

Automated Machine Learning

Automated machine learning, also referred to as autoML, is the process of automating the time-consuming iterative tasks of machine learning model development. It allows data scientists, analysts, and developers to build ML models with high scale, efficiency, and productivity all while sustaining model quality.

Traditional machine learning model development is resource-intensive, requiring significant domain knowledge and time to produce and compare dozens of models. Apply automated ML when you want Azure Machine Learning to train and tune a model for you using the target metric you specify. The service then iterates through ML algorithms paired with featured selections, where each iteration produces a model with a training score. The higher the score, the better the model is considered to “fit” your data.

With automated machine learning, you’ll accelerate the time it takes to get production-ready ML models with great ease and efficiency.

When to use automated ML

Automated ML democratizes the machine learning model development process, and empowers its users, no matter their data science expertise, to identify an end-to-end machine learning pipeline for any problem.

Data scientist, analysts and developers across industries can use automated ML to:

- Implement machine learning solutions without extensive programming knowledge
- Save time and resources
- Leverage data science best practices
- Provide agile problem-solving

1. Select **AI + Machine Learning** > **Machine Learning service workspace**

[Dashboard](#) > [New](#)

New

Azure Marketplace [See all](#)

Get started

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Analytics


Blockchain

Compute


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Machine Learning service workspace
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[Quickstart tutorial](#)



Computer Vision
[Quickstart tutorial](#)

2. Naming the **Workspace Name** > Select **Resource Group** and **Location**. Click on **Review + Create**.

Machine Learning service workspace

Create

[* Main](#) [Tags](#) [* Review](#)

* **Workspace Name**

AutomatedML ✓

Subscription

[Redacted] ▼


Resource group

(New) AutomatedML ▼

[Create new](#)

Location

West Central US ▼



For your convenience, these resources are added automatically to the workspace, if regionally available: [Azure storage](#), [Azure Application Insights](#) and [Azure Key Vault](#).

3. Click on **Create** button.

4. Click on **Go to resource** button.

Delete Cancel Redeploy Refresh

Your deployment is complete

Deployment name: Microsoft.MachineLearningServices
Subscription: [Microsoft Azure Sponsorship \(bc4f2c45-a8b4-44c8-9...](#) Start time: 7/18/2019, 10:31:18 AM
Resource group: [AutomatedML](#) Correlation ID: 58777a41-3a6b-4b1e-

Deployment details [\(Download\)](#)

RESOURCE	TYPE	STATUS	OPERATION DETAILS
AutomatedML	Microsoft.MachineLearn...	OK	Operation details
automatedml2825807998	Microsoft.Insights/comp...	OK	Operation details
automatedml0837381173	Microsoft.KeyVault/vaults	OK	Operation details
automatedml3718950035	Microsoft.Storage/stora...	OK	Operation details

Next steps

[Go to resource](#)

5. Click on **Create a new Automated Machine Learning Model (Preview)**.

Download config.json Delete

Resource group : [AutomatedML](#) Storage : [automatedml3718950035](#)
Location : West Central US Registry : ...
Subscription : [Microsoft Azure Sponsorship](#) Key Vault : [automatedml0837381173](#)
Subscription ID : XXXXXXXXXX Application Insights : [automatedml2825807998](#)

Getting Started

Create Notebooks in an Azure Machine Learning Notebook VM (Preview)
Explore data, create models, and deploy services in your Notebook VM.

Create a new Automated Machine Learning Model (Preview)
Automatically create a model from your existing data.

Build a model using the Visual Interface (Preview)
Drag and drop existing components to create new models.

View Documentation
Learn how to use Azure Machine Learning.

6. Click on **Create experiment** button

Welcome to Automated Machine Learning

Getting Started

Create your first experiment with automated machine learning to produce quality models with zero effort.

Create experiment

7. Give **Experiment name** and **Select a training compute**. In case you did not have a Compute, you need to create one that specifies the size of the virtual machine that model is going to run on it.

Create a new automated machine learning experiment

← Back Refresh

Experiment name *
TitanicAutoML

Select a training compute * ⓘ
Select a Compute...

