

A nighttime photograph of a city skyline, likely New York City, featuring a suspension bridge on the left and numerous illuminated skyscrapers. The scene is reflected in the water in the foreground. The text is overlaid on the image.

利用Python在Azure上玩转机器学习

Kinfey Lo

关于我

微软技术社区区域总监

微软人工智能方向最有价值专家

Xamarin最有价值专家

Microsoft Teched/Ignite/Teched Summit 讲师

PyCon 2019 /2020 Breakout Session 讲师

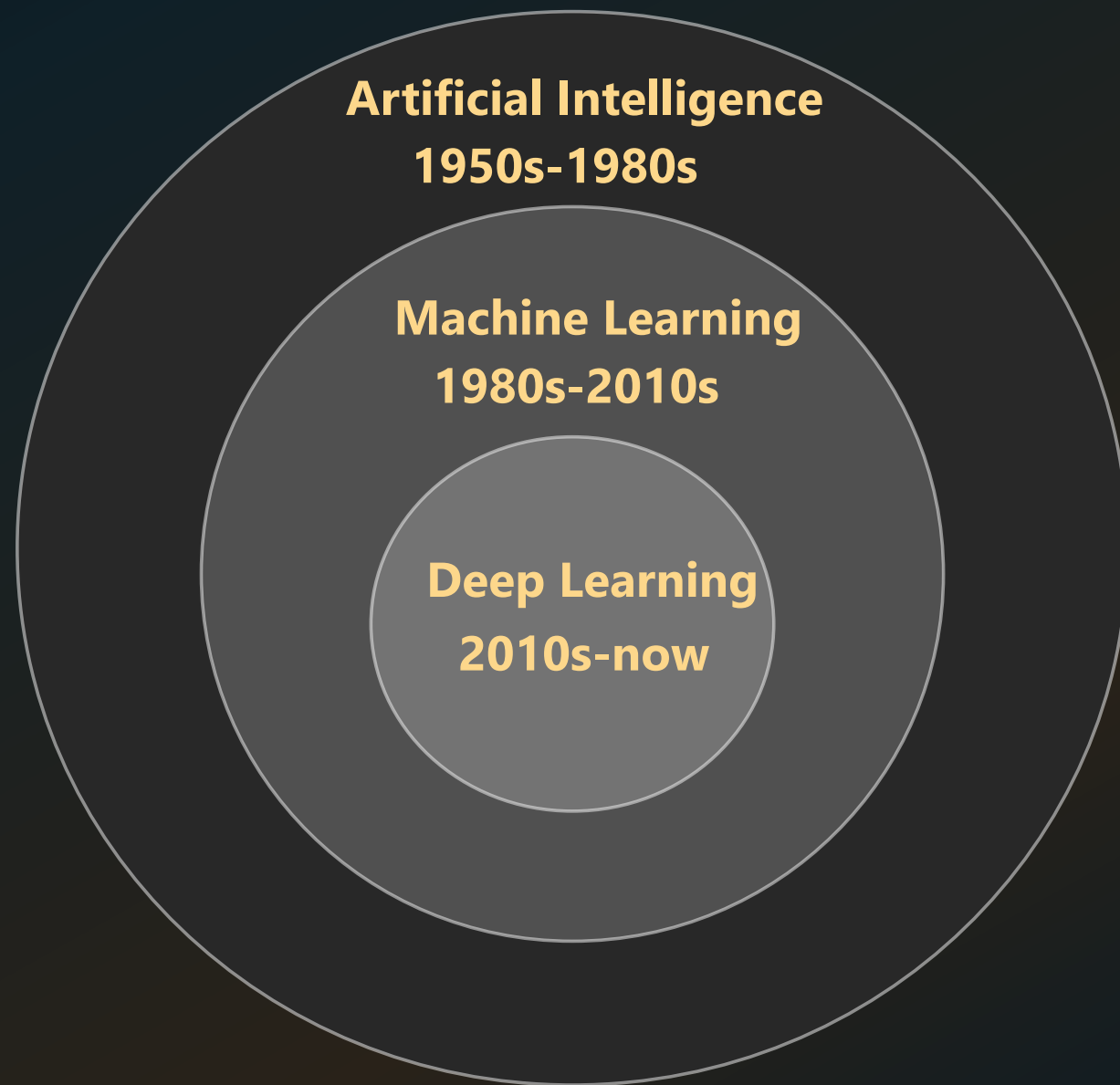
微软人工智能黑客松教练

Mail: lokinfey@outlook.com

Github : <https://github.com/lokinfey>



Artificial Intelligence 发展历程



AI、Machine Learning 与 Deep Learning 关系

- **Artificial Intelligence** 是一种电脑模仿人的技术 (目标)
- **Machine Learning** 让电脑能够依赖经验更好去处理任务的多项技术(过程)
- **Deep Learning** 通过Neural Network 作为基础, 让电脑自我训练(方法)

传统编程

Data

Algorithm



Computation



Output

机器学习

(features)

(labels)

