

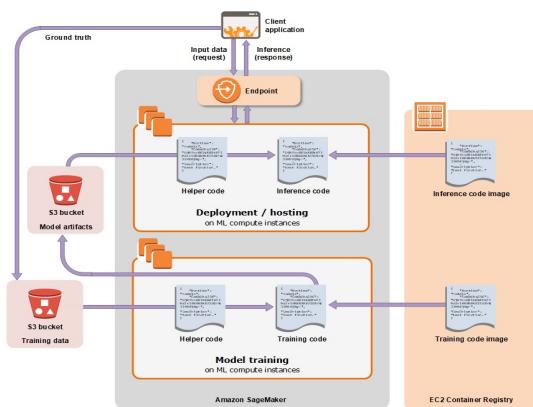
AWS SageMaker工作坊

AWS SageMaker是一個全受管的機器學習服務。從監督式學習到非監督式學習，從決策樹到深度學習，資料科學家可以輕鬆的將自己的分析流程及演算法實現在上面，並可以使用AWS最佳化過的演算法來進行分析。特色為貼近目前開發者的生態體系，例如：使用Jupyter Notebook開發、可以使用Docker客製化環境、整合SDK可以跨語言使用提供其他團隊使用，目前提供AWS Cli、.NET、C++、Go、Java、JavaScript、PHP、Python、Ruby等SDK。

Created by Hans (github: <https://github.com/ogckw>)

SageMaker元件說明

SageMaker架構



- **S3 Bucket**

提供SageMaker儲存及讀取訓練資料、存放模型

- **Container Registry**

提供程式碼執行環境的image

- **Notebook Instance**

用於資料科學家互動式分析服務，可以使用資料科學家常使用的Jupyter Notebook分析並分享給合作團隊。

- **ML Training Service**

用於訓練及分析資料運算服務，可以利用分散式演算法來進行分散式運算，不用管理叢集的基礎設施，讓資料科學家只用專注在算法上而不是管理叢集。

- **ML Hosting Service**

用於最終提供預測或分類算演法結果服務，不用管理叢集的基礎設施，可以輕鬆的整合任何語言呼叫演算法使用，就像在使用習慣語言中的SDK一樣。

Workshop 流程教學指引

預先要求

- AWS帳號並有Admin權限
- 能連上網路且足夠順暢的電腦

- 瀏覽器為Chrome或Firefox
- 基礎的IAM、EC2、S3知識

Module0 Prepare Environment 約10分鐘

準備基礎環境

1. 登入AWS

本Lab可選擇的Region如下列，請確保接下來開的服務都在同個Region，這邊範例使用US East (N. Virginia)

1. US East (N. Virginia)
2. US East (Ohio)
3. US West (Oregon)
4. EU (Ireland)

確認自己所在的Region為US East (N. Virginia)

The screenshot shows the AWS Management Console homepage. At the top right, the region dropdown is set to "N. Virginia". The main area displays various AWS services like EC2, Amazon SageMaker, VPC, and CloudTrail under "Recently visited services". A sidebar on the left lists "All services" categorized into Compute, Storage, and Database. On the right, there are sections for "Helpful tips" (Manage your costs, Create an organization) and "Explore AWS" (Amazon Relational Database Service (RDS), AR & VR, Real-Time Analytics with Amazon Kinesis).

2. 建立S3 Bucket提供之後進行Module使用

The screenshot shows the AWS S3 console. At the top, there's a search bar and navigation links for "History" and "Console Home". The main area is titled "Amazon S3". It features a "Create bucket" button with a red box around it. Below it is a "Search for buckets" input field. Underneath are buttons for "Delete bucket" and "Empty bucket". At the bottom, there are filters for "Bucket name", "Access", "Region", and "Date created". The "Storage" section is expanded, showing "S3" (which has a red box around it) and other options like EFS, Glacier, and Storage Gateway.

