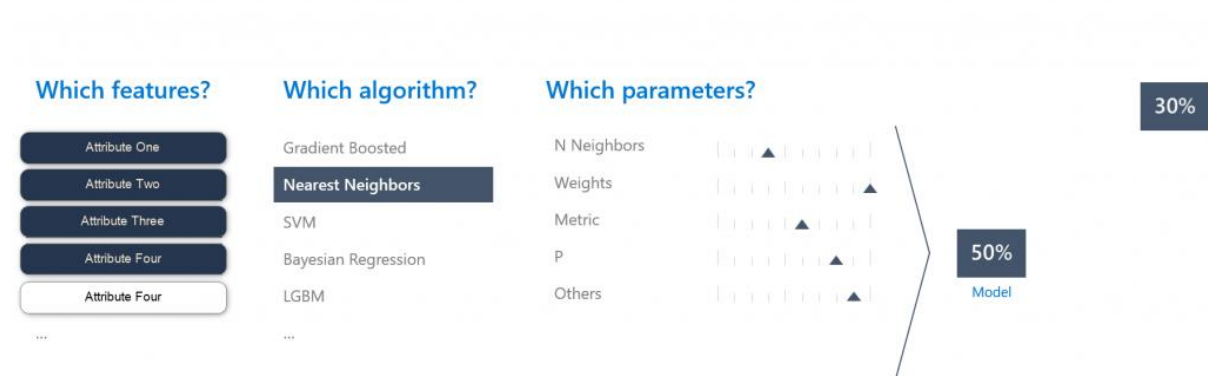
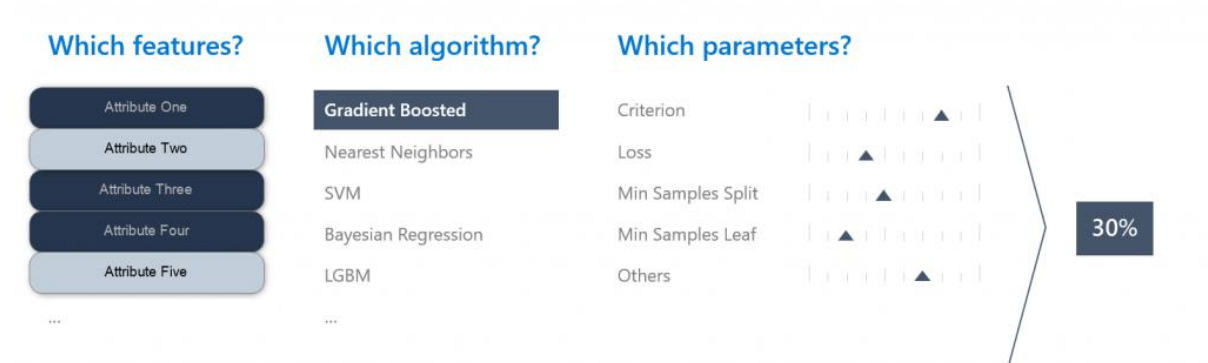


Azure AutoML :

Automated machine learning (automated ML) picks an algorithm and hyperparameters for you and generates a model ready for deployment. Automated machine learning helps to identify the relevant features, what algorithms to choose and how to set up the parameters of the algorithms. for instance, in the below picture, for the first round, AutoML chose the first four features, using Nearest neighbours algorithms, and set up the parameters like several neighbours.



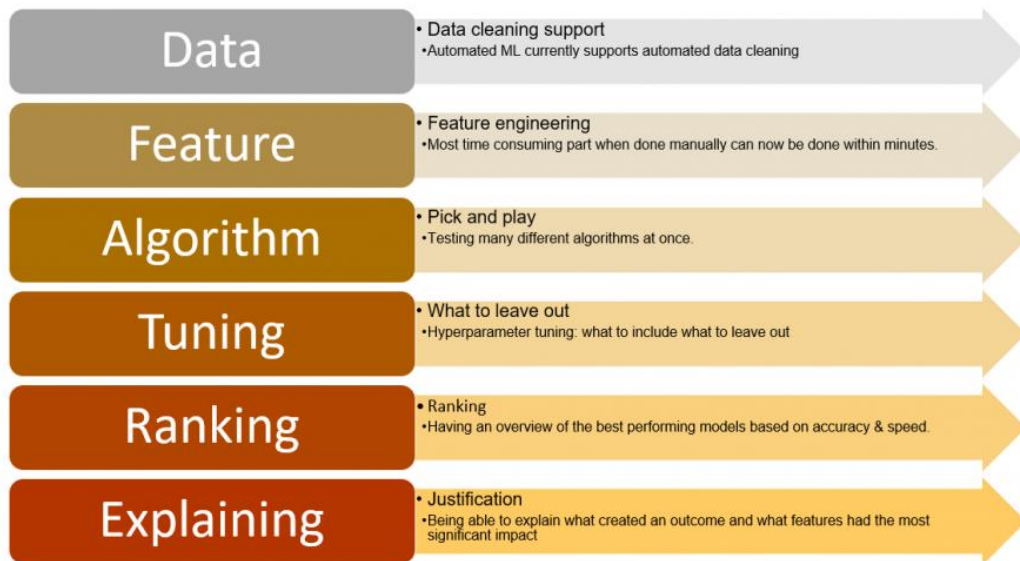
In the same process, it may choose other features, with different algorithms and parameters.,



finally, it will check which of those algorithms perform better.

In general, Automated machine learning, clean data automatically, feature selection, choose better algorithms, tune model by applying different parameters, find the best model and provide an explanation on each algorithm and provide some accuracy analysis.

