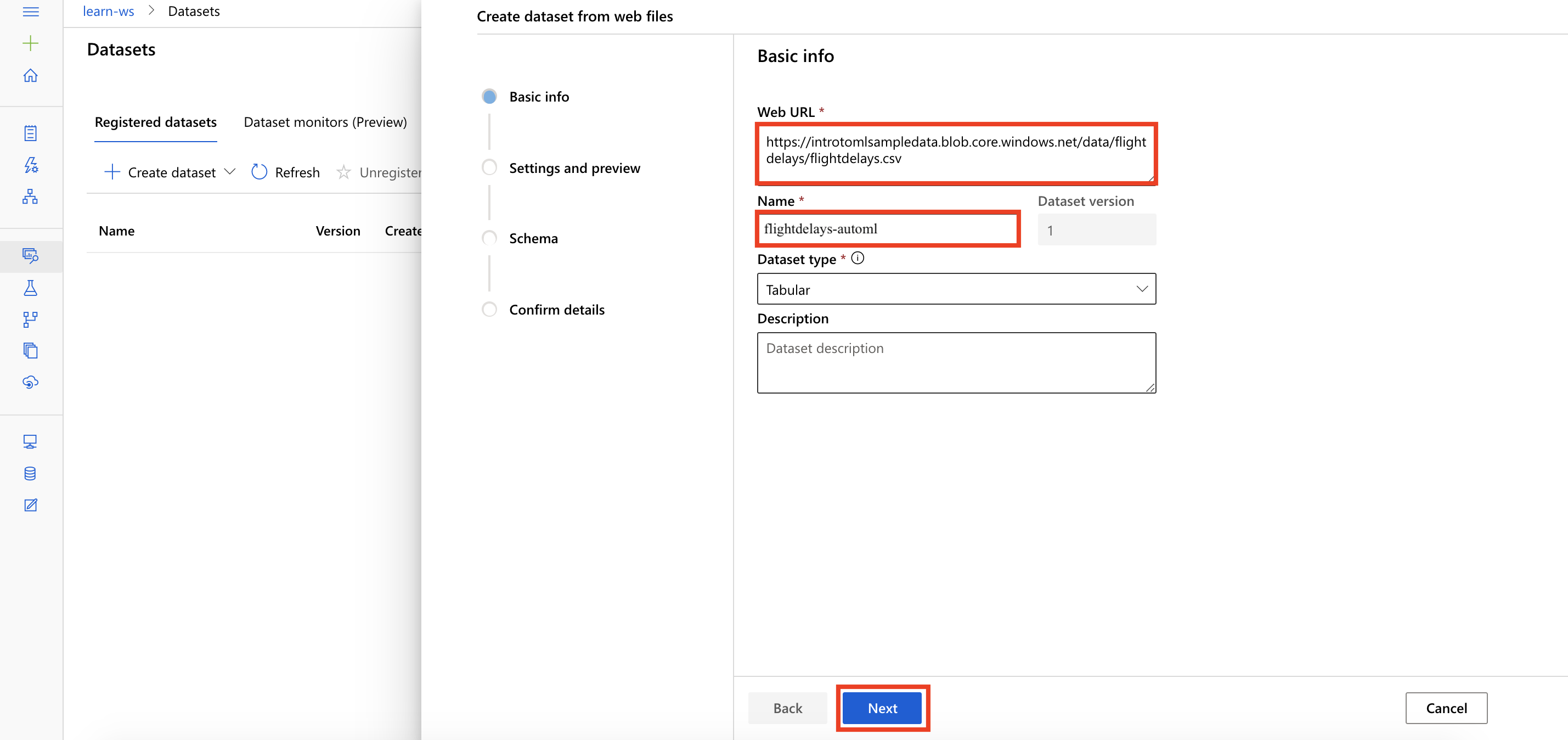
1. From the studio, select **Datasets, + Create dataset, From web files**. This will open the Create dataset from web files dialog on the right.



1. In the Web URL field provide the following URL for the training data file:

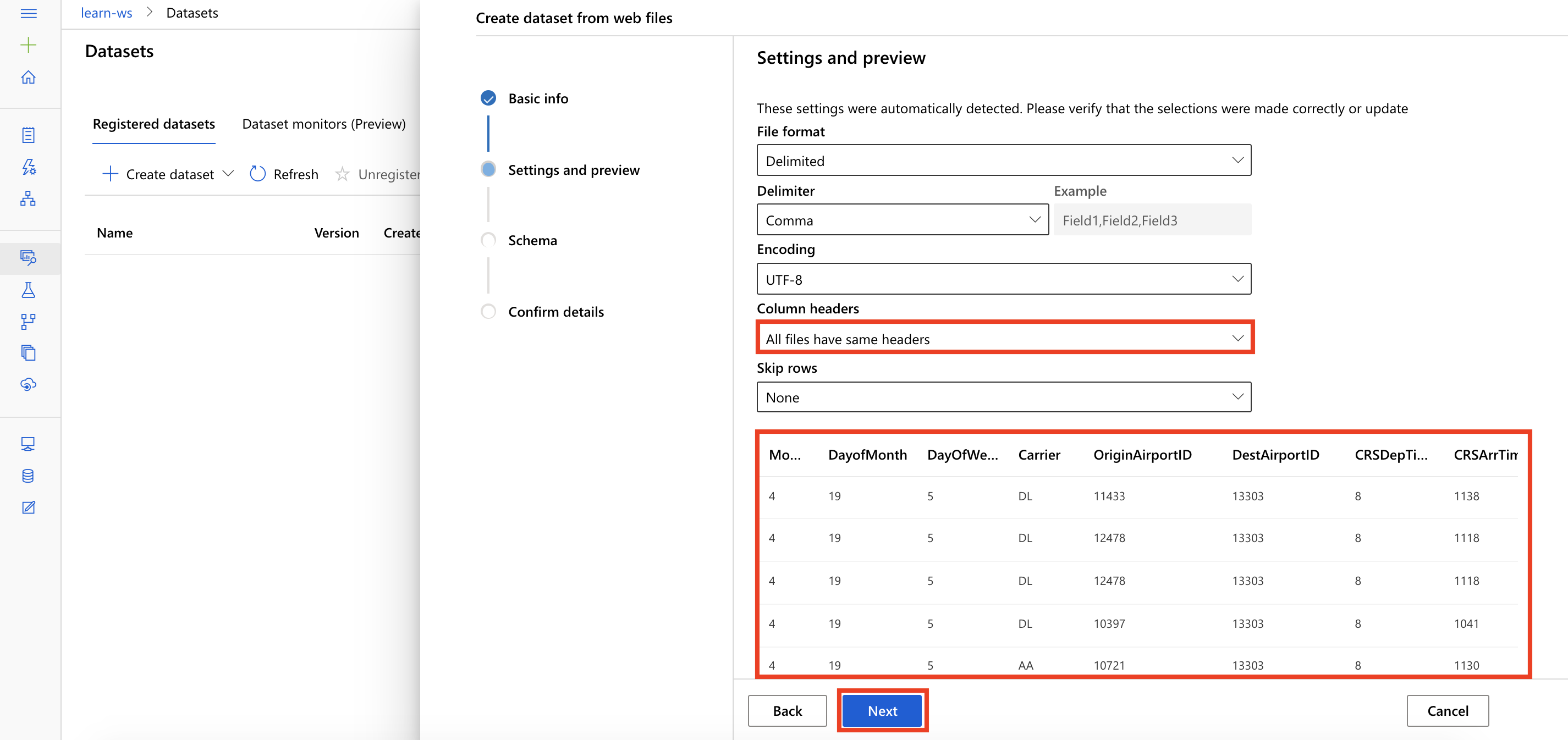
https://introtomlsampledata.blob.core.windows.net/data/flightdelays/flightdelays.csv

