Cloud Computing

Engineering School

University Autonoma of Barcelona

Daniel Franco

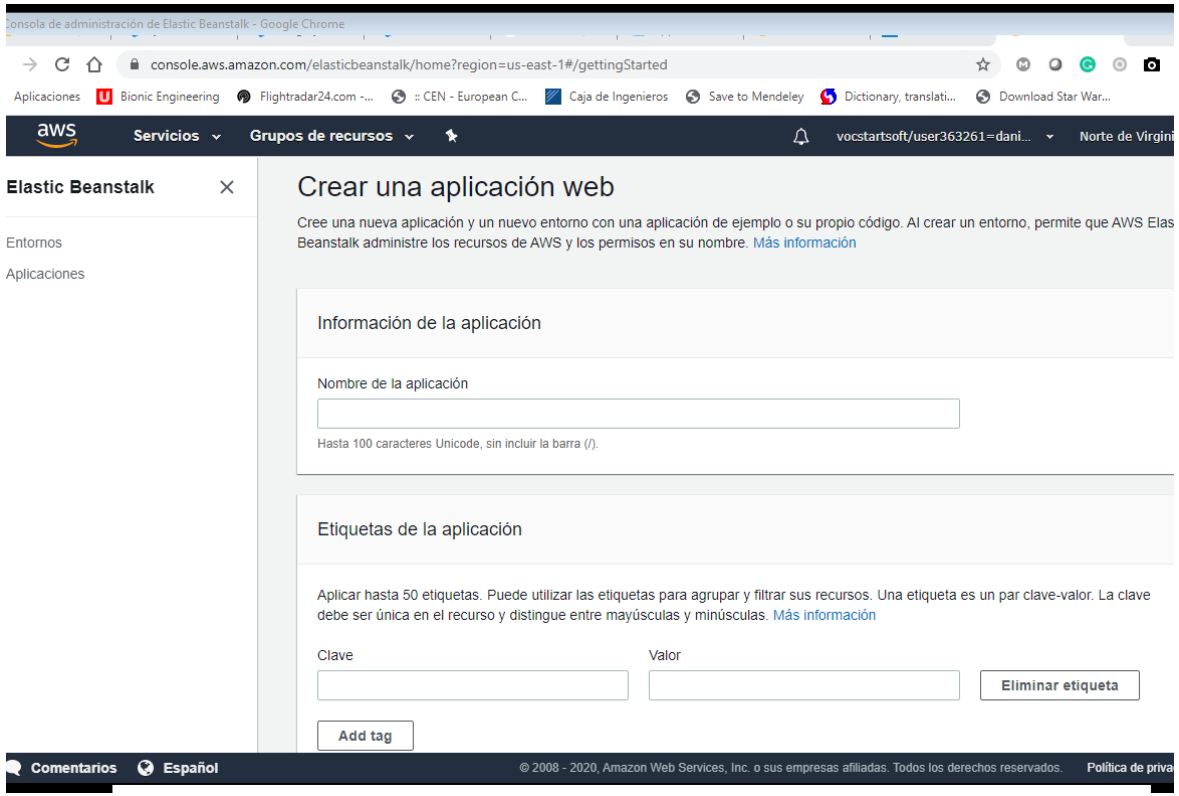
Infrastructure and Web Development

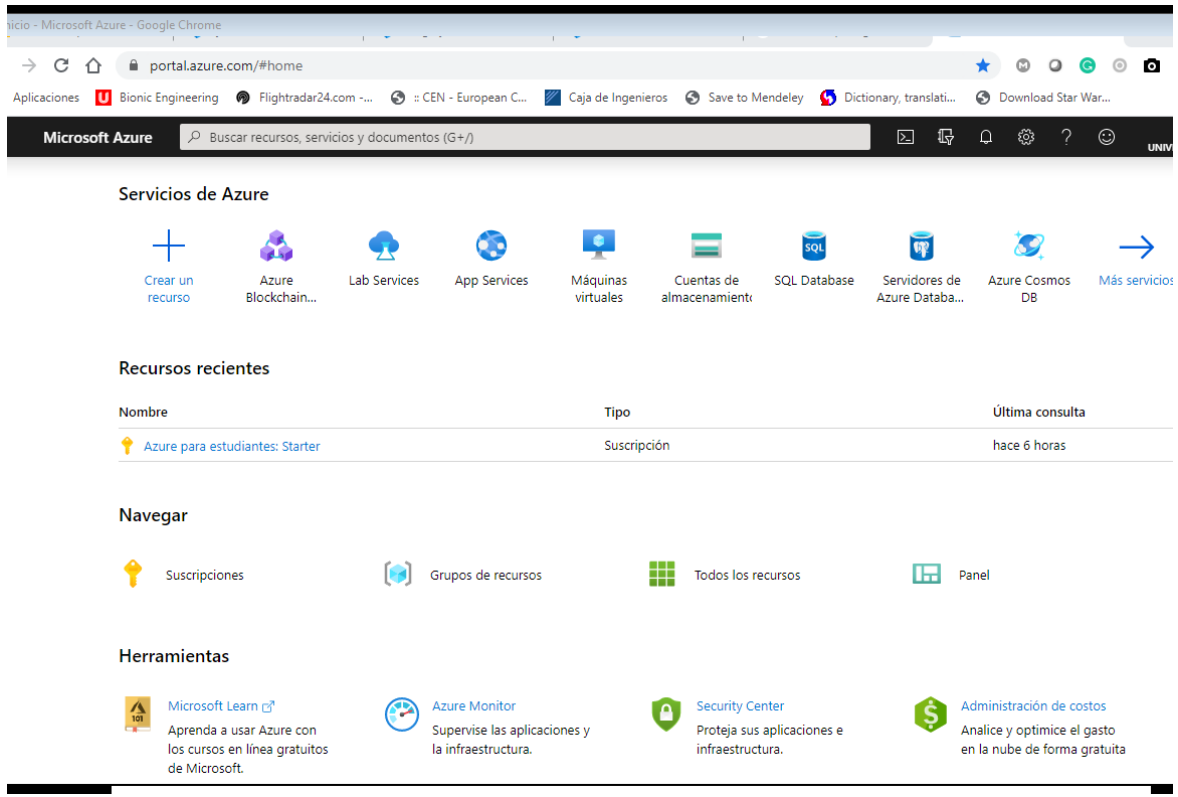
UAB Universitat Autònoma de Barcelona




What are we going to do?

- Manage your cloud suscription
- Create cloud services



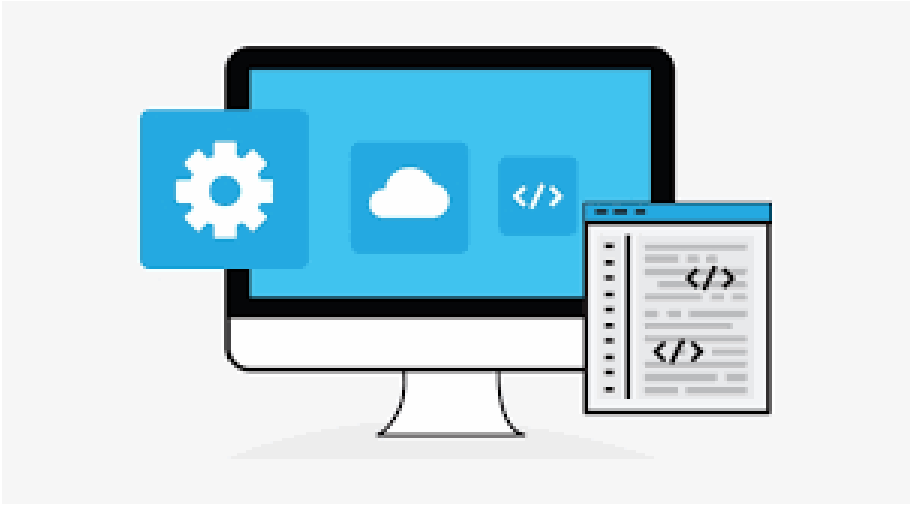


Developing & Connecting Cloud Services

Cloud Services

Adapted from https://docs.microsoft.com/es-es/azure/app-service/containers/tutorial-python-postgresql-app

