Challenge #3

Azure Machine Learning

IN THIS CHALLENGE:

1. Azure Machine Learning
2. Azure ML Studio
3. Create your compute
4. Train your model
5. Analyze the results
6. Your turn
7. Check your subscription

Challenge #3.1

Azure Machine Learning

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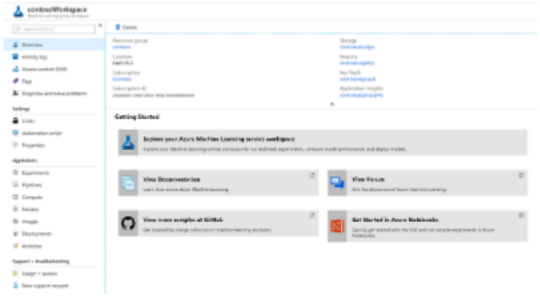
Azure Machine Learning empowers developers and data scientists with a wide range of productive experiences for building, training, and deploying machine learning models. Create an Azure Machine Learning workspace to train, manage, and deploy machine-learning experiments and web services.

Media



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Machine learning

Create a machine learning workspace

Subscription * Free Trial

Resource group * rg-caio-ai

Create new

Workspace details

Specify the name and region for the workspace.

Workspace name * machinelearning-caio

Region * Brazil South

Storage account * (new) machinelearnin0720013928

Create new

Key vault * (new) machinelearnin9082890833

Create new

Application insights * (new) machinelearnin1030589640

Create new

Container registry * None

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Review + create | < Previous | Next : Networking

Define the name of your instance Azure Machine Learning

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Create a machine learning workspace

Validation passed

Basics | Networking | Advanced | Tags | Review + create

Basics

Subscription	Free Trial
Resource group	rg-caio-ai
Region	Brazil South
Workspace name	machinelearning-caio
Storage account	(new) machinelearnin0720013928
Key vault	(new) machinelearnin9082890833
Application insights	(new) machinelearnin1030589640
Container registry	None

Networking

Connectivity method	Public endpoint (all networks)

Advanced

Create | < Previous | Next > | Download a template for automation

Select CREATE

Microsoft.MachineLearningServic

portal.azure.com/#blade/HubsExtension/DeploymentDetailsBlade/overview/id/%2Fsubscriptions%2Fbf350b48-f641-49a2-b7e4-598ce72df8ab%2FresourceGroups%2Frg-caio-ai%2Fproviders...

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Search (Ctrl+/)

- Overview
- Inputs
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Delete | Cancel | Redeploy | Refresh

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Deployment is in progress

Deployment name: Microsoft.MachineLearningServices
Subscription: Free Trial
Resource group: rg-caio-ai

Start time: 6/14/2021, 3:49:16 PM
Correlation ID: 4df1e076-db75-48ac-b314-b4c5509df773

Deployment details (Download)

Resource	Type	Status	Operation details
No results.			

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Your deployment is complete

Deployment name: Microsoft.MachineLearningServices
Subscription: Free Trial
Resource group: rg-caio-ai

Start time: 6/14/2021, 3:49:16 PM
Correlation ID: 4df1e076-db75-48ac-b314-b4c5509df773

Deployment details (Download)

Resource	Type	Status	Operation details
machinelearning-caio	Microsoft.MachineLearningService...	OK	Operation details
machinelearnin9082890833	Microsoft.KeyVault/vaults	OK	Operation details
machinelearnin0720013928	Microsoft.Storage/storageAccounts	OK	Operation details
machinelearnin1030589640	Microsoft.Insights/components	OK	Operation details

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machinelearning-caio

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Settings

- Private endpoint connections
- Properties
- Locks

Monitoring

- Alerts
- Metrics
- Diagnostic settings
- Logs

Automation

Download config.json | Delete

Essentials JSON View

Resource group	rg-caio-ai
Location	Brazil South
Subscription	Free Trial
Subscription ID	bf350b48-f641-49a2-b7e4-598ce72df8ab
Studio web URL	https://ml.azure.com/?tid=362067a6-2936-460f-ae05-bf263cebe940&wsi...
Storage	machinelearnin0720013928
Registry	...
Key Vault	machinelearnin9082890833
Application Insights	machinelearnin1030589640

Manage your machine learning lifecycle

Use the Azure Machine Learning studio to build, train, evaluate, and deploy machine learning models. Learn more

Launch studio

https://portal.azure.com/#@caiogasparinegmail.onmicrosoft.com/resource/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourcegroups/rg-caio-ai/providers/Microsoft.MachineLearningServices/workspaces/machinelearning-caio/alerts

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Microsoft Azure Machine Learning

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Run	Run ID	Experiment	Status	Submitted time	Submitted by	Run type