1. Provide flightdelays-automl as the Name, leave the remaining values at their defaults and select **Next**.



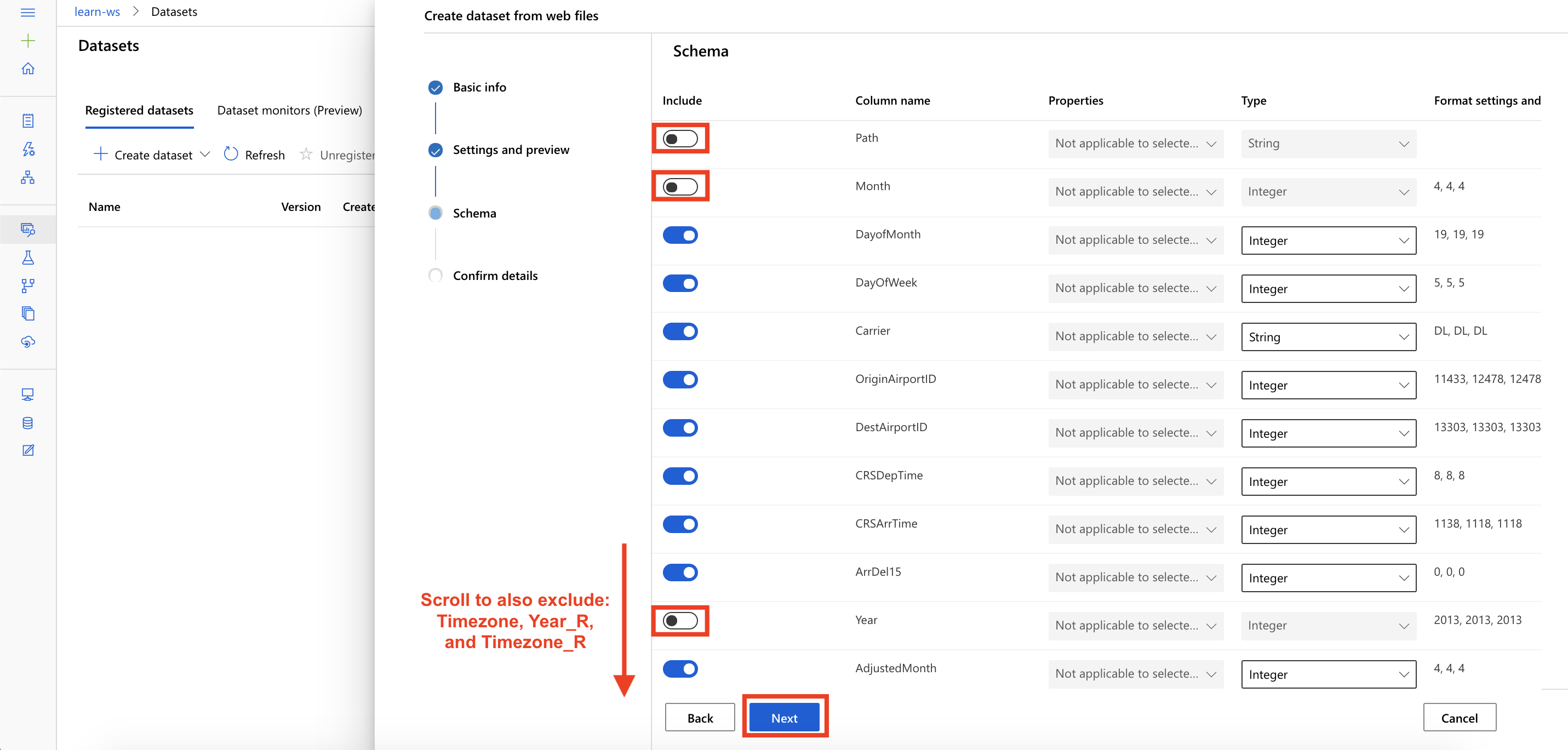
Task 2: Preview Dataset

1. On the Settings and preview panel, set the column headers drop down to All files have same headers.
2. Review the dataset and then select **Next**



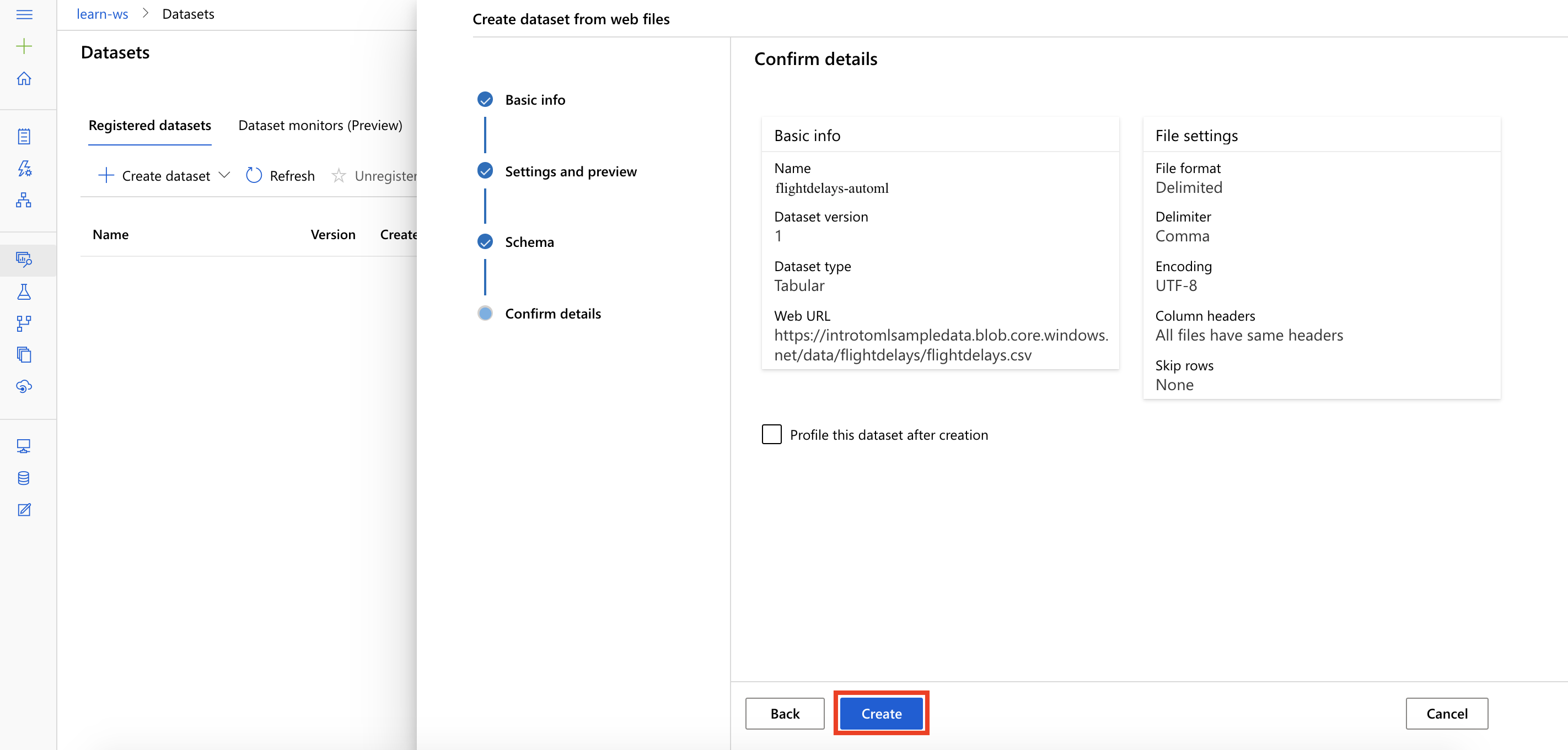
Task 3: Select Columns

1. Select columns from the dataset to include as part of your training data. Exclude the following columns: **Path, Month, Year, Timezone, Year\_R, Timezone\_R**, and then select **Next**