- WEB APP
- DATA BASE



Back End Frameworks

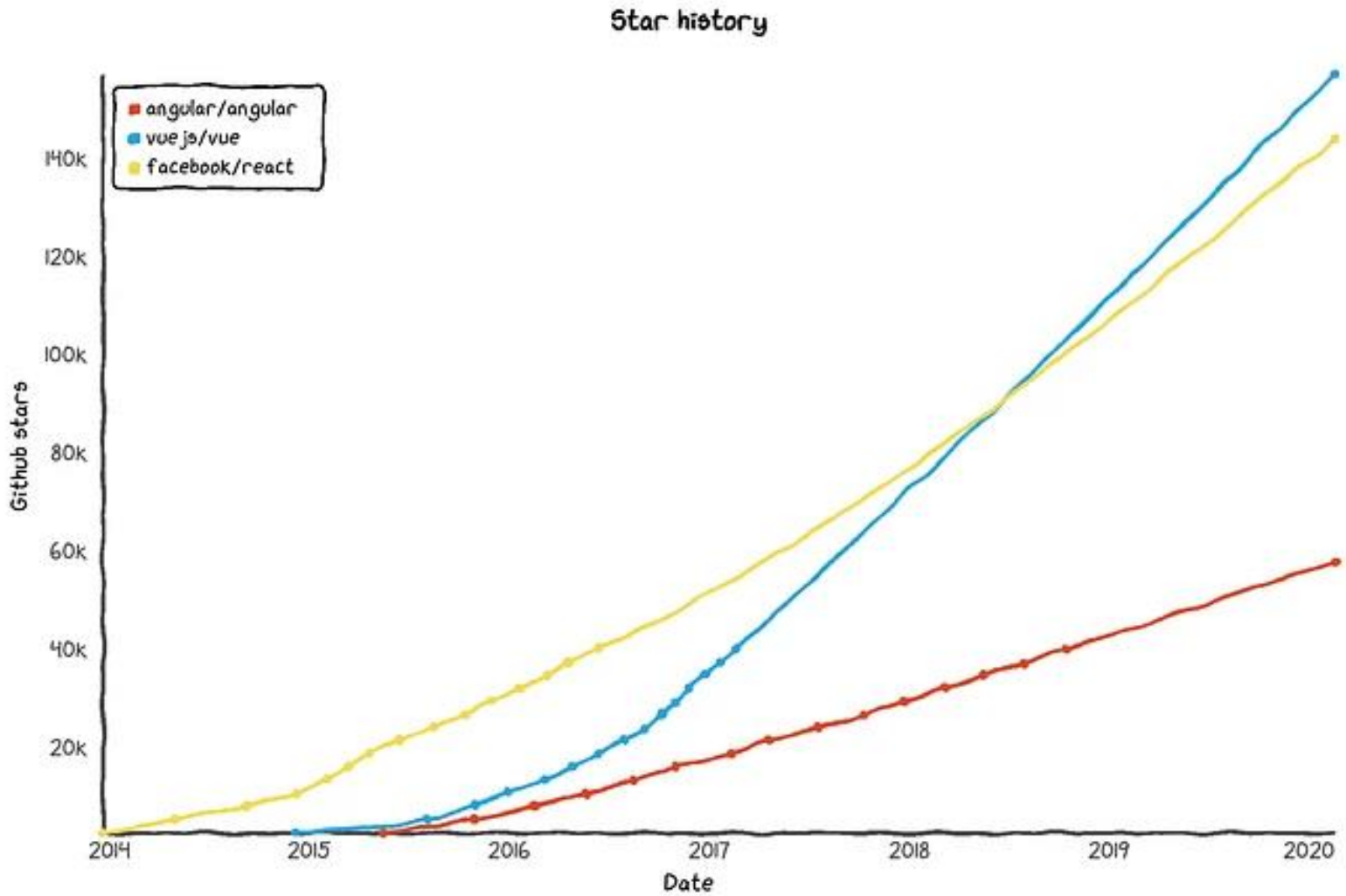
Web Development Frameworks

Django vs Laravel vs Node js

Programming Language	Web Framework
Python	Django, Flask, Tornado, web2py
Javascript	Angular, React, Vue.js, Node.js
PHP	Laravel, CodeIgniter, Symfony
Java	Spring, JSF, GWT

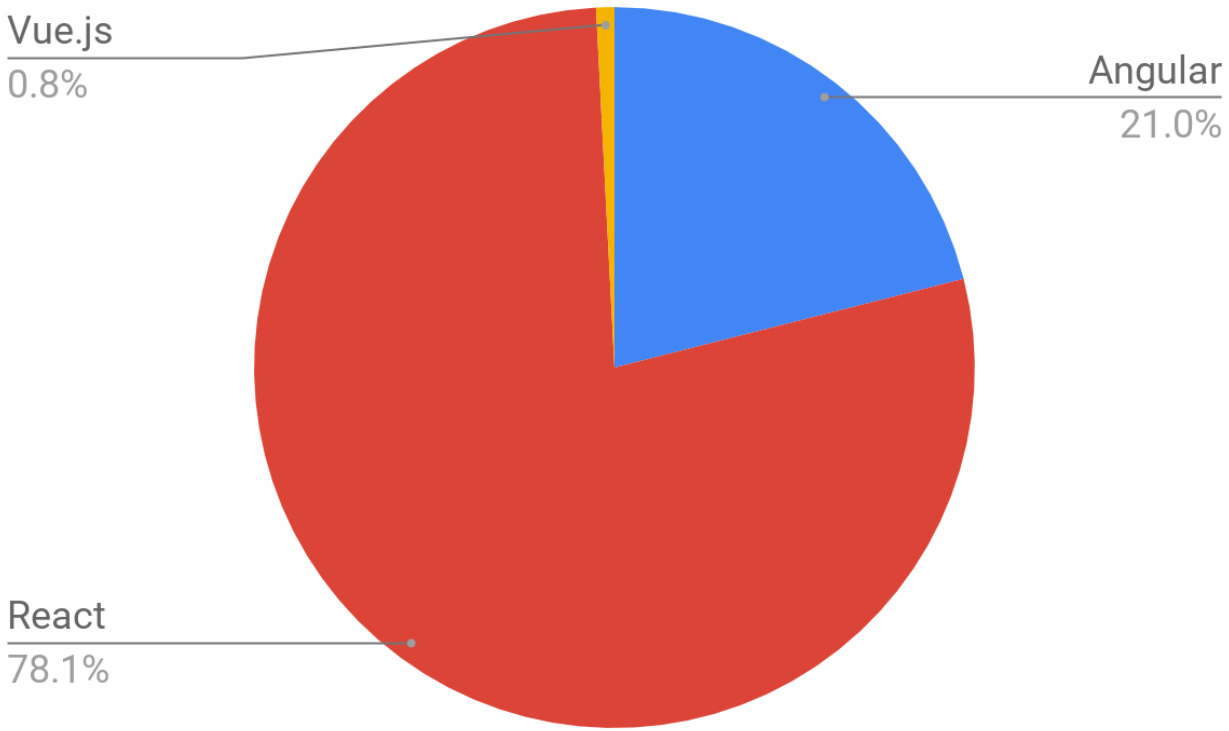
Front End Frameworks

Front End Frameworks



Front End Frameworks

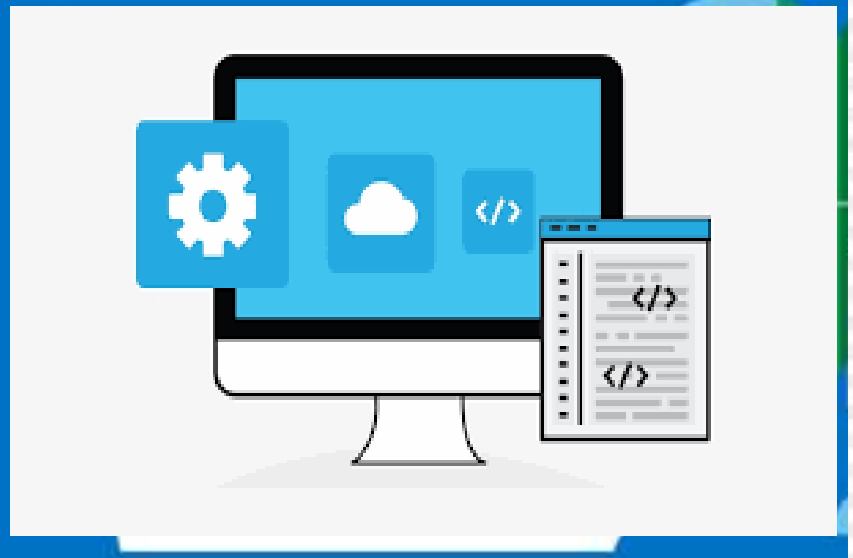
- Job Offers

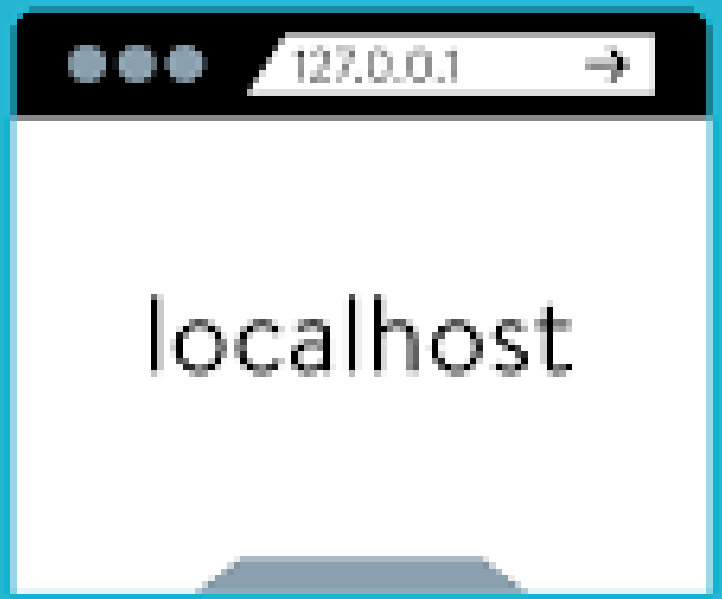


Web App Creation

- WEB APP
- DATA BASE

Microsoft Azure



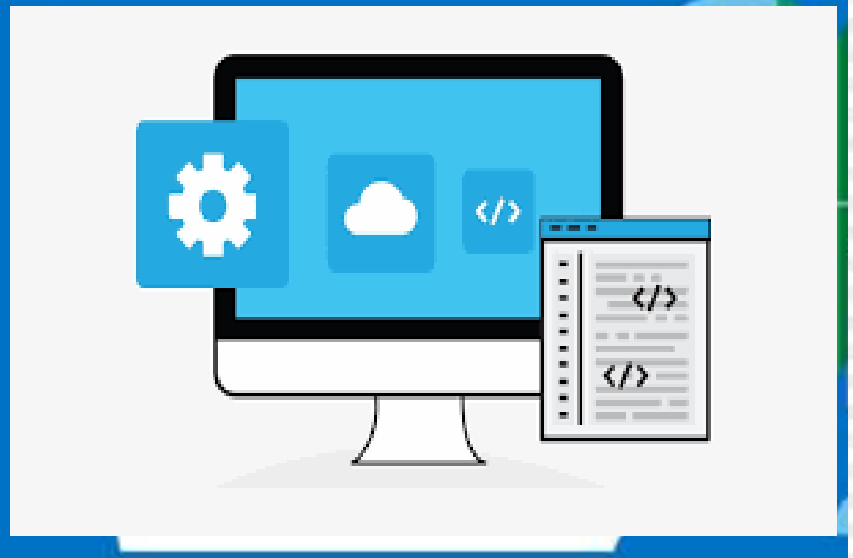

127.0.0.1
localhost


DB


127.0.0.1
localhost


Microsoft
Azure
DB

Microsoft Azure



1/3 Create Postgress DB

- python3 –version (bash) / py -3 –version (PowerShell)
- az --version
- az login
- git clone https://github.com/Azure-Samples/djangoapp
- cd djangoapp
- az extension add --name db-up
- az postgres up --resource-group DjangoPostgres-tutorial-rg --location centralus --sku-name B_Gen5_1 --server-name <postgres-server-name> --database-name pollsdb --admin-user <admin-username> --admin-password <admin-password> --ssl-enforcement Enabled