Automated Machine Learning



In this document, we will show how to do a Prediction.

The AutoML environment in Azure.

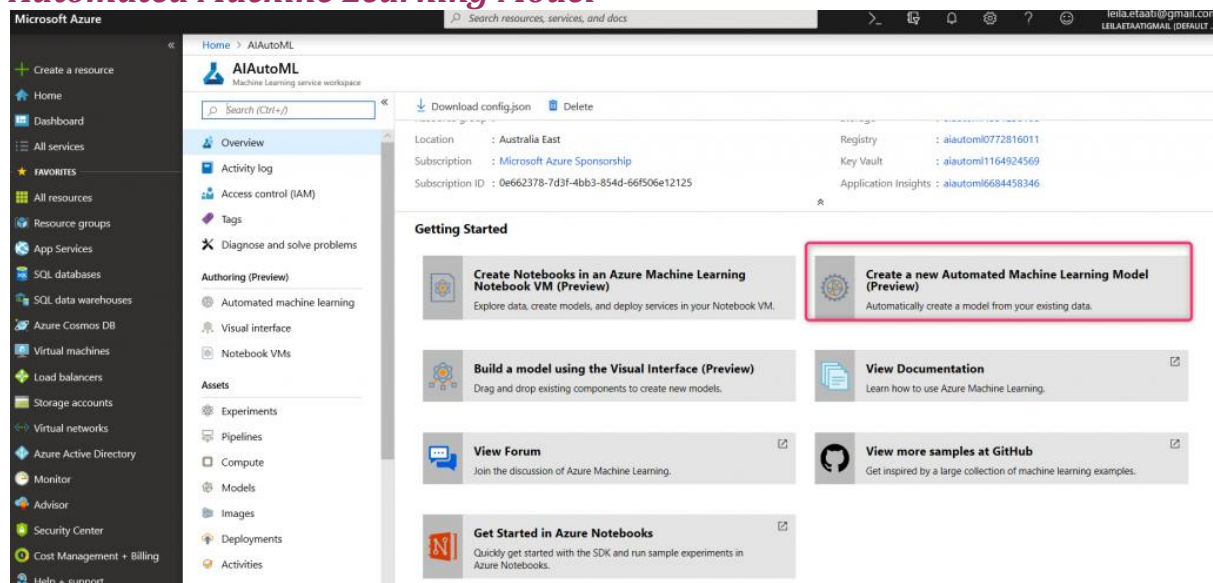
1- first log into portal.azure.com

2- after creating the Azure ML Services component

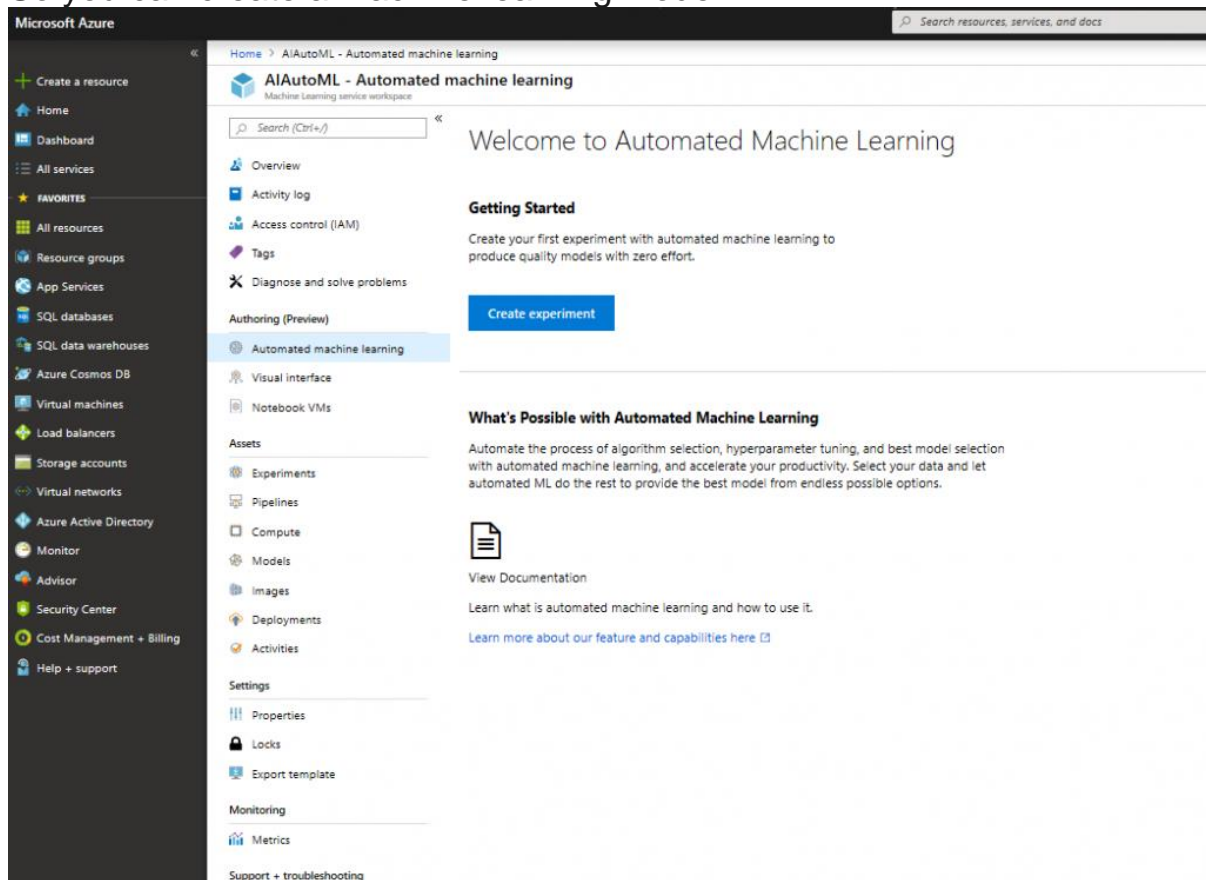
3- Click on Overview to see the details.