Task 4: Create Dataset

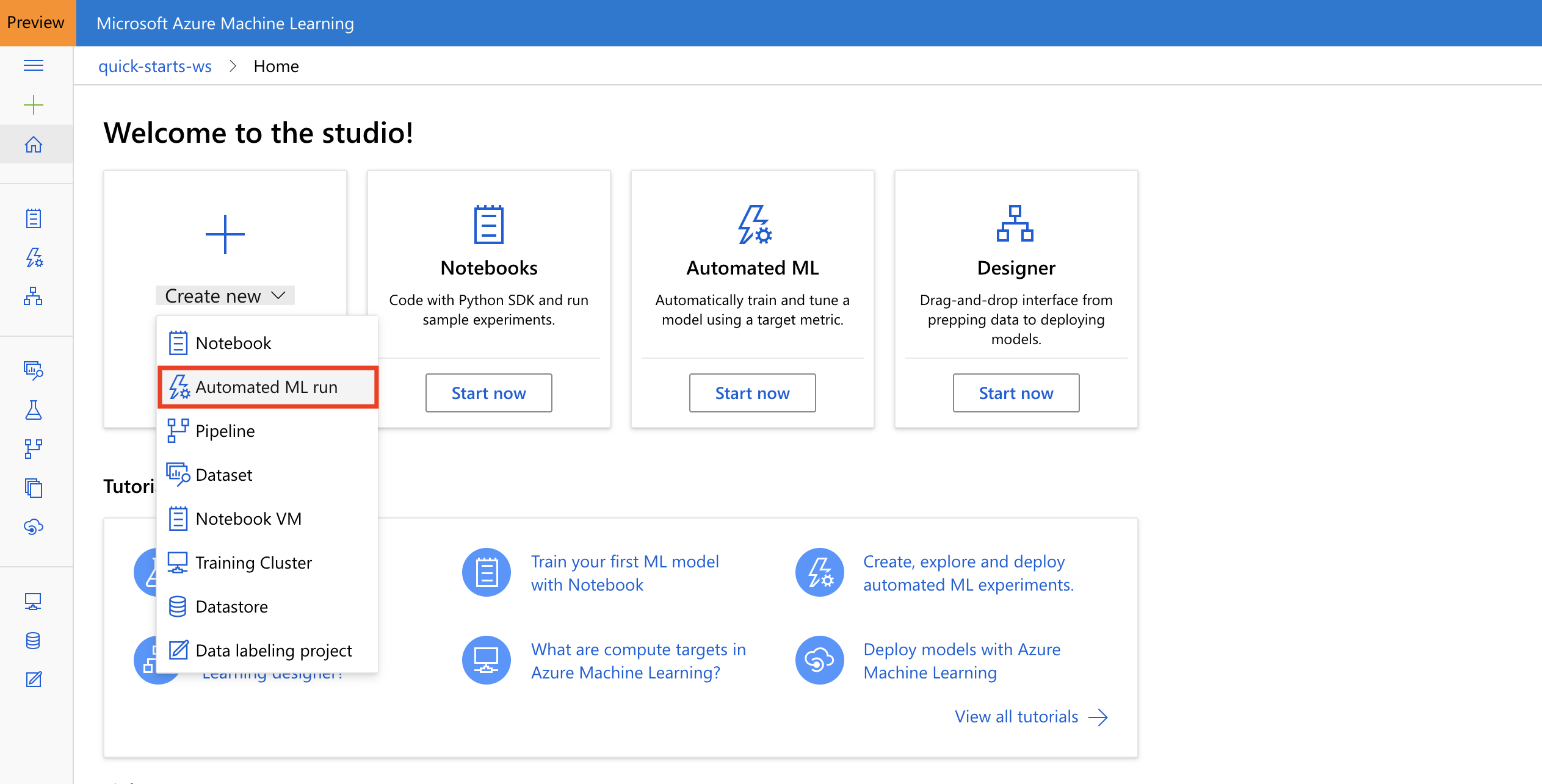
1. Confirm the dataset details and select **Create**



**Exercise 2: Setup New Automated Machine Learning Experiment**

Task 1: Create New Automated Machine Learning Experiment

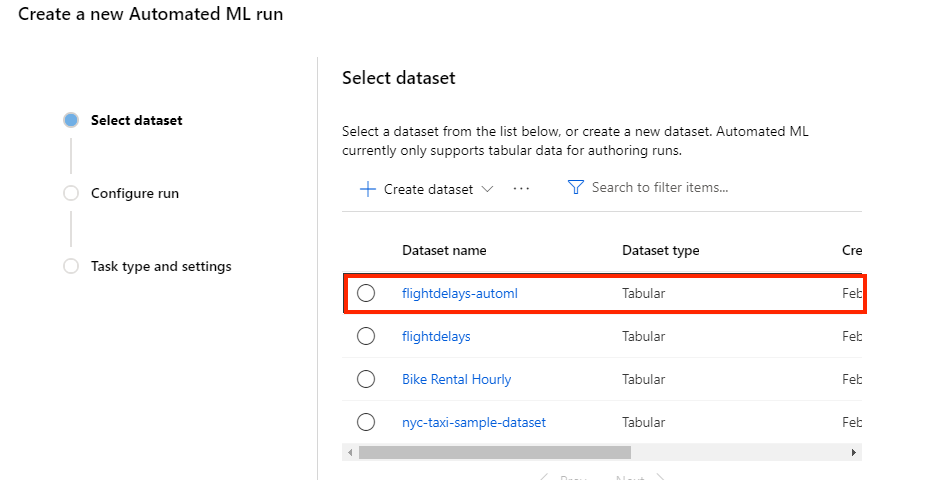
1. From the studio home, select **Create new, Automated ML run**