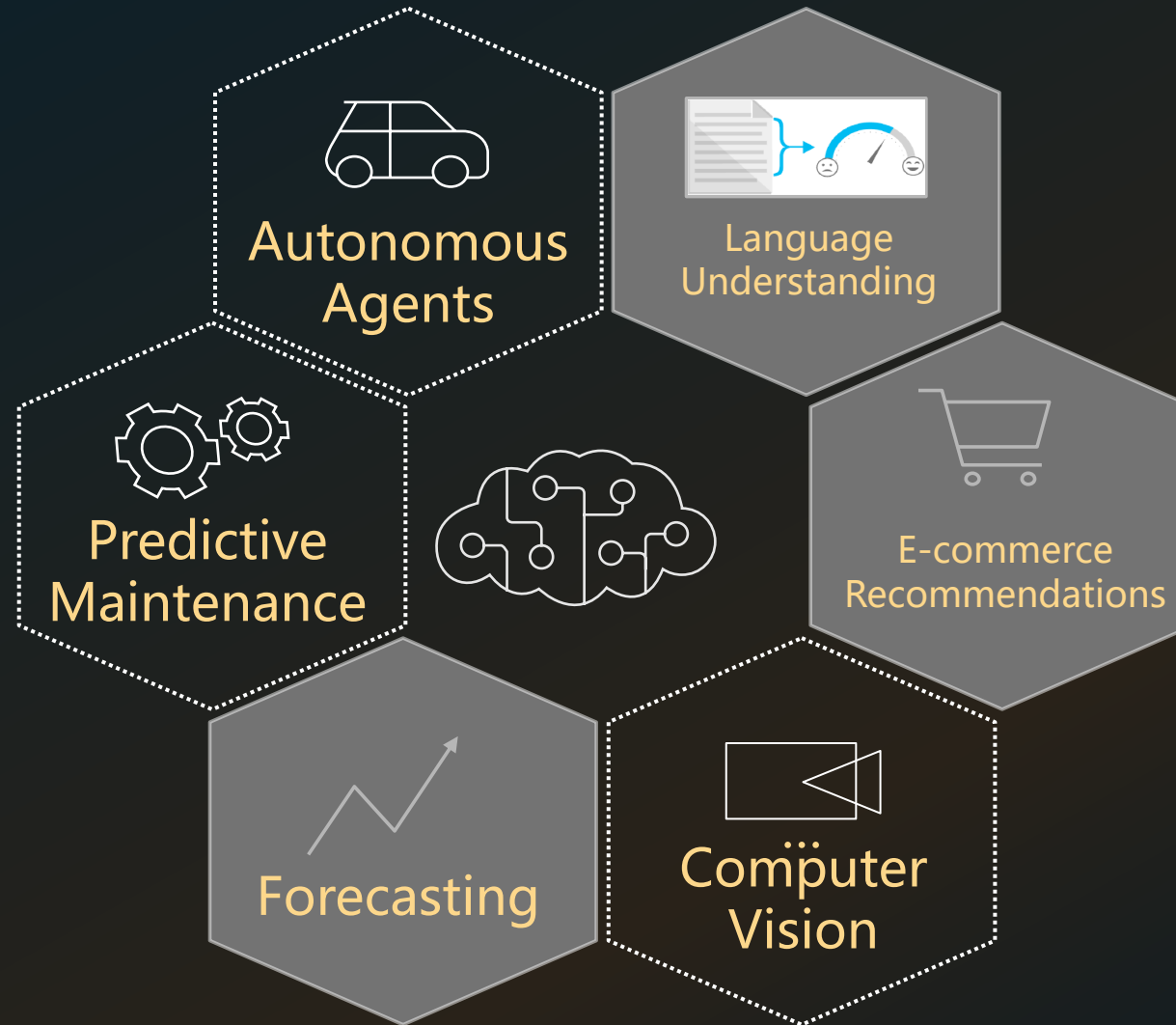


Computation



(model)

Artificial Intelligence的應用場景



人工智能技术栈



Language



Framework

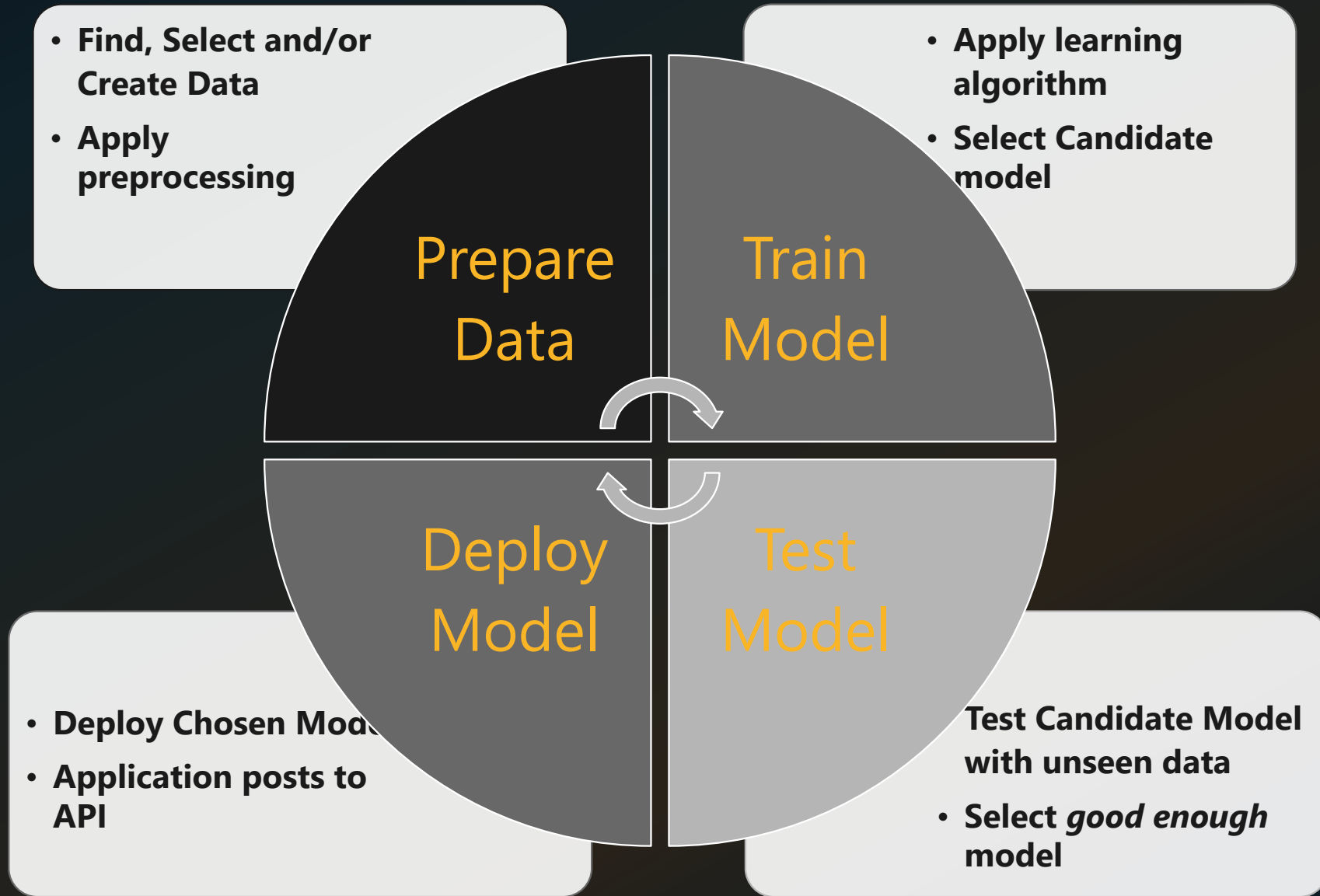


Hardware

Bye Bye AI ! ! !



完成一個Artificial Intelligence 过程



Azure AI

AI Application & Service



Azure Bot Service
Azure Cognitive Services

Machine Learning



Azure Databricks
Azure Machine Learning

Knowledge mining



Azure Cognitive Search

什么是Azure Machine Learning

Set of Azure
Cloud Services



Python
SDK

You can :

- ✓ Prepare data
- ✓ Build model
- ✓ Train model

- ✓ Manage Model
- ✓ Track Experiments
- ✓ Model Registration

Azure Machine Learning

```
File Edit Selection View Go Run Terminal Help
EXPLORER
OPEN EDITORS
AZUREML
.azureml
config.json
pytorch-env.yml
aml_config
project.json
src
model.py
train.py
amignore
01.localeml.py
02.create-compute.py
03.torch.py
src > train.py > ...
1 import torch
2 import torch.optim as optim
3 import torchvision
4 import torchvision.transforms as transforms
5
6 from model import Net
7
8 # download CIFAR10 data
9 trainset = torchvision.datasets.CIFAR10(
10     root='./data',
11     train=True,
12     download=True,
13     transform=torchvision.transforms.ToTensor(),
14 )
15 trainloader = torch.utils.data.DataLoader(
16     trainset, batch_size=4, shuffle=True
17 )
18
19 if __name__ == "__main__":
20
21     # define convolutional network
22     net = Net()
23
24     # set up pytorch loss / optimizer
25     criterion = torch.nn.CrossEntropyLoss()
26     optimizer = optim.SGD(net.parameters(), lr=0.001, momentum=0.9)
27
28     # train the network
29     for epoch in range(2):
30
31         running_loss = 0.0
32         for i, data in enumerate(trainloader, 0):
33             # unpack the data
34             inputs, labels = data
35
36             # zero the parameter gradients
37             optimizer.zero_grad()
38
39             # forward + backward + optimize
40             outputs = net(inputs)
41             loss = criterion(outputs, labels)
42             loss.backward()
43             optimizer.step()
44
45             # print statistics
46             running_loss += loss.item()
47             if i % 2000 == 1999:
48                 loss = running_loss / 2000
49                 print(f'epoch={epoch + 1}, batch={i + 1:5}: loss {loss:.2f}')
50                 running_loss = 0.0
51
52     print("Finished Training")
```