as you can see in the below picture, there is an option to *Create a New*

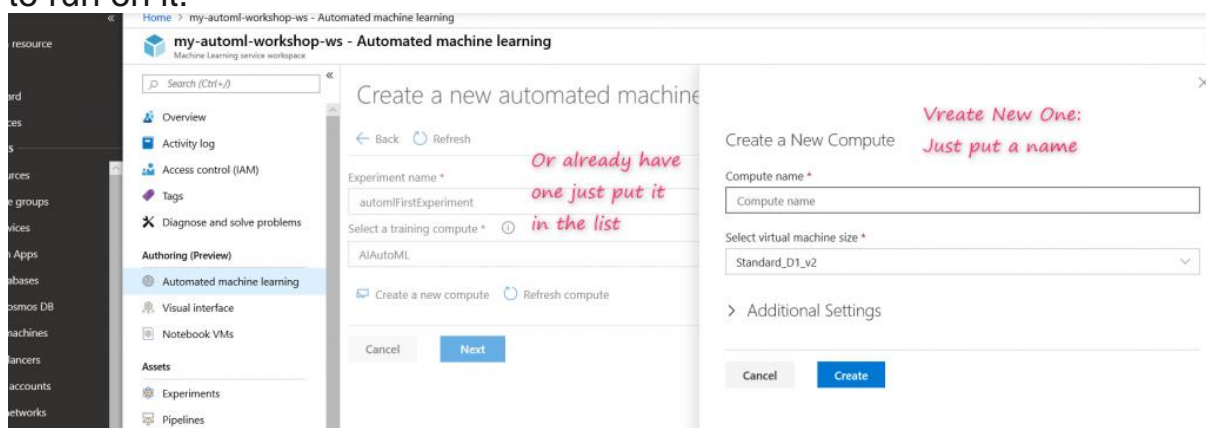
Automated Machine Learning Model



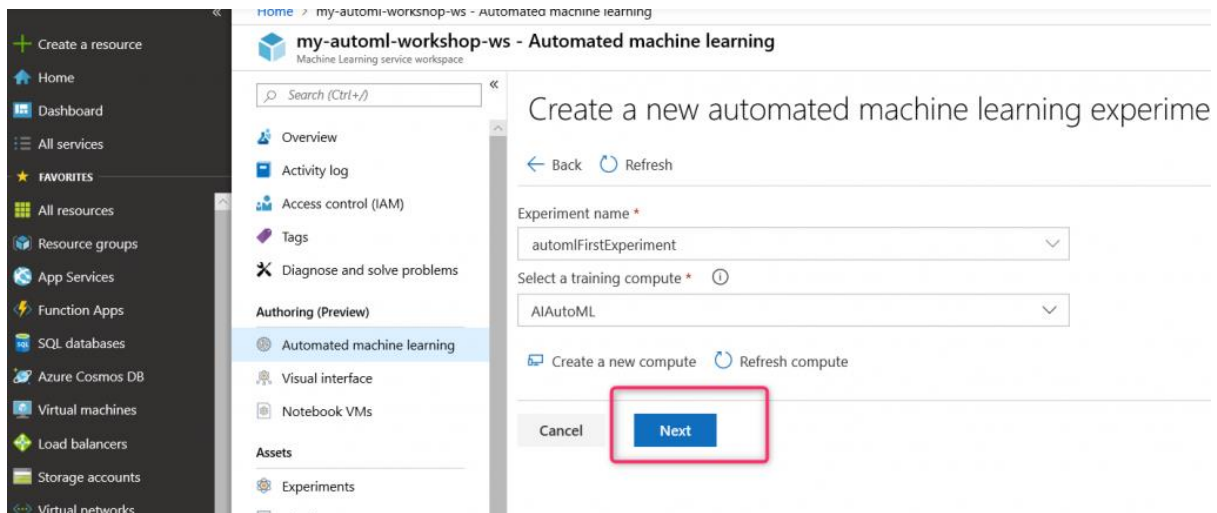
Click on it, and it navigates you to the Automate Machine Learning Environment, click on *Create Experiment*
So you can create a machine learning model.



Create a new experiment, if you do not have a Compute, you need first create one that specifies the size of the virtual machine that model is going to run on it.