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Challenge #3.2

Azure ML Studio

How automated ML works

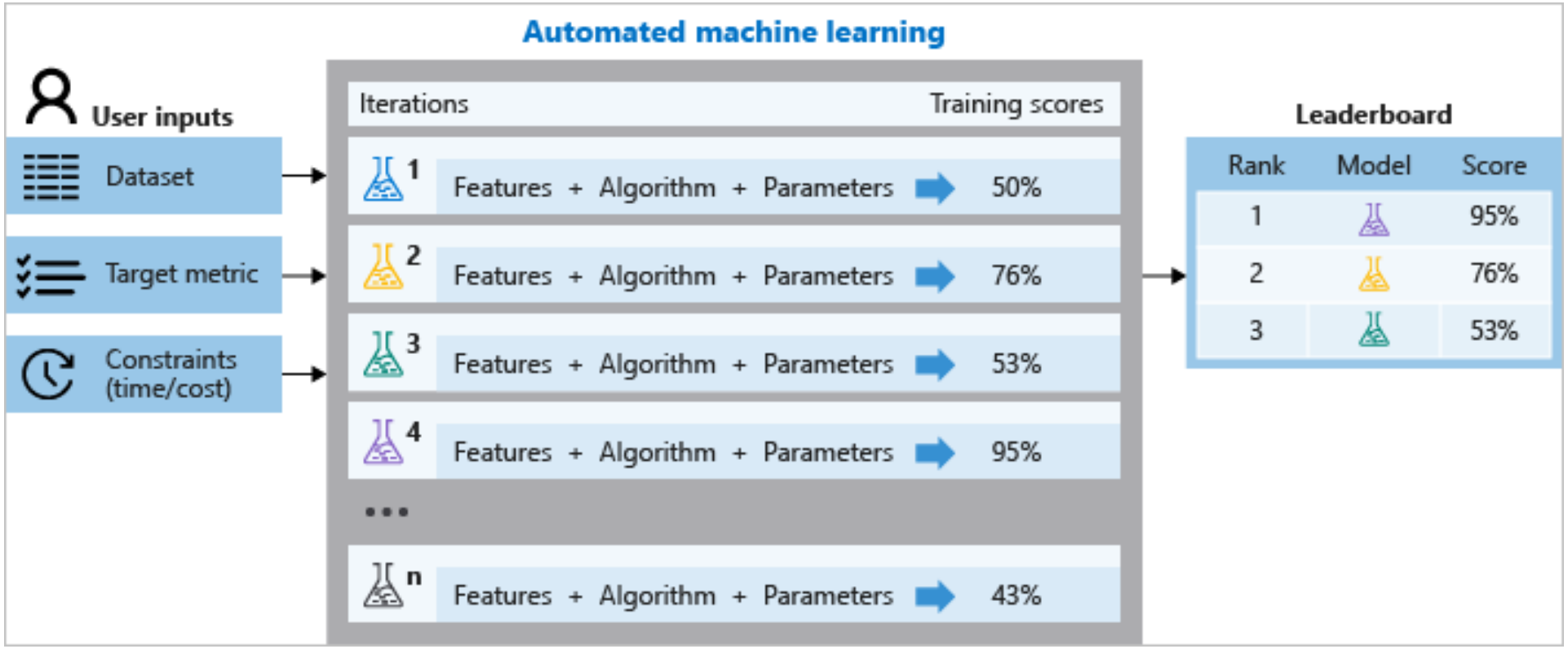
During training, Azure Machine Learning creates several pipelines in parallel that try different algorithms and parameters for you. The service iterates through ML algorithms paired with feature selections, where each iteration produces a model with a training score. The higher the score, the better the model is considered to "fit" your data. It will stop once it hits the exit criteria defined in the experiment.

Using Azure Machine Learning, you can design and run your automated ML training experiments with these steps:

1. Identify the ML problem to be solved: classification, forecasting, or regression
2. Choose whether you want to use the Python SDK or the studio web experience:
    1. For limited or no code experience, try the Azure Machine Learning studio web experience
    2. For Python developers, check out the Azure Machine Learning Python SDK
3. Specify the source and format of the labeled training data: Numpy arrays or Pandas dataframe
4. Configure the compute target for model training, such as your local computer, Azure Machine Learning Computes, remote VMs, or Azure Databricks.
5. Configure the automated machine learning parameters that determine how many iterations over different models, hyperparameter settings, advanced preprocessing/featurization, and what metrics to look at when determining the best model.
6. Submit the training run
7. Review the results

https://docs.microsoft.com/en-us/azure/machine-learning/concept-automated-ml

How automated ML works



https://docs.microsoft.com/en-us/azure/machine-learning/concept-automated-ml

Challenge #3.3

Create your compute

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Compute instances | Compute clusters | Inference clusters | Attached computes

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Choose from a selection of CPU or GPU instances preconfigured with popular tools such as JupyterLab, Jupyter, and RStudio, ML packages, deep learning frameworks, and GPU drivers. Learn more

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Microsoft Azure Machine Learning

Create compute instance

Virtua

Compute instance is always created in the same location as the Machine Learning service workspace.

Advanced Settings

Select virtual machine

ual machine size you would like to use for your compute instance. Please note that a compute instance can not be shared. It can only be used by a single By default, it will be assigned to the creator and you can change this to a different user in the advanced settings section.

Location

brazilsouth

Virtual machine type

CPU GPU

Virtual machine size

Select from recommended options Select from all options

Total available quota: 8 cores

Name ↑	Category	Workload types	Available quota	Cost
Standard_DS2_v2 2 cores, 7GB RAM, 14GB storage	General purpose	Development on Notebooks (or other IDE) and light weight testing	8 cores	$0.17/hr
Standard_DS3_v2	General purpose	Classical ML model training, AutoML runs, pipeline runs	8 cores	$0.34/hr

Back Next Cancel

Select your COMPUTE options and select NEXT

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Create compute instance

- Virtual Machine
- **Advanced Settings**

Configure Settings

Configure compute instance settings for your selected virtual machine size.

Name	Category	Cores	Available quota	RAM	Storage	Cost/Hour
Standard_DS2_v2	General purpose	2	8 cores	7 GB	14 GB	$0.17/hr

Compute name *

ml-compute

Enable SSH access

Show advanced settings

Back | Create | Download a template for automation | Cancel

Type your compute name and select CREATE

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New | Start | Stop | Restart | Delete | Refresh | Edit columns | Reset view | View quota

Search

Show all instances | State | All filters | Clear all

Name	State	Applications	Size	Created on ↓	Assigned to
ml-compute	Creating	VS Code	STANDARD_DS2_V2	Jun 14, 2021 6:49 PM	caio gasparine

Compute CREATED!

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ml.azure.com/compute/list?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourcegroups/rg-caio-ai/workspaces/machinelearning-ai1006&tid=362067a6-2936-460f-ae05-b...

