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### Load Toy Data, Train Model and Save the Model

Used the same Iris dataset from sklearn and the trained Model saved using joblib from week 4.

```

# Import necessary libraries
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
import joblib

# Load the Iris dataset
iris = load_iris()
X = iris.data
y = iris.target

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)

# Train a Decision Tree Classifier
model = DecisionTreeClassifier()
model.fit(X_train, y_train)

# Save the trained model to a file
joblib.dump(model, 'model.pkl')

```

[1] ✓ 1.8s Python

... ['model.pkl']

### Deploy The Model using flask

Created a Flask web application to deploy the model with endpoints to make predictions.

```

23 from flask import Flask, request, jsonify
24 import numpy as np
25
26 # Create a Flask application
27 app = Flask(__name__)
28
29 # Load the trained model
30 model = joblib.load('model.pkl')
31
32 @app.route('/')
33 def home():
34     return "Welcome to the Iris Classifier!"
35
36 @app.route('/predict', methods=['POST'])
37 def predict():
38     try:
39         data = request.get_json() # Get data posted as a json
40         prediction = model.predict(np.array(data['features']).reshape(1, -1)) # Predict using the model
41         return jsonify({'prediction': int(prediction[0])}) # Return the prediction as JSON
42     except Exception as e:
43         return jsonify({'error': str(e)})
44
45 if __name__ == '__main__':
46     app.run(debug=True)

```

## Deployment on Azure

### Log in on Azure

```

C:\Users\Armel>az login
Please select the account you want to log in with.

Retrieving tenants and subscriptions for the selection...

[Tenant and subscription selection]

No      Subscription name      Subscription ID      Tenant
-----
[1] *   Azure for Students   8bb6e5ee-e380-4d03-90fd-f46f5a3ff8cb   aivancity

The default is marked with an *; the default tenant is 'aivancity' and subscrip
tion is 'Azure for Students' (8bb6e5ee-e380-4d03-90fd-f46f5a3ff8cb).

```

### Create Resource Group and App service plan

```

C:\Users\Armel>az group create --name FlaskResourceGroup --l
ocation eastus
{
  "id": "/subscriptions/8bb6e5ee-e380-4d03-90fd-f46f5a3ff8cb/resourceGroups/F
laskResourceGroup",
  "location": "eastus",
  "managedBy": null,
  "name": "FlaskResourceGroup",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}

C:\Users\Armel>az appservice plan create --name flaskAppServ
icePlan --resource-group FlaskResourceGroup --sku FREE
Readonly attribute name will be ignored in class <class 'azure.mgmt.web.v2023
_01_01.models._models_py3.AppServicePlan'>
Resource provider 'Microsoft.Web' used by this operation is not registered. W
e are registering for you.
Registration succeeded.
{
  "elasticScaleEnabled": false,
  "extendedLocation": null,
  "freeOfferExpirationTime": null,
  "geoRegion": "East US",
  "hostingEnvironmentProfile": null,
  "hyperV": false,
  "id": "/subscriptions/8bb6e5ee-e380-4d03-90fd-f46f5a3ff8cb/resourceGroups/F
laskResourceGroup/providers/Microsoft.Web/serverfarms/flaskAppServicePlan",
  "isSpot": false,

```

Realized I could not use python on windows hence I had to redo the app service plan.

```

C:\Users\Armel>az appservice plan delete --name FlaskAppServicePlan --resource-group FlaskResourceGroup
Are you sure you want to perform this operation? (y/n): y

C:\Users\Armel>az appservice plan create --name FlaskAppServicePlan --resource-group FlaskResourceGroup --sku FREE --is-linux
Readonly attribute name will be ignored in class <class 'azure.mgmt.web.v2023_01_01.models._models_py3.AppServicePlan'>
{
  "elasticScaleEnabled": false,
  "extendedLocation": null,
  "freeOfferExpirationTime": null,
  "geoRegion": "East US",
  "hostingEnvironmentProfile": null,
  "hyperV": false,
  "id": "/subscriptions/8bb6e5ee-e380-4d03-90fd-f46f5a3ff8cb/resourceGroups/FlaskResourceGroup/providers/Microsoft.Web/serverfarms/FlaskAppServicePlan",
  "isSpot": false,
  "isXenon": false,
  "kind": "linux",
  "kubeEnvironmentProfile": null,
  "location": "eastus",
  "maximumElasticWorkerCount": 1,
  "maximumNumberOfWorkers": 0,
  "name": "FlaskAppServicePlan",
  "numberOfSites": 0,
  "numberOfWorkers": 1,
  "perSiteScaling": false,
  "provisioningState": "Succeeded",
  "reserved": true,
  "resourceGroup": "FlaskResourceGroup",