Microsoft Azure Machine Learning

KinleyMLVSDemo1 > Home

Azure Machine Learning studio

Create new

Notebooks
Code with Python SDK and run sample experiments.
[Start now](#)

Automated ML
Automatically train and tune a model using a target metric.
[Start now](#)

Designer
Drag-and-drop interface from prepping data to deploying models.
[Start now](#)

My recent resources

Run	Run ID	Experiment	Status	Submitted time	Submitted by	Run type
Run 1	day2-experiment-train_16...	day2-exp...	Completed	Nov 26, 2020 10:20 AM	Lo Kinley	Script
Run 1	day1-experiment-train_16...	day1-exp...	Completed	Nov 26, 2020 10:14 AM	Lo Kinley	Script

[View all runs](#)

Name	Type	Provisioning state	Created on
cpu-cluster	Machine Learning com...	● Succeeded (0 nodes)	Nov 26, 2020 9:48 AM

[View all compute](#)

Tutorials

- What is Azure Machine Learning?
- Train your first ML model with Notebook
- Create, explore and deploy Automated ML experiments.
- What is Azure Machine Learning designer?
- What are compute targets in Azure Machine Learning?
- Deploy models with Azure Machine Learning

[View all tutorials](#)

Links

- Blog**
Follow us and find updates
- Documentation**
Find step-by-step tutorials, concepts, how-to guides, and more

Azure Machine Learning

Provide some predefined models

Can lower the development threshold



Vision



Speech



Language



Search

Compatible with different development tools

Quickly complete model development and simplify the development process



PyCharm



Jupyter



Visual Studio Code



Command line

Support for artificial intelligence development framework

Create deep learning solutions based on your needs



Pytorch



TensorFlow



Scikit-Learn



Onnx

Provide production services

Provide data and development environment for development team



Azure Databricks



Azure Machine Learning



Machine Learning VMs

Powerful hardware architecture support

Accelerate deep learning environment



CPU



GPU



FPGA



Azure Machine Learning service

- Is an AI development platform that enhances productivity



Improve data science productivity



Improve your training efficiency



Deploy and manage models anywhere



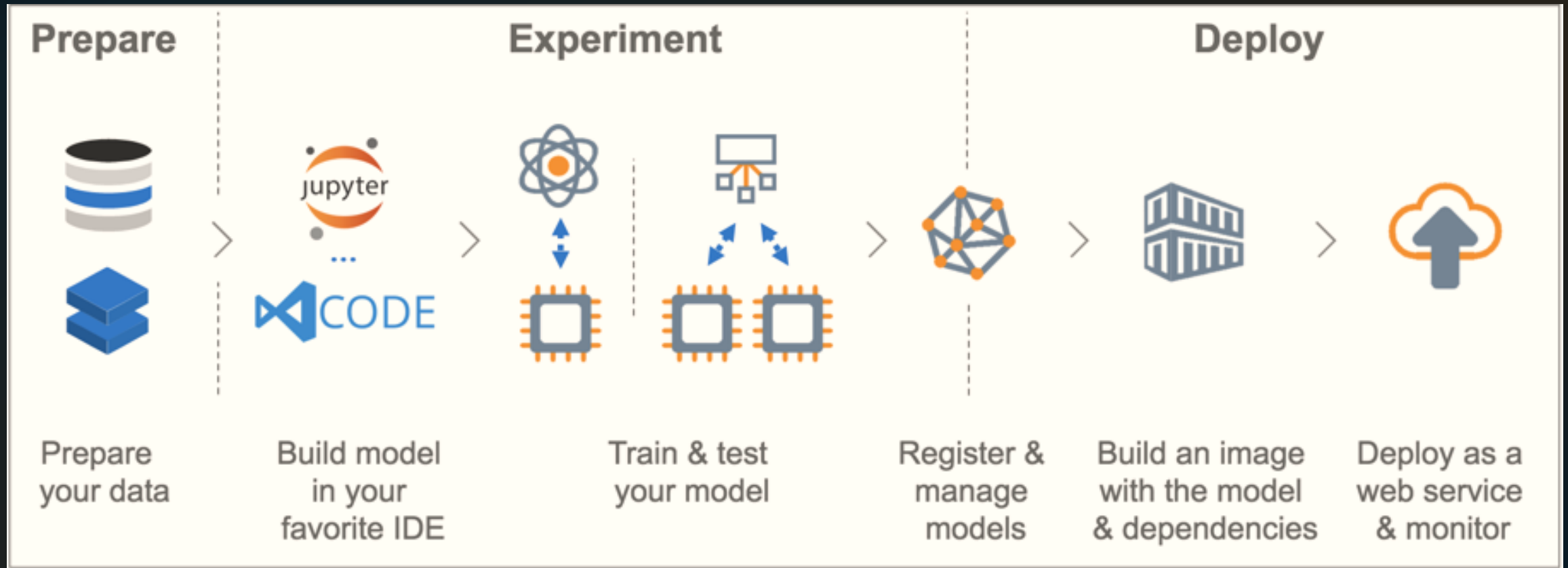
Create as needed

- Automated ML
- Managed Compute
- Deploy
- DevOps
- Support open source framework
- Python SDK

