AWS Deployment of a Machine Learning Model

In this report, we walked through the process of deploying a Machine Learning model on AWS (Amazon Web Services), using a RandomForestClassifier model as an example. The model was trained on the Iris dataset, a popular dataset used in Machine Learning for classification tasks.

Process

The steps involved in deploying the model are as follows:

1. AWS Setup: We started by setting up the AWS CLI (Command Line Interface) on the local machine. This involved installing the AWS CLI and configuring it with the user's access keys, region, and output format.

2. Model Deployment: The model, a RandomForestClassifier, was trained locally on the Iris dataset and saved to a .pkl file.

3. Uploading Model to AWS S3: The model file was then uploaded to an S3 bucket on AWS.

4. Downloading Model from S3: Using the boto3 Python library, we then demonstrated how to download the model file from the S3 bucket.

5. Loading and Using the Model: Once the model file was downloaded locally, we loaded the model into the Python environment using the joblib library. The model was then ready to be used for making predictions.

Testing the Model

To test the functionality of the deployed model, we generated ten random datapoints with the same features as the Iris dataset. These datapoints were then fed into the model, which produced a prediction for each datapoint.

The predictions were returned as an array of integers, each integer representing a class of Iris.

The results were as follows:

```
[2, 0, 0, 0, 2, 0, 2, 2, 2, 0]
```

In the context of the Iris dataset, these numbers correspond to the following classes:

- 0: Setosa

- 1: Versicolor
- 2: Virginica

Therefore, the model predictions correspond to the following classes of Iris:

```
[Virginica, Setosa, Setosa, Setosa, Virginica, Setosa, Virginica, Virginica, Virginica, Setosa]
```

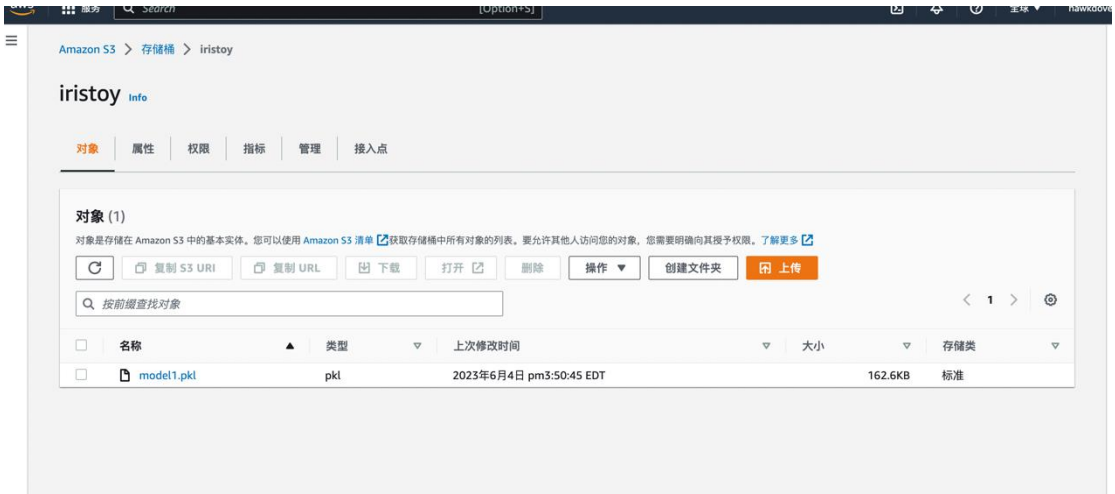
Conclusion

This report presented a step-by-step process of deploying a Machine Learning model on AWS. By storing the model on AWS S3, it can be accessed and used for prediction from any location. This makes it easy to integrate the model into different applications and services.

While this report focused on a specific example of a RandomForestClassifier trained on the Iris dataset, the same steps can be applied to deploy other types of Machine Learning models on AWS.

The screenshots related to each step are included in the Appendix section for more visual aid.

Appendix



In [12]:
```
import numpy as np
import pandas as pd
import boto3
import os
import joblib

s3 = boto3.client('s3')
bucket_name = 'iristoy'  # bucket
model_file_key = 'model1.pkl'  # model name
model_local_path = '/Users/zhenyan/virtual_internship/model1.pkl'  # path

if not os.path.exists('/tmp'):
    os.makedirs('/tmp')

s3.download_file(bucket_name, model_file_key, model_local_path)
```

In [6]:
```
model = joblib.load(model_local_path)
```

In [11]:
```
print(type(model))
```

```
<class 'sklearn.ensemble._forest.RandomForestClassifier'>
```

In [15]:
```
X = np.random.uniform(low=0.1, high=7.0, size=(10, 4))
```

In [16]:
```
# prediction
predictions = model.predict(X)

print(predictions)#[Virginica, Setosa, Setosa, Setosa, Virginica, Setosa, Virginica, Virginica, Virginica, Setosa]
```

```
[2 0 0 0 2 0 2 2 2 0]
```