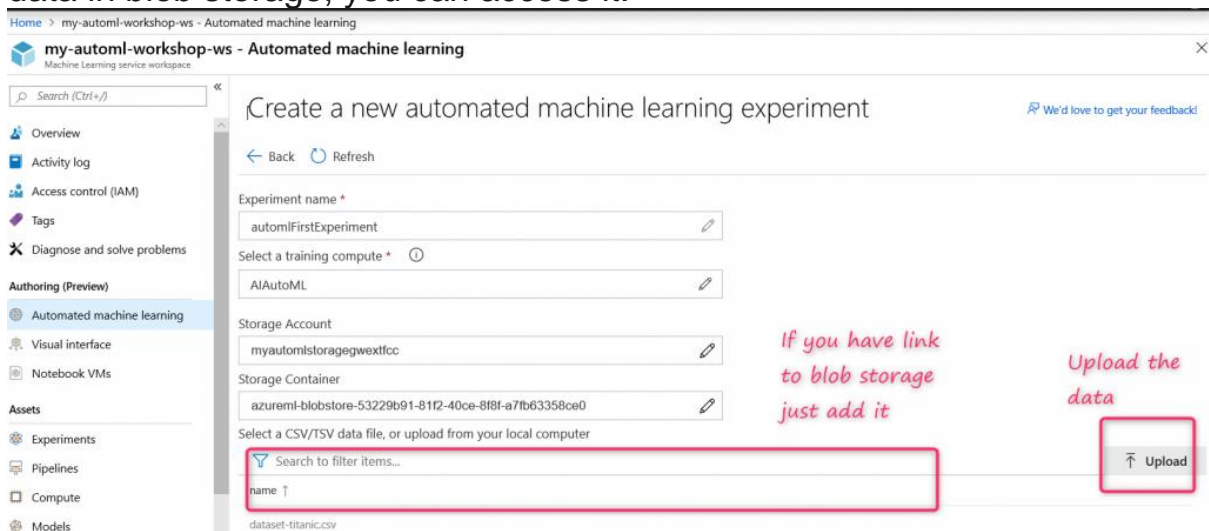


after creating a new AutoML experiment by assigning a training Compute to it, it navigates you to the data selection phase.



Now, you are able to see the experiment name selected, Compute name, storage account, and so forth.

At the bottom of the page, you are able to load your dataset, or if you have your data in blob storage, you can access it.



After uploading the Titanic dataset, you will see the name of the data columns, and be able to include or ignore each column for further analysis.

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my-automl-workshop-ws - Automated machine learning

Machine Learning service workspace

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Authoring (Preview)

Automated machine learning

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Pipelines

Compute

Models

Images

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Activities

Search to filter items...

PassengerId	Survived	Pclass	Name	Sex	Age
1	0	3	Braund, Mr. Owen Harris	male	22
2	1	1	Cummings, Mrs. John Bradle...	female	38
3	Include or NOT Include		Heikonen, 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

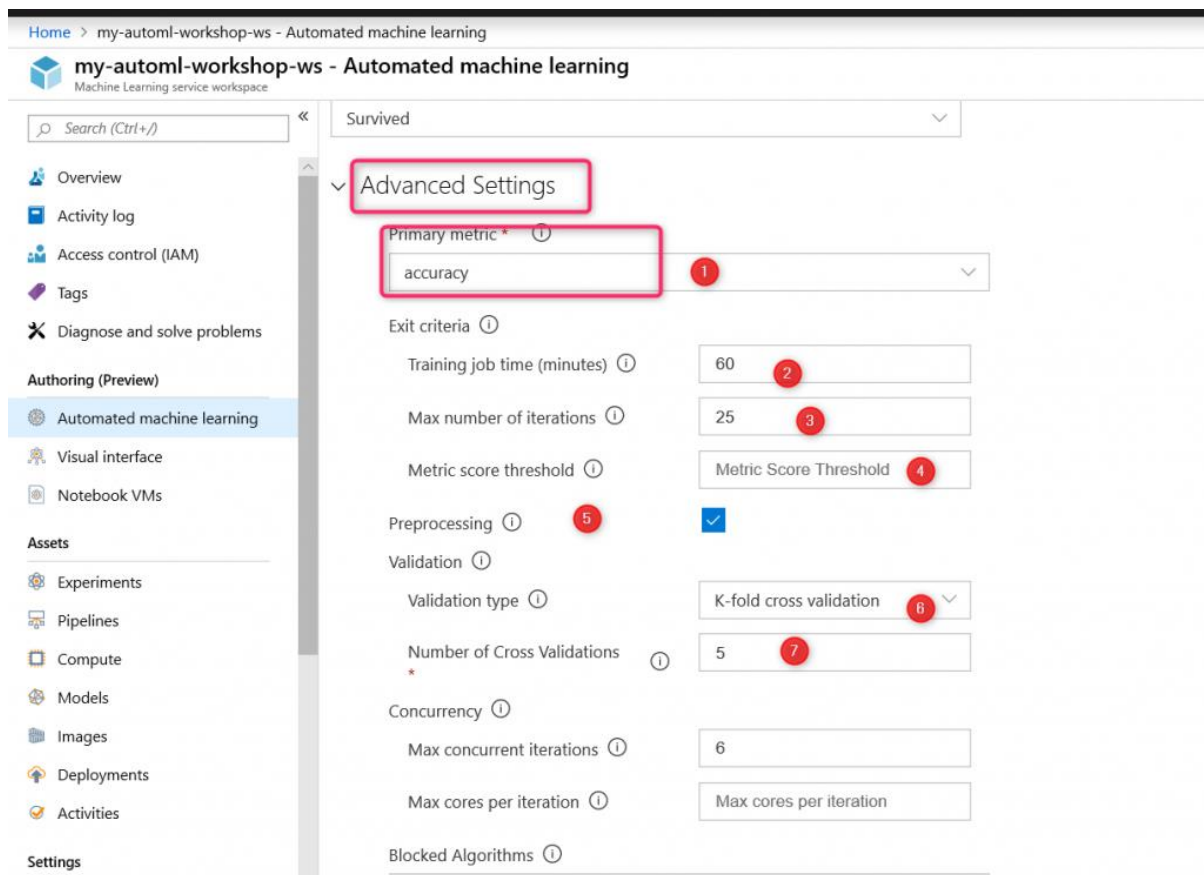
> Advanced Settings

Cancel Start

Moreover, you need to identify the prediction task, whether it is a **Classification**, **Regression**, **Forecasting** ..

In this scenario, we are going to predict passenger in the Titanic ship will survive or not.