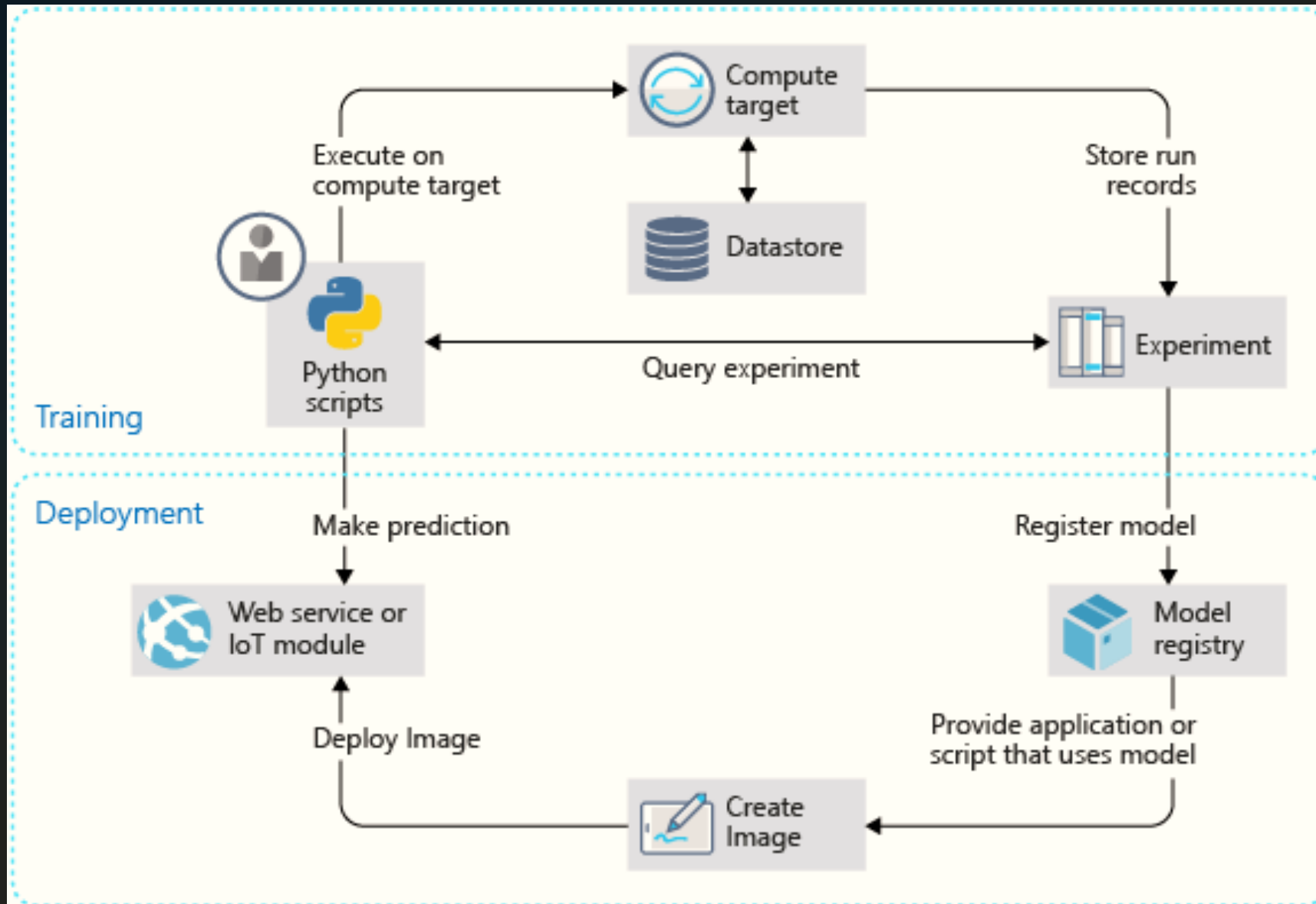
Seamlessly integrated with the Azure Portfolio

Azure Machine Learning Service

Azure Machine Learning Service provides a cloud-based environment that you can use to prepare data, train, test, deploy, manage, and track machine learning models.



Azure Machine Learning Service



Azure Machine Learning Service

Azure Marketplace [See all](#)

Featured [See all](#)

Get started

Recently created

AI + Machine Learning

Analytics

Blockchain

Compute

Containers

Databases

Developer Tools

DevOps

Identity

Integration

Internet of Things

Media

Mixed Reality

IT & Management Tools


Networking


Software as a Service (SaaS)


Security


Storage


Web


 **Machine Learning**
[Learn more](#)


 **Web App Bot**
[Quickstarts + tutorials](#)

 **Computer Vision**
[Quickstarts + tutorials](#)

 **Face**
[Quickstarts + tutorials](#)

 **Text Analytics**
[Quickstarts + tutorials](#)

 **Bing Search**
[Quickstarts + tutorials](#)

 **Ubuntu Server 18.04 LTS**
[Learn more](#)

StarWarAML

Machine Learning

Search (Cmd+/)

[Download config.json](#) [Delete](#)

Workspace edition : Enterprise Storage : starwaraml8174054724
Resource group : AMLGpuGroup Registry : starwaraml4c3fb7cd
Location : West US 2 Key Vault : starwaraml1653681273
Subscription : Microsoft Azure Sponsorship Application Insights : starwaraml3280106667
Subscription ID : a55f85f4-07fd-4798-ba7b-025be3b07f52

Try the new Azure Machine Learning studio

Introducing a new immersive experience (preview) for managing the end-to-end machine learning lifecycle.

[Launch now](#) [Learn more](#)

Getting Started

- View Documentation**
Learn how to use Azure Machine Learning.
- View more samples at GitHub**
Get inspired by a large collection of machine learning examples.
- View Forum**
Join the discussion of Azure Machine Learning.
- Learn about Enterprise Edition**
Use the Enterprise edition to access UI-based tools for all skill levels, built-in MLOps and more.

Overview

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

Assets

- Experiments
- Pipelines
- Compute
- Models
- Images
- Deployments
- Activities

Settings

- Properties
- Locks
- Export template

Monitoring


- Alerts
- Metrics
- Diagnostic settings
- Logs

Support + troubleshooting


- Usage + quotas
- New support request

StarWarAML > Home

Welcome to the studio!




Create new ▾



Notebooks

Code with Python SDK and run sample experiments.


Start now



Automated ML

Automatically train and tune a model using a target metric.

Start now



Designer

Drag-and-drop interface from prepping data to deploying models.

Start now

My recent resources

Runs

Run	Run ID	Experiment	Status	Submitted time
Run 3	gpuml_experiment_1586097535_909859...	gpuml_experiment	Completed	Apr 5, 2020 10:39 PM
Run 2	gpuml_experiment_1586095519_d7b07e...	gpuml_experiment	Failed	Apr 5, 2020 10:05 PM
Run 1	gpuml_experiment_1586093883_62ba7c...	gpuml_experiment	Failed	Apr 5, 2020 9:38 PM
Run 69	3db8774c-2473-4a31-a428-339dc127ed...	step1	Completed	Apr 2, 2020 8:50 PM
Run 63	9f7e1637-d9a9-48d7-9935-82e07bed16...	step1	Completed	Apr 2, 2020 8:43 PM
Run 60	afff788e-e427-4c20-896f-be541bc752eb	step1	Completed	Apr 2, 2020 8:37 PM
Run 57	133aa9ce-7ee9-498e-ad02-f7508eba6f41	step1	Failed	Apr 2, 2020 8:24 PM
Run 55	689e95ca-7748-4e94-9e81-588768b815...	step1	Failed	Apr 2, 2020 7:54 PM
Run 53	ee4ede60-d618-44ca-87af-eff09ddea885	step1	Failed	Apr 2, 2020 7:50 PM
Run 51	25be51c0-4f15-46e4-adcc-80aa34175c56	step1	Failed	Apr 2, 2020 7:47 PM

[View all experiments →](#)

Compute

Name	Type	Provisioning state	Created on
starwarcompute	Machine Learning Com...	✔ Succeeded (4 nodes)	Apr 2, 2020 4:12 PM

[View all compute →](#)