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Name	State	Applications	Size	Created on ↓	Assigned to
ml-compute	Running	JupyterLab Jupyter VS Code RStudio Terminal	STANDARD_DS2_V2	Jun 14, 2021 6:49 PM	caio gasparine

Compute UP and RUNING!

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ml.azure.com/compute/list?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourcegroups/rg-caio-ai/workspaces/machinelearning-ai1006&tid=362067a6-2936-460f-ae05-b...

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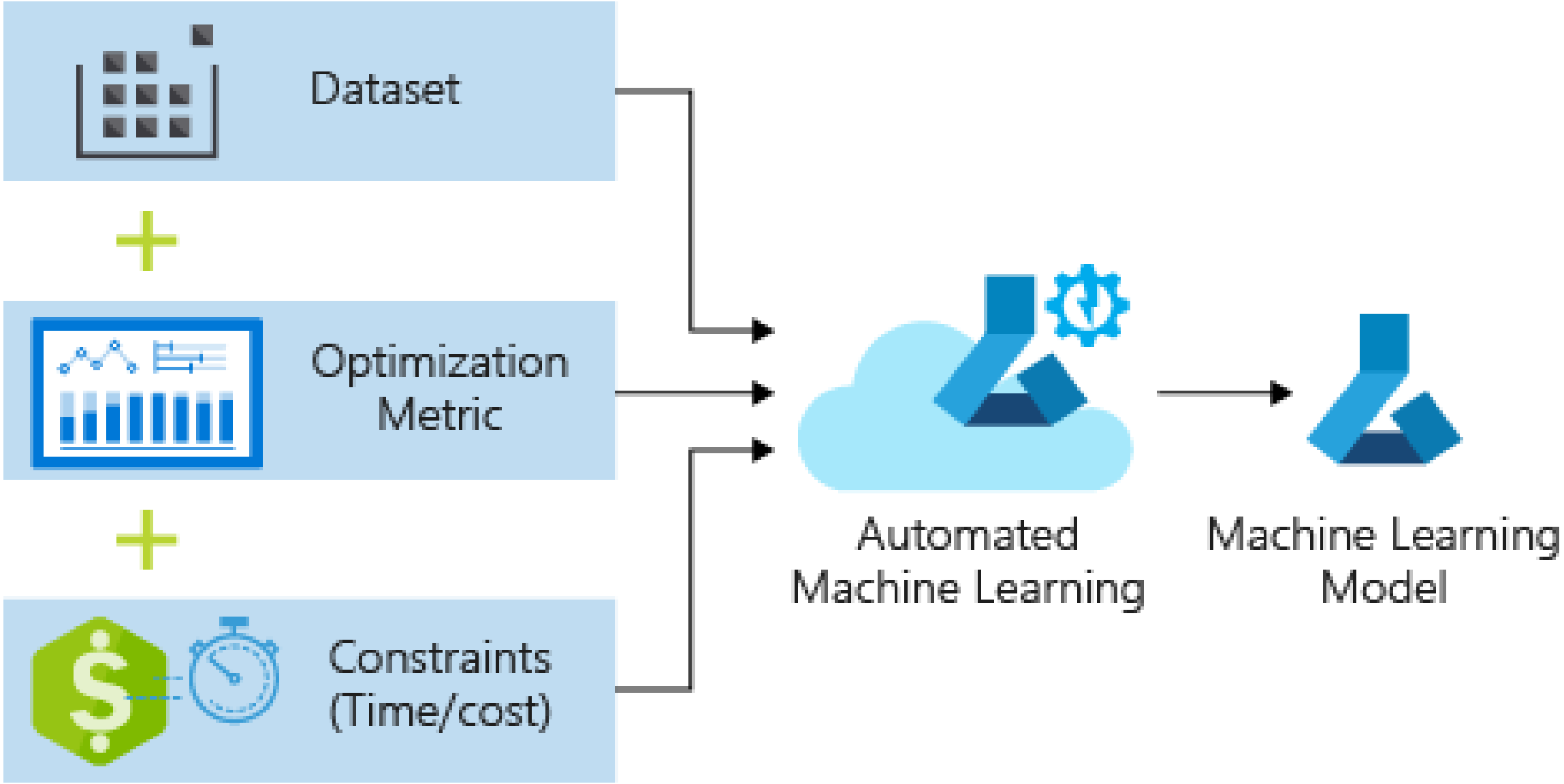
Name	State	Applications	Size	Created on ↓	Assigned to
ml-compute	Running	JupyterLab Jupyter VS Code RStudio Terminal	STANDARD_DS2_V2	Jun 14, 2021 6:49 PM	caio gasparine

Compute UP and RUNING!

Challenge #3.4

Train a regression model with AutoML and Python


Dataset
Optimization Metric
Constraints (Time/cost)
Automated Machine Learning
Machine Learning Model

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ml.azure.com/?tid=362067a6-2936-460f-ae05-bf263cebe940&wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourcegroups/rg-caio-ai/workspaces/machinelearning-caio

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Notebooks

Files Samples

Users

caiogasparine

Notebooks allow users to work with files, folders and Jupyter Notebooks directly in the workspace.

Browse your files and shared files with easy collaboration tools. You can also start with a Jupyter Notebook in the workspace with easy access to all workspace assets including experiment details, datasets, models and more. Learn more

Create Terminal

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      - machine-learning-pipelines-advanced
      - regression-automl-nyc-taxi-data
        - regression-automated-ml.ipynb
        - regression (regression-automated-ml.ipynb)
    - M README.md

regression-automat

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Import the necessary packages. The Open Datasets package contains a class representing each data source (`NycTlcGreen` for example) to easily filter date parameters before downloading.

