Mountain Car – Strategy 1

We are trying to make the car climb up the mountain.

The observation space element, which provides low and high position and velocity, is available.

Therefore, the car's position can range from -1.2 to 0.6, and its speed can range from -0.07 to 0.07. According to the instructions, an episode is over when the automobile reaches the 0.5 positions. A positive velocity indicates that the car is going to the right, and the position value is the x-axis with positive values to the right. I start at the bottom of the value at a standstill because the documentation also states that the starting state is a random position between -0.6 and -0.4 with no velocity.

There are three options. Push right is denoted by 2, push left by 0, and do nothing by 1. They state that until the objective position of 0.5 is reached, you receive "-1 for each time step." Thus, there is no beneficial reward.

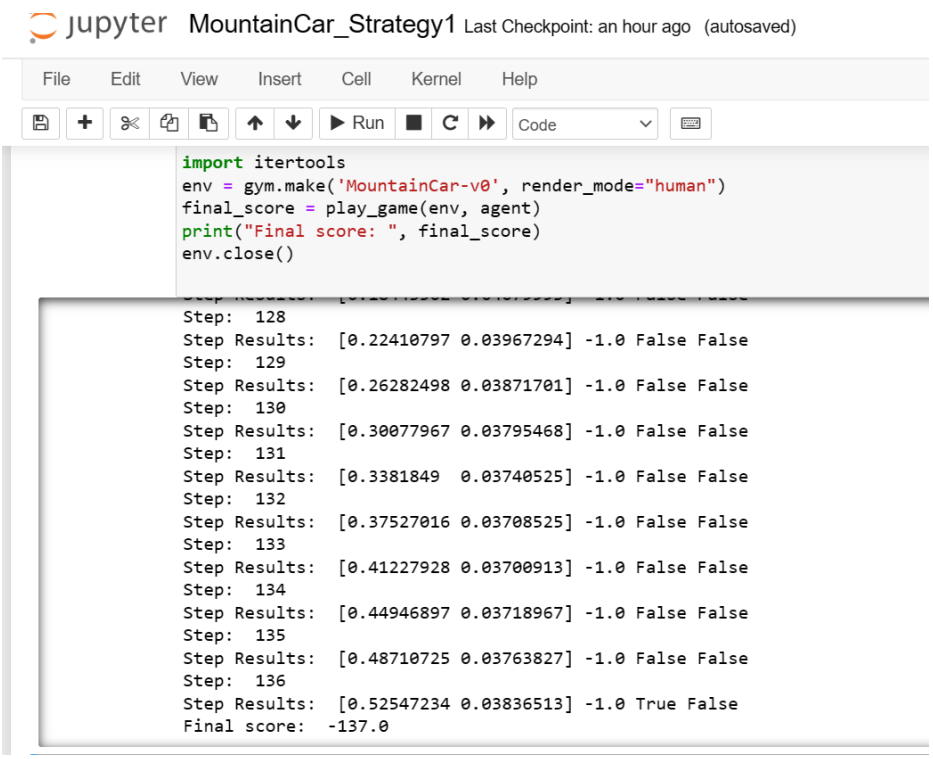
Tried a strategy where we take random movements left and right by using the below logic

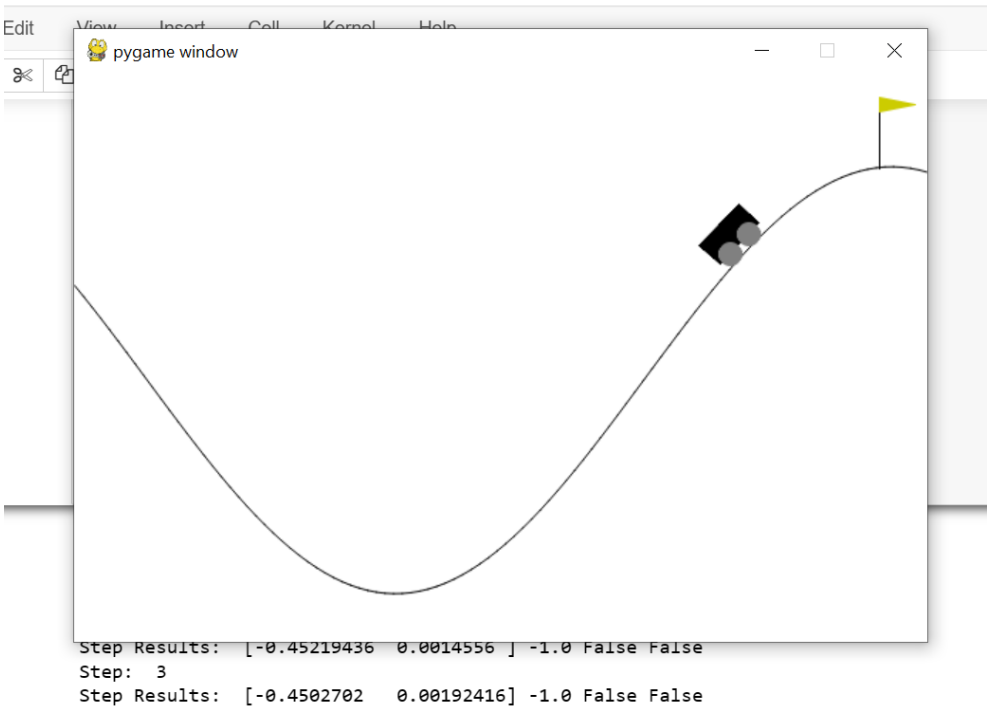
Until step 50, we push the car right to build the initial momentum and then we move the car in a leftward movement until step 100 to pick up the car's speed so that it climbs the top of hill.

