Machine Learning Model Deployment using Flask

This document discusses the various steps involved in deploying the flask app created to the cloud. This is a continuation of the steps followed in the Machine Learning Model Deployment using Flask file.

Dataset Used: Palmer Penguins

ML Model: Random Forest Classifier

Cloud Provider: AWS

Prerequisite Steps:

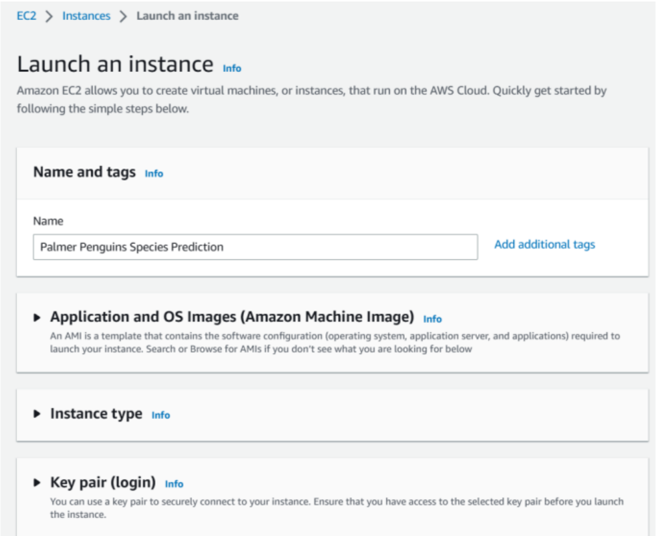
- Build a ML model in python
- Create a html template
- Create a flask app that uses the ML model and the template to create a webpage.

Now let us host this webpage on the AWS cloud.

- I am using the AWS free tier account.

Step 1:

The first step is to create and launch an EC2 instance. I have used a t2 micro instance with an Ubuntu environment.



EC2 > Instances > Launch an instance

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

Name: Palmer Penguins Species Prediction

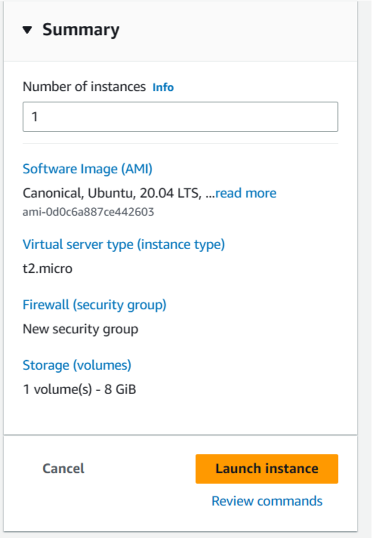
▸ Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

▸ Instance type Info

▸ Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.



▾ Summary

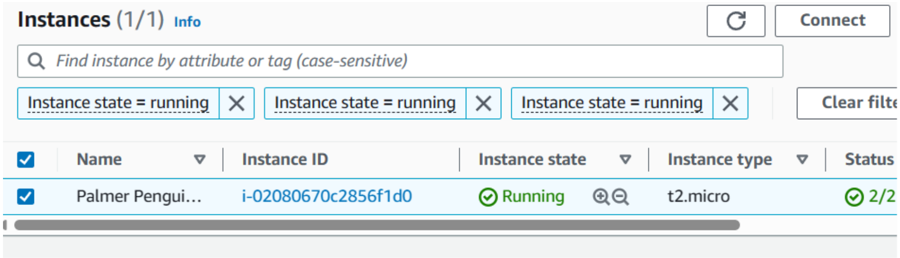
Number of instances Info: 1

Software Image (AMI): Canonical, Ubuntu, 20.04 LTS, ...read more
ami-0d0c6a887ce442603