[ ]

```
import pandas as pd
from azureml.core import Dataset
from datetime import datetime
from dateutil.relativedelta import relativedelta
```

Begin by creating a dataframe to hold the taxi data. Then preview the data.

```
green_taxi_dataset = Dataset.Tabular.from_parquet_files(path="https://automlsamplenotebookdata.blob.core.windows.net/autom
green_taxi_df = green_taxi_dataset.to_pandas_dataframe()
green_taxi_df.head(10)
```

Now that the initial data is loaded, define a function to create various time-based features from the pickup datetime field. This will create new fields for the month number, day of month, day of week, and hour of day, and will allow the model to factor in time-based seasonality.

Use the `apply()` function on the dataframe to iteratively apply the `build_time_features()` function to each row in the taxi data.

https://github.com/Azure/MachineLearningNotebooks/tree/master/tutorials

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      - image-classification-mnist-data
      - machine-learning-pipelines-advanced
      - regression-automl-nyc-taxi-data
        - regression-automated-ml.ipynb
        - regression-automated-ml.yml
    - README.md

regression-automat

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Tutorial: Use automated machine learning to predict taxi fares

In this tutorial, you use automated machine learning in Azure Machine Learning service to create a regression model to predict NYC taxi fare prices. This process accepts training data and configuration settings, and automatically iterates through combinations of different feature normalization/standardization methods, models, and hyperparameter settings to arrive at the best model.

In this tutorial you learn the following tasks:

- Download, transform, and clean data using Azure Open Datasets
- Train an automated machine learning regression model
- Calculate model accuracy

If you donâ€™t have an Azure subscription, create a free account before you begin. Try the free or paid version of Azure Machine Learning service today.

Prerequisites

- Complete the setup tutorial if you don't already have an Azure Machine Learning service workspace or notebook virtual machine.

https://github.com/Azure/MachineLearningNotebooks/tree/master/tutorials

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regression-automat

Want to start editing? Clone this notebook

Select target directory

User files

- Users
  - caiogasparine

Please note that cloning this notebook will al the following files and folders

regression-automated-ml.yml

Clone | Cancel

fares

gression model to predict NYC taxi fare prices.
binations of different feature
odel.

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Prerequisites

- Complete the setup tutorial if you don't already have an Azure Machine Learning service workspace or notebook virtual machine.

Create a clone of the code

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ml.azure.com/fileexplorerAzNB?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourceGroups/rg-caio-ai/providers/Microsoft.MachineLearningServices/workspaces/machine...

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Notebooks

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- Users
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    - regression-automl-nyc-taxi-data
      - .amlignore
      - regression-automated-ml.ipynb
      - regression-a (regression-automated-ml.ipynb)
    - .amlignore
    - text-translator.ipynb

regression-automat | regression-automate

Editors | Compute: machinelearning-pc - Running | Python 3.6 - AzureML

machinelearning-pc · Jupyter kernel idle | Python 3.6.9

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Tutorial: Use automated machine learning to predict taxi fares

In this tutorial, you use automated machine learning in Azure Machine Learning service to create a regression model to predict NYC taxi fare prices. This process accepts training data and configuration settings, and automatically iterates through combinations of different feature normalization/standardization methods, models, and hyperparameter settings to arrive at the best model.

In this tutorial you learn the following tasks:

- Download, transform, and clean data using Azure Open Datasets
- Train an automated machine learning regression model
- Calculate model accuracy

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    - .amlignore
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Restart kernel and run all cells

Notebooks

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        - regression-automated-ml.ipynb
        - regression-automated-ml.yml
    - README.md

Editors | Compute: machinelearning-pc - Running | Python 3.6 - AzureML

machinelearning-pc · Jupyter kernel busy | Python 3.6.9

[1]

```
import pandas as pd
from azureml.core import Dataset
from datetime import datetime
from dateutil.relativedelta import relativedelta
```

✓ 2 sec

Begin by creating a dataframe to hold the taxi data. Then preview the data.

[2]

```
green_taxi_dataset = Dataset.Tabular.from_parquet_files(path="https://automlsamplenotebookdata.blob.core.windows.net/aut
green_taxi_df = green_taxi_dataset.to_pandas_dataframe()
green_taxi_df.head(10)
```

✓ 7 sec

	vendorID	lpepPickupDatetime	lpepDropoffDatetime	passengerCount	tripDistance	puLocationId
0	2	1970-01-01 00:23:42.643089	1970-01-01 00:23:42.644509	1	1.88	None
1	1	1970-01-01 00:23:41.536899	1970-01-01 00:23:41.537716	1	2.70	None

This is your Azure Machine Learning Studio Main Screen

machinelearning-caio - Microsoft | Experiments - Microsoft Azure M

ml.azure.com/experiments?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourceGroups/rg-caio-ai/providers/Microsoft.MachineLearningServices/workspaces/machinelear...

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All experiments | All runs

Refresh | Archive experiment | View archived experiments

Search

Experiment	Latest run	Last submitted ↓	Created	Created by
Tutorial-NYCTaxi	1	Jun 14, 2021 4:26 PM	Jun 14, 2021 4:25 PM	caio gasparine

https://ml.azure.com/runs?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourceGroups/rg-caio-ai/providers/Microsoft.MachineLearningServices/workspaces/machinelearning-ai1006&tid=362067a6-2936-460f-ae05-bf263cebe940

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Tutorial-NYCTaxi

Edit columns | Refresh | Add chart | Current view: default | Save view | Edit view | Share view

Search | Add filter | Include child runs | View only my runs

Run status

Running	Completed
1	0
Failed	**Canceled**
0	0
Queued	**Other**
0	0

normalized_median_absolute_error

No data available. Select runs with data to see the chart.

mean_absolute_percentage_error

No data available. Select runs with data to see the chart.