1. This will open a Create a new automated machine learning experiment page

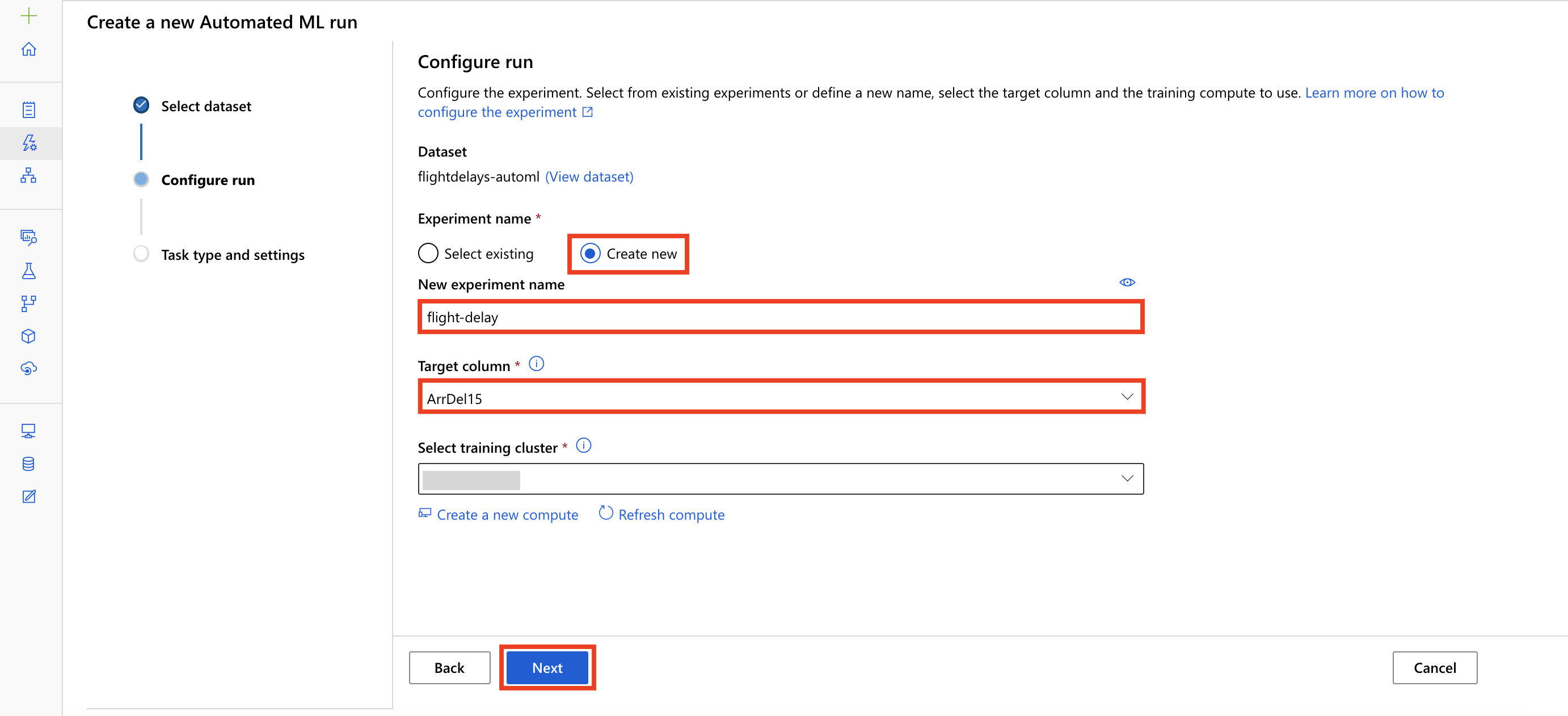
Task 2: Select Training Data

1. Select the dataset flightdelays-automl and then select **Next**



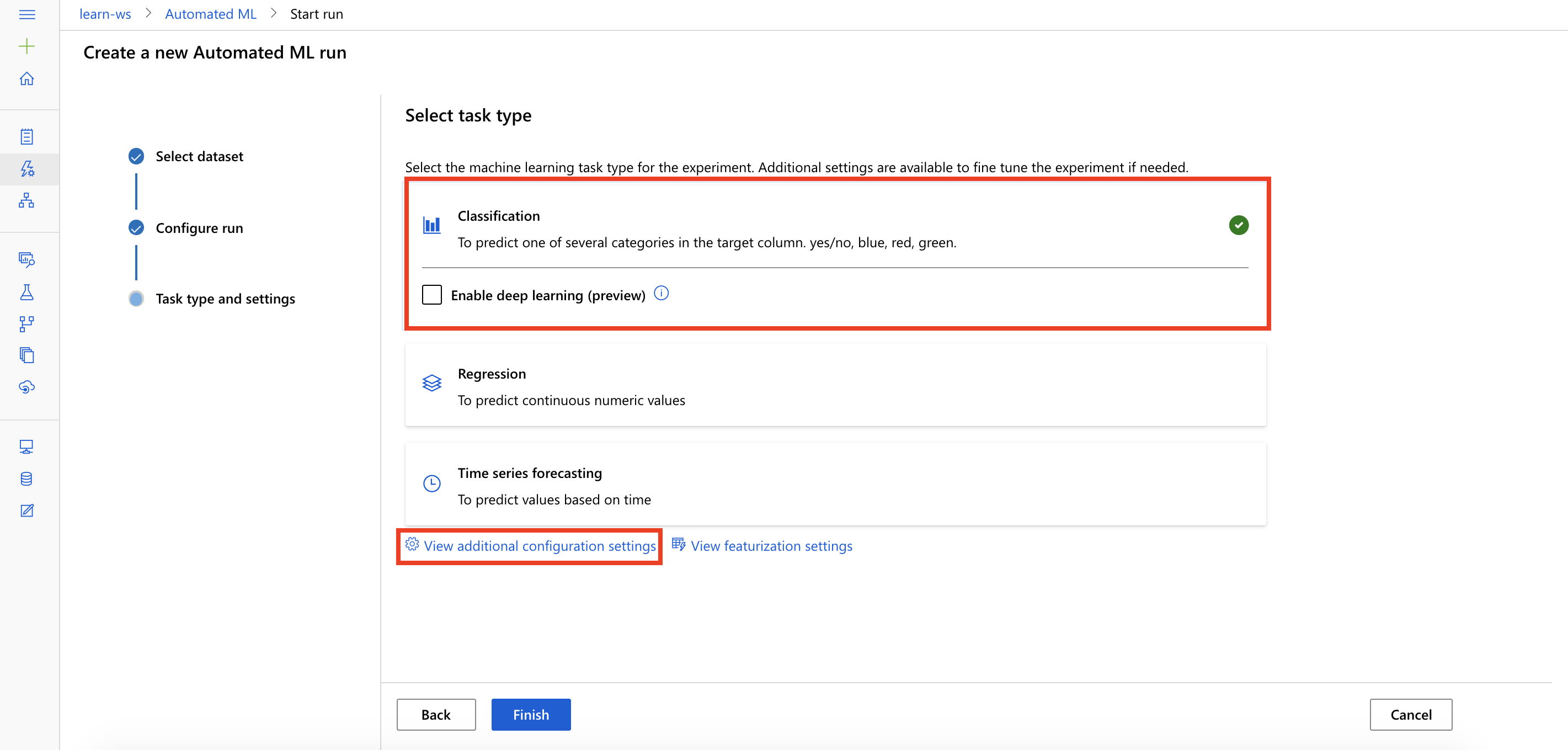
Task 3: Create a new Automated ML run

1. Provide an experiment name: **flight-delay**
2. Select target column: **ArrDel15**
3. Select compute target: **select the available compute**
4. Select **Next**