2/3 Create Web App

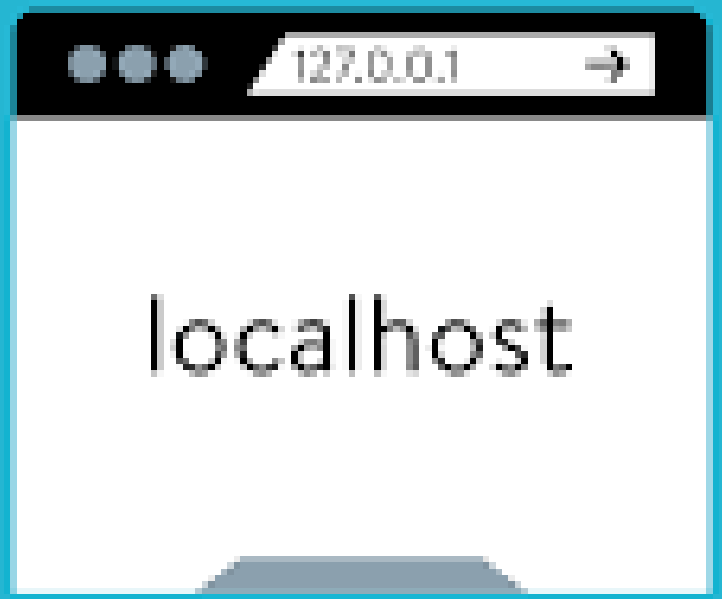
- az webapp up --resource-group DjangoPostgres-tutorial-rg --location centralus --plan DjangoPostgres-tutorial-plan --sku F1 --name <app-name>
- az webapp config appsettings set --settings DBHOST="<postgres-server-name>" DBUSER="<username>" DBPASS="<password>" DBNAME="pollsdb“
- az webapp ssh
  - # Run database migrations
  - python manage.py migrate
  - # Create the super user (follow prompts)
  - python manage.py createsuperuser

3/3 Browse your App

- az webapp browse
- http://<app-name>.azurewebsites.net/admin

- az webapp log tail

- Manage your app in the Azure portal


127.0.0.1
localhost


DB

1/2 Configure your App

- # Configure the Python virtual environment
- python3 -m venv venv (bash) / py -m venv .venv (PowerShell)
- source venv/bin/activate (bash) / .venv\scripts\activate (PowerShell)
- # Install dependencies
- pip install -r requirements.txt
- # Run Django migrations
- python manage.py migrate
- # Create Django superuser (follow prompts)
- python manage.py createsuperuser
- # Run the dev server
- python manage.py runserver

2/2 Run your App

- Go to http://localhost:8000 in a browser, which should display the message "No polls are available".
- Go to http://localhost:8000/admin and sign in using the admin user you created previously. Under Polls, again select Add next to Questions and create a poll question with some choices.
- Go to http://localhost:8000 again and answer the question to test the app.
- Stop the Django server by pressing Ctrl+C.


127.0.0.1
localhost


Microsoft
Azure
DB

Run a Python (Django) web app with PostgreSQL in Azure App Service

- Edit your local *env.ps1:*
  - $Env:DBHOST = "<postgresql-name>“
  - $Env:DBUSER = "manager"
  - $Env:DBNAME = "pollsdb"
  - $Env:DBPASS = "supersecretpass"
- In PowerShell:
  - .\env.ps1
  - python manage.py runserver

Run a Python (Django) web app with PostgreSQL in Azure App Service

- In web browser
  - *http://localhost:8000*
    - **No polls are available**.
  - *http://localhost:8000/admin*
    - **Add Questions**, and create a poll question with some choices.
  - *http://localhost:8000*
    - see the poll question and answer the question.
    - The local Django sample application writes and stores user data to the the Azure Database for PostgreSQL database.
- In PowerShell:
    - To stop the Django server, type Ctrl+C in the terminal.

Clean up resources

- az group delete --name Python-Django-PGFlex-rg --no-wait

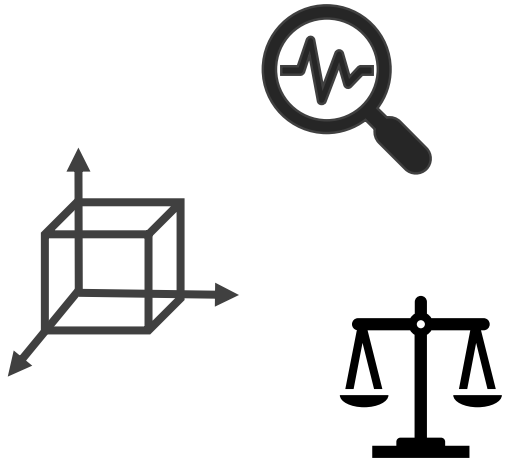
New version!!

- Tutorial sobre la implementación de una aplicación Django con App Service y el servidor flexible de Azure Database for PostgreSQL en una red virtual | Microsoft Learn
- https://learn.microsoft.com/es-es/azure/postgresql/flexible-server/tutorial-django-app-service-postgres?tabs=clone

AWS Elastic Beanstalk

AWS Elastic Beanstalk

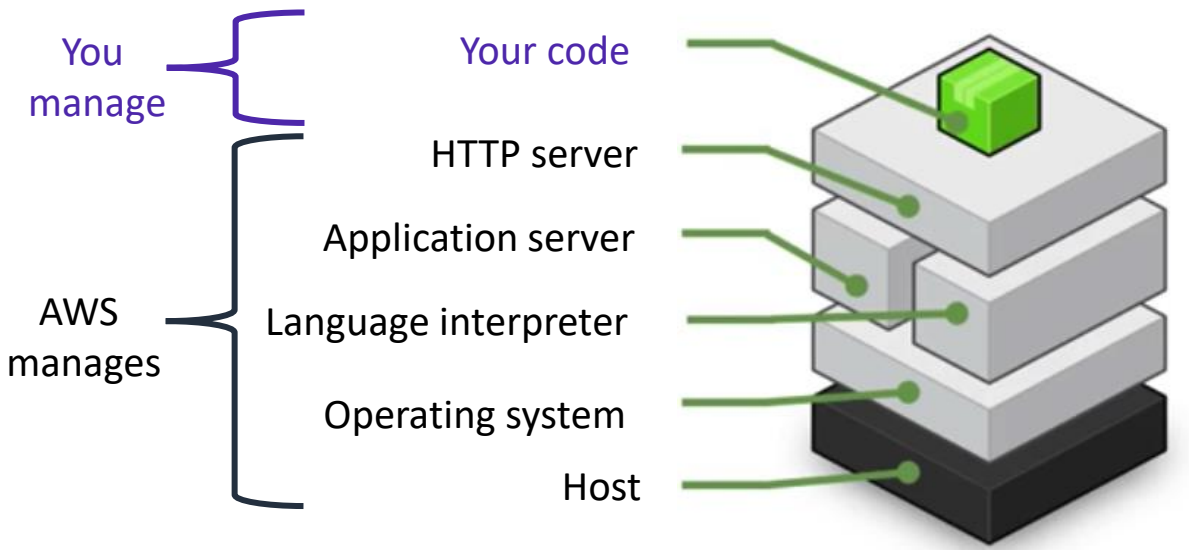
- Easy way to get web applications up and running
- Managed service that automatically handles –
  - Infrastructure provisioning and configuration
  - Deployment
  - Load balancing
  - Automatic scaling
  - Health monitoring
  - Analysis and debugging
  - Logging



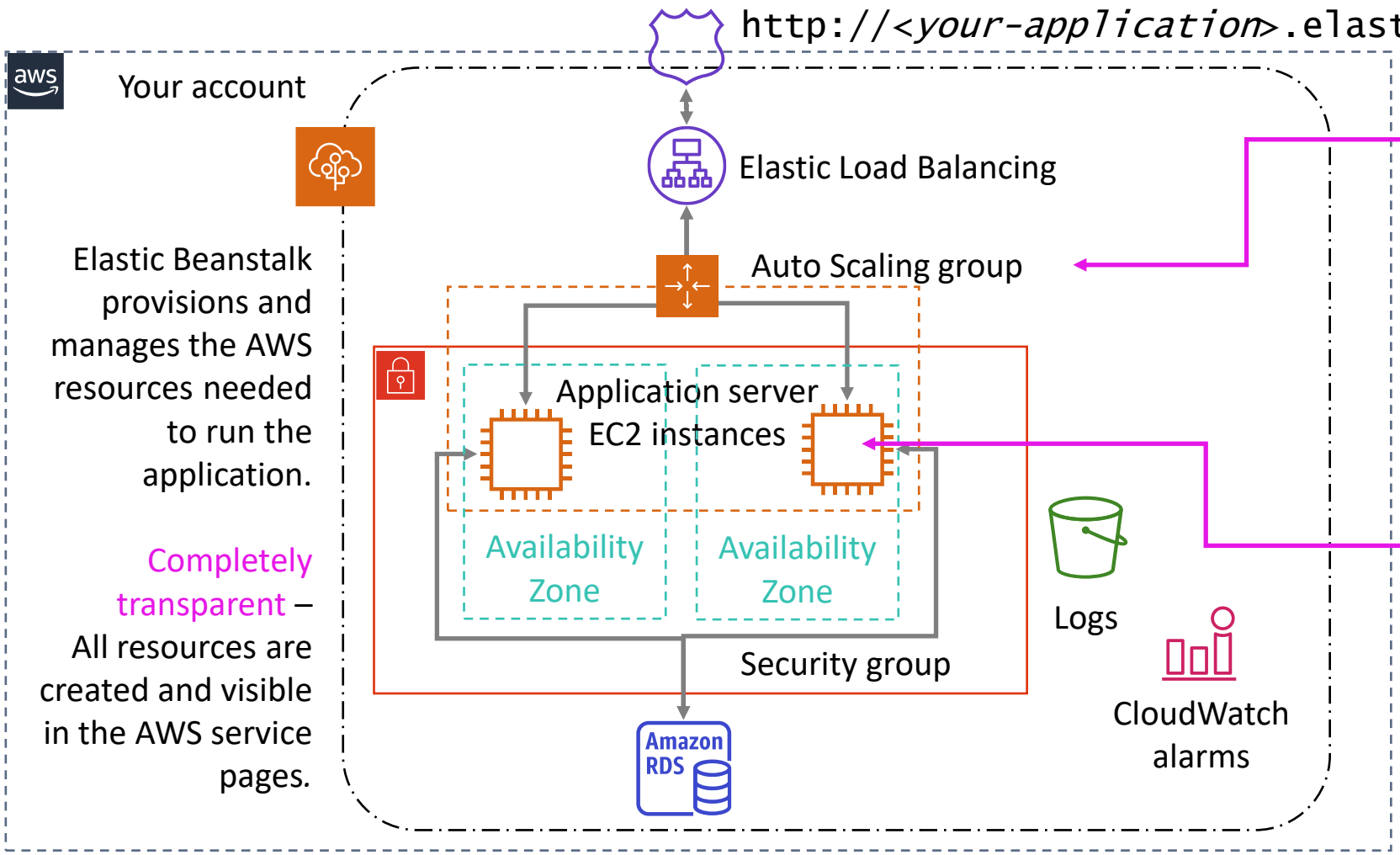
- No additional charge for using it
  - Pay only for the underlying resources that are used