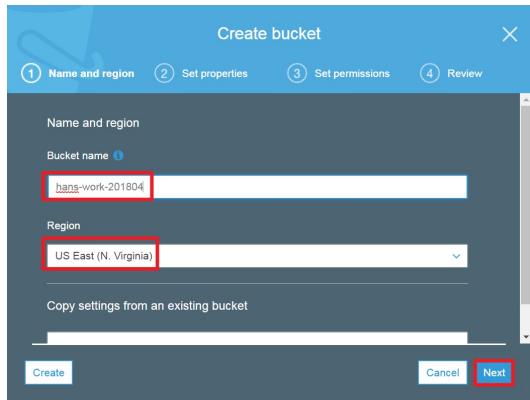
輸入S3 名稱及區域

Bucket Name: 請填入想要的名稱

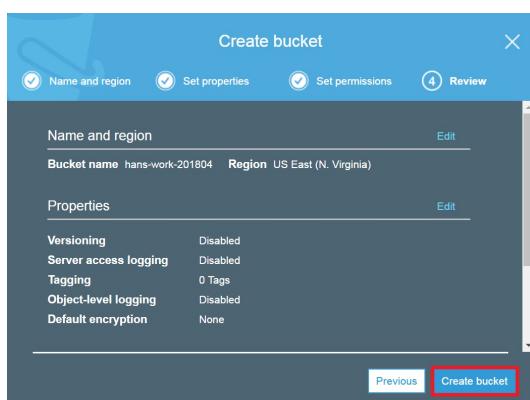
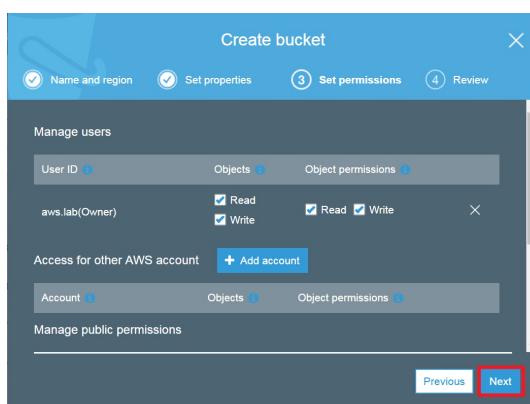
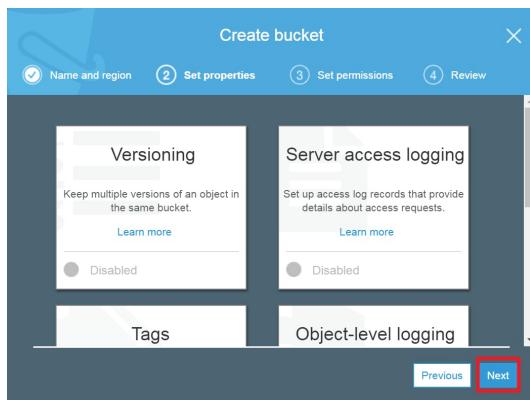
這邊的範例使用hans-work-201804

注意! S3 bucket名稱為全球唯一，重覆的名稱會無法建立，所以請勿照抄範例，請自己想一個適合的名稱

Region: US East (N. Virginia)



一直選Next直到建立好bucket



hans

+ Create bucket Delete bucket Empty bucket

4 Buckets 0 Public 2 Regions

Bucket name	Access	Region	Date created
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
hans-work-201804	Not public *	US East (N. Virginia)	Apr 3, 2018 3:47:47 PM GMT+0800

Module1 Introduction to Notebook Instance 15分鐘

建立一個資料科學家探索資料用機器並探索資料

1. 建立Notebook Instance

選擇服務SageMaker

History

Amazon SageMaker

Elastic Container Service

S3

IAM

EC2

Console Home

Find a service by name or feature (for example, EC2, S3 or VM, storage).

Group A-Z

Compute

- EC2
- Lightsail
- Elastic Container Service
- Lambda
- Batch
- Elastic Beanstalk

Machine Learning

- Amazon SageMaker
- Amazon Comprehend
- AWS DeepLens
- Amazon Lex
- Machine Learning
- Amazon Polly
- Rekognition

建立Notebook Instance

Amazon SageMaker

Dashboard

Notebook

Jobs

Models

Endpoint configurations

Endpoints

Amazon SageMaker > Dashboard

Overview

Notebook instance

Explore AWS data in your notebooks, and use algorithms to create models via training jobs.

Create notebook instance

Jobs

Track training jobs at your desk or remotely. Leverage high-performance AWS algorithms.

View jobs

Models

Create models for hosting from job outputs, or import externally trained models into Amazon SageMaker.

View models

Endpoint

Deploy endpoints for developers to use in production. A/B Test model variants via an endpoint.

View endpoints

設定Notebook Instance規格

Notebook instance name: 請填入想要的名稱

Notebook instance type: 請選擇想要的型號

建議instance type選擇m1.t2.medium或m1.m4.xlarge

include example code for common model training and hosting exercises. [Learn More](#)

Notebook instance settings

Notebook instance name: hans-notebook
 Maximum of 63 alphanumeric characters. Can include hyphens (-), but not spaces. Must be unique within your account in an AWS Region.

Notebook instance type: ml.t2.medium

設定Notebook所使用的IAM Role權限

Notebook instance name: hans-notebook
 Maximum of 63 alphanumeric characters. Can include hyphens (-), but not spaces. Must be unique within your account in an AWS Region.

Notebook instance type: ml.m4.xlarge

IAM role
 Notebook instances require permissions to call other services including SageMaker and S3. Choose a role or let us create a role with the [AmazonSageMakerFullAccess](#) IAM policy attached.

Create a new role

Enter a custom IAM role ARN

Use existing role

Lifecycle configuration - optional
 Customize your notebook environment with default scripts and plugins.