Next, in the advanced setting, we able to identify accuracy parameters, training job time, the maximum number of iterations, some preprocessing tasks like cross validations process, concurrency of iteration and so forth.



In the next step, you can limit the number of algorithms that are going to apply to your dataset.

this is one of my favorite part of AutoML as you will access to many algorithms as you able to see which on works better for your dataset.

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Machine Learning service workspace

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Authoring (Preview)

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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

Blocked Algorithms ⓘ

- ☐ LogisticRegression
- ☐ SGD
- ☐ MultinomialNaiveBayes
- ☐ BernoulliNaiveBayes
- ☐ SVM
- ☐ LinearSVM
- ☐ KNN

Cancel Start

for this scenario, I limit it just to two algorithms to make it faster.

After setting up the AutoML, AutoML will start to create a model that has better performance on data, based on the number of algorithms you choose and, hyperparameter tuning task, it may take a couple of minutes.

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my-automl-workshop-ws - Automated machine learning

Machine Learning service workspace

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Settings

Run Detail

Back Refresh Logs Cancel Run

☒ Auto refresh every 30 seconds

Run is **Preparing**

ITERATION CHART

No data for visualization

ITERATIONS

Search to filter items...

Iteration	Name	accuracy ↓	Status	Created	Duration	Model

RUN SUMMARY

Experiment Name automlFirstEx...

Run Id AutoML_23ce...

Task Type classification

Status Preparing

RUN SETTINGS

Compute Target AIAutoML

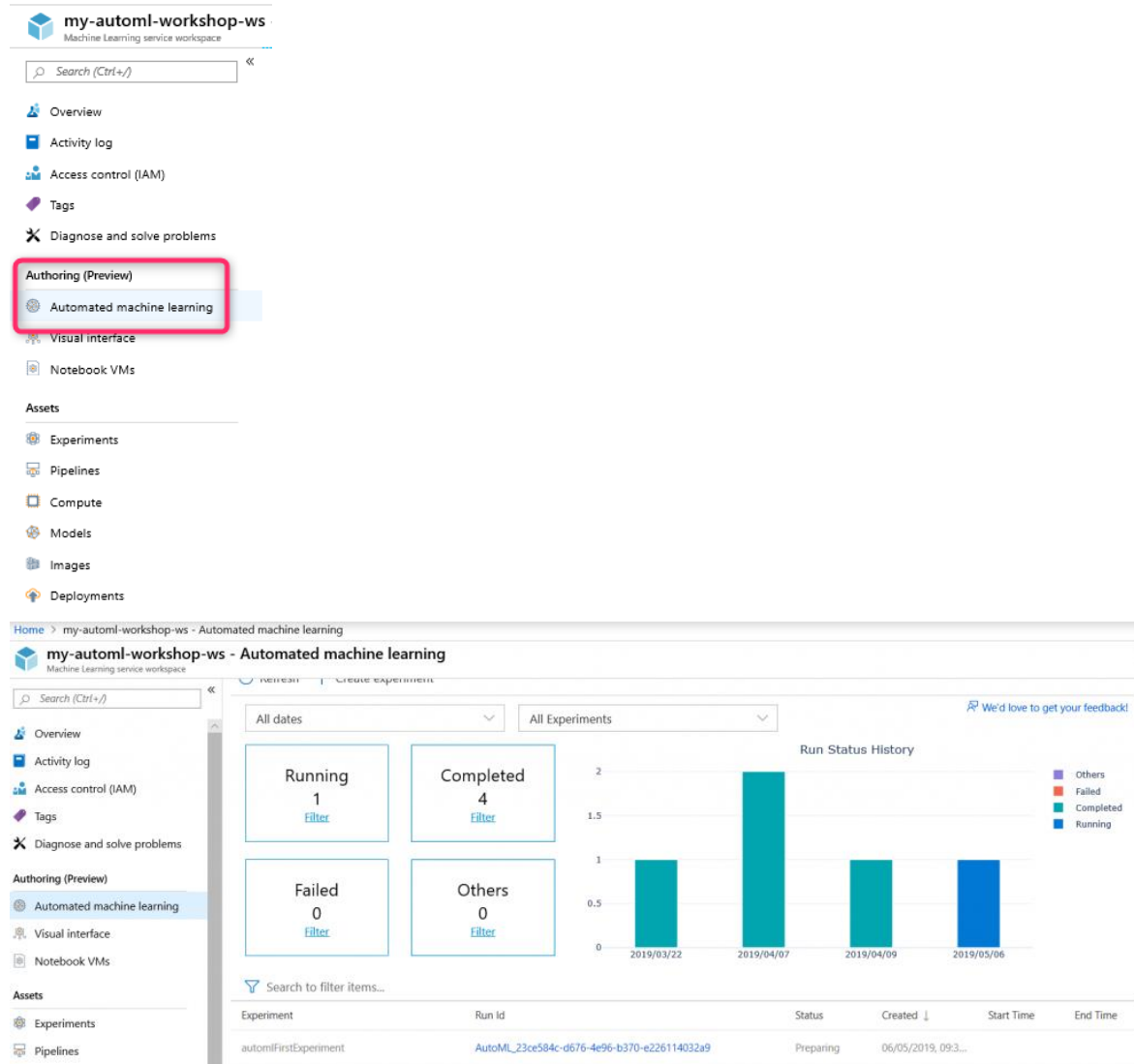
N Cross Validati... 5

Max Cores Per It... -1

Primary Metric

Overview of Running Experiment

During the run, you still able to see the list of experiment you have, whether they are running Completed, Failed or other situation by click on the Authoring (Preview)→ Automated Machine Learning.



