Hands-on Exercise 1:

Model Training Using the AWS DeepRacer Console

Overview

This exercise walks you through building, training, and evaluating your first reinforcement learning model via the AWS DeepRacer console.

*Note: This exercise is designed to be completed in your AWS account. AWS DeepRacer is part of AWS Free Tier, so you can get started with the service at no cost. For the first month after sign-up, you are offered a monthly free tier of 10 hours of Amazon SageMaker training, and 60 simulation units of Amazon RoboMaker (enough to cover 10 hours of training). If you go beyond those free tier limits, you will accrue additional costs. For more information see the AWS DeepRacer Pricing page.

Learning Objectives

By the end of this exercise, you will be able to:

1. Access and navigate the AWS DeepRacer console
2. Identify the steps that go into building a model in the AWS DeepRacer console
3. Use the basic reward function in AWS DeepRacer when configuring a model
4. Use the AWS DeepRacer simulator to train and evaluate a model

Technical Prerequisites

- Experience using AWS technologies
- Basic understanding of machine learning concepts, particularly reinforcement learning and how it applies to AWS DeepRacer

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Task 1: Create your first AWS DeepRacer model

This exercise is made up of one main task that has you create, train, and evaluate a model using the basic reward function and other default settings within the AWS DeepRacer console. You will have a chance to

build on this model in order to enhance your car's performance in later exercises. To get started building your first model, follow the steps below.

1. In your AWS account, go to the Management Console.
2. Choose `us-east-1` region at the top right corner of the **Regions** dropdown menu.
3. From the top left of the console, click **Services**, type **DeepRacer** in the search box, and select **AWS DeepRacer**. That will open the AWS DeepRacer console.
4. On the landing page, click **Create model**.
5. Create a model name and description.
6. Click **Create resource**.
7. Under **Environment simulation**, select a track from the list. It's recommended to start with the "re:Invent 2018 Track" and then explore more tracks from there.
8. Under **Action space**, familiarize yourself with these settings and accept the defaults.
9. Read through both basic and advanced **reward functions** to familiarize yourself with the code. For the purposes of this exercise, choose to **insert code** for the basic reward function and leave the code unchanged.
10. Expand **Algorithm settings** and review the different hyperparameters available to set. For this exercise, accept the default hyperparameter settings.
11. For the **Stop conditions** go ahead and choose a max time of 60 minutes and click **Start training**.
12. Select the name of the model to watch the live stream in the simulator. Notice how your car is moving and become familiar with the general look and feel of the simulation. The new training will initiate in about 6 minutes. You then must wait for the training job to complete before proceeding. If you choose a maximum time of 60 minutes, it will take up to 60 minutes for this training job to complete. It is complete when the status reads "Ready."

    Note: Since the training job may take more than an hour, you might want to consider moving on to Chapter 3 of this course while the training job is running.
13. Now, select the name of the model you just trained and click **Start new evaluation**.
14. Select the same track you used for training.
15. Set the number of trials to **3** and click **Start evaluation**. The evaluation results will update in approximately 5 minutes.

16. Before the evaluation job completes, take some time to watch the simulator to see how your car's performing in real time. Look for things that you might want to tweak in the future and note them down. You'll have a chance to apply some of those ideas in a later exercise (Chapter 4).
17. Watch the evaluation results update and write them down. You will use your results from this model as a benchmark that you can compare to as you tweak your model in later exercises.

Conclusion

Congratulations! You now have successfully:

1. Accessed and navigated within the AWS DeepRacer console
2. Identified the steps that go into building a model in the AWS DeepRacer console
3. Used the basic reward function in AWS DeepRacer to configure a model
4. Used the AWS DeepRacer simulator to train and evaluate a model

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Additional Resources

- For more information about AWS DeepRacer, see https://aws.amazon.com/deepracer/.
- For more information about AWS Training and Certification, see https://aws.amazon.com/training/.
- To troubleshoot and collaborate about the AWS DeepRacer, see https://forums.aws.amazon.com/forum.jspa?forumID=318.

For feedback, suggestions, or corrections, email us at aws-course-feedback@amazon.com.