Virtual server type (instance type): t2.micro

Firewall (security group): New security group

Storage (volumes): 1 volume(s) - 8 GiB



Instances (1/1) Info

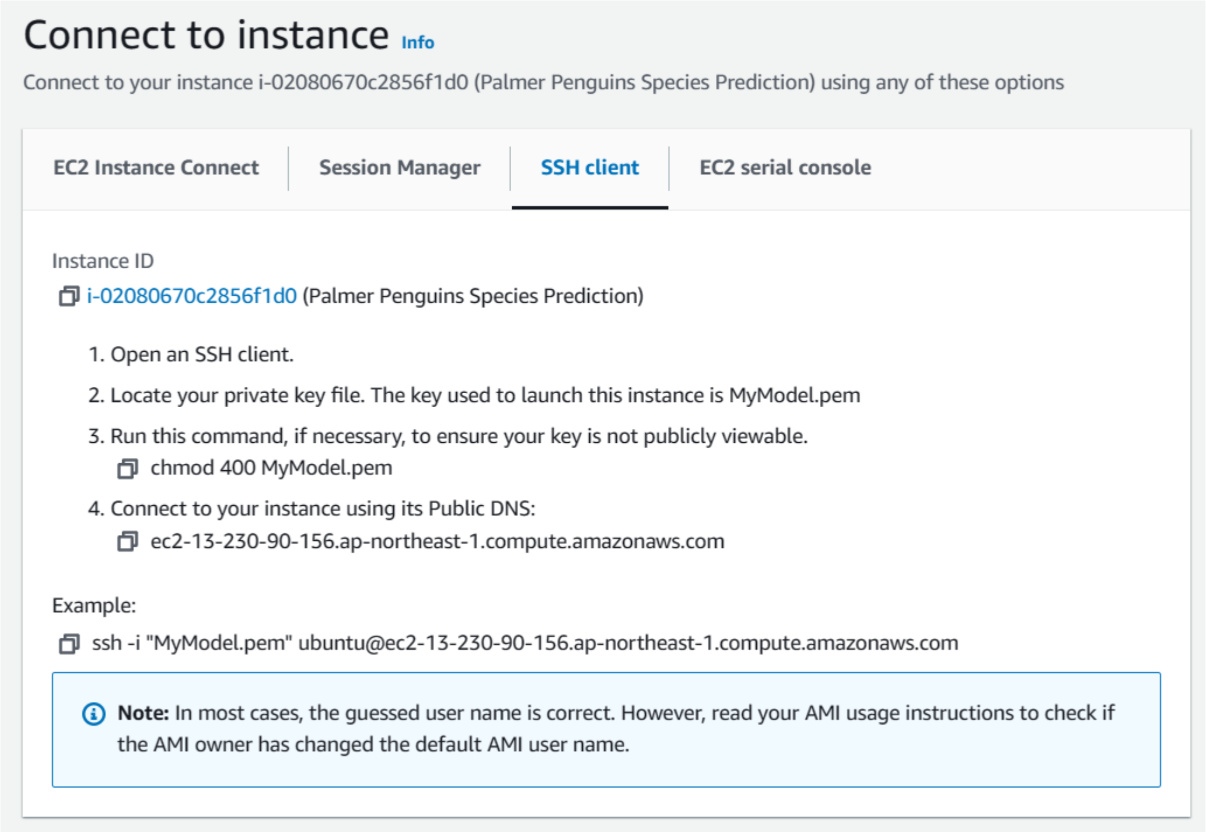
Connect
Find instance by attribute or tag (case-sensitive)
Instance state = running ✕
Instance state = running ✕
Instance state = running ✕
Clear filte

☑	Name	Instance ID	Instance state	Instance type	Status
☑	Palmer Pengui...	i-02080670c2856f1d0	✓ Running	t2.micro	✓ 2/2

Step 2:

The next step is to connect to the created instance so that the created model can be loaded to it. We do thjs with the help of Putty and WinSCP.

We use an SSH connection, the details for which can be found in the connection tab for the instance.