AWS Elastic Beanstalk deployments

- It supports web applications written for common platforms
  - Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker
- You upload your code
  - Elastic Beanstalk automatically handles the deployment
  - Deploys on servers such as Apache, NGINX, Passenger, Puma, and Microsoft Internet Information Services (IIS)

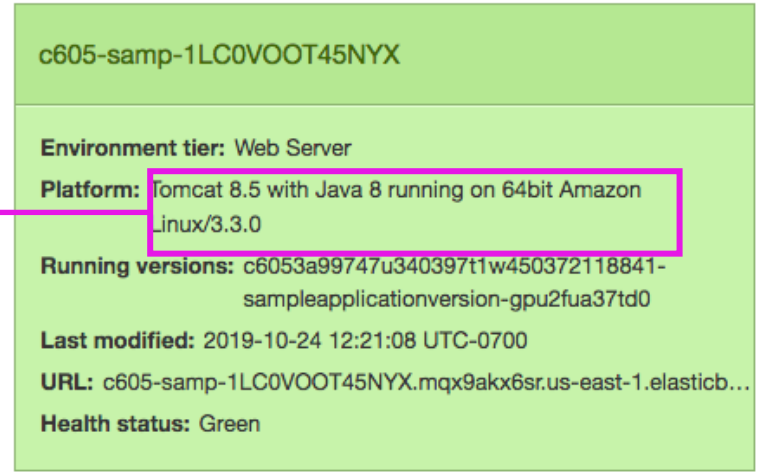


Elastic Beanstalk application environment

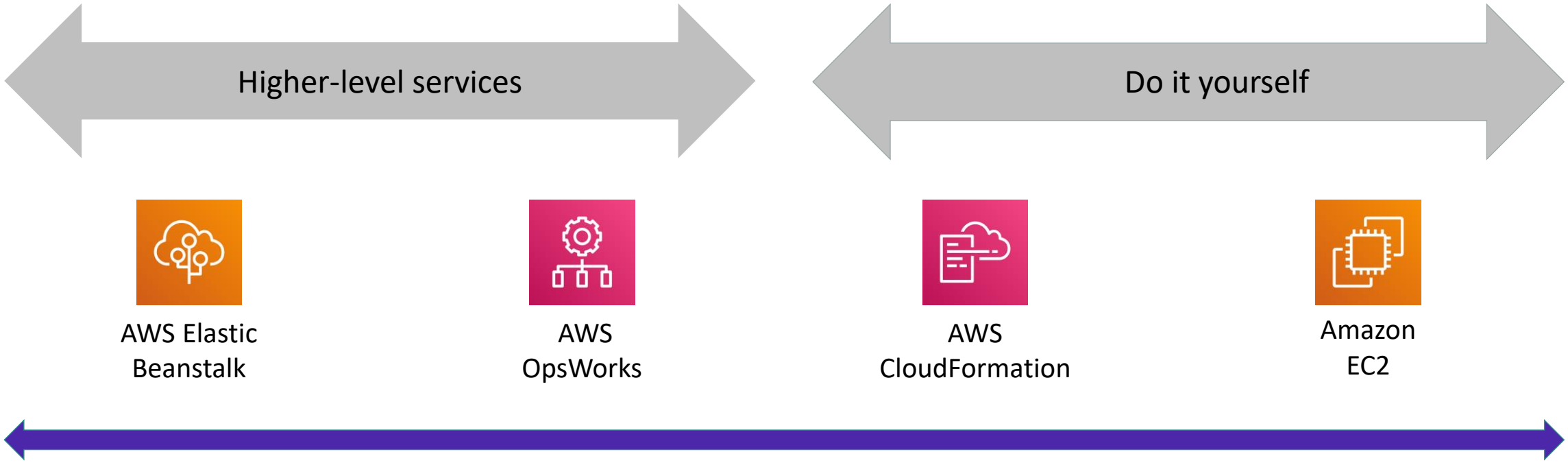


Automatically scales to meet your application's needs.

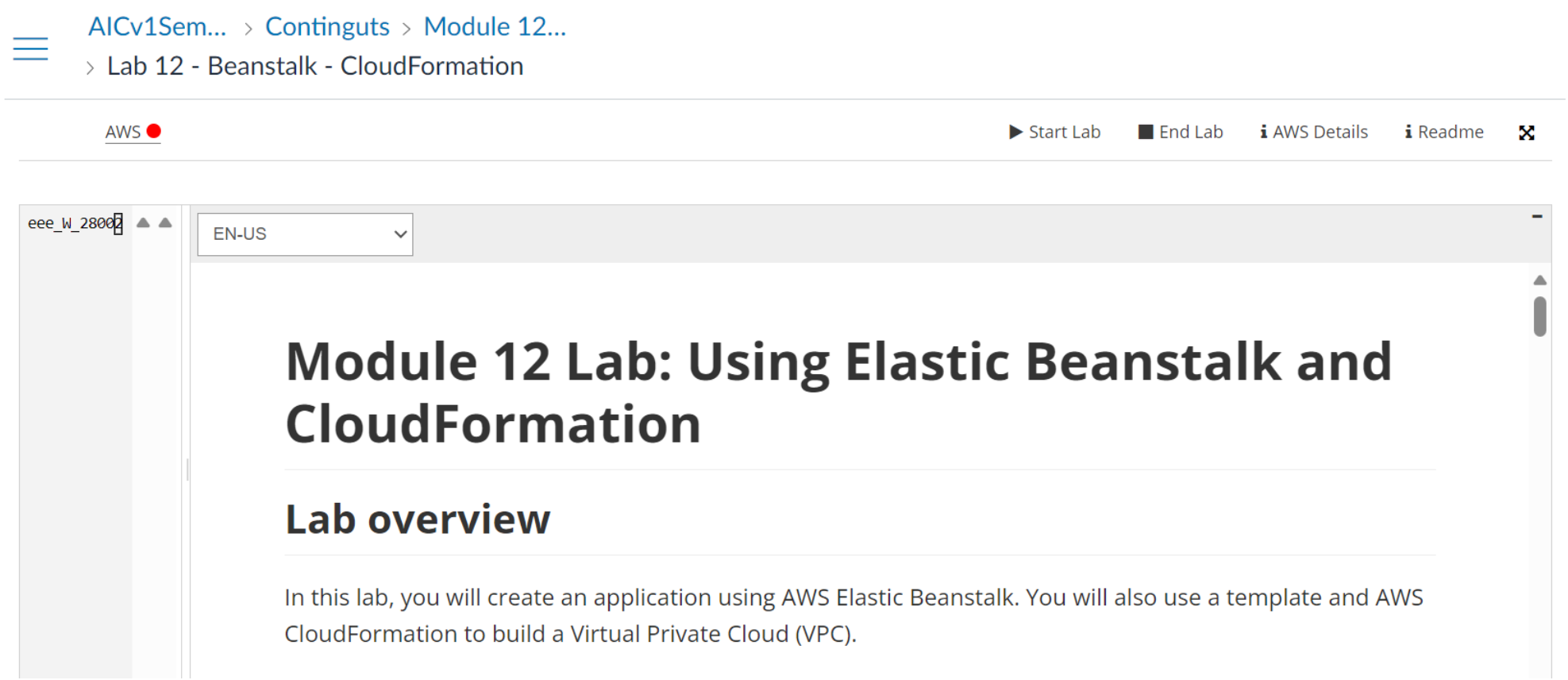
Example Elastic Beanstalk environment where your web application code can run:



Choosing the right automation solution



Lab: Using Elastic Beanstalk and CloudFormation



Other services

- IBM AI Cognitive Service

IBM Cloud

- **https://cloud.ibm.com/login**
- **https://cognitiveclass.ai/**
- **https://cognitiveclass.ai/applying-ibm-cloud-promo-code**
- **https://developer.ibm.com/tutorials/visual-recognition-challenge/**
- https://dataplatform.cloud.ibm.com/docs/content/wsj/analyze-data/visual-recognition-overview.html
- https://developer.ibm.com/tutorials/deploy-your-first-app-to-ibm-cloud/
- https://cognitiveclass.ai/learn/data-science-with-python
- https://cognitiveclass.ai/learn/data-science
- https://developer.ibm.com/tutorials/?fa=date%3ADESC&fb=
- https://developer.ibm.com/tutorials/category/continuous-integration,continuous-delivery/?fa=date%3ADESC&fb=
- https://developer.ibm.com/digitalconference/