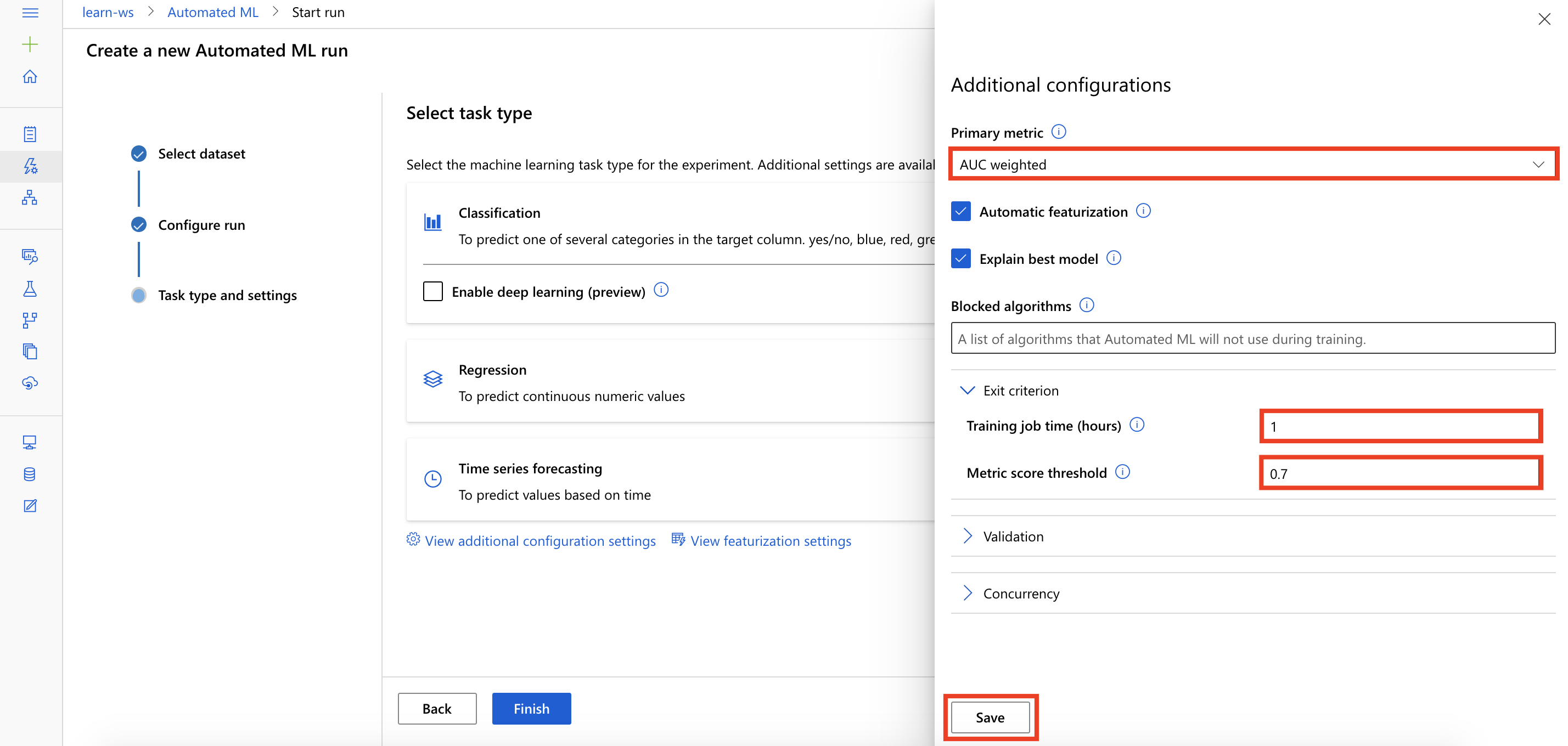


Task 4: Setup Task type and Settings

1. Select task type: **Classification**, and then select **View additional configuration settings**



1. This will open the Additional configurations dialog.
2. Provide the following information and then select **Save**
   1. Primary metric: **AUC weighted**
   2. Exit criteria, Training job time (hours): 1
   3. Exit criteria, Metric score threshold: 0.7

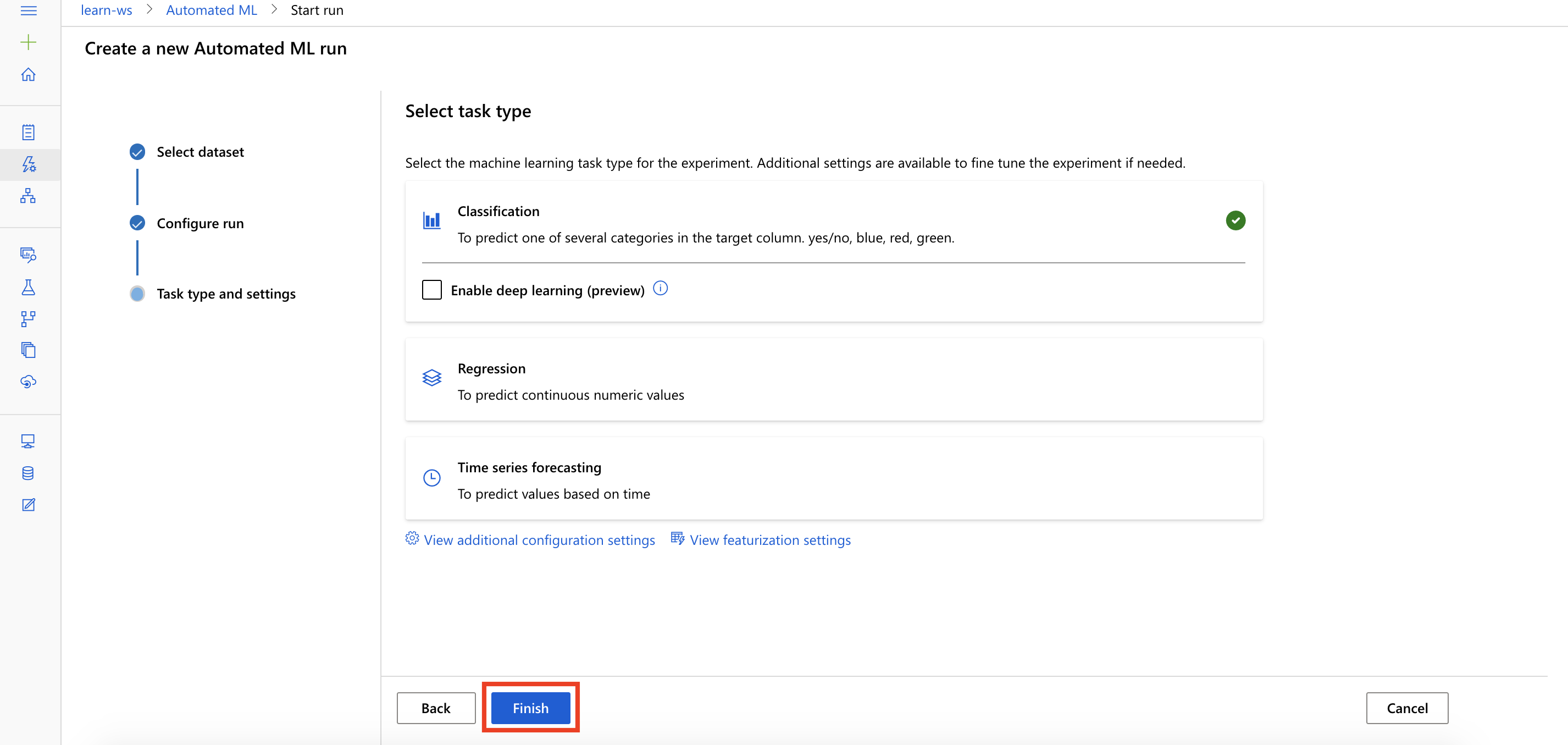


*Note that we are setting a metric score threshold to limit the training time. In practice, for initial experiments, you will typically only set the training job time to allow AutoML to discover the best algorithm to use for your specific data.*

