

In the first model we went with the stay within borders models and did not adjust the code and simply trained the model for 1 hour. With the first model we got rank 211 and time of 2:17

In the second try of the mode, I we decided to go with the prevent zig-zag which is different from the stay within the borders model. We also adjusted the cars max speed in this newer model and as well adjusted the rewards distances.

Choose and modify one of the sample reward functions.

Follow the centerline

Sections the track into three reward zones. The farther the car strays from the centerline, the less it's rewarded.



Stay within borders

Defines the track border and gives high rewards if all 4 wheels stay on the track, which leaves it to the model to find the optimal path.



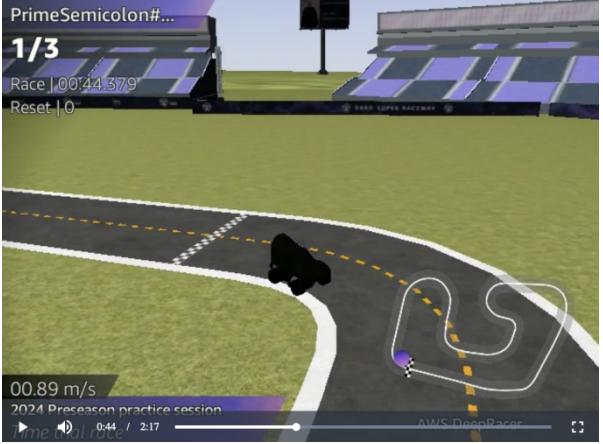
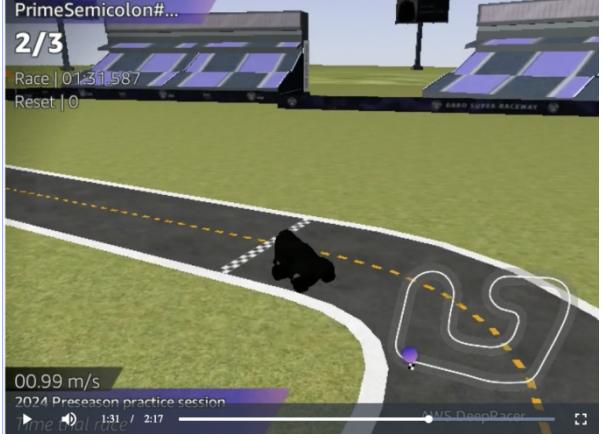
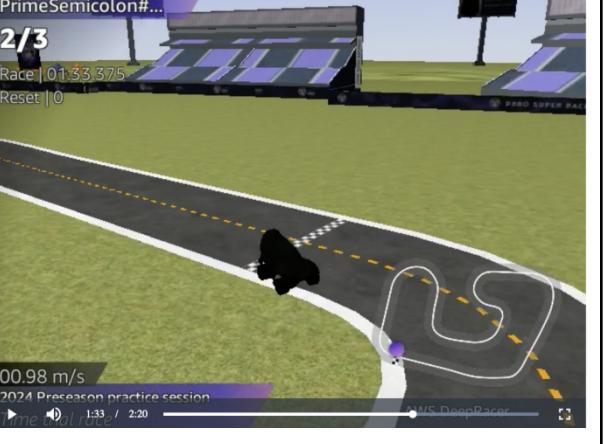
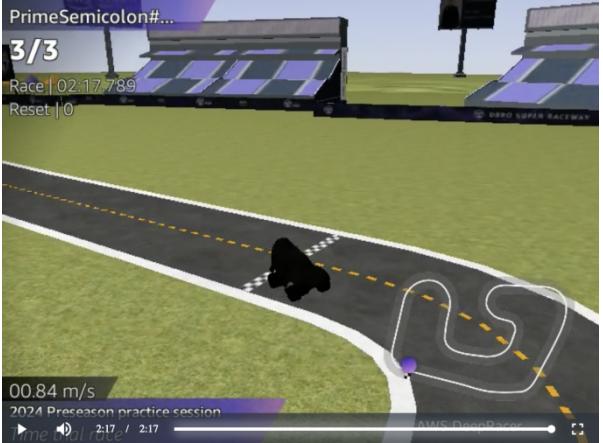
Prevent zig-zag

Is the centerline reward function plus a steering angle range limit. Keeps the car driving smoothly down the middle.



```
1 MAX_SPEED = 4
```

```
2 def reward_function(params):
3     # Example of penalize steering, which helps
4     # mitigate zig-zag behaviors
5     speed = params['speed']
6     speed_rate = speed / MAX_SPEED
7     return speed_rate ** 2
8
9     # Read input parameters
10    distance_from_center =
11        params['distance_from_center']
12    track_width = params['track_width']
13    abs_steering = abs(params['steering_angle']) #
14        Only need the absolute steering angle
15
16    # Calculate 3 marks that are farther and farther
17        away from the center line
18    marker_1 = 0.1 * track_width
19    marker_2 = 0.25 * track_width
20    marker_3 = 0.5 * track_width
21
22    # Give higher reward if the car is closer to
23        center line and vice versa
24    if distance_from_center <= marker_1:
25        reward = 5.0
26    elif distance_from_center <= marker_2:
27        reward = 1.0
28    else:
29        reward = -0.5
30
31    return reward
```

First Model	Clone Model (prevent zigzag)
<p>PrimeSemicolon#...</p> <p>1/3</p> <p>Race 00:44.379 Reset 0</p> <p>00.89 m/s 2024 Preseason practice session Time 0:44 / 2:17</p> 	<p>PrimeSemicolon#...</p> <p>1/3</p> <p>Race 00:46.389 Reset 0</p> <p>00.99 m/s 2024 Preseason practice session Time 0:46 / 2:20</p> 
<p>PrimeSemicolon#...</p> <p>2/3</p> <p>Race 01:31.587 Reset 0</p> <p>00.99 m/s 2024 Preseason practice session Time 1:31 / 2:17</p> 	<p>PrimeSemicolon#...</p> <p>2/3</p> <p>Race 01:33.375 Reset 0</p> <p>00.98 m/s 2024 Preseason practice session Time 1:33 / 2:20</p> 
<p>PrimeSemicolon#...</p> <p>3/3</p> <p>Race 02:17.789 Reset 0</p> <p>00.84 m/s 2024 Preseason practice session Time 2:17 / 2:17</p> 	<p>PrimeSemicolon#...</p> <p>3/3</p> <p>Race 02:20.454 Reset 0</p> <p>00.79 m/s 2024 Preseason practice session Time 2:20 / 2:20</p> 