Show only selected rows (1 selected)

Page Size: 25

Run	Run ID	Status	Submitted time	Duration	Submitted by	Compute target	Run type	Last(norma...	Last(mean_...	Tags
Run 1	AutoML_6cfdb811-51f2-46be-9a0f-	Running	Jun 14, 2021 4:26 PM	1m 24s	caio gasparine	local	Automate...			

Select the RUN ID to see the details...

machinelearning-caio - Microsoft | Run 1 - Microsoft Azure Machine

ml.azure.com/experiments/id/2795be59-3d23-43b4-9ab8-95ab26728eb2/runs/AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598c...

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Run 1 Running

Refresh | Mark as canceled

Details | Data guardrails | Models | Outputs + logs | Child runs | Snapshot

Properties

Status
Running

Created
Jun 14, 2021 4:26 PM

Started
Jun 14, 2021 4:26 PM

Compute target
local

Run ID
AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5

Script name
--

Created by
caio gasparine

Input datasets
None

Output datasets
None

Run summary

Task type
Regression View configuration settings

Featurization
Auto

Primary metric
Spearman correlation

Experiment name
Tutorial-NYCTaxi

Details...

machinelearning-caio - Microsoft | Tutorial-NYCTaxi - Microsoft Azu

ml.azure.com/experiments/id/2795be59-3d23-43b4-9ab8-95ab26728eb2?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourceGroups/rg-caio-ai/providers/Microsoft...

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Edit columns | Refresh | Add chart | Current view: default | Save view | Edit view | Share view

Search | Add filter | Include child runs | View only my runs

Run status

Running	Completed
1	0
Failed	Canceled
0	0
Queued	Other
0	0

normalized_median_absolute_error

No data available. Select runs with data to see the chart.

mean_absolute_percentage_error

No data available. Select runs with data to see the chart.

Show only selected rows (1 selected)

Page Size: 25

Run	Run ID	Status	Submitted time	Duration	Submitted by	Compute target	Run type	Last(norma...	Last(mean_...	Tags
Run 1	AutoML_6cfdb811-51f2-46be-9a0f-488...	Running	Jan 14, 2021 4:26 PM	1m 24s	caio gasparine	local	Automate...			

Your process is running...

Challenge #3.5

Analyzing the results…

machinelearning-caio - Microsoft | Tutorial-NYCTaxi - Microsoft Azu

ml.azure.com/experiments/id/2795be59-3d23-43b4-9ab8-95ab26728eb2?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/resourceGroups/rg-caio-ai/providers/Microsoft...

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Edit columns | Refresh | Add chart | Current view: default | Save view | Edit view | Share view

Search | Add filter | Include child runs | View only my runs

Run status

Running	Completed
1	0
Failed	Canceled
0	0
Queued	Other
0	0

normalized_median_absolute_error

No data available. Select runs with data to see the chart.

mean_absolute_percentage_error

No data available. Select runs with data to see the chart.

Show only selected rows (1 selected)

Page Size: 25

Run	Run ID	Status	Submitted time	Duration	Submitted by	Compute target	Run type	Last(norma...	Last(mean_...	Tags
Run 1	AutoML_6cfdb811-51f2-46be-9a0f-48	Running	Jun 14, 2021 4:26 PM	1m 24s	caio gasparine	local	Automate...			

Select your process

machinelearning-ai1006 - Micros | Run 1 - Microsoft Azure Machine

ml.azure.com/experiments/id/2795be59-3d23-43b4-9ab8-95ab26728eb2/runs/AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598c...

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Run 1 Completed

Refresh Cancel

Details | Data guardrails | Models | Outputs + logs | Child runs | Snapshot

Properties

Status
Completed

Created
Jun 14, 2021 4:26 PM

Started
Jun 14, 2021 4:26 PM

Duration
20m 5.042s

Compute target
local

Run ID
AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5

Script name
--

Created by
caio gasparine

Input datasets
None

Output datasets

Best model summary

Algorithm name
VotingEnsemble

Ensemble details
View ensemble details

Spearman correlation
0.94487 View all other metrics

Sampling
100.00 %

Registered models
No registration yet

Deploy status
No deployment yet

Run summary

Task type
Regression View configuration settings

Featurization
Auto

Primary metric

Visualize the details

machinelearning-ai1006 - Micros | Run 1 - Microsoft Azure Machine

ml.azure.com/experiments/id/2795be59-3d23-43b4-9ab8-95ab26728eb2/runs/AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-598c...

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Run 1 Completed

Refresh Cancel

Details | **Data guardrails** | Models | Outputs + logs | Child runs | Snapshot

Data guardrails are run by Automated ML when automatic featurization is enabled. This is a sequence of checks over the input data to ensure high quality data is being used to train model.

Type	Status	Description
Missing feature values imputation	Passed	No feature missing values were detected in the training data. Learn more about missing value imputation.

Type	Status	Description
High cardinality feature detection	Passed	Your inputs were analyzed, and no high cardinality features were detected. Learn more about high cardinality feature detection.

Visualize the details

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Refresh Cancel

Details | Data guardrails | Models | Outputs + logs | Child runs | Snapshot

Deploy Download Explain model

Search

Submitted time All filters Clear all

Showing 1-25 of 31 models

Page size: 25

Algorithm name	Explained	Spearman corr...	Sampling	Submitted time	Duration	Hyperparameter
VotingEnsemble	View explanation	0.94487	100.00 %	Jun 14, 2021 4:44 PM	38s	algorithm : ['ElasticNet', 'ElasticN
StackEnsemble		0.94486	100.00 %	Jun 14, 2021 4:45 PM	38s	algorithm : ['ElasticNet', 'ElasticN
TruncatedSVDWrapper, ElasticNet		0.94480	100.00 %	Jun 14, 2021 4:41 PM	24s	alpha : 0.6845263157894736
StandardScalerWrapper, ElasticNet		0.94478	100.00 %	Jun 14, 2021 4:43 PM	23s	alpha : 0.05357894736842105
StandardScalerWrapper, ElasticNet		0.94478	100.00 %	Jun 14, 2021 4:31 PM	24s	alpha : 0.05357894736842105
StandardScalerWrapper, ElasticNet		0.94474	100.00 %	Jun 14, 2021 4:38 PM	23s	alpha : 0.05357894736842105
MaxAbsScaler, ElasticNet		0.94472	100.00 %	Jun 14, 2021 4:36 PM	49s	alpha : 0.001 l1_ratio : 1 nor