**Exercise 3: Start and Monitor Experiment**

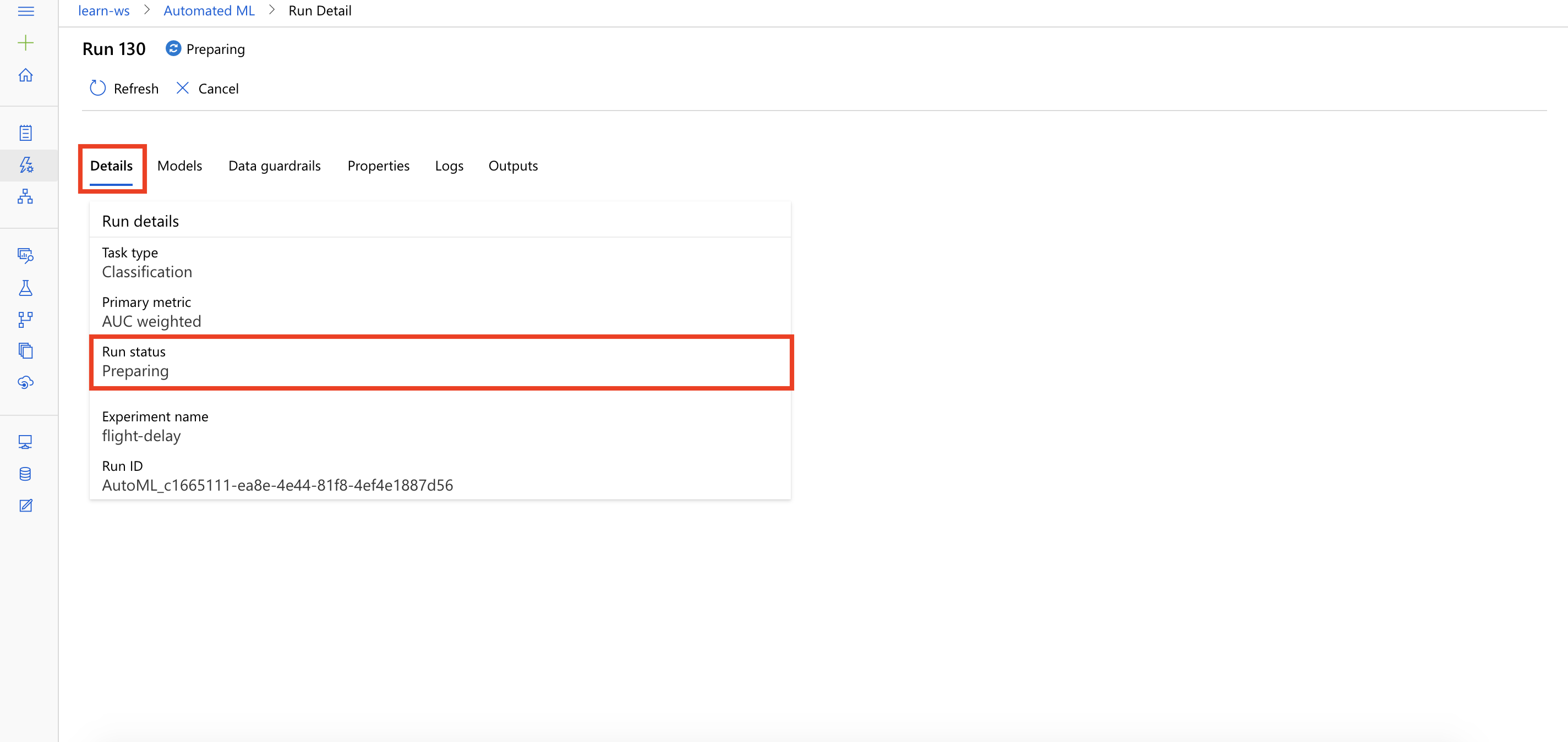
Task 1: Start Experiment

1. Select **Finish** to start running the experiment

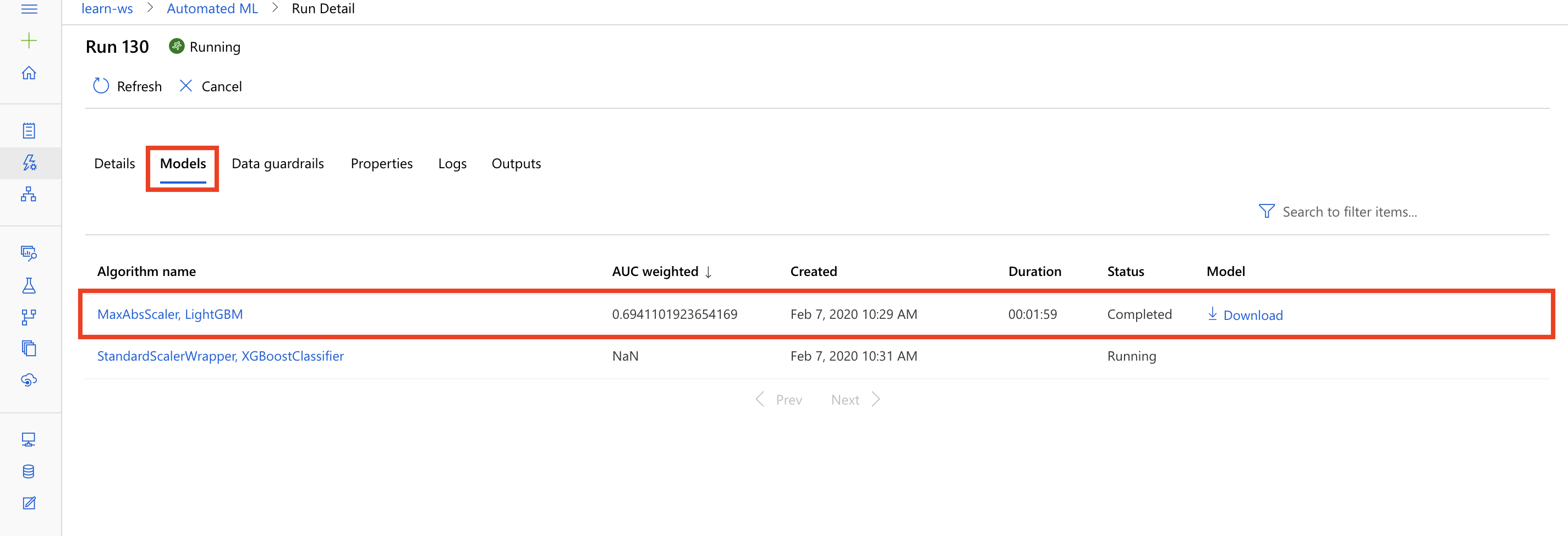


Task 2: Monitor Experiment

1. The experiment will run for about *10 min*
2. In the **Details** tab, observe the **run status** of the job.

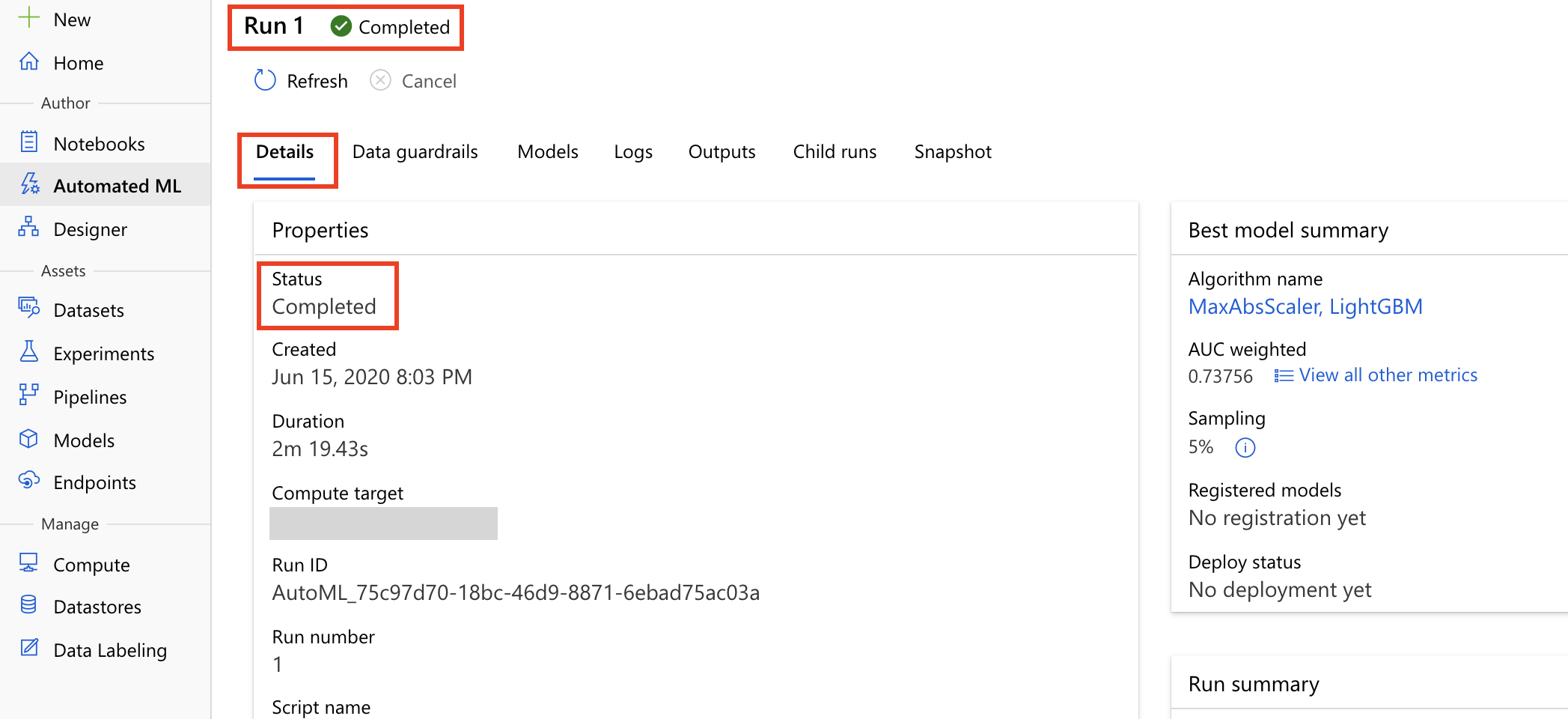


1. Select the **Models** tab, and observe the various algorithms the AutoML is evaluating. You can also observe the corresponding **AUC weighted** scores for each algorithm.