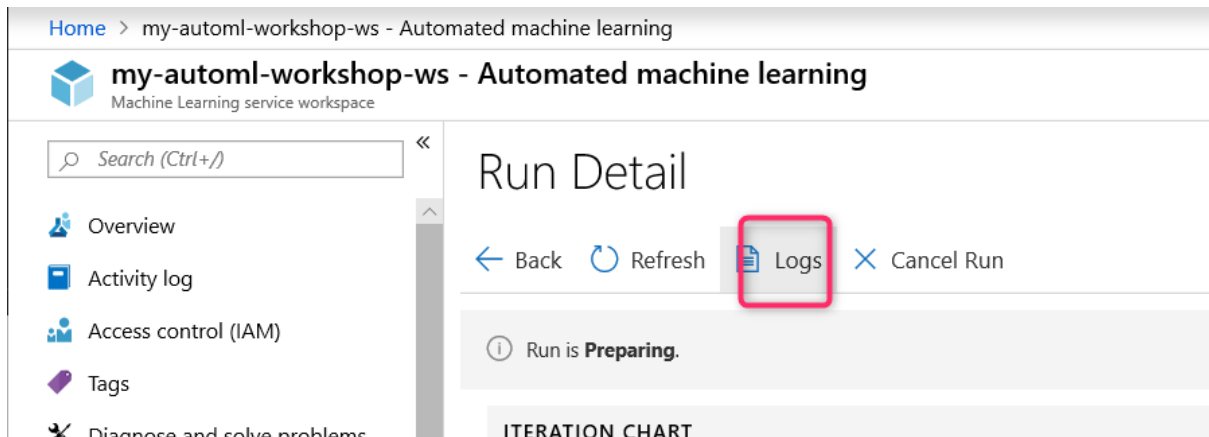
As you can see in the above picture, there is a chart that shows the run history and it has some legend that shows their run situation.

In our example, we have one algorithm that has been running.

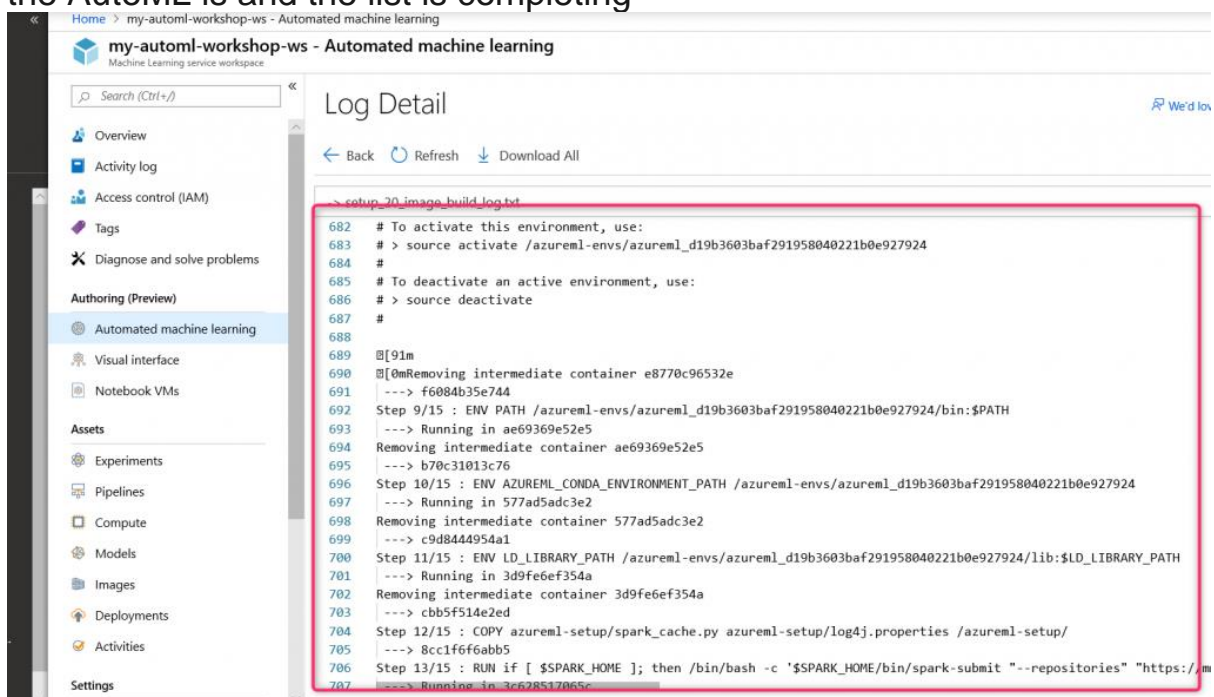
Now at the bottom of the page, Under Experiment, you are able to see the list of the experiment that is created. Click on the recent one.

For this one you are able to see at the top of the page, there are an option name **Logs**

and there is a message showing that **Run is Preparing**.