No configuration

填入剛剛建立的S3 bucket名稱後建立Role

Create an IAM role

Passing an IAM role gives Amazon SageMaker permission to perform actions in other AWS services on your behalf. Creating a role here will grant permissions described by the [AmazonSageMakerFullAccess](#) IAM policy to the role you create.

The IAM role you create will provide access to:

S3 buckets you specify - optional

Specific S3 buckets
hans-work-201804

Comma delimited ARNs, "*" and "/" are not supported.

Any S3 bucket
 Allow users that have access to your notebook instance access to any bucket and its contents in your account.

None

Any S3 bucket with "sagemaker" in the name

Any S3 object with "sagemaker" in the name

Any S3 object with the tag "sagemaker" and value "true"

S3 bucket with a Bucket Policy allowing access to SageMaker

See Object tagging [\[?\]](#) See S3 bucket policies [\[?\]](#)

Create role

建立成功畫面並確認VPC - optional選擇No VPC後選擇Create notebook instance

Amazon SageMaker

Dashboard

Notebook

Lifecycle configurations

Jobs

Models

Endpoint configurations

Endpoints

AmazonSageMaker-ExecutionRole-20180403T164286

Success! You created an IAM role.
[AmazonSageMaker-ExecutionRole-20180403T164286](#)

VPC - optional
 Your notebook instance will be provided with SageMaker provided internet access because a VPC setting is not specified.
No VPC

Lifecycle configuration - optional
 Customize your notebook environment with default scripts and plugins.
 No configuration

Encryption key - optional
 Encrypt your notebook data. Choose an existing KMS key or enter a key's ARN.
 No Encryption

Tags - optional

Create notebook instance

會出現建立中的畫面

Amazon SageMaker

Success! Your notebook instance is being created.
Open the notebook instance when status is InService and open a template notebook to get started.

View details X

Dashboard
Notebook
Jobs
Models
Endpoint configurations
Endpoints

Amazon SageMaker > Notebook instances

Notebook instances

Open Start Update settings Actions Create notebook instance

Search notebook instances

Name	Instance	Creation time	Status	Actions
hans-notebook	ml.m4.xlarge	Apr 03, 2018 08:46 UTC	Pending	—

建立完成看到InService後點選Open

Amazon SageMaker

Amazon SageMaker > Notebook instances

Notebook instances

Open Start Update settings Actions Create notebook instance

Search notebook instances

Name	Instance	Creation time	Status	Actions
hans-notebook	ml.m4.xlarge	Apr 03, 2018 08:46 UTC	InService	Open Stop

瀏覽器會跳出新的視窗，恭喜你！成功建立第一個資料科學家所使用的環境

2. 探索資料

選擇New建立新的資料夾並改名為video-game-sales

Files Running Clusters Conda

Select items to perform actions on them.

Upload New

Notebook:

- Sparkmagic (PySpark)
- Sparkmagic (PySpark3)
- Sparkmagic (Spark)
- Sparkmagic (SparkR)
- conda_mxnet_p27
- conda_mxnet_p36
- conda_python2
- conda_python3
- conda_tensorflow_p27
- conda_tensorflow_p36

Other:

- Text File
- Folder **Folder**
- Terminal

Rename directory

Enter a new directory name:

Cancel Rename

點選進入新建的資料夾並上傳檔案 **cht-video-game-sales-xgboost.ipynb**

jupyter

Select items to perform actions on them.

Name ↑ Last Modified ↑

Notebook list empty.

Cancel

進入 Notebook 開始開發

Select items to perform actions on them.

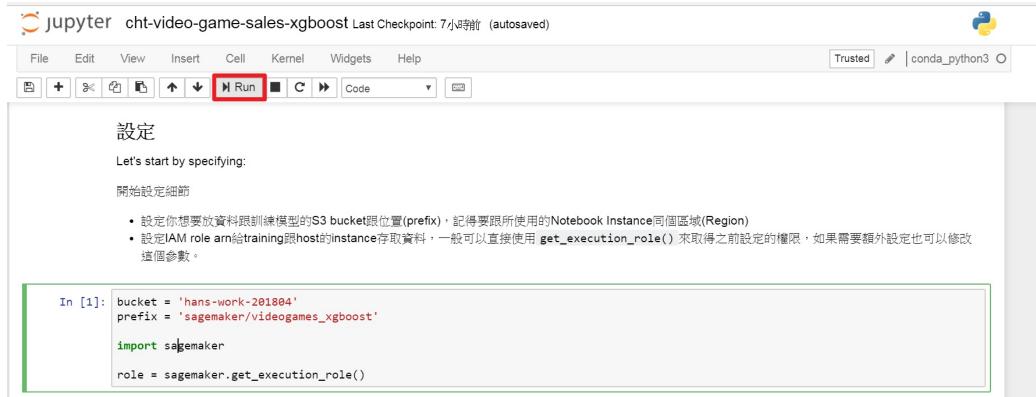
簡易介紹 **Jupyter Notebook** 使用方式，**Jupyter Notebook** 是一個資料科學家常使用的開發工具，舉例來說，剛剛上傳的 **cht-video-game-sales-xgboost.ipynb** 為一個 Notebook，一個 Notebook 又由一個個 Cell 組成，程式碼來達到與資料分析跟互動。紅框框起來的部分是編輯程式碼及執行的地方，稱為 Cell，透過滑鼠左鍵點擊選取想要的 Cell，使用 **Shift + Enter** 來執行該