Note that we have set a metric score threshold to limit the training time. As a result you might see only one algorithm in your models list.

1. Select **Details** and wait till the run status becomes **Completed**.

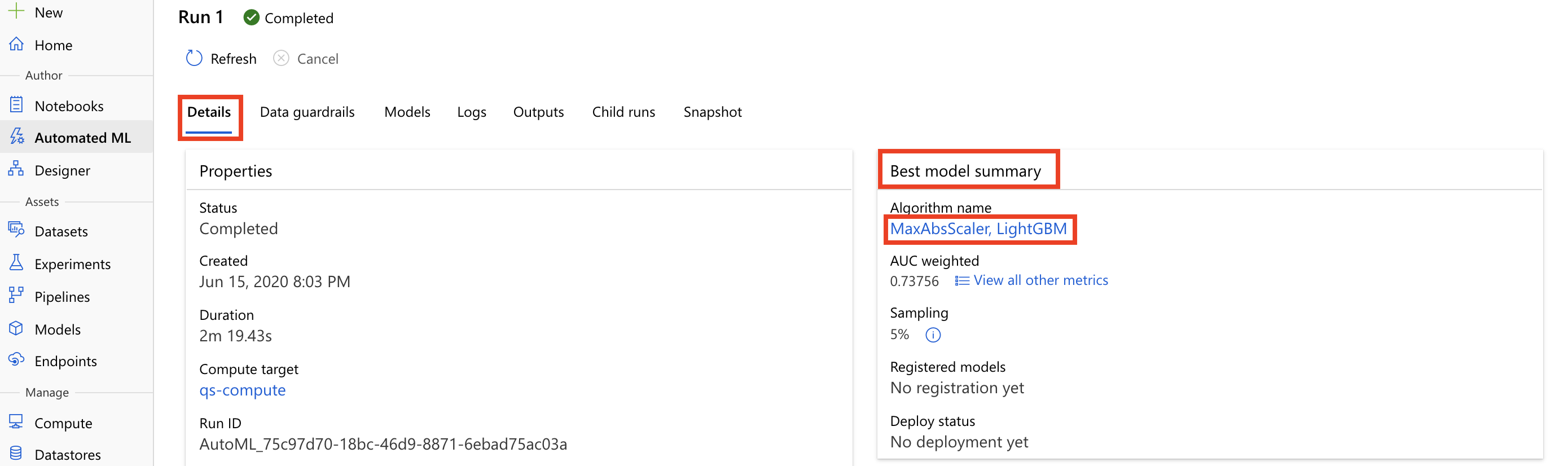


1. While you wait for the model training to complete, you can learn to view and understand the charts and metrics for your automated machine learning run by selecting [Understand automated machine learning results](https://docs.microsoft.com/en-us/azure/machine-learning/how-to-understand-automated-ml).

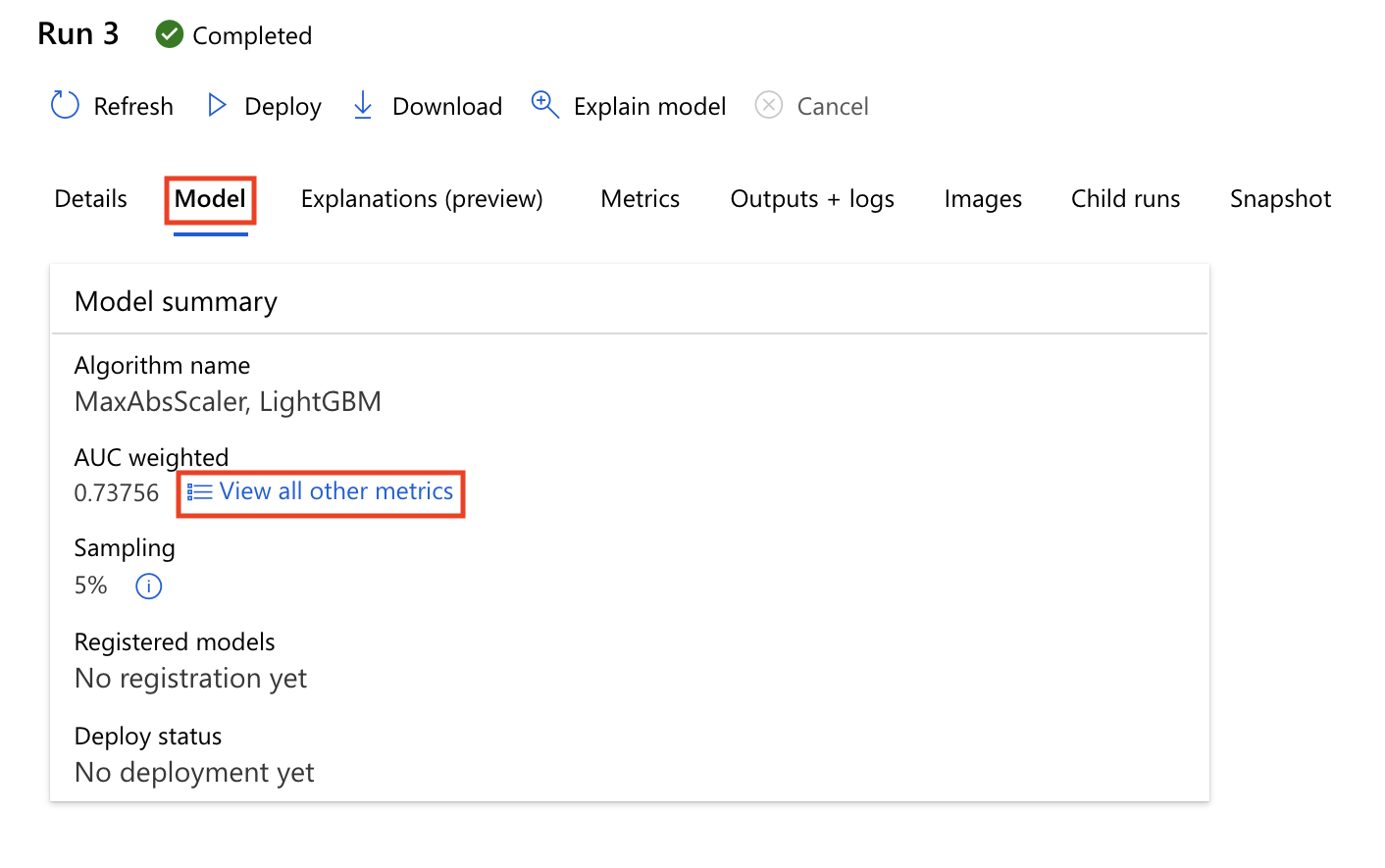
**Exercise 4: Review Best Model’s Performance**