Image Classifier - Test

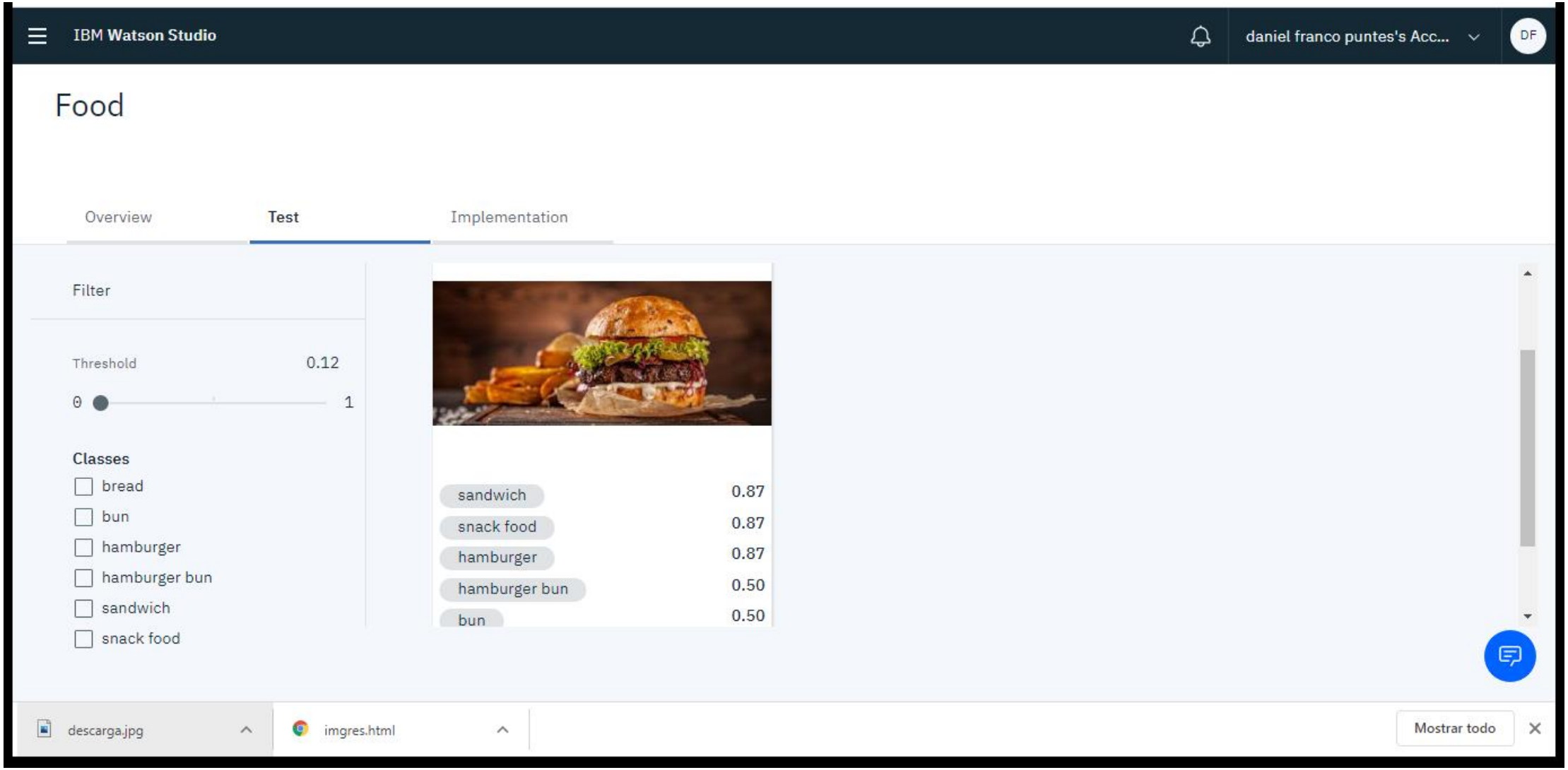


Image Classifier – Python Code Snippets

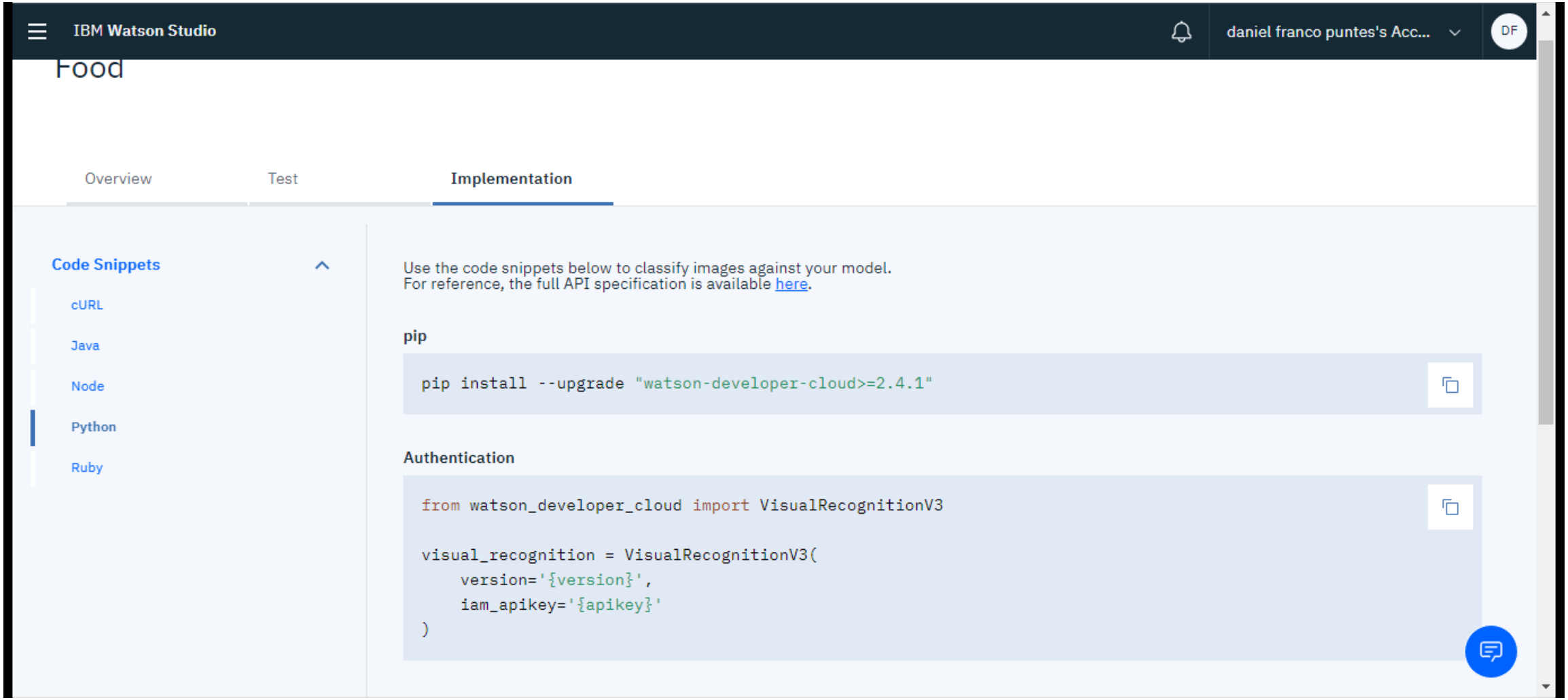
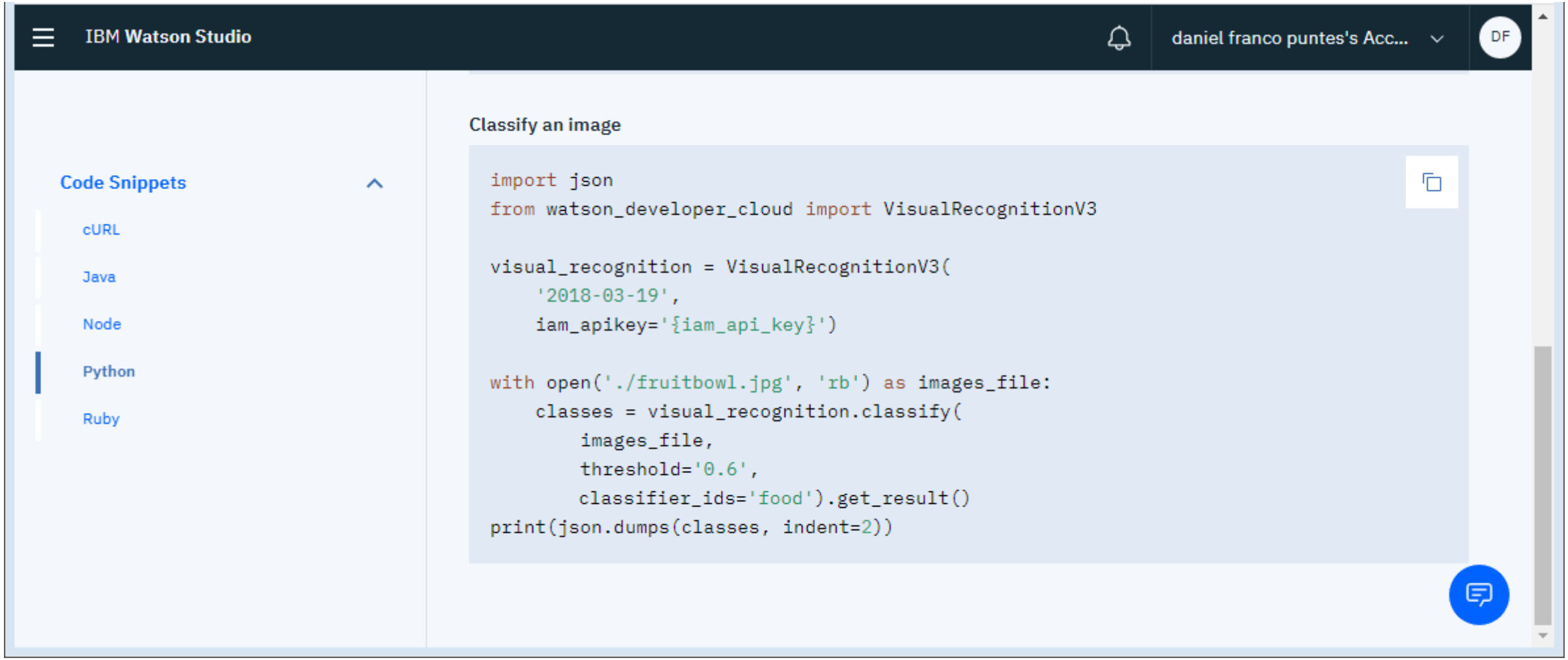
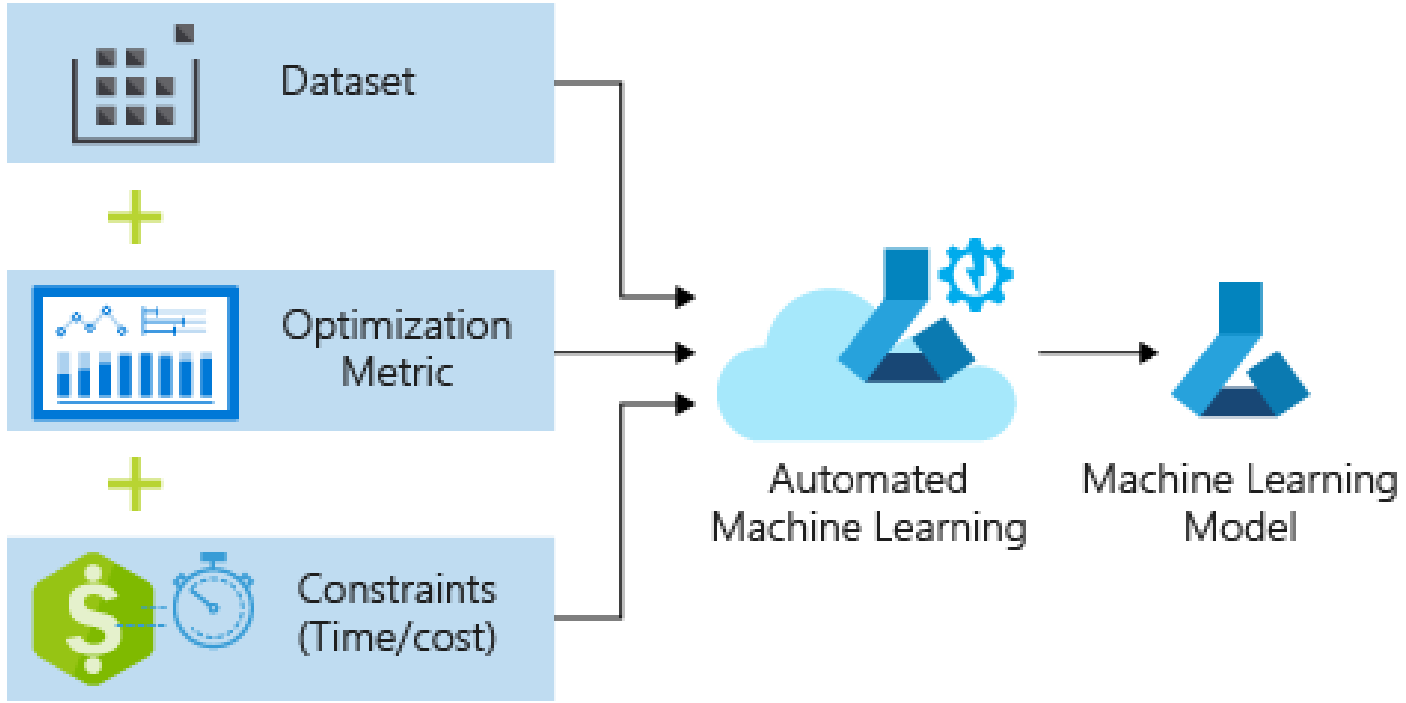