Create a new compute Refresh Compute

Cancel Next

Create a New Compute

Compute name *
TitanicAutoML

Select virtual machine size *
STANDARD_DS1_V2 --- 1 vCPUs, 3.5 GB memory, 7 GB storage

> Additional Settings

Cancel Create

8. **Select a training compute that you created** in previous step and click on **Next** button.

Create a new automated machine learning experiment

← Back Refresh

Experiment name *
TitanicAutoML

Select a training compute * ⓘ
TitanicAutoML

Create a new compute Refresh Compute

Cancel Next

9. Click on **Upload** button to upload the dataset

Create a new automated machine learning experiment

[We'd love to get your feedback!](#)

[← Back](#) [↻ Refresh](#)

Experiment name *

TitanicAutoML

Select a training compute *

TitanicAutoML

Storage Account

automatedml3718950035

Storage Container

azureml-blobstore-08994e90-a39f-4088-9e51-8a6fcbfcee

Select a CSV/TSV data file, or upload from your local computer

[🔍 Search to filter items...](#)

[↑ Upload](#)

NAME ↑

10. Click on the dataset that you uploaded.

Create a new automated machine learning experiment

[We'd love to get your feedback!](#)

[← Back](#) [↻ Refresh](#)

Experiment name *

TitanicAutoML

Select a training compute *

TitanicAutoML

Storage Account

automatedml3718950035

Storage Container

azureml-blobstore-08994e90-a39f-4088-9e51-8a6fcbfcee

Select a CSV/TSV data file, or upload from your local computer

[🔍 Search to filter items...](#)

[↑ Upload](#)

NAME ↑

titanicdataset.csv

11. Select **Prediction Task** like Classification and so on. In this scenario, we going to predict passenger in the Titanic Ship will survive or not.

[🔍 Search to filter items...](#)

PASSENGERID	SURVIVED	PCLASS	NAME	SEX	AGE
<input type="radio"/> Ignored	<input checked="" type="checkbox"/> Included	<input checked="" type="checkbox"/> Included	<input checked="" type="checkbox"/> Included	<input checked="" type="checkbox"/> Included	<input checked="" type="checkbox"/> Included
1	0	3	Braund, Mr. Owen Harris	male	22
2	1	1	Cumings, Mrs. John Bradle...	female	38
3	1	3	Heikinen, Miss. Laina	female	26
4	1	1	Futrelle, Mrs. Jacques Heat...	female	35
5	0	3	Allen, Mr. William Henry	male	35

[<](#) [>](#)

Prediction Task * [?](#)

Classification

Target column * [?](#)

Survived

12. In **Advanced Settings**, we able to identify the **accuracy parameters**, **training job time**, the **maximum number of iterations**, some preprocessing tasks like **cross validations process**, **concurrency of iteration**.

Advanced Settings

Primary metric * ⓘ

accuracy

Exit criteria ⓘ

Training job time (minutes) ⓘ 60

Max number of iterations ⓘ 25

Metric score threshold ⓘ *Metric Score Threshold*

Preprocessing ⓘ ☒

Validation ⓘ

Validation type ⓘ K-fold cross validation

Number of Cross Validations * ⓘ 5

Concurrency ⓘ

Max concurrent iterations ⓘ 6

Max cores per iteration ⓘ *Max cores per iteration*

13. Select the Algorithms you needed to see which on works better for your dataset and click on **Start** button.

Blocked Algorithms * ⓘ

☒ LogisticRegression
☐ SGD
☐ MultinomialNaiveBayes
☐ BernoulliNaiveBayes
☒ SVM
☐ LinearSVM
☐ KNN
☐ DecisionTree
☐ RandomForest
☐ ExtremeRandomTrees