Connect to instance

Connect to your instance i-02080670c2856f1d0 (Palmer Penguins Species Prediction) using any of these options

Instance ID

i-02080670c2856f1d0 (Palmer Penguins Species Prediction)

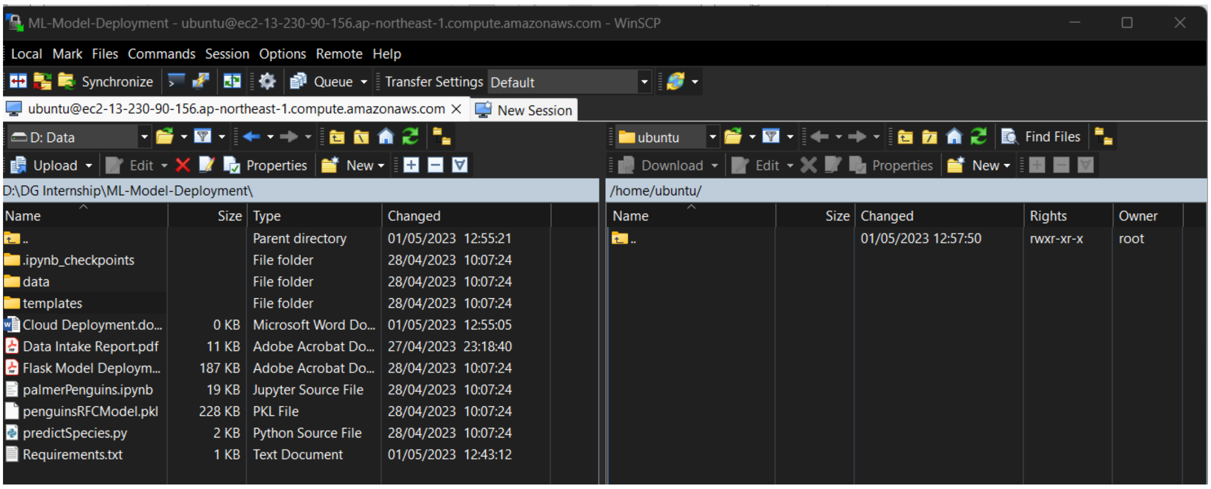
1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is MyModel.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
   `chmod 400 MyModel.pem`
4. Connect to your instance using its Public DNS:
   `ec2-13-230-90-156.ap-northeast-1.compute.amazonaws.com`

Example:

```
ssh -i "MyModel.pem" ubuntu@ec2-13-230-90-156.ap-northeast-1.compute.amazonaws.com
```

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

We login to WinSCP first to transfer the files that we had previously created.



ML-Model-Deployment - ubuntu@ec2-13-230-90-156.ap-northeast-1.compute.amazonaws.com - WinSCP

Local Mark Files Commands Session Options Remote Help
Synchronize
Queue
Transfer Settings Default
ubuntu@ec2-13-230-90-156.ap-northeast-1.compute.amazonaws.com
New Session
D: Data
Upload
Edit
Properties
New
ubuntu
Find Files
Download
Edit
Properties
New