Image Classifier – Python Code Snippets



AZURE ML Labs



- Tutorial: AutoML- train no-code classification models - Azure Machine Learning | Microsoft Docs
- Tutorial: Demand forecasting & AutoML - Azure Machine Learning | Microsoft Docs
- Tutorial: AutoML-train regression model - Azure Machine Learning | Microsoft Docs

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Properties

Status
Running

Setting up the run

Validating run configuration

Created
May 5, 2022 5:54 PM

Started
May 5, 2022 5:54 PM

Compute target
automl-compute

Best model summary

No data

Run summary

Task type
Classification View configuration settings

Featurization
Auto

Primary metric
AUC weighted

Experiment name
my-1st-automl-experiment

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Properties

Status
Running

Model training

Created
May 5, 2022 5:54 PM

Started
May 5, 2022 5:54 PM

Compute target
automl-compute

Run ID

Best model summary

No data

Run summary

Task type
Classification View configuration settings

Featurization
Auto

Primary metric
AUC weighted

Experiment name
my-1st-automl-experiment

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Refresh | Deploy | Download | Explain model | View generated code (preview) | Edit columns | Reset view

Search

Submitted time | All filters | Clear all

Showing 1-5 of 5 models

Page size: 25

Algorithm name	Explained	AUC weighted ↓	Sampling	Submitted time	Dura
MaxAbsScaler, XGBoostClassifier		0.94172	100.00 %	May 5, 2022 6:01 PM	25s
StandardScalerWrapper, LightGBM		0.93110	100.00 %	May 5, 2022 6:01 PM	27s
MaxAbsScaler, RandomForest		0.90572	100.00 %	May 5, 2022 6:01 PM	26s
MaxAbsScaler, ExtremeRandomTrees		0.89353	100.00 %	May 5, 2022 6:01 PM	22s

MaxAbsScaler, LightGBM
0.94583
100.00 %
May 5, 2022 6:01 PM
24s
min_data_in_leaf : 20
SparseNormalizer, XGBoostClassifier
0.94221
100.00 %
May 5, 2022 6:01 PM
27s
booster : gbtree
colsample_bytree : 0.8
eta : 0.3
gamma
max_depth : 6
+7
SparseNormalizer, XGBoostClassifier
0.94181
100.00 %
May 5, 2022 6:01 PM
22s
booster : gbtree
colsample_bytree : 0.8
eta : 0.3
gamma : 0.1
max_depth : 10
+7
MaxAbsScaler, XGBoostClassifier
0.94172
100.00 %
May 5, 2022 6:01 PM
25s
tree_method : auto
SparseNormalizer, RandomForest
0.93590
100.00 %
May 5, 2022 6:01 PM
25s
bootstrap : true
class_weight : balanced
criterion : gini
max_features : sqrt
min_samples_leaf : 0.01
+3
SparseNormalizer, LightGBM
0.93414
100.00 %
May 5, 2022 6:01 PM
27s
boosting_type : goss
colsample_bytree : 0.7922222222222222
learning_rate : 0.09473736842105263
max_bin : 80
max_depth : 6
+8
StandardScalerWrapper, XGBoostClassifier
0.93287
100.00 %
May 5, 2022 6:01 PM
28s
booster : gbtree
colsample_bytree : 0.5
eta : 0.3
gamma
max_depth : 10
+7
StandardScalerWrapper, LightGBM
0.93110
100.00 %
May 5, 2022 6:01 PM
27s
boosting_type : gbdt
colsample_bytree : 0.4955555555555555
learning_rate : 0.09473736842105263
max_bin : 140
max_depth : 6
+8
MaxAbsScaler, RandomForest
0.90572
100.00 %
May 5, 2022 6:01 PM
26s
bootstrap : true
class_weight
criterion : gini
max_features : log2
min_samples_leaf : 0.01
+3
MaxAbsScaler, ExtremeRandomTrees
0.89353
100.00 %
May 5, 2022 6:01 PM
22s
bootstrap
class_weight
criterion : gini
max_features : 0.7
min_samples_leaf : 0.035789473684210524
+3
MaxAbsScaler, RandomForest
0.87956
100.00 %
May 5, 2022 6:01 PM
27s
bootstrap : true
class_weight : balanced
criterion : gini
max_features : log2
min_samples_leaf : 0.06157894736842105
+3

MaxAbsScaler, ExtremeRandomTrees
0.82578
100.00 %
May 5, 2022 6:01 PM
32s

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Properties

Status
Completed

Warning: Experiment timeout reached, hence experiment stopped. Current experiment timeout: 1 hour(s) 0 minute(s)

See more details

Created
May 5, 2022 5:54 PM

Started
May 5, 2022 5:54 PM

Duration
1h 12m 16.92s

Best model summary

Algorithm name
VotingEnsemble

Ensemble details
View ensemble details

AUC weighted
0.94816 View all other metrics

Sampling
100.00 %

Registered models
No registration yet

Deploy status
No deployment yet

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Refresh | Deploy | Download | Explain model | View generated code (preview) | Edit columns | Reset view

Search

Submitted time | All filters | Clear all

Showing 1-43 of 43 models

Page size: 50

Algorithm name		weighted	Sampling	Submitted time	Dura
VotingEnsemble	View explanation	0.94816	100.00 %	May 5, 2022 7:01 PM	4s
StackEnsemble		0.94798	100.00 %	May 5, 2022 7:01 PM	4s
MaxAbsScaler, LightGBM		0.94606	100.00 %	May 5, 2022 6:25 PM	4s
MaxAbsScaler, LightGBM		0.94583	100.00 %	May 5, 2022 6:01 PM	24s

AutoML_5a6ad552-6d31-4b7b-b108-24a4cf8587c3_45

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Refresh | Deploy | Download | Explain model | View generated code (preview) | Edit columns | Reset view

Search

Submitted time | All filters | Clear all

Showing 1-43 of 43 models

Page size: 50

Algorithm name		weighted	Sampling	Submitted time	Dura
VotingEnsemble	View explanation	0.94816	100.00 %	May 5, 2022 7:01 PM	4s
StackEnsemble		0.94798	100.00 %	May 5, 2022 7:01 PM	4s
MaxAbsScaler, LightGBM		0.94606	100.00 %	May 5, 2022 6:25 PM	4s
MaxAbsScaler, LightGBM		0.94583	100.00 %	May 5, 2022 6:01 PM	24s

AutoML_5a6ad552-6d31-4b7b-b108-24a4cf8587c3_45

happy_line_pht00z5z

Refresh | Edit and submit (preview) | Cancel | Delete

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

Success: Explainability run successfully created. You can view the run status in the "Child runs" tab. Once the run is complete, the explainability tab will populate with your explanations.

Refresh | Deploy | Download | Explain model | View generated code (preview) | Edit columns | Reset view

Search

Submitted time | All filters | Clear all

Showing 1-43 of 43 models

Page size: 50

Algorithm name	Explained	AUC weighted ↓	Sampling	Submitted time	Dura
VotingEnsemble	View explanation	0.94816	100.00 %	May 5, 2022 7:01 PM	4s
StackEnsemble		0.94798	100.00 %	May 5, 2022 7:01 PM	4s
MaxAbsScaler, LightGBM		0.94606	100.00 %	May 5, 2022 6:25 PM	4s

https://ml.azure.com/experiments/id/12e9f0d9-d63e-4c3d-b7b5-28c9a8b45f04/runs/AutoML_5a6ad552-6d31-4b7b-b108-24a4cf8...

Microsoft Azure Machine Learning Studio

Azure for Students
mlfromuab

DF

mlfromuab > Experiments > my-1st-automl-experiment > happy_line_pht00z5z > patient_school_5f0wg8j0

This job is using the new compute runtime to improve performance. You can expect to see a different log structure along with the new runtime.

patient_school_5f0wg8j0

Refresh | Deploy | Download | Explain model | View generated code (preview) | Test model (preview) | Cancel | Delete

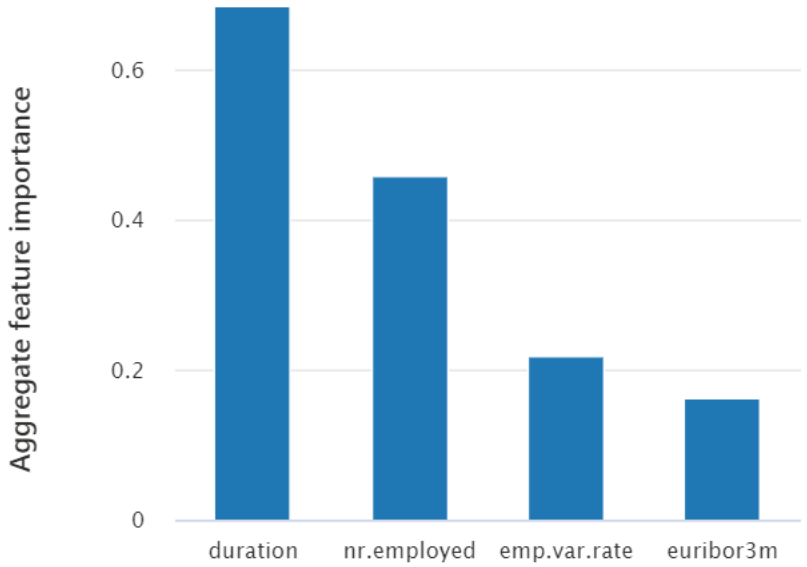
Details | Model | Explanations (preview) | Metrics | Data transformation (preview) | Test results (preview) | Outputs + logs | Images | Child runs | Snapshot | Monit

0 filters

Explanation ID

50e76c96

b649a202



Sort by datapoint

All data

Chart type

Bar

Box

https://ml.azure.com/experiments/id/12e9f0d9-d63e-4c3d-b7b5-28c9a8b45f04/runs/AutoML_5a6ad552-6d31-4b7b-b108-24a4cf8...