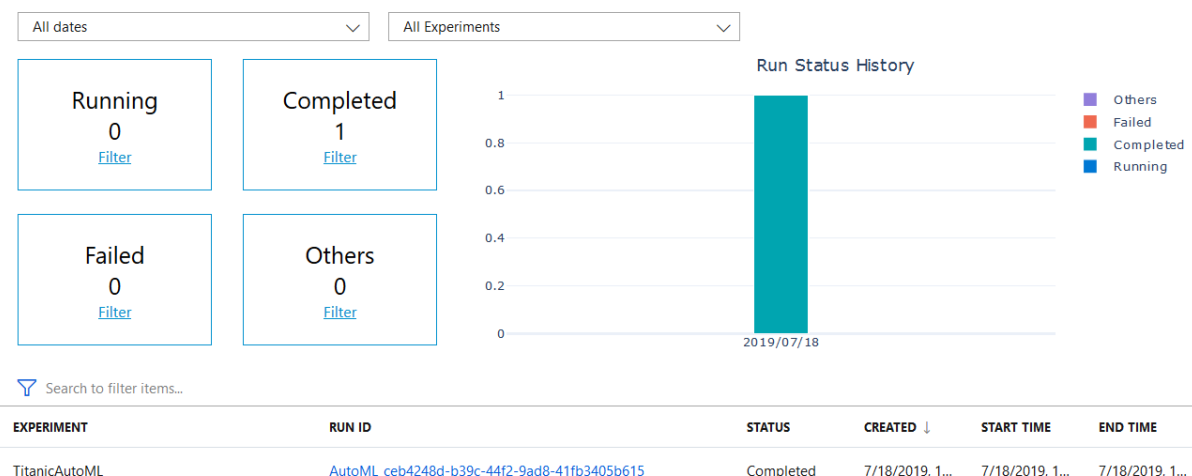
[Cancel](#) [Start](#)

14. Go to Automated machine learning, you will see the list of experiment you have, whether they are running Completed, Failed or another situation.

Automated Machine Learning Dashboard

[We'd love to get your feedback!](#)

[Refresh](#) [+ Create experiment](#)

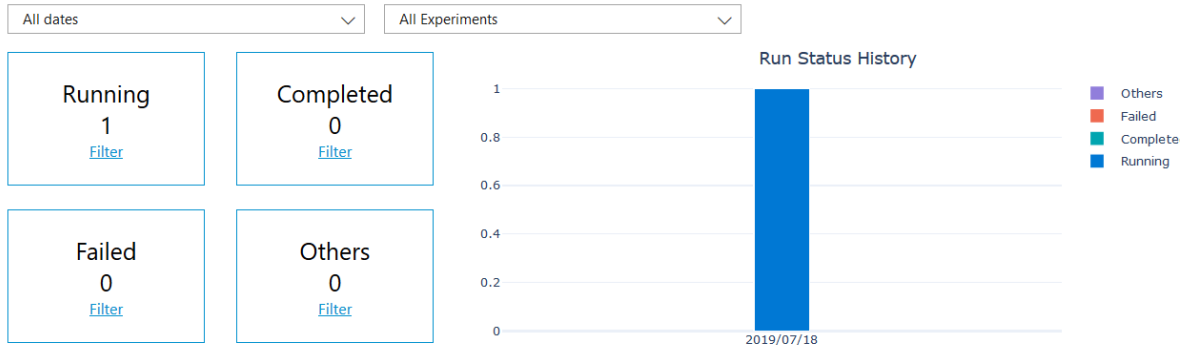


15. Click on the **Experiment** that you created.

Automated Machine Learning Dashboard

[We'd love to get your feedback](#)

[Refresh](#) [+ Create experiment](#)



[Search to filter items...](#)

EXPERIMENT	RUN ID	STATUS	CREATED ↓	START TIME	END TIME
TitanicAutoML	AutoML_ceb4248d-b39c-44f2-9ad8-41fb3405b615	Running	7/18/2019, 1...	7/18/2019, 1...	

16. Clicks on the **Logs** to see a list show in the recent update and what steps the AutoML is and the list is completing.