個Cell內的程式碼

- 設定IAM role arn給training跟host的instance存取資料，一般可以直接使用 `get_execution_role()` 來取得之前設定的權限，如果需要額外設定也可以修改這個參數。

```
In [1]: bucket = 'hans-work-201804'  
prefix = 'sagemaker/videogames_xgboost'  
  
import sagemaker  
  
role = sagemaker.get_execution_role()
```

或選Run也可以執行該Cell的程式碼



執行中的Cell會顯示左側框框(In[])會顯示*號

```
In [1]: bucket = 'hans-work-201804'  
prefix = 'sagemaker/videogames_xgboost'  
  
import sagemaker  
  
role = sagemaker.get_execution_role()
```

接下來載入所需要的Python套件

```
In [*]: import numpy as np  
import pandas as pd  
import matplotlib.pyplot as plt  
from IPython.display import Image  
from IPython.display import display  
from sklearn.datasets import dump_svmlight_file  
from time import gmtime, strftime  
import sys  
import math  
import json  
import boto3
```

修改S3 Bucket成自己剛剛建立的Bucket名稱

開始設定細節

- 設定你想要放資料跟訓練模型的S3 bucket跟位置(prefix)，記得要跟所使用的Notebook Instance同個區域(Region)
- 設定IAM role arn給training跟host的instance存取資料，一般可以直接使用 `get_execution_role()` 來取得之前設定的權限，如果需要額外設定也可以修改這個參數。

```
In [ ]: bucket = '<your-s3-bucket-name>'  
prefix = 'sagemaker/videogames_xgboost'  
  
import sagemaker  
  
role = sagemaker.get_execution_role()
```

接下來可以照著Notebook上的指示開發

請注意!!! 本程式碼腳本會上下互相依賴，請務必照順序執行Cell，請勿隨意重新整理網頁，如果重新整理網頁之前執行的內容會消失

Module2 Introduction to ML Training Service 約15分鐘

建立一個資料科學家運算跟分析機器

1. 建立ML Training Service Instance

設定要訓練的工作，例如要用什麼機器，在哪個Region

訓練模型

資料已經準備完畢，接下來是使用XGBoost model來訓練。XGBoost有很多超參數可以調整來優化模型。以下列出比較會用到的參數。

- `max_depth`: 樹的深度，太小會不足以反應資料的特性，太多會導致過度擬合
- `eta`: 學習的步驟大小，用來避免過度擬合
- `eval_metric`: 用來評估模型的指標
- `scale_pos_weight`: 如果遇到不平衡的分佈可以用這個參數來作調整

直接開始訓練吧！

```
In [59]: job_name = 'videogames-xgboost-' + strftime("%Y-%m-%d-%H-%M-%S", gmtime())
print("Training job", job_name)

containers = {
    'us-west-2': '433757028032.dkr.ecr.us-west-2.amazonaws.com/xgboost:latest',
    'us-east-1': '811284229777.dkr.ecr.us-east-1.amazonaws.com/xgboost:latest',
    'us-east-2': '825641698319.dkr.ecr.us-east-2.amazonaws.com/xgboost:latest',
    'eu-west-1': '685385470294.dkr.ecr.eu-west-1.amazonaws.com/xgboost:latest'
}

create_training_params = \
{
    "RoleArn": role,
    "TrainingJobName": job_name,
```



```
In [17]: job_name = 'videogames-xgboost-' + strftime("%Y-%m-%d-%H-%M-%S", gmtime())
print("Training job", job_name)

containers = {
    'us-west-2': '433757028032.dkr.ecr.us-west-2.amazonaws.com/xgboost:latest',
    'us-east-1': '811284229777.dkr.ecr.us-east-1.amazonaws.com/xgboost:latest',
    'us-east-2': '825641698319.dkr.ecr.us-east-2.amazonaws.com/xgboost:latest',
    'eu-west-1': '685385470294.dkr.ecr.eu-west-1.amazonaws.com/xgboost:latest'
}

create_training_params = \
{
    "RoleArn": role,
    "TrainingJobName": job_name,
    "AlgorithmSpecification": {
        "TrainingImage": containers[boto3.Session().region_name],
        "TrainingInputMode": "File"
    },
    "ResourceConfig": {
        "InstanceCount": 1,
        "InstanceType": "ml.m4.xlarge",
        "VolumeSizeInGB": 10
    },
}
```

