Start Lab 02:00:00

Reinforcement Learning DQN

2 hours Free

Overview

Like many other areas of machine learning research, reinforcement learning (RL) is evolving at breakneck speed. Just as they have done in other research areas, researchers are leveraging deep learning to achieve state-of-the-art results.

In particular, reinforcement learning has significantly outperformed prior ML techniques in game playing, reaching human-level and even world-best performance on Atari, beating the human Go champion, and is showing promising results in more difficult games like Starcraft II.

In this lab, you will learn to train an RL model to play the cart pole game with near 100% accuracy.

Objectives

In this lab, you will:

- Create an intermediary GCS bucket, clone the sample repository, and configure environment variables.
- Create a training job with AI Platform.
- Learn the basic principles of reinforcement learning (RL).
- Learn about the cart pole game and how RL can be applied to it.
- Generate videos of increasingly better performing models on cart pole.
- Bonus: play a game of cart pole in the GCP Console with your trained model.

Once you're ready, scroll down and follow the steps below to get your lab environment set up.

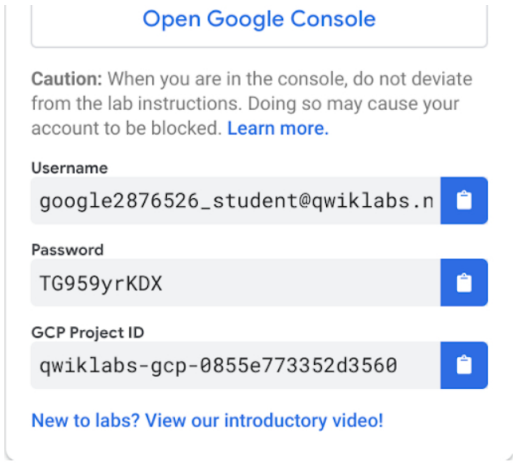
Set up your environment

For each lab, you get a new Google Cloud project and set of resources for a fixed time at no cost.

1. Make sure you signed into Qwiklabs using an **incognito window**.
2. Note the lab's access time (for example, 02:00:00 and make sure you can finish in that time block.

   There is no pause feature. You can restart if needed, but you have to start at the beginning.

3. When ready, click START LAB.
4. Note your lab credentials. You will use them to sign in to the Google Cloud Console.



5. Click **Open Google Console**.
6. Click **Use another account** and copy/paste credentials for **this** lab into the prompts.

> If you use other credentials, you'll get errors or **incur charges**.

7. Accept the terms and skip the recovery resource page.

> Do not click **End Lab** unless you are finished with the lab or want to restart it. This clears your work and removes the project.

Enable AI Platform

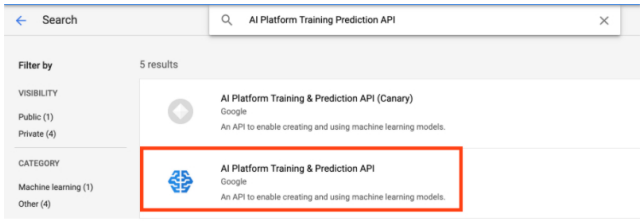
Before you clone the code for this lab, make sure the AI Platform service is enabled.

Step 1

On the left-hand side navigation menu of the GCP console, select **APIs & Services > Library**.

Step 2

Type in **AI Platform Training Prediction API** in the search console and select the following option:



Step 3

If the API is not already enabled, select the option to enable it. It takes a few minutes to enable the API. Don't proceed until the API is enabled.

Create a Storage Bucket

Create a bucket using the GCP console:

Step 1

In your GCP Console, click on the **Navigation menu** ( ), and select **Storage**.

Step 2

Click on **Create bucket**.

Step 3

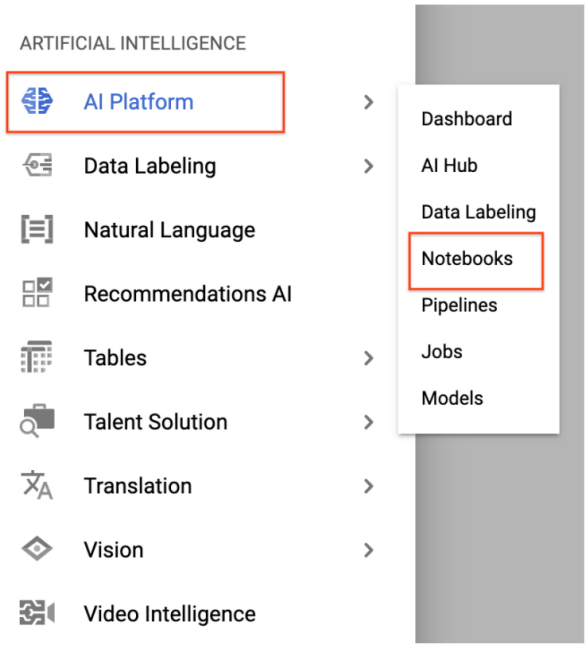
Choose a Regional bucket and set a unique name (use your project ID because it is unique). Then, click **Create**.

Launch AI Platform Notebooks

To launch AI Platform Notebooks:

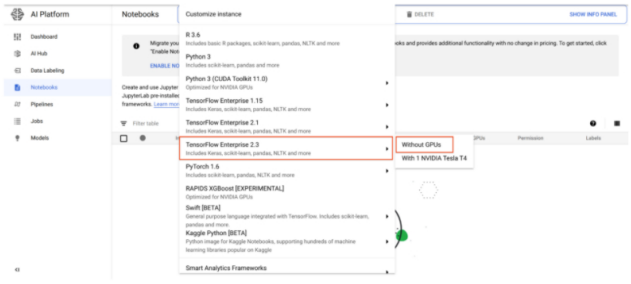
Step 1

Click on the **Navigation Menu**. Navigate to **AI Platform**, then to **Notebooks**.