Azure Machine Learning Service



Workspace



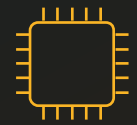
Models



Experiments



Pipelines



Compute Target



Images

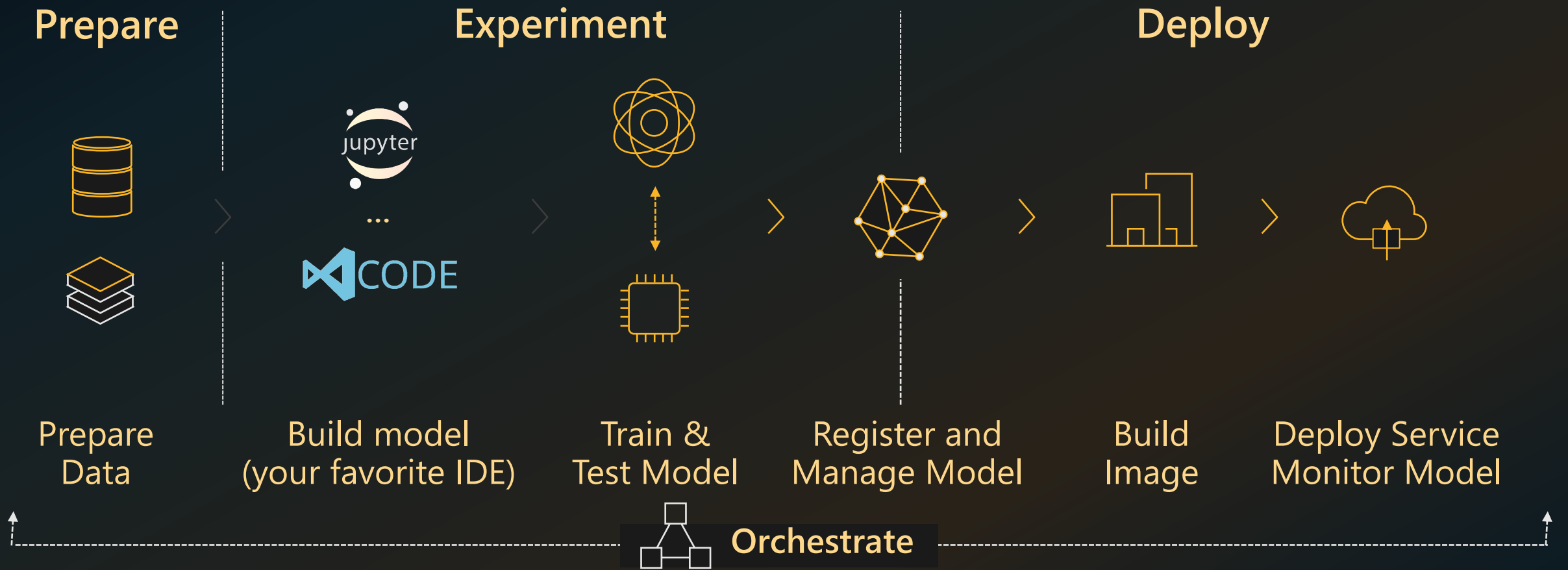


Deployment



Data Stores

Azure Machine Learning



Azure Machine Learning Pipelines

```
101010  
010101  
101010
```

Dataset



- Preview
- Microsoft Azure Machine Learning
- Home
- Author
- Notebooks
- Automated ML
- Designer
- Assets
- Datasets
- Experiments
- Pipelines
- Models
- Endpoints
- Manage
- Compute
- Datastores
- Data Labeling

StarWarAML > Home

Welcome to the studio!

Create new

Notebooks
Code with Python SDK and run sample experiments.
[Start now](#)

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[Start now](#)

Designer
Drag-and-drop interface from prepping data to deploying models.
[Start now](#)

My recent resources

Runs				
Run	Run ID	Experiment	Status	Submitted time
Run 3	gpuml_experiment_1586097535_909859...	gpuml_experiment	Completed	Apr 5, 2020 10:39 PM
Run 2	gpuml_experiment_1586095519_d7b07e...	gpuml_experiment	Failed	Apr 5, 2020 10:05 PM
Run 1	gpuml_experiment_1586093883_62ba7c...	gpuml_experiment	Failed	Apr 5, 2020 9:38 PM
Run 69	3db8774c-2473-4a31-a428-339dc127ed...	step1	Completed	Apr 2, 2020 8:50 PM
Run 63	9f7e1637-d9a9-48d7-9935-82e07bed16...	step1	Completed	Apr 2, 2020 8:43 PM
Run 60	afff788e-e427-4c20-896f-be541bc752eb	step1	Completed	Apr 2, 2020 8:37 PM
Run 57	133aa9ce-7ee9-498e-ad02-f7508eba6f41	step1	Failed	Apr 2, 2020 8:24 PM
Run 55	689e95ca-7748-4e94-9e81-588768b815...	step1	Failed	Apr 2, 2020 7:54 PM
Run 53	ee4ede60-d618-44ca-87af-ef09d8ea885	step1	Failed	Apr 2, 2020 7:50 PM
Run 51	25be51c0-4f15-46e4-adcc-80aa34175c56	step1	Failed	Apr 2, 2020 7:47 PM

[View all experiments](#) →

Compute			
Name	Type	Provisioning state	Created on
starwarcompute	Machine Learning Com...	✔ Succeeded (4 nodes)	Apr 2, 2020 4:12 PM

[View all compute](#) →

Tutorials

What is Azure Machine Learning?

Train your first ML model with Notebook

Create, explore and deploy Automated ML experiments.

What is Azure Machine Learning designer?

What are compute targets in Azure Machine Learning?

Deploy models with Azure Machine Learning

EXPLORER

OPEN EDITORS

datasets_init.ipynb

dataset.ipynb*

MLDEMO

datasets

resized_dataset

aml.ipynb

config.json

dataset.ipynb

datasets_init.ipynb

train.py

datasets_init.ipynb dataset.ipynb*

Jupyter Server: loc... Python 3.7.5 64-bit: I...

```
[1] In [1]:
from azureml.core import Workspace, Dataset
import azureml.contrib.dataset

subscription_id = ''
resource_group = 'AMLGpuGroup'
workspace_name = 'StarWarAML'

workspace = Workspace(subscription_id, resource_group, workspace_name)

dataset = Dataset.get_by_name(workspace, name='StarWarLabel-2020-04-02 11:53:10')
dataset.to_pandas_dataframe()
```

WARNING - Warning: Falling back to use azure cli login credentials.
If you run your code in unattended mode, i.e., where you can't give a user input, then we recommend to use ServicePrincipalAuthentication or MsiAuthentication.
Please refer to aka.ms/aml-notebook-auth for different authentication mechanisms in azureml-sdk.