XGBoost演算法要輸出模型的位置以及超參數等設定

```
    },
    "OutputDataConfig": {
        "S3OutputPath": "s3://{}//{}//xgboost-video-games/output".format(bucket, prefix)
    },
    "HyperParameters": {
        "max_depth": "3",
        "eta": "0.1",
        "eval_metric": "auc",
        "scale_pos_weight": "2.0",
        "subsample": "0.5",
        "objective": "binary:logistic",
        "num_round": "100"
    },
    "StoppingCondition": {
        "MaxRuntimeInSeconds": 60 * 60
    }
}
```

Training job videotames-xgboost-2018-04-12-07-07-00

開始訓練，這邊準備的範例約需要訓練6-10分鐘

Training job videogames-xgboost-2018-04-09-07-27-01

```
In [*]: %%time
sm = boto3.client('sagemaker')
sm.create_training_job(**create_training_params)

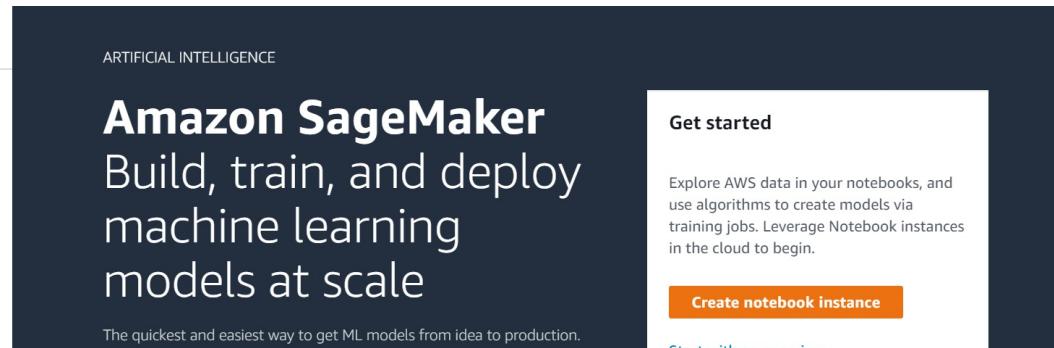
status = sm.describe_training_job(TrainingJobName=job_name)['TrainingJobStatus']
print(status)

try:
    sm.get_waiter('training_job_completed_or_stopped').wait(TrainingJobName=job_name)
finally:
    status = sm.describe_training_job(TrainingJobName=job_name)['TrainingJobStatus']
    print("Training job ended with status: " + status)
    if status == 'Failed':
        message = sm.describe_training_job(TrainingJobName=job_name)['FailureReason']
        print('Training failed with the following error: {}'.format(message))
        raise Exception('Training job failed')
```