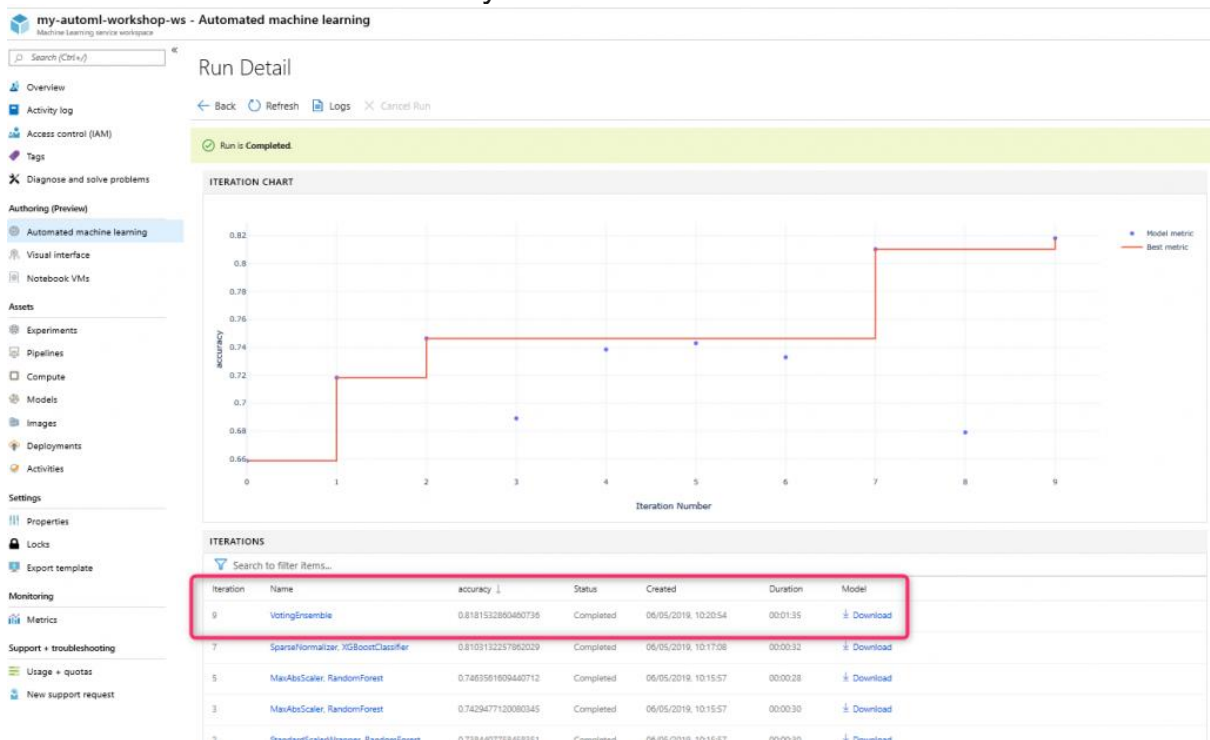
Click on the Logs to see the a list showin the recent update and what steps the AutoML is and the list is completing



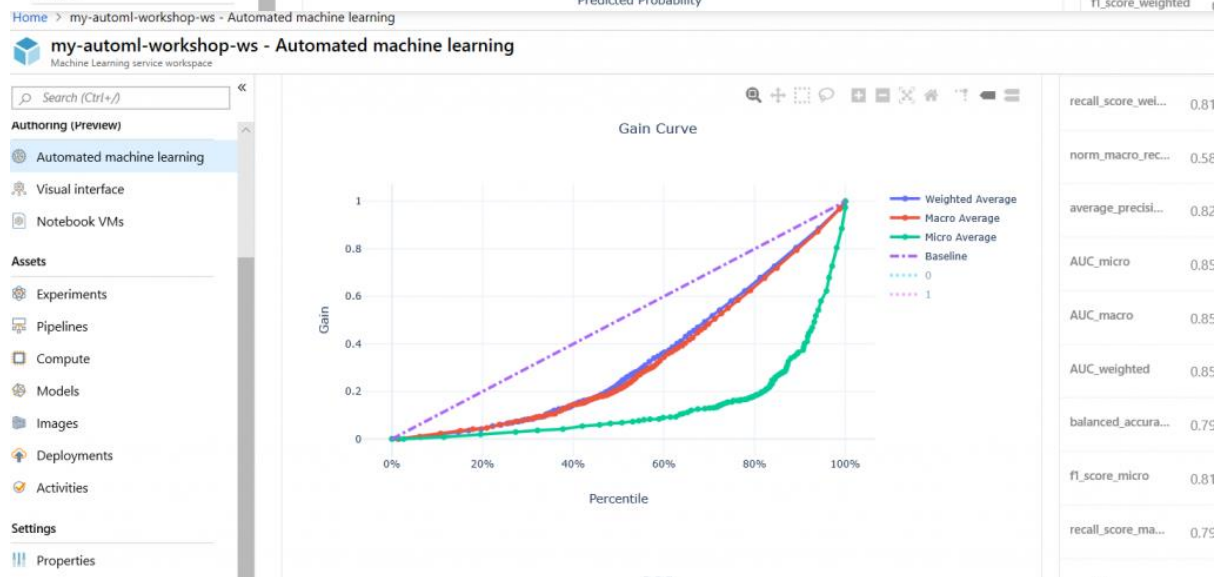
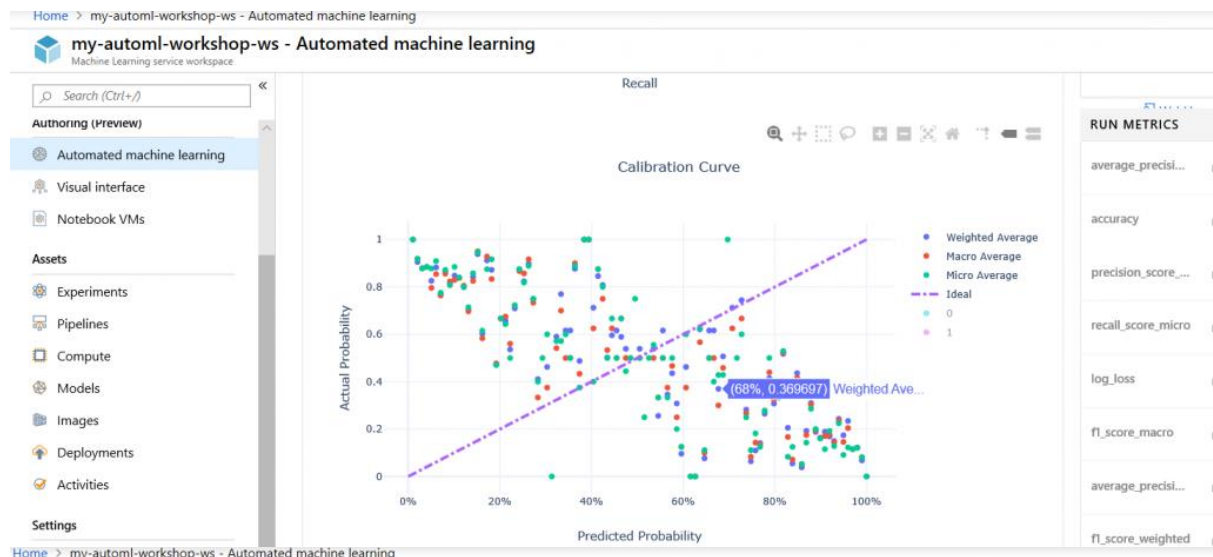
Moreover, under the running page, you able to see a chart that shows the iteration, which algorithms achieve what accuracy level.