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https://en.wikipedia.org/wiki/Spearman%27s_rank_correlation_coefficient

Spearman's rank correlation coefficient

In statistics, **Spearman's rank correlation coefficient** or Spearman's ρ, named after Charles Spearman and often denoted by the Greek letter, is a nonparametric measure of rank correlation (statistical dependence between the rankings of two variables). It assesses how well the relationship between two variables can be described using a monotonic function.

The Spearman correlation between two variables is equal to the Pearson correlation between the rank values of those two variables; while Pearson's correlation assesses linear relationships, Spearman's correlation assesses monotonic relationships (**whether linear or not**). If there are no repeated data values, a perfect Spearman correlation of +1 or −1 occurs when each of the variables is a perfect monotone function of the other.

Intuitively, the Spearman correlation between two variables will be high when observations have a similar (or identical for a correlation of 1) rank (i.e. relative position label of the observations within the variable: 1st, 2nd, 3rd, etc.) between the two variables, and low when observations have a dissimilar (or fully opposed for a correlation of −1) rank between the two variables.

Spearman's coefficient is appropriate for both continuous and discrete ordinal variables.
Both Spearman’s and Kendall’s can be formulated as special cases of a more general correlation coefficient.

https://en.wikipedia.org/wiki/Spearman%27s_rank_correlation_coefficient

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Refresh Cancel Word wrap

Details | Data guardrails | Models | Outputs + logs | Child runs | Snapshot

outputs

File Explorer Pane

Visualize the details

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Details | Data guardrails | Models | Outputs + logs | **Child runs** | Snapshot

Run	Run ID	Status	Submitted time	Duration	Submitted by	Compute target	Run type	Tags
Run 32	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:45 PM	38s	caio gasparine			
Run 31	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:44 PM	38s	caio gasparine			model_explanatio ···
Run 30	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:44 PM	49s	caio gasparine			
Run 29	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:43 PM	23s	caio gasparine			
Run 28	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:41 PM	1m 45s	caio gasparine			
Run 27	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:41 PM	24s	caio gasparine			
Run 26	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:40 PM	1m 10s	caio gasparine			
Run 25	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:39 PM	30s	caio gasparine			
Run 24	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:39 PM	37s	caio gasparine			
Run 23	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:38 PM	23s	caio gasparine			
Run 22	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:38 PM	24s	caio gasparine			
Run 21	AutoML_6cfdb811-51f2-46be-9a0f-488...	Completed	Jun 14, 2021 4:37 PM	25s	caio gasparine			

Visualize the details

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Details | Data guardrails | Models | Outputs + logs | Child runs | Snapshot

There are no snapshots for this run

A snapshot is a record of everything needed to reproduce a run. Snapshots can be downloaded and shared. Learn more about logging and snapshots.

Visualize the details

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Details | Data guardrails | **Models** | Outputs + logs | Child runs | Snapshot

Deploy Download Explain model

Search

Submitted time All filters Clear all

Showing 1-25 of 31 models

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Algorithm name	Explained	Spearman corr...	Sampling	Submitted time	Duration	Hype
VotingEnsemble	View explanation	0.94487	100.00 %	Jun 14, 2021 4:44 PM	38s	algo
AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5_25		0.94486	100.00 %	Jun 14, 2021 4:45 PM	38s	algo
TruncatedSVDWrapper, ElasticNet		0.94480	100.00 %	Jun 14, 2021 4:41 PM	24s	alph
StandardScalerWrapper, ElasticNet		0.94478	100.00 %	Jun 14, 2021 4:43 PM	23s	alph
StandardScalerWrapper, ElasticNet		0.94478	100.00 %	Jun 14, 2021 4:31 PM	24s	alph

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ml.azure.com/experiments/id/.../AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5_25?wsid...

Visualize the details

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Refresh | Deploy | Download | Explain model | Cancel

Details | Model | Explanations (preview) | **Metrics** | Data transformation (preview) | Outputs + logs | Images | Child runs | Snapshot | Monitoring (preview)

Select a metric to see a visualization or table of the data.

Search

- [x] explained_variance
- [x] mean_absolute_error
- [x] mean_absolute_percentage_error
- [x] median_absolute_error
- [x] normalized_mean_absolute_error
- [ ] normalized_median_absolute_er...
- [ ] normalized_root_mean_squared...
- [ ] normalized_root_mean_squared...
- [ ] predicted_true
- [ ] r2_score
- [ ] residuals
- [ ] root_mean_squared_error

View as: (•) Chart ( ) Table

explained_variance	mean_absolute_error	mean_absolute_percentage_e...	median_absolute_error	normalized_mean_absolute_e...
0.857	2.101	68.827	1.283	0.011

Visualize the details

machinelearning-ai1006 - Micros | Run 31 - Microsoft Azure Machin

ml.azure.com/experiments/id/2795be59-3d23-43b4-9ab8-95ab26728eb2/runs/AutoML_6cfdb811-51f2-46be-9a0f-4882ad1151d5_29?wsid=/subscriptions/bf350b48-f641-49a2-b7e4-5...