Task 1: Review Best Model Performance

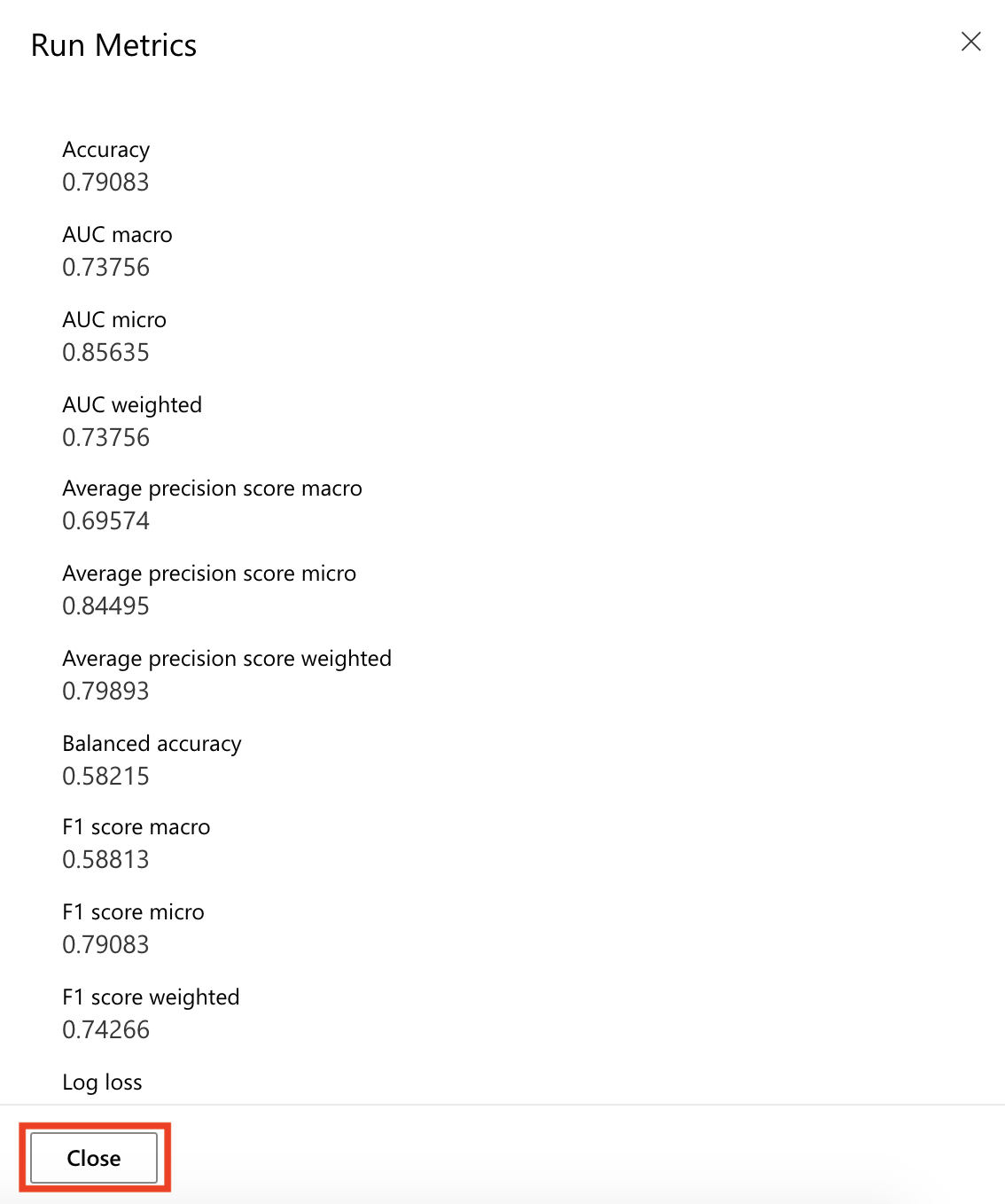
1. The Details tab shows the Best model summary. Next, select **Algorithm name** to review the model details.



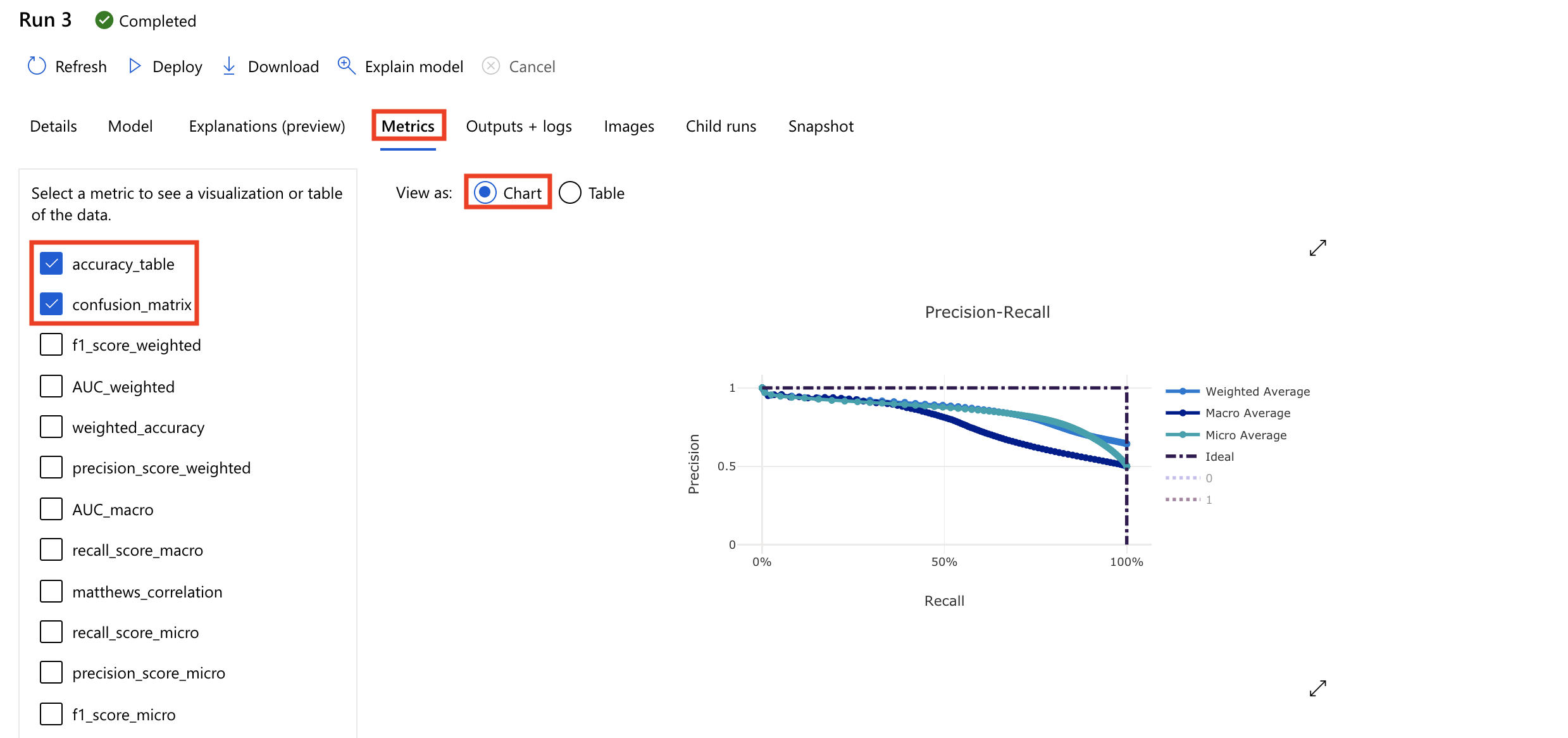
1. From the Model details tab, to view the various metrics to evaluate the best model performance, select **View all other metrics**.



1. Review the model performance metrics and then select **Close**.



1. Next, select **Metrics** to review the various model performance curves, such as Precision-Recall, ROC, Calibration curve, Gain & Lift curves, and Confusion matrix.



**Next Steps**

Congratulations! You have trained and evaluated your first automated machine learning model. You can continue to experiment in the environment but are free to close the lab environment tab and return to the Udacity portal to continue with the lesson.