	image_url	label	label_confidence
0	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	r2d2	1.0
1	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0
2	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	r2d2	1.0
3	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0
4	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0
5	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	r2d2	1.0
6	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0
7	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0
8	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	r2d2	1.0
9	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	r2d2	1.0
10	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0
11	StreamInfo(AmlDatastore://UI/04-02-2020_073223...	c3po	1.0

```
[2] In [2]:
print('Workspace name: ' + workspace.name,
      'Azure region: ' + workspace.location,
      'Subscription id: ' + workspace.subscription_id,
      'Resource group: ' + workspace.resource_group, sep='\n')
```

```
Workspace name: StarWarAML
Azure region: westus2
Subscription id: a55f85f4-07fd-4798-ba7b-025be3b07132
Resource group: AMLGpuGroup
```

```
[4] In [4]:
starwar_labels = Dataset.get_by_name(workspace, name='StarWarLabel-2020-04-02 11:53:10')
starwar_labels

{
  "source": [
    {
      "workspaceblobstore": "/export/dataset/7cba7279-5ced-6ccf-1233-e53167d797c6/4984c20b-a101-4767-9909-082fd3766d62/c2c1a5bc-bc3f-4558-b926-5fff9b17b706/LabeledDatasetJsonLines.json"
    }
  ],
  "definition": [
    "GetDatastoreFiles",
    "ParseJsonLines",
    "ExpressionAddColumn",
    "DropColumns",
    "DropColumns",
    "RenameColumns"
  ],
  "registration": {
    "id": "b5212952-a08a-4b26-8ada-77138ef9fcb9",
    "name": "StarWarLabel-2020-04-02 11:53:10",
    "version": 1,
    "description": "LabeledDs_StarWarLabel Of Type ImageClassificationMultiClass, Sourced From 4984c20b-a101-4767-9909-082fd3766d62",
  }
}
```

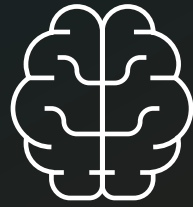
OUTLINE

TIMELINE

Azure Machine Learning Pipelines

101010
010101
101010

Dataset



Training



EXPLORER

OPEN EDITORS

- datasets_init.ipynb
- train.py 4

MLDEMO

- datasets
- resized_dataset
- aml.ipynb
- config.json
- dataset.ipynb
- datasets_init.ipynb
- train.py 4

OUTLINE

TIMELINE

```
train.py > ...
67
68 model = tf.keras.Sequential()
69 model.add(tf.keras.layers.Conv2D(32, (6, 6), input_shape=(x_train.shape[1], x_train.shape[2], x_train.shape[3]), act
70 model.add(tf.keras.layers.MaxPooling2D(pool_size=(2,2)))
71 model.add(tf.keras.layers.Conv2D(32, (6, 6), activation='relu'))
72 model.add(tf.keras.layers.MaxPooling2D(pool_size=(2, 2)))
73 model.add(tf.keras.layers.Dropout(0.5))
74 model.add(tf.keras.layers.Conv2D(32, (6, 6), activation='relu'))
75 model.add(tf.keras.layers.MaxPooling2D(pool_size=(2, 2)))
76 model.add(tf.keras.layers.Dropout(0.5))
77 model.add(tf.keras.layers.Flatten())
78 model.add(tf.keras.layers.Dense(len(classnames), activation='softmax'))
79
80 model.compile(loss='categorical_crossentropy',
81               optimizer='adam',
82               metrics=['accuracy'])
83 num_epochs = 20
84 history = model.fit(x_train, y_train, epochs=num_epochs, batch_size=64, validation_data=(x_test, y_test))
85
86 import tensorflow.keras.models
87
88 model_json = model.to_json()
89 with open("./outputs/starwar.json", "w") as json_file:
90     json_file.write(model_json)
91 # serialize weights to HDF5
92 model.save_weights("./outputs/startwar.h5")
93 print("Saved model to disk")
94
95
96
97
98
```

Azure Machine Learning Pipelines

101010
010101
101010

Dataset



Training



Model Registration



EXPLORER

OPEN EDITORS

AMLTrain.ipynb

AZURECOVID

.ipynb_checkpoints

dataset

model

AMLTrain.ipynb

config.json

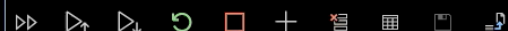
test001.png

test002.png

test003.png

train.py

AMLTrain.ipynb



Jupyter Server: lo... Python 3: Idle

```
[1] In [1]: ML
import azureml.core
print(azureml.core.VERSION)
```

1.0.85

```
[3] In [3]: ML
import azureml.core
from azureml.core import Workspace, Datastore
```

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

```
[4] In [4]: ML
ds = ws.get_default_datastore()
```

```
[5] In [5]: ML
datastores = ws.datastores
for name, ds in datastores.items():
    print(name, ds.datastore_type)
```

```
workspaceblobstore AzureBlob
workspacefilestore AzureFile
```

```
[7] In [7]: ML
import azureml.data
from azureml.data.azure_storage_datastore import AzureFileDatastore, AzureBlobDatastore
```

```
ds.upload(src_dir='./dataset',
          target_path='dataset',
          overwrite=True,
          show_progress=True)
```

[Output was trimmed for performance reasons.](#)
[To see the full output set the setting "python.dataScience.textOutputLimit" to 0.](#)

```
***
person291_virus_596.jpeg, 5845 files out of an estimated total of 5978
Uploading ./dataset/train/person731_bacteria_2633.jpeg
Uploaded ./dataset/train/person58_bacteria_272.jpeg, 5846 files out of an estimated total of 5978
Uploading ./dataset/train/person860_virus_1505.jpeg
Uploading ./dataset/train/person1438_bacteria_3718.jpeg
Uploaded ./dataset/train/person731_bacteria_2633.jpeg, 5847 files out of an estimated total of 5978
Uploaded ./dataset/train/person24_bacteria_111.jpeg, 5848 files out of an estimated total of 5978
Uploaded ./dataset/train/person860_virus_1505.jpeg, 5849 files out of an estimated total of 5978
Uploaded ./dataset/train/person1438_bacteria_3718.jpeg, 5850 files out of an estimated total of 5978
Uploading ./dataset/train/person397_virus_790.jpeg
Uploading ./dataset/train/person1235_virus_2095.jpeg
Uploading ./dataset/train/NORMAL2-IM-0553-0001.jpeg
```

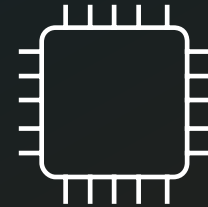
> OUTLINE

> TIMELINE

Azure Machine Learning Pipelines



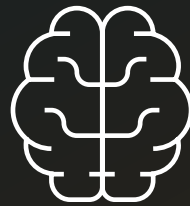
Dataset



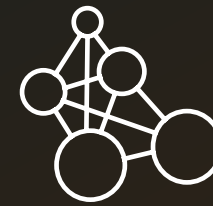
Compute

101010
010101
101010

Data Preparation



Training



Model Registration



Azure Machine Learning Automated ML

The screenshot displays the Microsoft Azure Machine Learning interface. On the left, a navigation pane shows the 'Automated ML' workflow selected. The main area is titled 'Create a new Automated ML' and shows a progress indicator with four steps: 'Select dataset' (active), 'Configure run', 'Task type and settings', and 'Task type and settings'. Below this, the 'Select Open Dataset' step is detailed. It includes a search bar with the placeholder text 'Type to filter...'. A grid of 24 dataset cards is displayed, each with a title, a brief description, and a 'Learn more' link. The datasets include: San Francisco Safety Data, Sample: Diabetes, US National Employment Hours and Earnings, NOAA Global Forecast System (GFS), US Labor Force Statistics, US Consumer Price Index, US Population by ZIP Code, NYC Taxi & Limousine Commission - green taxi trip records, The MNIST database of handwritten digits, US State Employment Hours and Earnings, US Producer Price Index - Commodities, New York City Safety Data, US Producer Price Index - Industry, NYC Taxi & Limousine Commission - yellow taxi trip records, Public Holidays, US Local Area Unemployment Statistics, Boston Safety Data, Seattle Safety Data, Chicago Safety Data, US Population by County, NOAA Integrated Surface Data (ISD), and NYC Taxi & Limousine Commission - For-Hire Vehicle (FHV) trip records.