Run Detail

[← Back](#) [Refresh](#) [Logs](#) [✕ Cancel Run](#)

Log Detail

We'd love to see you

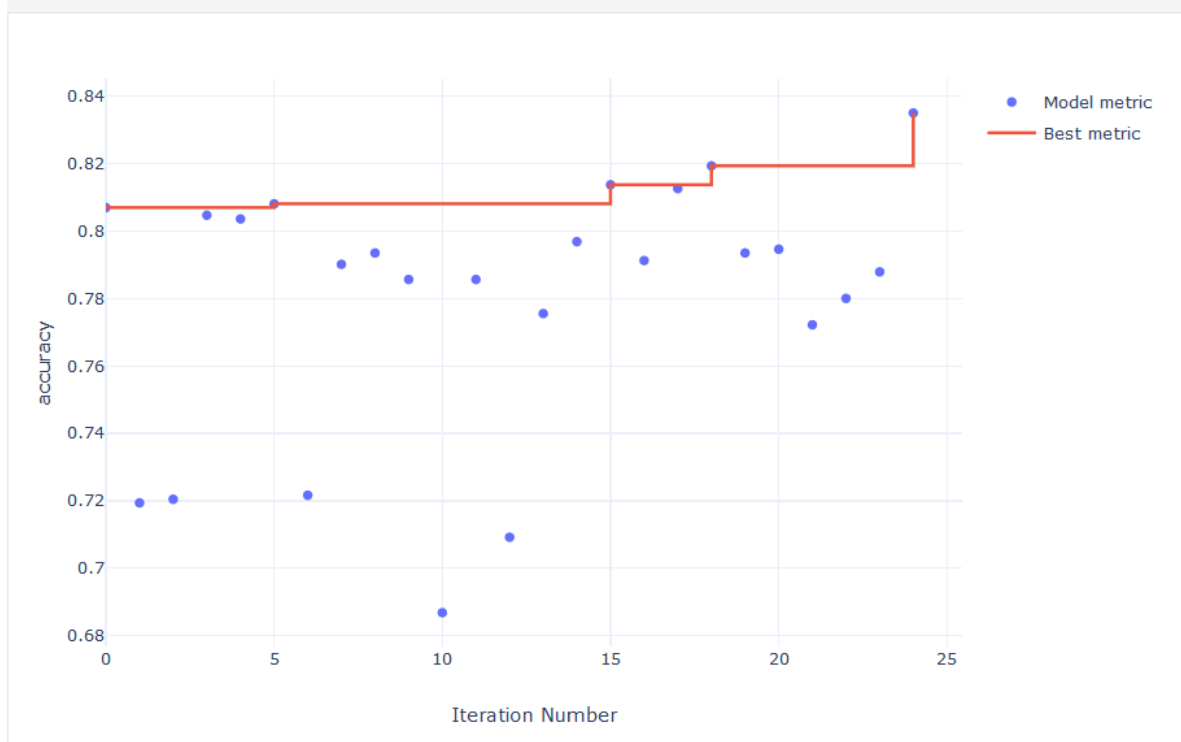
← Back ↻ Refresh ↓ Download All

-> setup_20_image_build_log.txt


```
1 2019/07/18 03:27:50 Downloading source code...
2 2019/07/18 03:27:52 Finished downloading source code
3 2019/07/18 03:27:52 Using acb_vol_c9fb207a-1286-49a7-beb7-58a37fda78b3 as the home volume
4 2019/07/18 03:27:52 Creating Docker network: acb_default_network, driver: 'bridge'
5 2019/07/18 03:27:52 Successfully set up Docker network: acb_default_network
6 2019/07/18 03:27:52 Setting up Docker configuration...
7 2019/07/18 03:27:53 Successfully set up Docker configuration
8 2019/07/18 03:27:53 Logging in to registry: automatedml2c093950.azurecr.io
9 2019/07/18 03:27:55 Successfully logged into automatedml2c093950.azurecr.io
10 2019/07/18 03:27:55 Executing step ID: acb_step_0. Timeout(sec): 5400, Working directory: '', Network: 'acb_def
11 2019/07/18 03:27:55 Scanning for dependencies...
12 2019/07/18 03:27:55 Successfully scanned dependencies
13 2019/07/18 03:27:55 Launching container with name: acb_step_0
14 Sending build context to Docker daemon 49.66kB
15
16 Step 1/15 : FROM mcr.microsoft.com/azureml/base:intelmpi2018.3-ubuntu16.04@sha256:ab8696f1d5d7f47cf4b2fc8f832a2
17 sha256:ab8696f1d5d7f47cf4b2fc8f832a24da18465fd7e1cb70369ebb66c908c92d3b: Pulling from azureml/base
18 Digest: sha256:ab8696f1d5d7f47cf4b2fc8f832a24da18465fd7e1cb70369ebb66c908c92d3b
19 Status: Downloaded newer image for mcr.microsoft.com/azureml/base:intelmpi2018.3-ubuntu16.04@sha256:ab8696f1d5d
20 ---> 74ec25ebb9ab
21 Step 2/15 : USER root
22 ---> Running in d83fee2c70a8
23 Removing intermediate container d83fee2c70a8
```