Microsoft Azure Machine Learning

Home > Experiments > Tutorial-NYCTaxi > Run 1 > Run 31

New
Home
Author
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Automated ML
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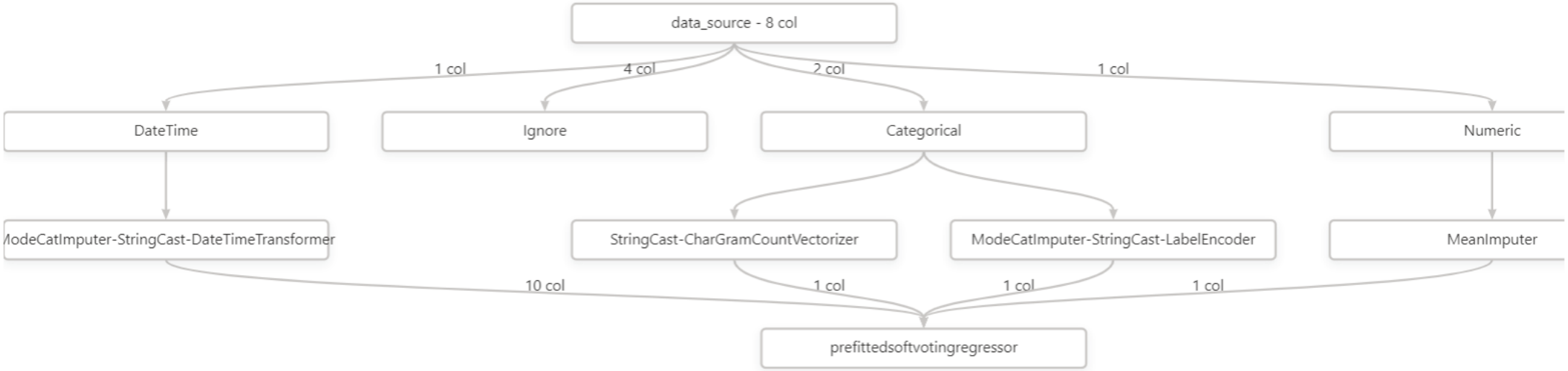
Assets
Datasets
Experiments
Pipelines
Models
Endpoints
Manage
Compute
Environments (preview)
Datastores
Data Labeling
Linked Services

Run 31 Completed

Refresh | Deploy | Download | Explain model | Cancel

Details | Model | Explanations (preview) | Metrics | **Data transformation (preview)** | Outputs + logs | Images | Child runs | Snapshot | Monitoring (preview)

The following diagram illustrates the data preprocessing, feature engineering, scaling techniques and the machine learning algorithm that Automated ML applied to generate this particular model.



Visualize the details

Challenge #3.6

Now it is your turn!

(1) Select your preferred dataset

(2) Run the AutoML process

(3) Analyse and compare the results

(4) Tell me your conclusions

Challenge #3.7

Check your subscription

Home - Microsoft Azure

portal.azure.com/#home

Upgrade | Search resources, services, and docs (G+/)

- Create a resource
- Home
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FAVORITES

- All resources
- Resource groups
- App Services
- Function App
- SQL databases
- Azure Cosmos DB
- Virtual machines
- Load balancers
- Storage accounts
- Virtual networks
- Azure Active Directory
- Monitor
- Advisor
- Security Center
- Cost Management + Bill...
- Help + support

Azure services

Create a resource | Cost Management ... | Subscriptions | All resources | Data factories | SQL databases | Quickstart Center | Virtual machines | App Services | More services

Recent resources

	Type	Last Viewed
	Subscription	a few seconds ago
	SQL database	39 minutes ago
	Storage account	4 days ago
	Synapse workspace	7 days ago
	Resource group	7 days ago
	Data factory (V2)	2 weeks ago

Cost Management + Billing

View

Free training from Microsoft

Control Azure spending and manage bills with ...
3 units · 2 hr 45 min

Analyze costs and create budgets with Azure C...
7 units · 40 min

Predict costs and optimize spending for Azure
9 units · 1 hr 14 min

Useful links

Overview
Get started
Documentation
Training Videos

Resource groups | All resources | Dashboard

https://portal.azure.com/#blade/Microsoft_Azure_GTM/ModernBillingMenuBlade

Left Menu, select Cost Management + Billing...

Cost Management + Billing - Mic

portal.azure.com/#blade/Microsoft_Azure_GTM/ModernBillingMenuBlade/Overview

Microsoft Azure | Upgrade | Search resources, services, and docs (G+/)

Home >

Cost Management + Billing | Overview

Default Directory

Search (Ctrl+/)

- Overview
- Cost Management
- Diagnose and solve problems
- Billing scopes

Billing

- Subscriptions
- Invoices
- Payment methods

Settings

- Properties

Support + troubleshooting

- New support request

Essentials

Account admin : caiogasparine@gmail.com

Notification email : caiogasparine@gmail.com

Billing account type : Microsoft Online Services Program

Currency : BRL

Billing country/region : BR

My subscriptions

View all my subscriptions >

You have billing access for the subscriptions listed below. To view subscriptions for which you have access to manage Azure resources. Click here.

Subscription name	Subscription ID	Status	Last billed amount	Due date	Current Cost
Free Trial	bf350b48-f641-49a2[illegible]4-598ce72df8ab	Active	Not available	Not available	R$11.15

Select your subscription...

Free Trial - Microsoft Azure | Compute - Microsoft Azure Mach

portal.azure.com/#@caiogasparinegmail.onmicrosoft.com/resource/subscriptions/bf350b48-f641-49a2-b7e4-598ce72df8ab/overview

Microsoft Azure | Upgrade | Search resources, services, and docs (G+/)

Home > Cost Management + Billing >

Free Trial

Subscription

Search (Ctrl+/)

- Overview
- Activity log
- Access control (IAM)
- Tags
- Diagnose and solve problems
- Security
- Events

Cost Management

- Cost analysis
- Cost alerts
- Budgets
- Advisor recommendations

Billing

- Invoices
- External services
- Payment methods

Upgrade | Cancel subscription | Rename | Change directory | Transfer billing ownership | Feedback

Your free credit expires in 4 days. Upgrade to keep going with your account.