InProgress

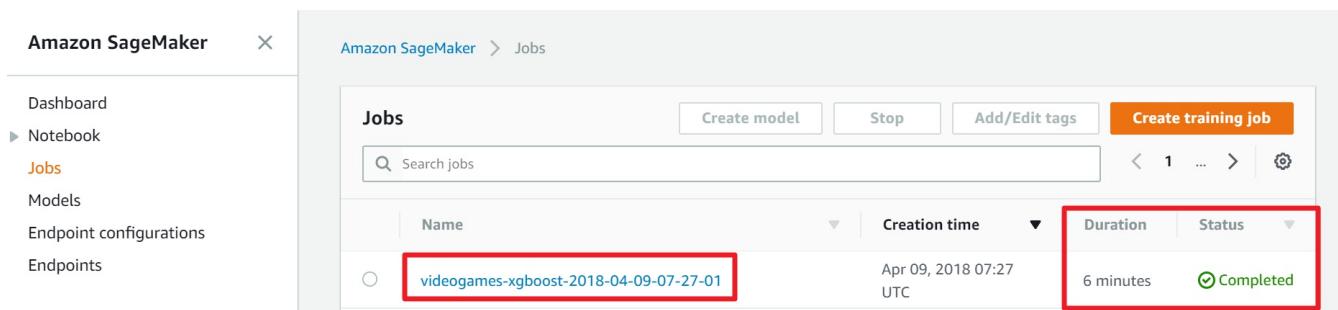
2. 監控訓練狀態

可以回到AWS的Console看到UI介面上的設定



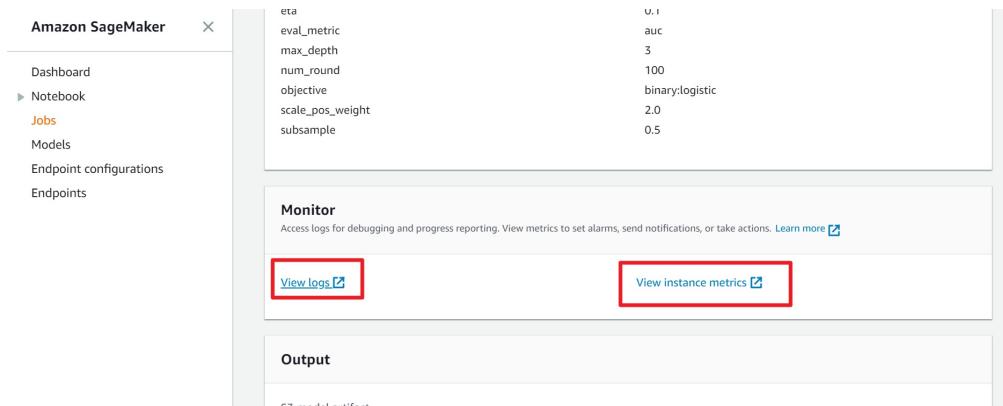
The screenshot shows the Amazon SageMaker console home page. On the left, there's a sidebar with navigation links: Dashboard, Notebook, Jobs (which is selected and highlighted with a red box), Models, Endpoint configurations, and Endpoints. The main content area features the text "ARTIFICIAL INTELLIGENCE" and "Amazon SageMaker Build, train, and deploy machine learning models at scale". Below this, it says "The quickest and easiest way to get ML models from idea to production." To the right, there's a "Get started" section with a "Create notebook instance" button and a "Start with an overview" link.

訓練的狀態



The screenshot shows the "Jobs" page in the Amazon SageMaker console. The sidebar on the left is identical to the home page. The main area has a "Jobs" heading with a search bar and buttons for "Create model", "Stop", "Add/Edit tags", and "Create training job". A table lists a single job entry: "videogames-xgboost-2018-04-09-07-27-01". The table includes columns for Name, Creation time, Duration, and Status. The "Status" column shows "Completed" with a green checkmark. The entire row for this job is highlighted with a red box.

CloudWatch會紀錄訓練的log



The screenshot shows the details for the "videogames-xgboost-2018-04-09-07-27-01" job. The sidebar is the same as before. The main area has sections for "eta", "eval_metric", "max_depth", "num_round", "objective", "scale_pos_weight", and "subsample". Below this is a "Monitor" section with "View logs" and "View instance metrics" buttons, both of which are highlighted with red boxes. At the bottom, there's an "Output" section showing "63 model artifact".

Module3 Introduction to ML Hosting Service 約15分鐘

建立一個機器學習提供預測或分群服務使用

1. 建立ML Hosting Service Instance

指定模型

部署模型

現在將訓練好的模型部署到serverless的結點作服務

1. 指定container
2. 指定使用model
3. 建立服務model

```
In [61]: create_model_response = sm.create_model(  
    ModelName=job_name,  
    ExecutionRoleArn=role,  
    PrimaryContainer={  
        'Image': containers[boto3.Session().region_name],  
        'ModelDataUrl': sm.describe_training_job(TrainingJobName=job_name)['ModelArtifacts'][['S3ModelArtifacts']]})  
  
print(create_model_response['ModelArn'])  
  
arn:aws:sagemaker:us-east-1:326623638833:model/videogames-xgboost-2018-04-09-07-27-01
```

設定EC2規格

建立服務

1. 決定EC2 instance的機型
2. 決定EC2的數量
3. 決定model名稱

設定好後建立endpoint

```
In [62]: xgboost_endpoint_config = 'videogames-xgboost-endpoint-config-' + strftime("%Y-%m-%d-%H-%M-%S", gmtime())  
print(xgboost_endpoint_config)  
create_endpoint_config_response = sm.create_endpoint_config(  
    EndpointConfigName=xgboost_endpoint_config,  
    ProductionVariants=[{  
        'InstanceType': 'ml.t2.medium',  
        'InitialInstanceCount': 1,  
        'ModelName': job_name,  
        'VariantName': 'AllTraffic'}])  
  
print("Endpoint Config Arn: " + create_endpoint_config_response['EndpointConfigArn'])
```

建立服務的Endpoint約需要8-10分鐘

```
In [*]: %%time  
  
xgboost_endpoint = 'EXAMPLE-videogames-xgb-endpoint-' + strftime("%Y%m%d%H%M", gmtime())  
print(xgboost_endpoint)  
create_endpoint_response = sm.create_endpoint(  
    EndpointName=xgboost_endpoint,  
    EndpointConfigName=xgboost_endpoint_config)  
print(create_endpoint_response['EndpointArn'])  
  
resp = sm.describe_endpoint(EndpointName=xgboost_endpoint)  
status = resp['EndpointStatus']  
print("Status: " + status)  
  
try:  
    sm.get_waiter('endpoint_in_service').wait(EndpointName=xgboost_endpoint)  
finally:  
    resp = sm.describe_endpoint(EndpointName=xgboost_endpoint)  
    status = resp['EndpointStatus']  
    print("Arn: " + resp['EndpointArn'])  
    print("Status: " + status)  
  
if status != 'InService':  
    message = sm.describe_endpoint(EndpointName=xgboost_endpoint)['FailureReason']  
    print("Endpoint creation failed with the following error: {}".format(message))  
    raise Exception('Endpoint creation did not succeed')
```