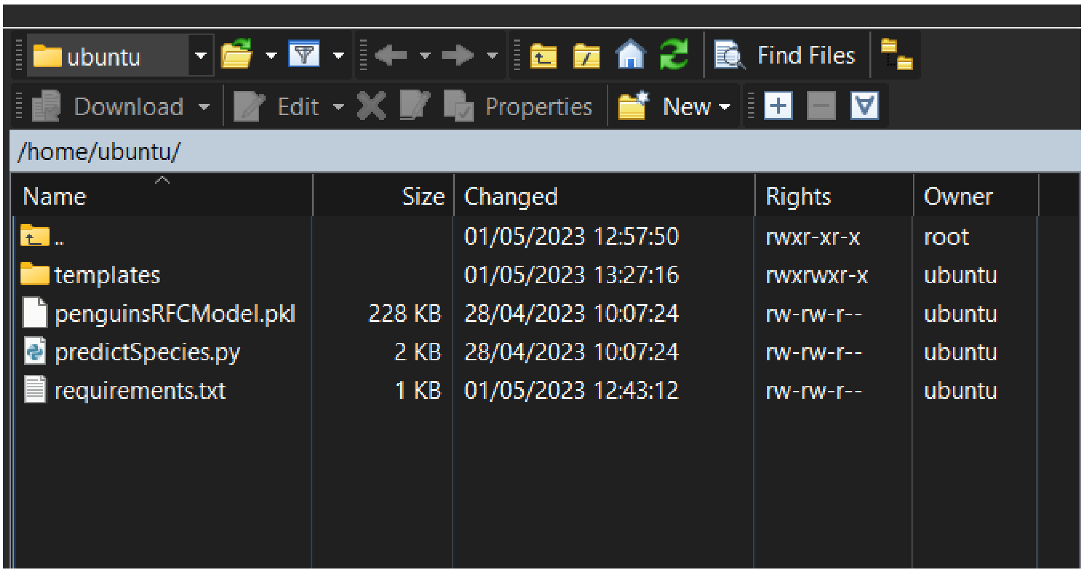
D:\DG Internship\ML-Model-Deployment\

Name	Size	Type	Changed
..		Parent directory	01/05/2023 12:55:21
.ipynb_checkpoints		File folder	28/04/2023 10:07:24
data		File folder	28/04/2023 10:07:24
templates		File folder	28/04/2023 10:07:24
Cloud Deployment.do...	0 KB	Microsoft Word Do...	01/05/2023 12:55:05
Data Intake Report.pdf	11 KB	Adobe Acrobat Do...	27/04/2023 23:18:40
Flask Model Deploym...	187 KB	Adobe Acrobat Do...	28/04/2023 10:07:24
palmerPenguins.ipynb	19 KB	Jupyter Source File	28/04/2023 10:07:24
penguinsRFCModel.pkl	228 KB	PKL File	28/04/2023 10:07:24
predictSpecies.py	2 KB	Python Source File	28/04/2023 10:07:24
Requirements.txt	1 KB	Text Document	01/05/2023 12:43:12

/home/ubuntu/

Name	Size	Changed	Rights	Owner
..		01/05/2023 12:57:50	rwxr-xr-x	root

The figure below shows the required files that have been transferred to the ubuntu instance. We add a requirements.txt file that contains all the libraries needed for the execution of our model and flask app..



/home/ubuntu/

Name	Size	Changed	Rights	Owner
..		01/05/2023 12:57:50	rwxr-xr-x	root
templates		01/05/2023 13:27:16	rwxrwxr-x	ubuntu
penguinsRFCModel.pkl	228 KB	28/04/2023 10:07:24	rw-rw-r--	ubuntu
predictSpecies.py	2 KB	28/04/2023 10:07:24	rw-rw-r--	ubuntu
requirements.txt	1 KB	01/05/2023 12:43:12	rw-rw-r--	ubuntu

Step 3:

We then connect to the EC2 instance using Putty. This will allow us to interact with the terminal of the instance. We download python3 and the using pip3 install to install the required packages from the requirements.txt file. The commands required are:

>> sudo apt install python3

>> sudo apt-get update && sudo apt-get install python3-pip

>>pip3 install -r requirements.txt

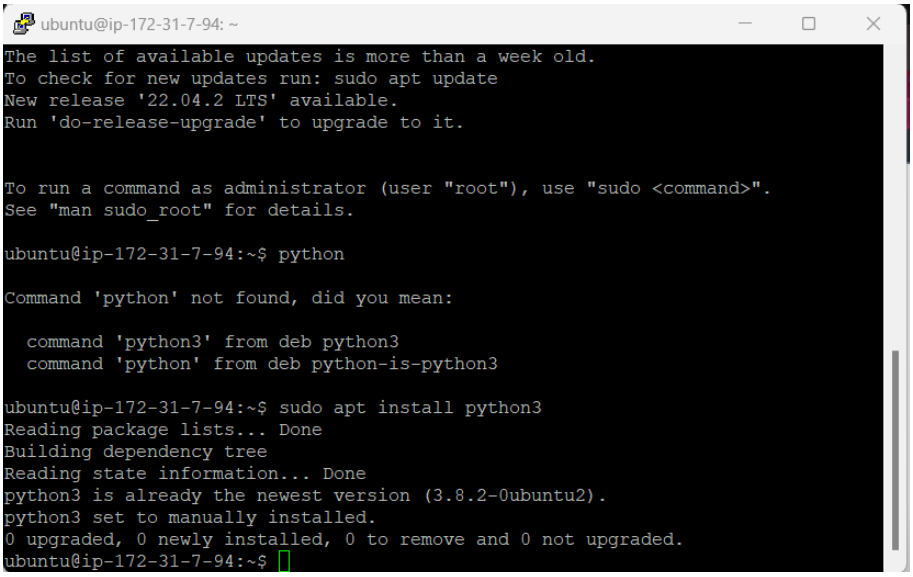
We then open the flask app in the instance and change the host name to 0.0.0.0 and add port as 8080.