Microsoft Azure Machine Learning Studio

Azure for Students
mlfromuab

DF

mlfromuab > Experiments > my-1st-automl-experiment > happy_line_pht00z5z > patient_school_5f0wg8j0

This job is using the new compute runtime to improve performance. You can expect to see a different log structure along with the new runtime.

patient_school_5f0wg8j0

Refresh | Deploy | Download | Explain mo

Details | Model | Explanations (preview) | Metrics

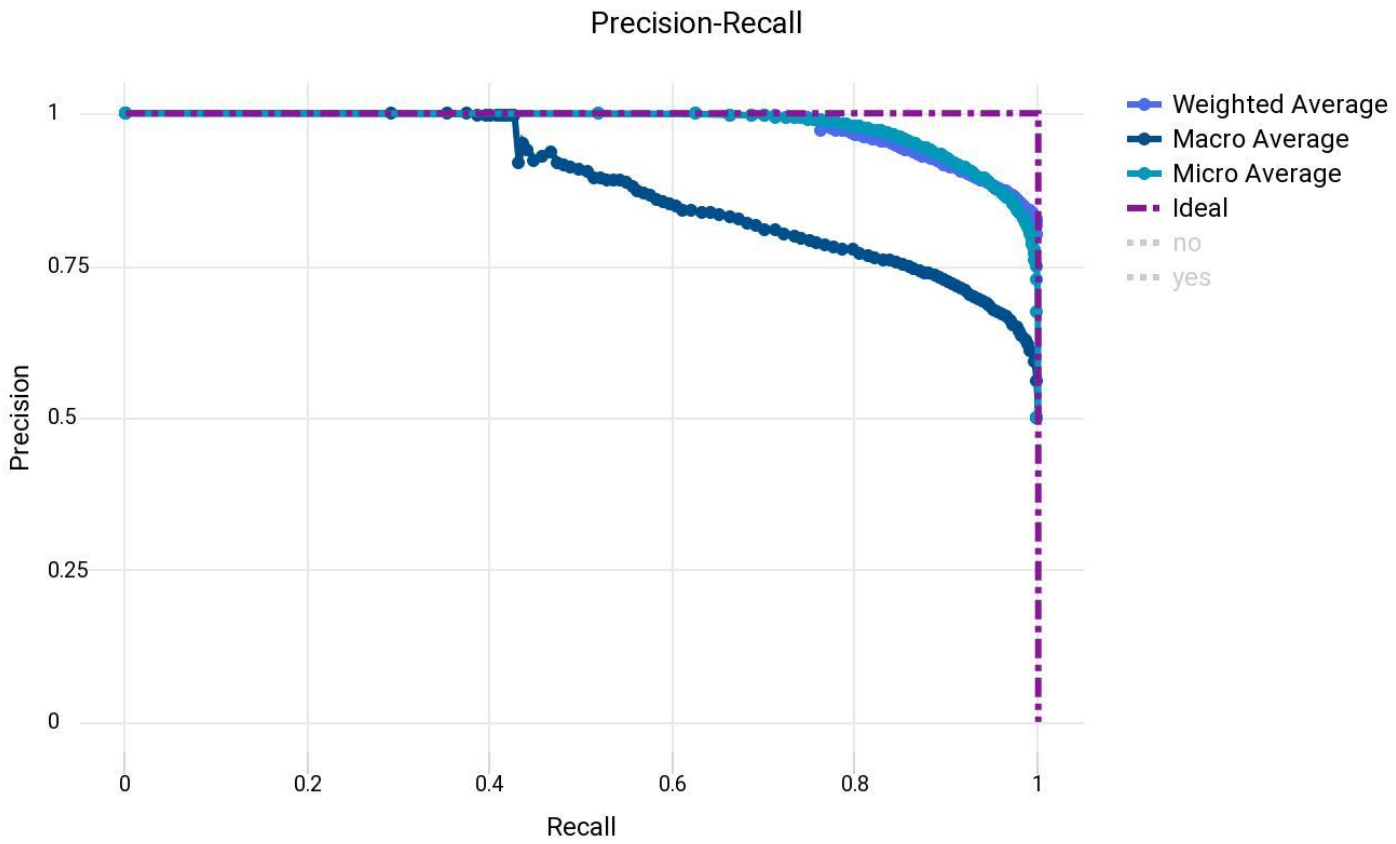
Select a metric to see a visualization or table of the data.

Search

- accuracy
- accuracy_table
- AUC_macro
- AUC_micro
- AUC_weighted

View as:

accurac
0.915



Moni

my-automl-deploy

Details | Test | Consume | Deployment logs

Input data to test real-time endpoint

Test

Select editor type

(•) Form editor ( ) JSON editor

data

age

40

job

example_value

marital

example_value

Test result


```
{
  "Results": [
    "no"
  ]
}
```

This job is using the new compute runtime to improve performance. You can expect to see a different log structure along with the new runtime.

patient_school_5f0wg8j0

Refresh | Deploy | Download | Explain model | View generated code (preview) | Test model (preview) | Cancel | Delete

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

Model summary

Algorithm name
VotingEnsemble

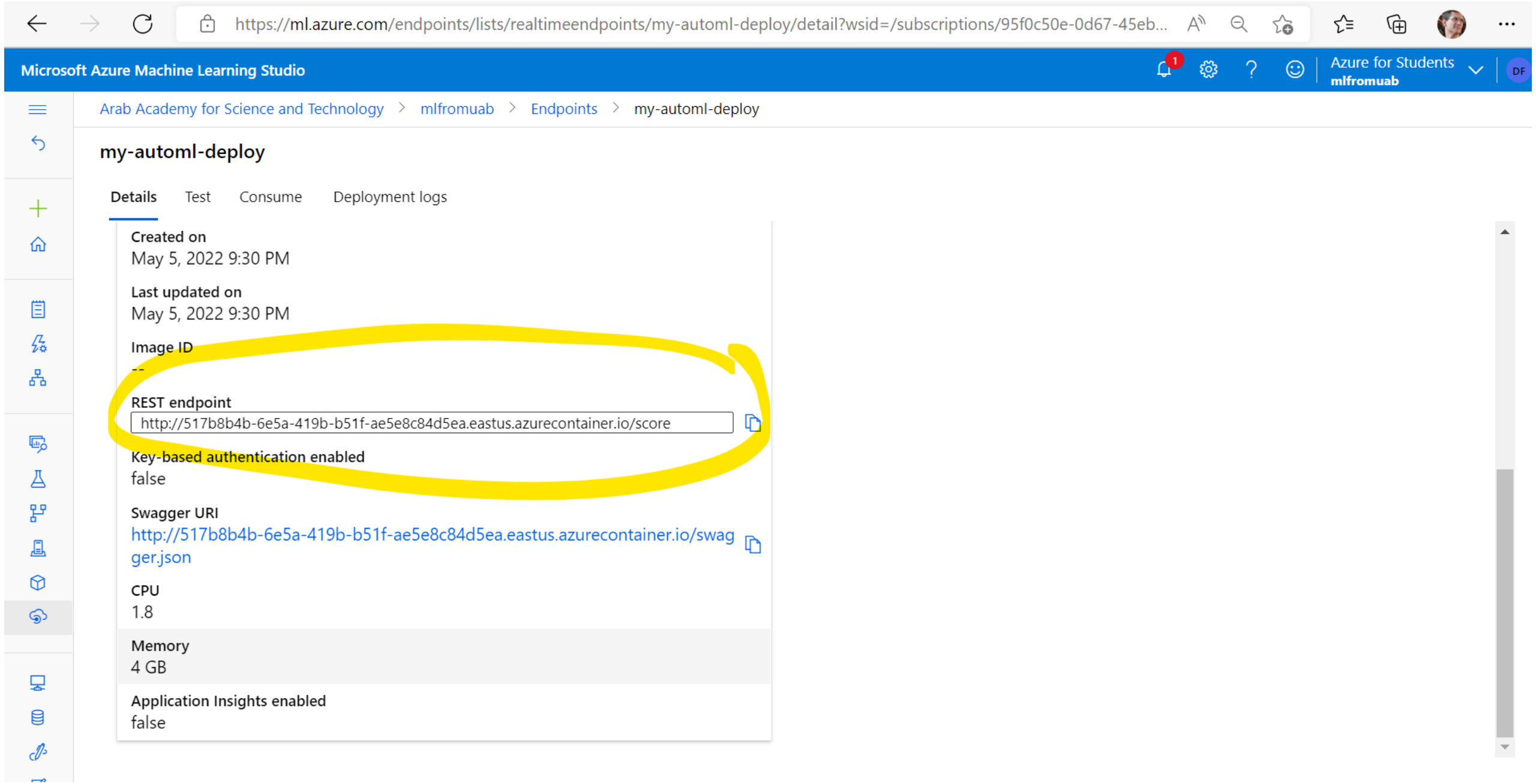
Ensemble details
View ensemble details

AUC weighted
0.94816 View all other metrics

Sampling
100.00 %

Registered models
AutoML5a6ad552645:1

Deploy status
my-automl-deploy Succeeded


https://ml.azure.com/endpoints/lists/realtimeendpoints/my-automl-deploy/detail?wsid=/subscriptions/95f0c50e-0d67-45eb...
Microsoft Azure Machine Learning Studio
Azure for Students
mlfromuab
Arab Academy for Science and Technology
mlfromuab
Endpoints
my-automl-deploy
my-automl-deploy
Details
Test
Consume
Deployment logs
Created on
May 5, 2022 9:30 PM
Last updated on
May 5, 2022 9:30 PM
Image ID
--
REST endpoint
http://517b8b4b-6e5a-419b-b51f-ae5e8c84d5ea.eastus.azurecontainer.io/score
Key-based authentication enabled
false
Swagger URI
http://517b8b4b-6e5a-419b-b51f-ae5e8c84d5ea.eastus.azurecontainer.io/swagger.json
CPU
1.8
Memory
4 GB
Application Insights enabled
false

my-automl-deploy

Details | Test | Consume | Deployment logs

Input data to test real-time endpoint

Test

Select editor type

(•) Form editor ( ) JSON editor

data

age
0

job
example_value

marital
example_value

education
example_value

Test result


```
{
  "Results": [
    "no"
  ]
}
```

Build an AI web app by using Python and Flask

- Learn how to set up a Flask development environment
- Learn how to use Flask to build a form
- Learn how to use the Translator service to translate text

AWS Computer Vision
Amazon Rekognition Custom Labels

Amazon Rekognition Custom Labels

- Get started
- Projects Updated
- circuit_boards_1
  - Dataset
- Pricing
- Documentation

NEW! Amazon Rekognition Custom Labels now manages datasets within a project.
You can now create datasets for your projects with the console or AWS SDK. If you have previously used Amazon Rekognition Custom Labels, your older datasets need to be associated with a new project.