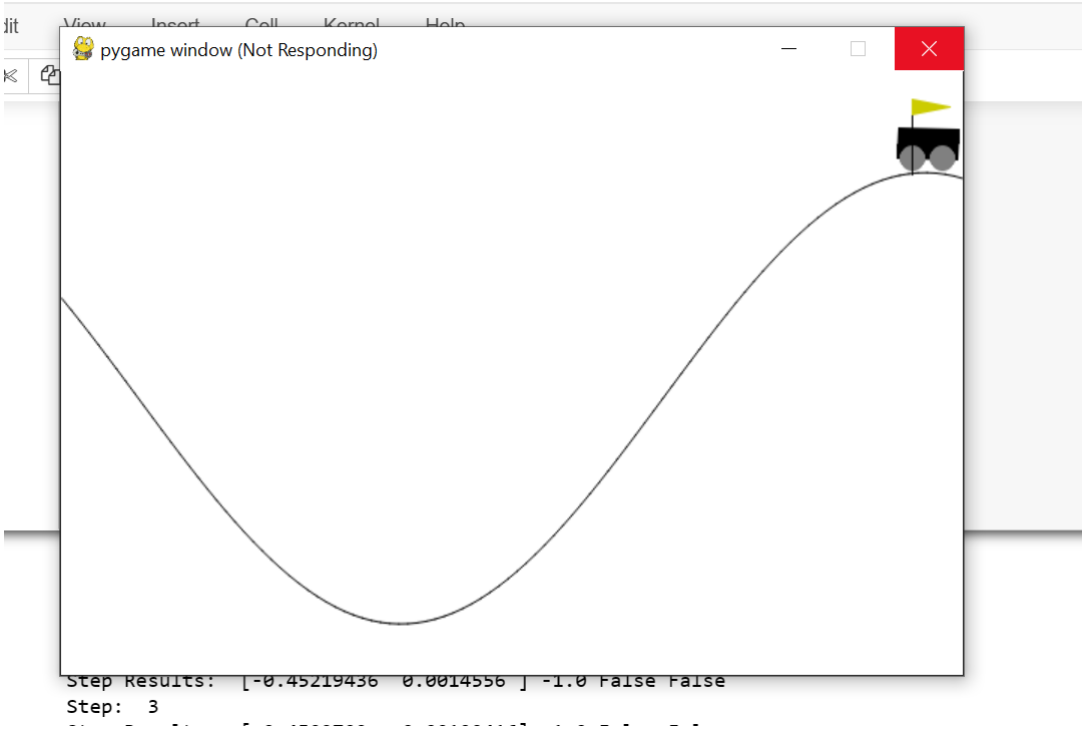
We define the action to be taken for the steps to reach the goal.

The car climbed the hill before 200 steps and reached the goal.

Output:







