

## COMP-2040 Python Essentials with Data Analysis

### Module 13 – Case Studies

#### Case Study #3: AWS Deep Racer

This case study will use reinforcement learning to train a car to automatically navigate a race track. Your job will be to develop a reward function that rewards the car for correctly navigating the track, and punish it for making mistakes. Your team will compete with the other class teams on a time trial race to get the best time.

Your instructor will send you an AWS Academy invitation to your academic email. Once you receive it, sign up with AWS Academy, it is completely free. Then start the learner lab environment and navigate to DeepRacer, as per your instructors demonstration. Each student receives \$100USD of credit as part of the learner lab. Monitor your usage carefully so you can make the most of it, but don't worry, you can't exceed it and will NEVER be charged any money.

You can follow the tutorial here on how to train your first model:

<https://docs.aws.amazon.com/deepracer/latest/developerguide/deepracer-get-started-training-model.html>

You will have the following state variables available to use in your reward function:

<https://docs.aws.amazon.com/deepracer/latest/developerguide/deepracer-reward-function-input.html>

You can use the following reward function examples as a starting point for your own function:

<https://docs.aws.amazon.com/deepracer/latest/developerguide/deepracer-reward-function-examples.html>

See Learn for more resources you can use.

Once you are satisfied with your model, use OBS Studio to record a video of your best race. You'll use this video along with your reward function in your final presentation, to demonstrate to the class how you approached this problem.

<https://obsproject.com/>

You can find a quick start tutorial on how to use OBS here:

[https://youtu.be/DTk99mHDX\\_I](https://youtu.be/DTk99mHDX_I)

Submit your video and your reward function into the dropbox for this assignment. The team leader needs to only submit one copy into the team dropbox on behalf of the entire team.