Parent management group : ---

Costs by resource

View details >

sql-caio-ai1 **13.52** BRL

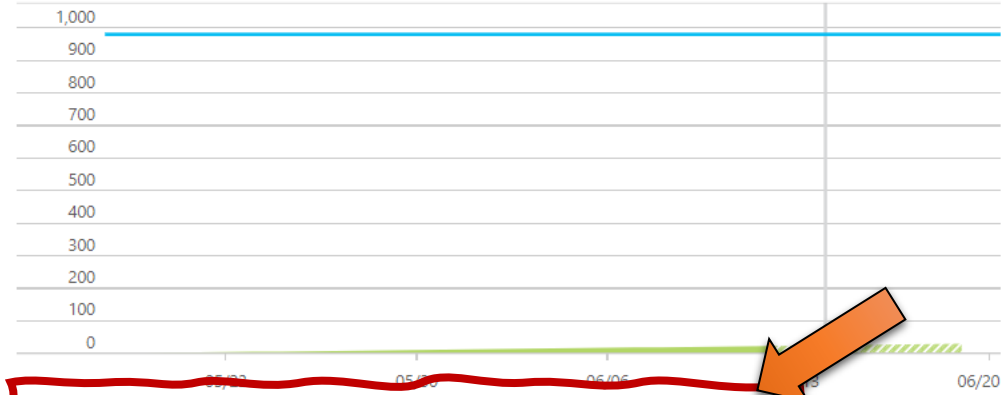
sql-caio-ai1 **9.94** BRL

df-caio-001 **0.28** BRL

Others **0.03** BRL

Spending rate and forecast

View details >



Starting credit **980** BRL

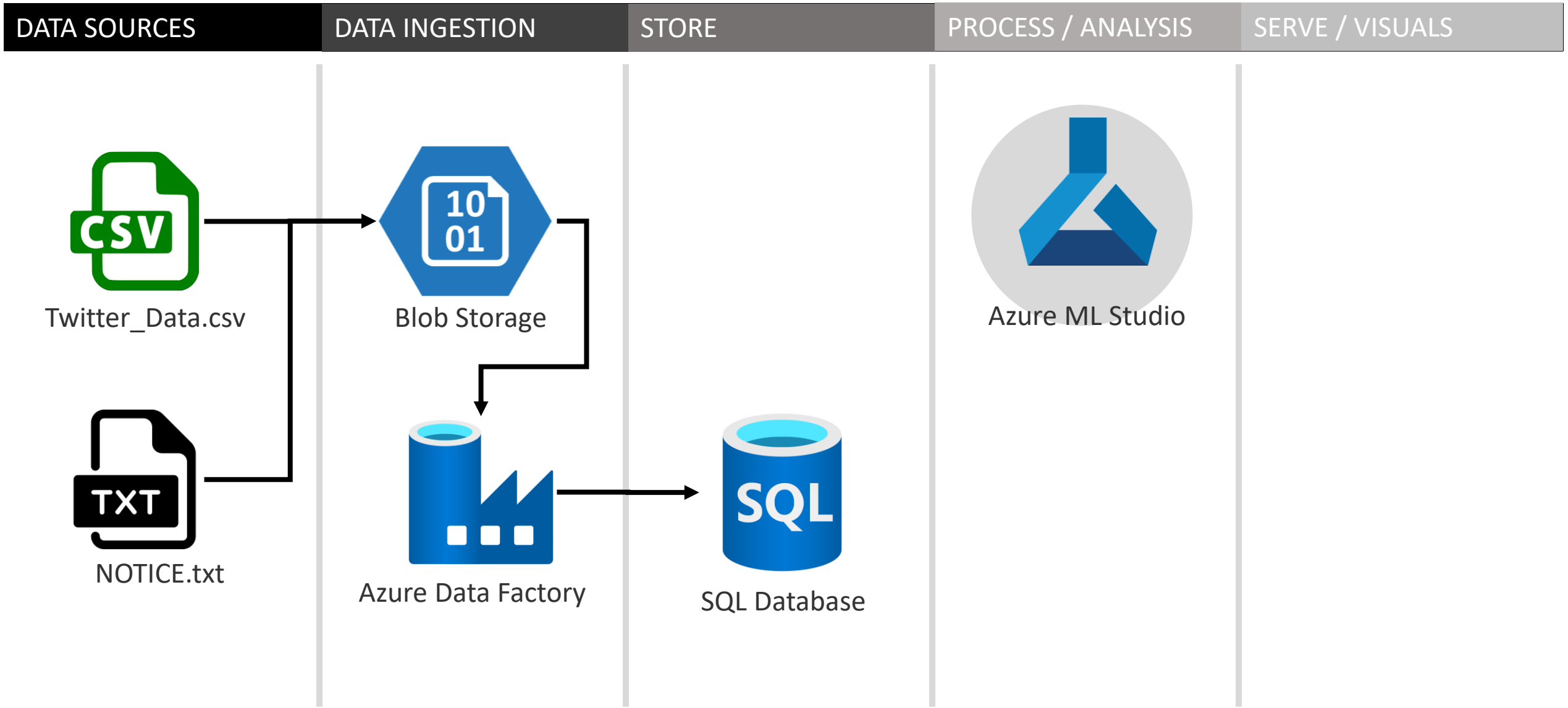
Credit remaining **955.42** BRL

Forecast **29.57** BRL

Free services for 12 months

Visualize your subscription costs and forecast.

Data Architecture so far…



Thank you! ;-)

Please e-mail me the screenshots of your final steps for each component / service to validate your bonus points.