Select Open Dataset

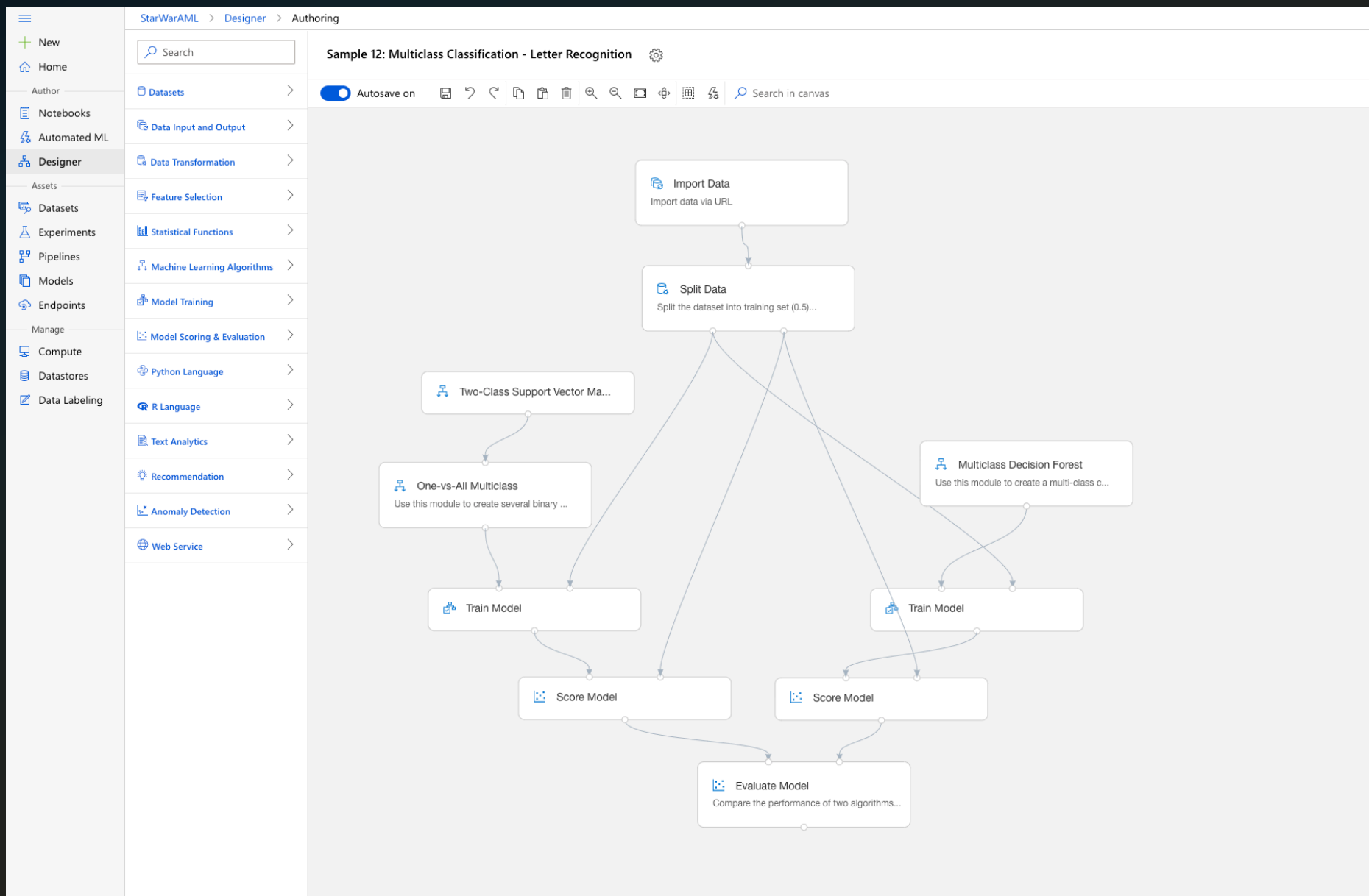
Azure Open Datasets offers ML ready data from the open domain. Registering open datasets in the workspace lets you easily access open data in your experiments from a common storage location without creating a copy of the data in your storage account.

Select an Open Dataset to register with your workspace.

Type to filter...

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Azure Machine Learning Designer



DevOps 过程

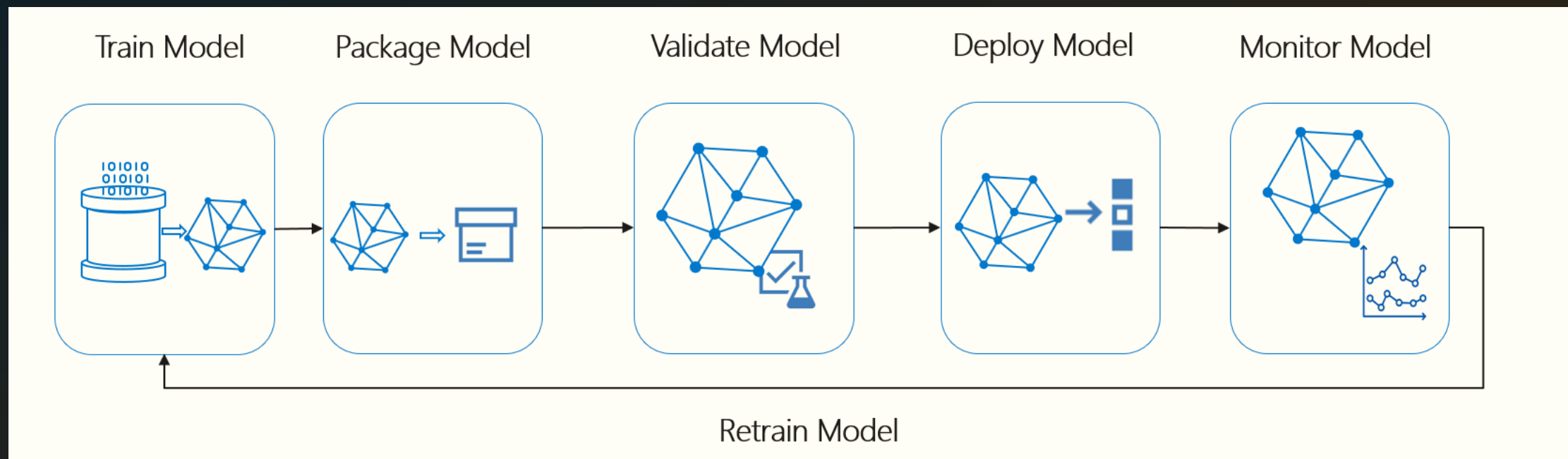


DevOps Good Practices

- Source Control
- Continuous Integration
- Continuous Delivery

MLOps

- MLOps是数据科学家与管理或开发团队之间的沟通。它本质上是深度协作，旨在通过机器学习消除浪费，尽可能地自动化，产生更丰富和更一致的见解。



Source Control

- 代码和注释（不是Jupyter输出）
- 加上管道的每一部分
- 基础设施和依赖关系
- 数据的一个子集



Continuous Integration



- Triggered on code change
- Refresh and execute AML Pipeline
- Code quality, linting, and unit testing
- Pull request process
- aka.ms/mitt/azuredevops