```

**Create a web app**

```

C:\Users\Armel>az webapp create --resource-group FlaskResourceGroup --plan FlaskAppServicePlan --name IrisClassifierArmel --runtime "PYTHON|3.8"
{
  "availabilityState": "Normal",
  "clientAffinityEnabled": true,
  "clientCertEnabled": false,
  "clientCertExclusionPaths": null,
  "clientCertMode": "Required",
  "cloningInfo": null,
  "containerSize": 0,
  "customDomainVerificationId": "36A625C23E82514614F8E69F717853CE0996D63FE39B30E8518EA962A3D367B4",
  "dailyMemoryTimeQuota": 0,
  "daprConfig": null,
  "defaultHostName": "irisclassifierarmel.azurewebsites.net",
  "enabled": true,
  "enabledHostNames": [
    "irisclassifierarmel.azurewebsites.net",
    "irisclassifierarmel.scm.azurewebsites.net"
  ],
  "extendedLocation": null,
  "ftpPublishingUrl": "https://waws-prod-blu-569.ftp.azurewebsites.windows.net/site/wwwroot",
  "hostNameSslStates": [
    {
      "certificateResourceId": null,
      "hostType": "Standard",
      "ipBasedSslResult": null,
      "ipBasedSslState": "NotConfigured",
      "name": "irisclassifierarmel.azurewebsites.net",
      "sslState": "Disabled",
    }
  ]
}

```

## Deployment of the web app

```

az webapp deployment source config-local-git --name IrisClassifierArmel --resource-group FlaskResourceGroup
{
  "url": "https://None@irisclassifierarmel.scm.azurewebsites.net/IrisClassifierArmel.git"
}

```

## Add Azure Remote and Push Code

```

C:\Users\Armel>git remote add azure "https://None@irisclassifierarmel.scm.azurewebsites.net/IrisClassifierArmel.git"

C:\Users\Armel>git push azure master

```

## Setting up the start-up command

```

C:\Users\Armel>az webapp config set --resource-group FlaskResourceGroup --name IrisClassifierArmel --startup-file "gunicorn --bind=0.0.0.0 --timeout 600 app:app"
{
  "acrUseManagedIdentityCreds": false,
  "acrUserManagedIdentityId": null,
  "alwaysOn": false,
  "apiDefinition": null,
  "apiManagementConfig": null,
  "appCommandLine": "gunicorn --bind=0.0.0.0 --timeout 600 app:app",
  "appSettings": null,
  "autoHealEnabled": false,
  "autoHealRules": null,
  "autoSwapSlotName": null,
  "azureStorageAccounts": {},
  "connectionStrings": null,
  "cors": null,
  "defaultDocuments": [
    "Default.htm",
    "Default.html",
    "Default.asp",
    "index.htm",
    "index.html",
    "iisstart.htm",
    "default.aspx",
    "index.php",
    "hostingstart.html"
  ],
  "detailedErrorLoggingEnabled": false,
  "documentRoot": null,
  "elasticWebAppScaleLimit": 0,
  "experiments": {

```

## Access to Web App

```

C:\Users\Armel>az webapp show --name IrisClassifierArmel --resource-group FlaskResourceGroup --query defaultHostName
"irisclassifierarmel.azurewebsites.net"

```