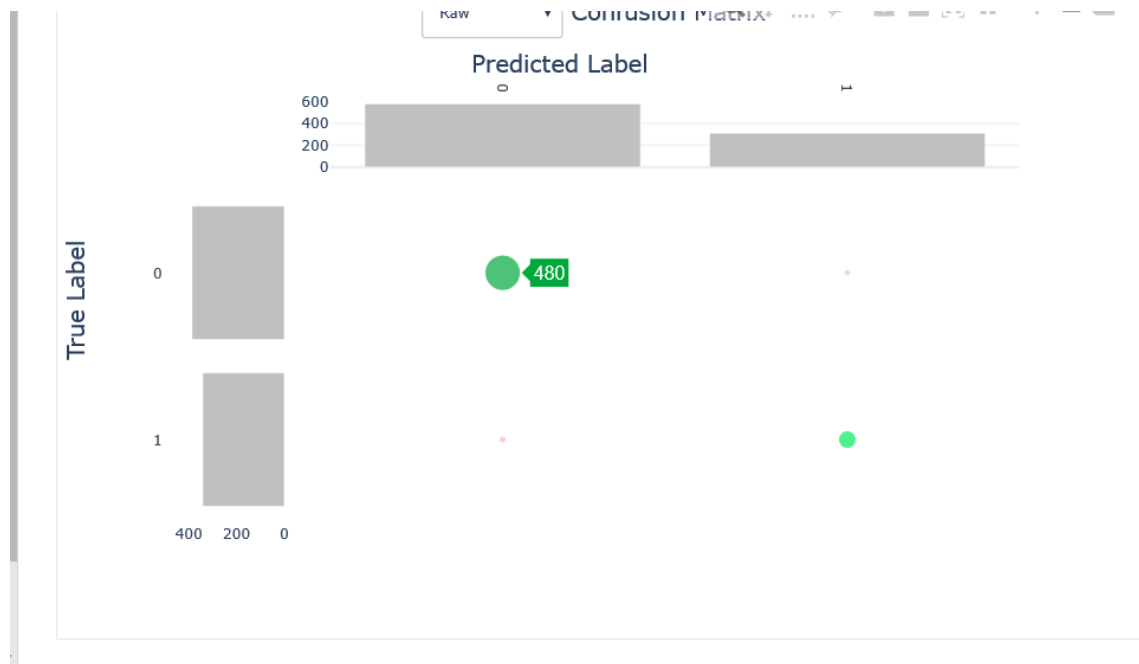
Also you can click on each of these algorithms that has been listed and sorted based on their accuracy



Now, the detailed explanation of these algorithms will be shown to you like the accuracy chart and so forth, hopefully in the near future I write some post on it.



or a confuion matrix for classification accuracy analysis



however, if you interested to analyze the other algorithms, you can access them and see the detail of accuracy for each of them.

ITERATIONS							
<div> Search to filter items... </div>							Metr
Iteration	Name	accuracy ↓	Status	Created	Duration	Model	Blac
9	VotingEnsemble	0.818153286...	Completed	06/05/2019, ...	00:01:35	↓ Downl...	
7	SparseNormalizer, XGBoostClas...	0.810313225...	Completed	06/05/2019, ...	00:00:32	↓ Downl...	
5	MaxAbsScaler, RandomForest	0.746356160...	Completed	06/05/2019, ...	00:00:28	↓ Downl...	
3	MaxAbsScaler, RandomForest	0.742947712...	Completed	06/05/2019, ...	00:00:30	↓ Downl...	
2	StandardScalerWrapper, Rando...	0.738440775...	Completed	06/05/2019, ...	00:00:30	↓ Downl...	
6	MaxAbsScaler, RandomForest	0.732860460...	Completed	06/05/2019, ...	00:00:43	↓ Downl...	
4	MaxAbsScaler, RandomForest	0.718234887...	Completed	06/05/2019, ...	00:00:35	↓ Downl...	
1	MaxAbsScaler, RandomForest	0.689084175...	Completed	06/05/2019, ...	00:00:33	↓ Downl...	
8	SparseNormalizer, LogisticRegr...	0.679022032...	Completed	06/05/2019, ...	00:00:26	↓ Downl...	
0	MaxAbsScaler, RandomForest	0.658684326...	Completed	06/05/2019, ...	00:00:30	↓ Downl...	