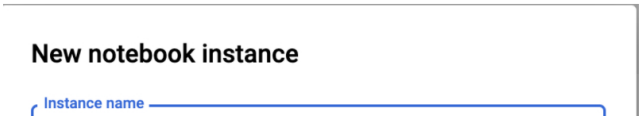


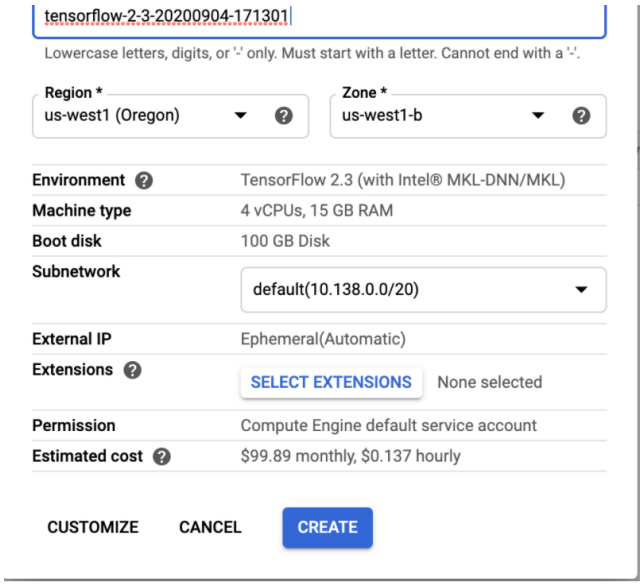
Step 2

On the Notebook instances page, click + NEW INSTANCE . Select the latest version of TensorFlow Enterprise `2.x` *Without GPUs*.



In the pop-up, confirm the name of the deep learning VM, move to the bottom of the window and click **Create**.

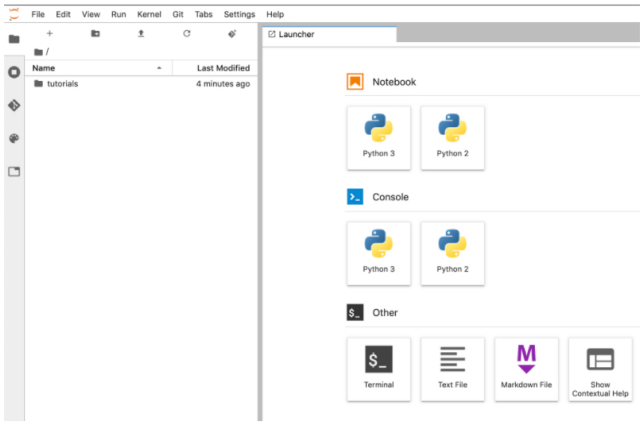




The new VM will take 2-3 minutes to start.

Step 3

Click **Open JupyterLab**. A JupyterLab window will open in a new tab.

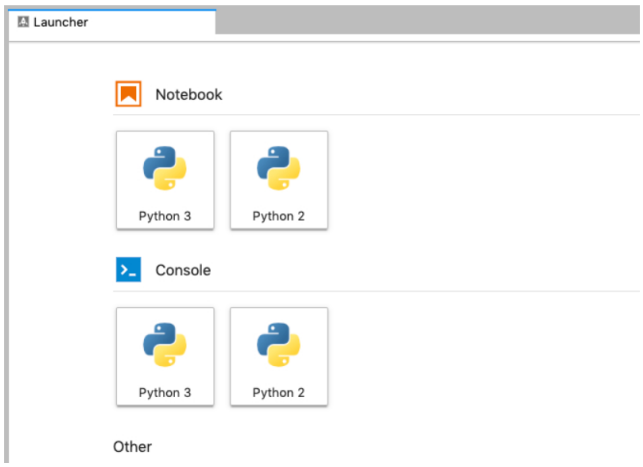


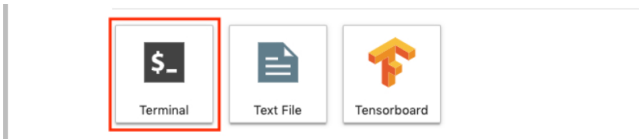
Clone Code

To clone the relevant notebook into your JupyterLab instance:

Step 1

In JupyterLab, click the Terminal icon to open a new terminal.





Step 2

At the command-line prompt, type in the following command and press Enter.

```
git clone https://github.com/GoogleCloudPlatform/training-data-analyst.git
```

Step 3

Confirm that you have cloned the repository by double clicking on the `training-data-analyst` directory and ensuring you can see its contents.

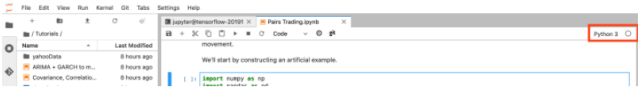
Run Through the Notebook

Step 1

From the left-hand menu, select **training-data-analyst > quests > rl > dqn > dqns_on_gcp.ipynb**. This will open a new tab.

Step 2

Ensure you're using the Python 3 kernel by selecting `Python 3` from the upper right corner of the notebook.



Step 3

Read through the notebook's contents and run all code blocks with **Shift + Enter**. Return here after you have completed the instructions in the notebook.

End your lab

When you have completed your lab, click **End Lab**. Qwiklabs removes the resources you've used and cleans the account for you.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
- 2 stars = Dissatisfied
- 3 stars = Neutral
- 4 stars = Satisfied
- 5 stars = Very satisfied

You can close the dialog box if you don't want to provide feedback.

For feedback, suggestions, or corrections, please use the **Support** tab.