EXAMPLE-videogames-xgb-endpoint-201804090742

2. 開始評估模型

```
In [64]: runtime = boto3.client('runtime.sagemaker')

In [65]: def do_predict(data, endpoint_name, content_type):
    payload = '\n'.join(data)
    response = runtime.invoke_endpoint(EndpointName=endpoint_name,
                                        ContentType=content_type,
                                        Body=payload)
    result = response['Body'].read()
    result = result.decode("utf-8")
    result = result.split(',')
    preds = [float(num) for num in result]
    preds = [round(num) for num in preds]
    return preds

def batch_predict(data, batch_size, endpoint_name, content_type):
    items = len(data)
    arrs = []
    for offset in range(0, items, batch_size):
        if offset+batch_size < items:
            results = do_predict(data[offset:(offset+batch_size)], endpoint_name, content_type)
            arrs.extend(results)
        else:
            arrs.extend(do_predict(data[offset:items], endpoint_name, content_type))
            sys.stdout.write('.')
    return(arrs)
```

建立混淆矩陣 (Confusion Matrix)

```
In [66]: %%time
import json
with open('test.libsvm', 'r') as f:
    payload = f.read().strip()
labels = [int(line.split(' ')[0]) for line in payload.split('\n')]
test_data = [line for line in payload.split('\n')]
preds = batch_predict(test_data, 100, xgboost_endpoint, 'text/x-libsvm')
print ('\nerror rate=%f' % (sum(1 for i in range(len(preds)) if preds[i]!=labels[i])/float(len(preds))))
```

.....
error rate=0.134496
CPU times: user 24 ms, sys: 8 ms, total: 32 ms
Wall time: 1.04 s

```
In [ ]:
```

```
In [67]: pd.crosstab(index=np.array(labels), columns=np.array(preds))
```

```
Out[67]:
```

	0	1
row_0	622	49
1	59	73

計算預測的準確率

```
In [67]: pd.crosstab(index=np.array(labels), columns=np.array(preds))
```

```
Out[67]:
```

	0	1
row_0	622	49
1	59	73

橫 0 1 代表預測狀況 列 0 1 代表實際狀況

從矩陣可以分析

$$622 + 49 + 59 + 73 = 803$$

判斷正確的狀況為 $622 + 73 / 803 = 0.8655$ 判斷錯誤的狀況為 $49 + 59 / 803 = 0.1345$

從矩陣可以分析看到整體正確率為 86.55% 從矩陣可以分析看到整體誤判率為 13.45%

Clean Up

清除你的環境避免額外的收費

1. 清除ML Hosting Service (清除Endpoints)

額外評估

可以透過其他方式來增加準確率，例如調整超參數跟作特徵工程。

```
In [38]: sm.delete_endpoint(EndpointName=xgboost_endpoint)
```

```
Out[38]: {'ResponseMetadata': {'HTTPHeaders': {'connection': 'keep-alive',
                                              'content-length': '0',
                                              'content-type': 'application/x-amz-json-1.1',
                                              'date': 'Tue, 17 Apr 2018 09:19:06 GMT',
                                              'x-amzn-requestid': '2d292c20-f37e-4fe5-9b47-81c5d3f06227',
                                              'HTTPStatusCode': 200,
                                              'RequestId': '2d292c20-f37e-4fe5-9b47-81c5d3f06227',
                                              'RetryAttempts': 0}}
```

2. 清除Endpoint Configuration

The screenshot shows the 'Endpoint configuration' list in the Amazon SageMaker console. The left sidebar shows 'Endpoint configurations' selected. The main area lists one endpoint configuration named 'videogames-xgboost-endpoint-config-2018-04-18-07-14-56'. The 'Actions' dropdown menu is highlighted with a red box.

Name	ARN	Creation time
videogames-xgboost-endpoint-config-2018-04-18-07-14-56	arn:aws:sagemaker:us-east-1:326623638833:endpoint-config/videogames-xgboost-endpoint-config-2018-04-18-07-14-56	Apr 18, 2018 07:14 UTC

3. 清除Models

The screenshot shows the 'Models' list in the Amazon SageMaker console. The left sidebar shows 'Models' selected. The main area lists one model named 'videogames-xgboost-2018-04-18-07-02-00'. The 'Delete' button is highlighted with a red box.