Learn more

Custom Labels > Projects > circuit_boards_1

We notice you're using an unsupported browser version. Amazon Rekognition Custom Labels supports only the most recent stable versions of Firefox, Chrome and Edge.

circuit_boards_1 Info

How it works

Creating your dataset

1. Create dataset

A dataset is a collection of images, and image labels, that you use to train or test a model.

Created

2. Label images

Labels identify objects, scenes, or concepts on an entire image, or they identify object locations on an image.

Add labels

Training your mode

3. Train model

Depending on the training dataset, the training model finds image-level scenes and concepts, or it finds object locations.

Train model

Evaluating your model

4. Check performance metrics

Performance metrics tell you if your model needs additional training before you can use it.

Check metrics

Amazon Rekognition Custom Labels

- Get started
- Projects Updated
- circuit_boards_1

Pricing

Documentation

Your model is running. You incur charges while it is running. Stop your model if it's not being used.

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Learn more

Custom Labels > Projects > circuit_boards_1 > Models > circuit_boards_1.2022-05-04T16.47.47

We notice you're using an unsupported browser version. Amazon Rekognition Custom Labels supports only the most recent stable versions of Firefox, Chrome and Edge.

circuit_boards_1.2022-05-04T16.47.47 Info

Delete model

Evaluation | Model details | Use model | Tags

Evaluation
The Evaluation tab shows the testing results for your trained model. This helps you understand the overall performance of your model. To view the results for an image, choose the View test results button.

Evaluation results

View test results

F1 score Info	Average precision Info	Overall recall Info
0.726	0.836	0.657

Amazon Rekognition Custom Labels

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test a model.

Created

identify object locations on an image.

Add labels

scenes and concepts, or it finds object locations.

Train model

before you can use it.

Check metrics

Project details

Project name	Created	Dataset	Models
circuit_boards_1	May 04, 2022 at 16:44:15 (UTC+02:00)	4 training labels, 16 training images, 4 test labels, 16 test images	2

Models (2)

Delete model | Download validation results

Find resources

1 ...

Name	Date created	Training dataset	Test dataset	Model performance (F1 score)	Model status	Status message
circuit_boards_1.2022-05-04T16.47.47	May 04, 2022			0.726	STARTING	The model is starting.
circuit_boards_1.2022-05-04T16.45.36	May 04, 2022			0.726	TRAINING_COMPLETED	The model is ready to run.

https://us-east-1.console.aws.amazon.com/rekognition/custom-labels#/projects/circuit_board...

aws | Services | Search for services, features, blogs, docs, and more [Alt+S] | Select a Region | voclabs/user363261=Daniel_Franco @ 3072-7320-1625

VPC | EC2

Amazon Rekognition Custom Labels

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Pricing

Documentation

Your model is starting. It might take up to 30 minutes to start running.

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Learn more

Custom Labels > Projects > circuit_boards_1 > Models > circuit_boards_1.2022-05-04T16.47.47

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circuit_boards_1.2022-05-04T16.47.47 Info

Delete model

Evaluation | Model details | Use model | Tags

Use model
Use the Use model tab to start and stop your model. Code examples for using your trained model are provided.

Use your model

Amazon Resource Name (ARN)

arn:aws:rekognition:us-east-1:307273201625:project/circuit_boards_1/version/circuit_boards_1.2022-05-04T16.47.47/1651675717461

API Code

Use your model circuit_boards_1.2022-05-04T16.47.47 by calling the following AWS CLI commands or Python scripts. You can start and stop the model, and analyze custom labels in new images.

- ○ AWS CLI command
- ◉ Python

Start model

Sample python script to start the circuit_boards_1.2022-05-04T16.47.47 model.

```python
#Copyright 2020 Amazon.com, Inc. or its affiliates. All Rights Reserved.
#PDX-License-Identifier: MIT-0 (For details, see https://github.com/awsdocs/amazon-rekognition-custom-labels-developer-guide/bl

import boto3

def start_model(project_arn, model_arn, version_name, min_inference_units):

    client=boto3.client('rekognition')

    try:
        # Start the model
        print('Starting model: ' + model_arn)
        response=client.start_project_version(ProjectVersionArn=model_arn, MinInferenceUnits=min_inference_units)
        # Wait for the model to be in the running state
        project_version_running_waiter = client.get_waiter('project_version_running')
        project_version_running_waiter.wait(ProjectArn=project_arn, VersionNames=[version_name])

        #Get the running status
        describe_response=client.describe_project_versions(ProjectArn=project_arn,
            VersionNames=[version_name])
        for model in describe_response['ProjectVersionDescriptions']:
            print("Status: " + model['Status'])
            print("Message: " + model['StatusMessage'])
    except Exception as e:
        print(e)

    print('Done...')

def main():
    project_arn='arn:aws:rekognition:us-east-1:307273201625:project/circuit_boards_1/1651675504840'
    model_arn='arn:aws:rekognition:us-east-1:307273201625:project/circuit_boards_1/version/circuit_boards_1.2022-05-04T16.47.47
    min_inference_units=1
    version_name='circuit_boards_1.2022-05-04T16.47.47'
    start_model(project_arn, model_arn, version_name, min_inference_units)

if __name__ == "__main__":
    main()
```

Analyze image

Sample python script to analyze an image with the circuit_boards_1.2022-05-04T16.47.47 model. Replace MY_BUCKET and MY_IMAGE_KEY with your S3 bucket name and image key (name).

```python
#Copyright 2020 Amazon.com, Inc. or its affiliates. All Rights Reserved.
#PDX-License-Identifier: MIT-0 (For details, see https://github.com/awsdocs/amazon-reko

import boto3
import io
from PIL import Image, ImageDraw, ExifTags, ImageColor, ImageFont

def display_image(bucket,photo,response):
    # Load image from S3 bucket
    s3_connection = boto3.resource('s3')

    s3_object = s3_connection.Object(bucket,photo)
    s3_response = s3_object.get()

    stream = io.BytesIO(s3_response['Body'].read())
    image=Image.open(stream)

    # Ready image to draw bounding boxes on it.
    imgWidth, imgHeight = image.size
    draw = ImageDraw.Draw(image)

    # calculate and display bounding boxes for each detected custom label
    print('Detected custom labels for ' + photo)
    for customLabel in response['CustomLabels']:
        print('Label ' + str(customLabel['Name']))
        print('Confidence ' + str(customLabel['Confidence']))
        if 'Geometry' in customLabel:
```

```
            box = customLabel['Geometry']['BoundingBox']
            left = imgWidth * box['Left']
            top = imgHeight * box['Top']
            width = imgWidth * box['Width']
            height = imgHeight * box['Height']

            fnt = ImageFont.truetype('/Library/Fonts/Arial.ttf', 50)
            draw.text((left,top), customLabel['Name'], fill='#00d400', font=fnt)

            print('Left: ' + '{0:.0f}'.format(left))
            print('Top: ' + '{0:.0f}'.format(top))
            print('Label Width: ' + "{0:.0f}".format(width))
            print('Label Height: ' + "{0:.0f}".format(height))

            points = (
                (left,top),
                (left + width, top),
                (left + width, top + height),
                (left , top + height),
                (left, top))
            draw.line(points, fill='#00d400', width=5)

    image.show()

def show_custom_labels(model,bucket,photo, min_confidence):
    client=boto3.client('rekognition')

    #Call DetectCustomLabels
    response = client.detect_custom_labels(Image={'S3Object': {'Bucket': bucket, 'Name'
        MinConfidence=min_confidence,
```

```
58          ProjectVersionArn=model)
59
60      # For object detection use case, uncomment below code to display image.
61      # display_image(bucket,photo,response)
62
63      return len(response['CustomLabels'])
64
65  def main():
66
67      bucket='MY_BUCKET'
68      photo='MY_IMAGE_KEY'
69      model='arn:aws:rekognition:us-east-1:307273201625:project/circuit_boards_1/version/
70      min_confidence=95
71
72      label_count=show_custom_labels(model,bucket,photo, min_confidence)
73      print("Custom labels detected: " + str(label_count))
74
75
76  if __name__ == "__main__":
77      main()
```

Stop model

Sample python script to stop the circuit_boards_1.2022-05-04T16.47.47 model.

```python
#Copyright 2020 Amazon.com, Inc. or its affiliates. All Rights Reserved.
#PDX-License-Identifier: MIT-0 (For details, see https://github.com/awsdocs/amazon-rekognition-custom-lab

import boto3
import time


def stop_model(model_arn):

    client=boto3.client('rekognition')

    print('Stopping model:' + model_arn)

    #Stop the model
    try:
        response=client.stop_project_version(ProjectVersionArn=model_arn)
        status=response['Status']
        print ('Status: ' + status)
    except Exception as e:
        print(e)

    print('Done...')

def main():

    model_arn='arn:aws:rekognition:us-east-1:307273201625:project/circuit_boards_1/version/circuit_boards
    stop_model(model_arn)

if __name__ == "__main__":
    main()
```

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Cloud Computing

Infrastructure and Web Development

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