17. You are able to see a chart that shows the iteration, which algorithms archive the accuracy level.

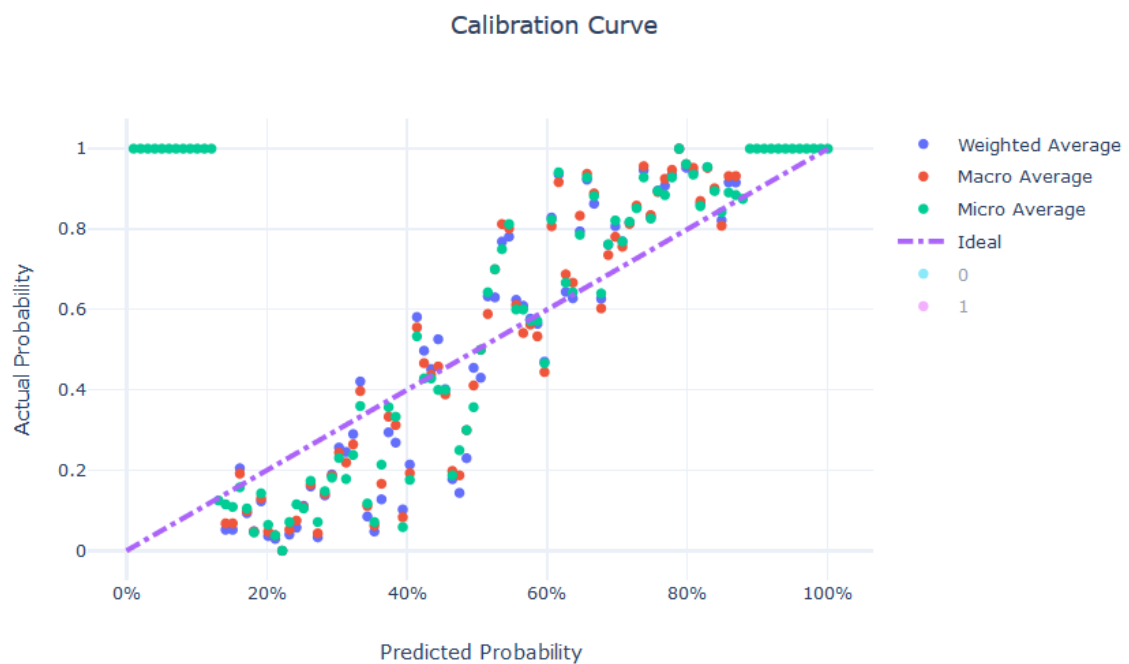
ITERATION CHART



18. Click on each of these algorithms that has been listed and sorted based on their accuracy.

ITERATIONS						
 Search to filter items...						
ITERATION	NAME	ACCURACY ↓	STATUS	CREATED	DURATION	MODEL
24	VotingEnsemble	0.834975833...	Completed	7/18/2019, 1...	00:00:43	↓ Downl...
17	MaxAbsScaler, LightGBM	0.819295712...	Completed	7/18/2019, 1...	00:00:27	↓ Downl...

19. The detailed explanation of these algorithms will be shown to you like the accuracy.



OR a confusion matrix for classification accuracy analysis.