Name	ARN	Creation time
videogames-xgboost-2018-04-18-07-02-00	arn:aws:sagemaker:us-east-1:326623638833:model/videogames-xgboost-2018-04-18-07-02-00	Apr 18, 2018 07:14 UTC

4. 清除Notebook

先停止

The screenshot shows the 'Notebook instances' list in the Amazon SageMaker console. The left sidebar shows 'Notebook' selected. The main area lists one notebook instance named 'hans-notebook'. The 'Stop' button is highlighted with a red box.

Name	Instance	Creation time	Status	Actions
hans-notebook	ml.m4.xlarge	Apr 03, 2018 08:46 UTC	InService	Open Stop

確認停止後刪除

The screenshot shows the 'Notebook instances' list in the Amazon SageMaker console. The left sidebar shows 'Notebook' selected (Step 1). The main area shows the notebook instance 'hans-notebook' with a 'Stopped' status (Step 2). The 'Actions' dropdown menu is highlighted with a red box (Step 3). The 'Delete' button is highlighted with a red box (Step 4).

Name	Instance	Creation time	Status	Actions
hans-notebook	ml.m4.xlarge	Apr 03, 2018 08:46 UTC	Stopped	Start

5. 清除S3

搜尋剛剛建立的S3 Bucket並選擇刪除

Amazon S3

Discover the new console Quick tips

1 Search bar: hans-work

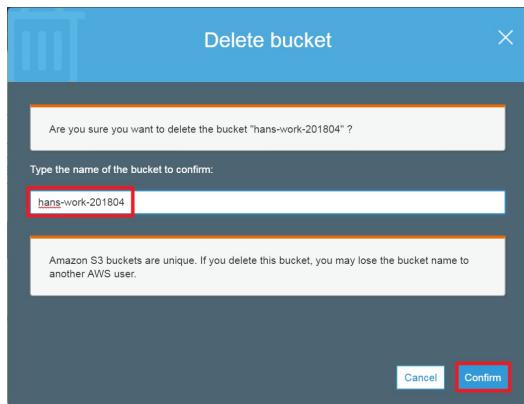
2 Bucket name: hans-work-201804

3 Buttons: + Create bucket, Delete bucket, Empty bucket

2 Buckets 0 Public 1 Regions

Access: Not public * Region: US East (N. Virginia) Date created: Apr 3, 2018 3:47:47 PM GMT+0800

填入想要刪除的S3 Bucket名稱後按確認



6. 清除IAM

Search IAM

Common Scenarios for Roles

Dashboard Groups Users **Roles** Policies Identity providers Account settings Credential report Encryption keys

Create role Delete role

Showing 1 result

Role name Description Trusted entities

AmazonSageMaker-ExecutionPolicy... SageMaker execution role created from the SageMaker A... AWS service: sagemaker

Search IAM

Create policy Policy actions

Filter: Policy type Show

Policy name Type Attachments Description

AmazonSageMaker-ExecutionPolicy... Customer managed 0

AmazonSageMaker-ExecutionPolicy... Customer managed 1

AmazonSageMaker-ExecutionPolicy... Customer managed 0

AmazonSageMaker-ExecutionPolicy... Customer managed 0

AmazonSageMakerFullAccess AWS managed 1 Provides full access to Amazon SageMaker via the AWS Management Console

AmazonSageMakerReadOnly AWS managed 0 Provides read only access to Amazon SageMaker via the AWS Management Console

AWSAccountUsageReportAccess AWS managed 0 Allows users to access the Account Usage Report page.

AWSServiceDiscoveryService AWS managed 0 Enables full admin access to run AgentlessDiscoveryService

AWSApplicationAutoScalingSageM... AWS managed 0 Policy granting permissions to Application Auto Scaling to access Sage

The screenshot shows the AWS IAM Policies page. On the left, a sidebar lists navigation options: Dashboard, Groups, Users, Roles, Policies (which is selected and highlighted in orange), Identity providers, Account settings, and Credential report. The main content area has a search bar labeled "Search IAM". At the top right are three icons: refresh, gear, and help. Below the search bar is a blue button labeled "Create policy". To its right is a dropdown menu labeled "Policy actions" with options "Attach" and "Detach". A red box highlights the "Delete" option in this dropdown. A table below lists policies, with the second row being the selected one (highlighted in blue). The columns are "Policy", "Type", "Attachments", and "Description". The "Policy" column shows the policy name followed by an ellipsis. The "Type" column shows "Customer managed" or "AWS managed". The "Attachments" column shows the count of attachments. The "Description" column shows a truncated description. The second policy in the list is described as "Provides full access to Amazon SageMaker via the AWS Management Con...".

Policy	Type	Attachments	Description
AmazonSageMaker-ExecutionPol...	Customer managed	0	
AmazonSageMaker-ExecutionPol...	Customer managed	1	
AmazonSageMaker-ExecutionPol...	Customer managed	0	
AmazonSageMaker-ExecutionPol...	Customer managed	0	
AmazonSageMaker-ExecutionPol...	AWS managed	1	Provides full access to Amazon SageMaker via the AWS Management Con...