Mountain Car – Strategy 2

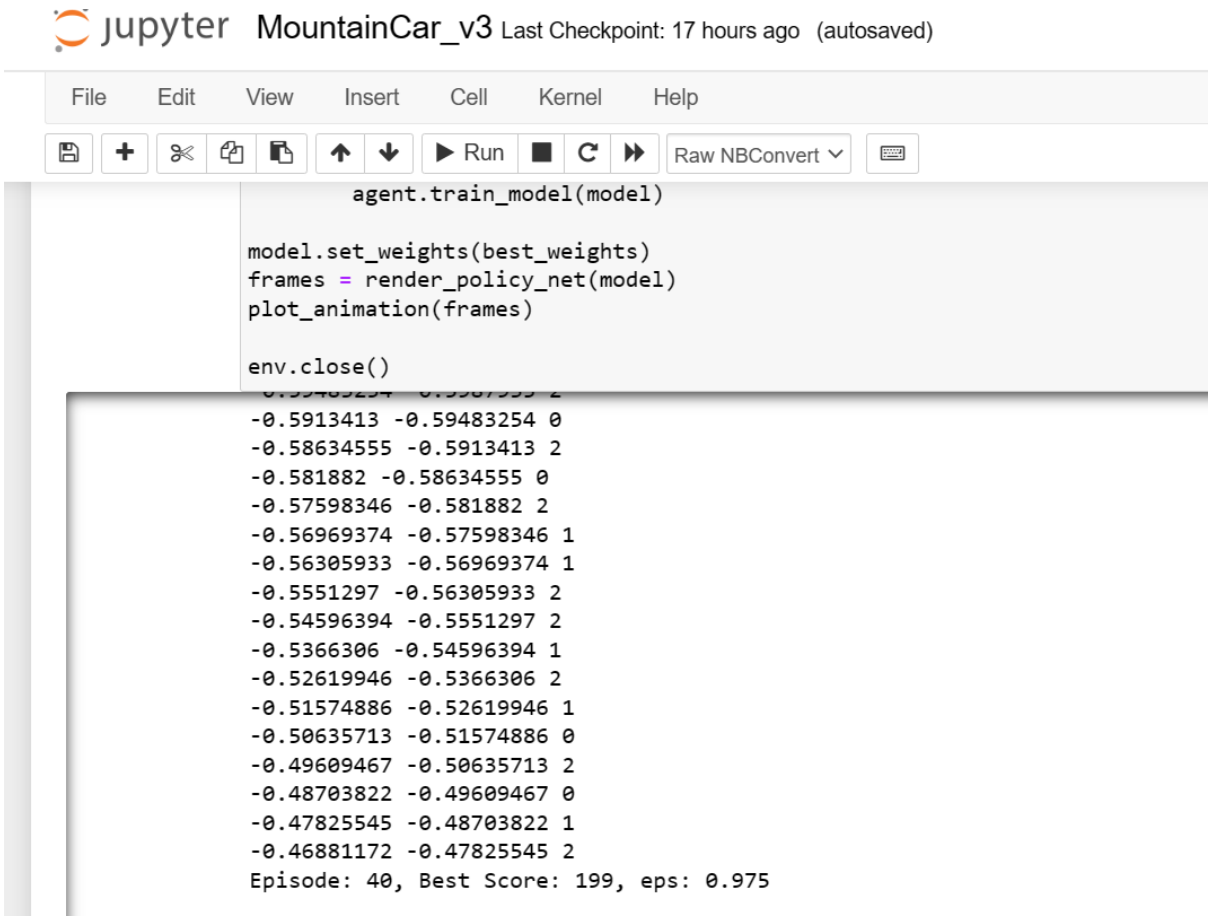
Solving the same using DQN Agent

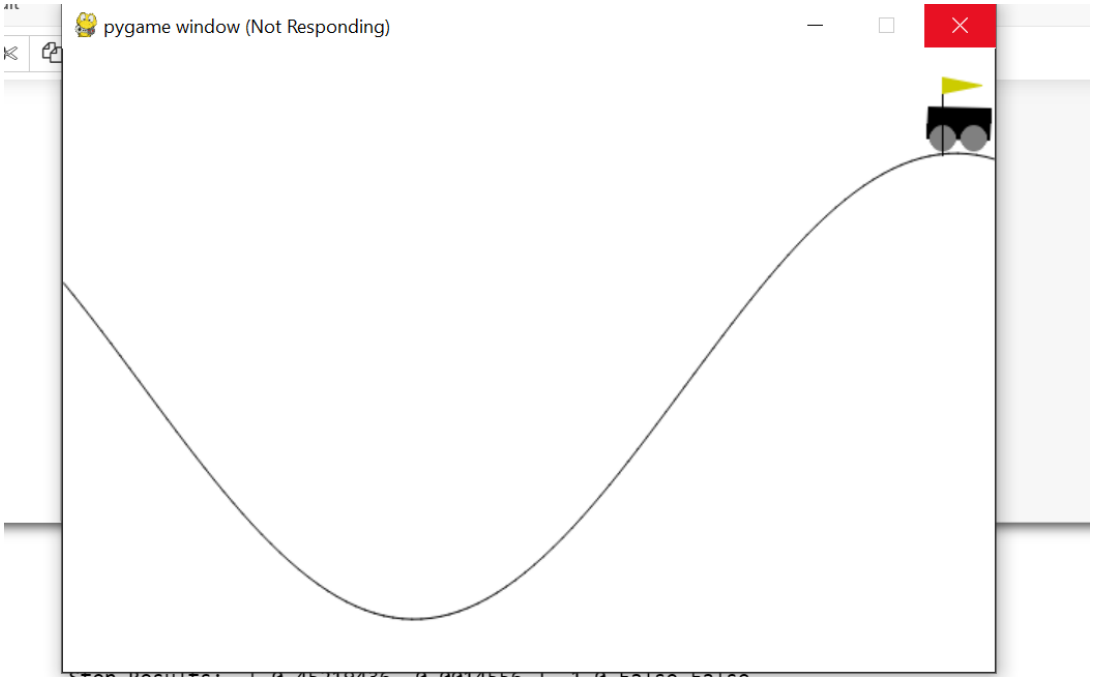
If action == 2 and next state[0] - state[0] > 0 then advancing right and pushing right will result in a reward of 1.

If action is equal to 0 and next state[0] - state[0] 0, then going left and pushing left will result in a reward.

Above logic is implemented with the DQN Agent and out of the 600 episodes, we were able to reach the score of 199 at the 40th episode after training.

Output:





On comparing the results, I was able to train the model to reach the goal using DQN strategy in episode 40 with the score of 199 but whereas using the random walk I was able to get a reward of -137.