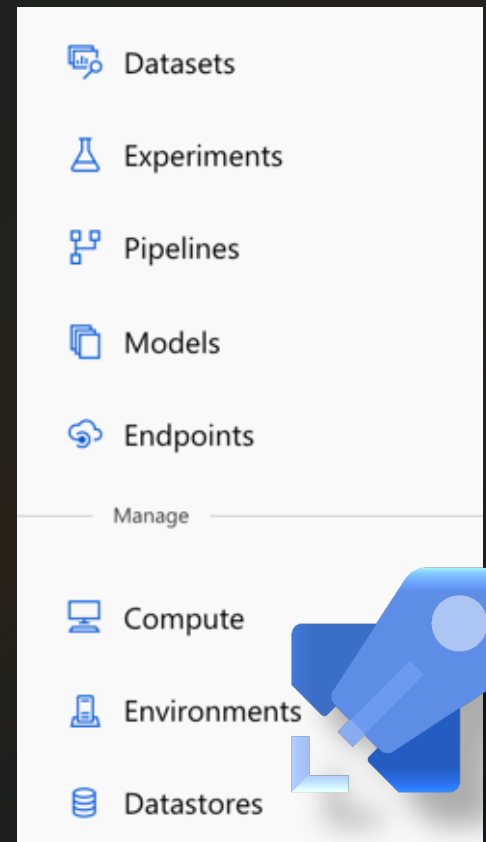
Continuous Delivery



- Trigger on model registration
- Deploy to test and staging environments
- Run integration and load tests
- Control: rollout, feature flags, A/B testing

小结

- 源代码管理中的所有代码和基础设施
- 已知的共享数据源
- AML管道和Azure管道
- DevOps



Search all pipelines

+ New

- Damovisa.seer master

Damovisa.seer

History Analytics

Edit Queue

Commit	Build #	Branch	Queued ↓	Duration	Started	Completed
Small updates to pipeline CI build for Damovisa	✓ 1.59.1	master	2019-09-17 12:04	2:55.397	2019-09-17 12:05	2019-09-17 12:08
Better training parameters? CI build for Damovisa	✓ 1.58.1	master	2019-09-13 09:13	2:57.720	2019-09-13 09:13	2019-09-13 09:16
reset training CI build for Damovisa	✓ 1.57.1	master	2019-09-13 07:36	2:59.262	2019-09-13 07:36	2019-09-13 07:39
No need to specify GPU CI build for Damovisa	✓ 1.56.1	master	2019-09-13 06:17	2:58.790	2019-09-13 06:17	2019-09-13 06:20
pip requirements for registration CI build for Damovisa	✓ 1.55.1	master	2019-09-13 05:26	2:52.644	2019-09-13 05:26	2019-09-13 05:29
pip requirements for tasks CI build for Damovisa	✓ 1.54.1	master	2019-09-13 04:54	2:58.449	2019-09-13 04:54	2019-09-13 04:57
Fixed environment creation CI build for Damovisa	✓ 1.53.1	master	2019-09-13 02:29	3:07.754	2019-09-13 02:30	2019-09-13 02:33
included tensorflow explicitly CI build for Damovisa	✓ 1.52.1	master	2019-09-12 08:25	2:51.539	2019-09-12 08:25	2019-09-12 08:28
run the published pipeline not the local one CI build for Damovisa	✓ 1.51.1	master	2019-09-12 08:17	2:49.706	2019-09-12 08:17	2019-09-12 08:20
Updated pipeline to better fit SDK CI build for Damovisa	✓ 1.50.1	master	2019-09-12 08:06	3:12.356	2019-09-12 08:06	2019-09-12 08:09
updated pipeline CI build for Damovisa	✓ 1.49.1	master	2019-09-06 09:37	2:57.616	2019-09-06 09:37	2019-09-06 09:40
reset batch and epochs CI build for Damovisa	✓ 1.48.1	master	2019-09-06 08:36	2:57.674	2019-09-06 08:36	2019-09-06 08:39
Increase running time and batch size CI build for Damovisa	✓ 1.47.1	master	2019-09-06 08:25	2:57.674	2019-09-06 08:25	2019-09-06 08:28

Some Tips for Learning Artificial Intelligence

/MS Learn

- 完成交互式学习练习，观看视频，练习并应用所学的新技能。

The screenshot shows the Microsoft Learn website. At the top, there is a navigation bar with the Microsoft logo, links for Docs, Documentation, Learn, and Code Samples, a search bar, and a user profile icon. Below this is a secondary navigation bar with links for Learn, Learning Paths, Certifications, and FAQ & Help. The main content area features a large, colorful graphic of the word 'LEARN' in a stylized font. To the left of this graphic is a white box with the text: 'Welcome back, Lo Kinfe' (partially visible), 'Master core concepts at your speed and on your schedule. Whether you've got 15 minutes or an hour, you can develop practical skills through interactive modules and paths.', and a blue button labeled 'Browse all paths'. Below the main graphic are three dark blue cards with white text and icons. The first card is titled 'LEARNING PATHS' and 'Learn on your own schedule', with a sub-description: 'Explore a topic in-depth through guided paths or learn how to accomplish a specific task through individual modules.' and a button 'Browse all learning options'. The second card is titled 'CERTIFICATIONS' and 'Become Microsoft certified', with a sub-description: 'Jump-start your career and demonstrate your achievements through industry-recognized Microsoft certifications.' and a button 'Explore Certifications'. The third card is titled 'DOCS' and 'Get the details', with a sub-description: 'Discover comprehensive documentation for consumers, developers, and IT administrators through tutorials and code examples.' and a button 'Find your solutions'.



挑战自我，学习新知

——了解 Python 在太空探索中扮演的角色

- 🏆 竞赛类型：个人竞技赛
- 🕒 挑战赛开始时间：11月28日 08:00 (北京时间)
- 🕒 挑战赛结束时间：11月29日 18:00 (北京时间)



添加小助手微信
在线解答您的问题



挑战赛规则



<http://aka.ms/pyconchina>

1. 扫描上方二维码，使用 **MS Learn Profile** 名称注册，加入挑战赛
2. 在规定时间内完成技能挑战
3. 完成个人挑战赛并排名在**前20的小伙伴**，即可获得惊喜礼品【反向伞或防水包，二选一】



反向伞



防水包

感謝