Run the app using the command python3 predictSpecies.py

To let the app run continuously even after we close Putty, we can use the following command:

Screen -R deploy python3 predictSpecies.py

Close Putty and WinSCP.



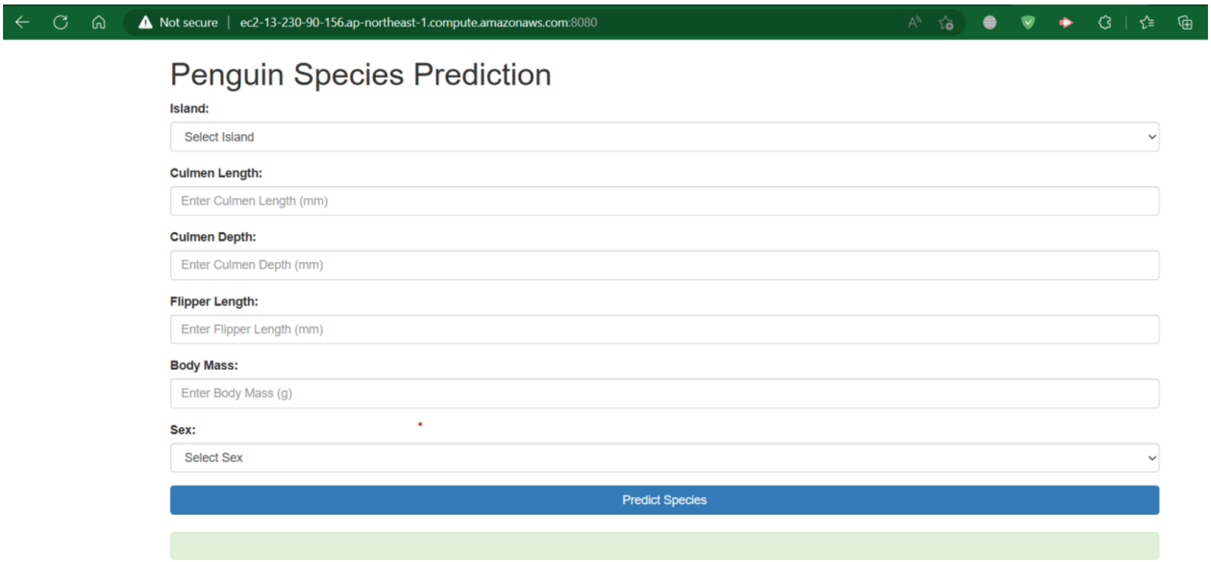
```
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
New release '22.04.2 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-7-94:~$ python

Command 'python' not found, did you mean:

  command 'python3' from deb python3
  command 'python' from deb python-is-python3

ubuntu@ip-172-31-7-94:~$ sudo apt install python3
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3 is already the newest version (3.8.2-0ubuntu2).
python3 set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-7-94:~$
```

Step 4:

The model is now up and running in the cloud. We can now access it using the public DNS with port 8080.

url for the model:

Penguin Species Prediction (ec2-35-78-200-13.ap-northeast-1.compute.amazonaws.com)



Not secure | ec2-13-230-90-156.ap-northeast-1.compute.amazonaws.com:8080

Penguin Species Prediction

Island:

Select Island

Culmen Length:

Enter Culmen Length (mm)

Culmen Depth:

Enter Culmen Depth (mm)

Flipper Length:

Enter Flipper Length (mm)

Body Mass:

Enter Body Mass (g)

Sex:

Select Sex