Report Navigation Assignment Deep Reinforcement Learning

Introduction

This project is the first Assignment of the Udacity Course Deep Reinforcement Learning. For this project, a virtual rectangular world has been created where the agent can move freely in.

This world has been filled with blue and yellow bananas, and the task of the agent is to navigate in it and collect all the yellow bananas, while discarding the blue ones.

Learning Algorithm

I have chosen the algorithm that we also used in the previous DQN exercise, namely **Normal DQN**. In this methods two networks are being used, a so called local one, and a target network. Furthermore, also soft updates for the fixed q targets.

In used hyper parameters used in these two implementations are given in the below table:

Number of Episodes	2000
Start Epsilon	1
Decay Epsilon	0.995
End Epsilon	0.01
Learning rate in optimizer	0.0005
Gamma	0.99
Tau	0.001
Batch Size	64
Update frequency	4

The task is episodic and the goal for this assignment is that the agent must get an average score of +13 over 500 consecutive episodes.

Plot of Rewards

The plot below give express the speed of learning for the two algorithms.
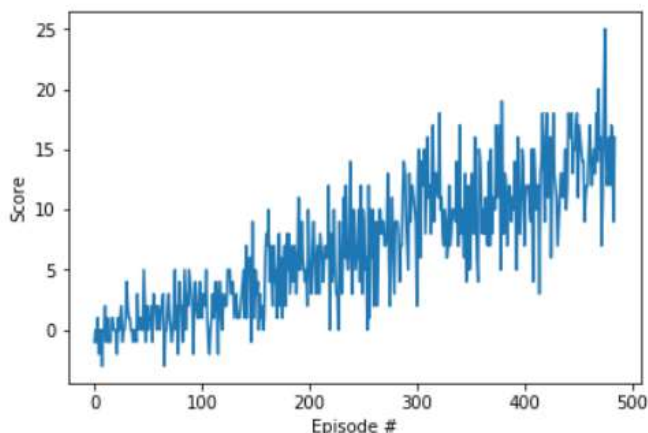
Ideas for Improvements

This project is just a first step to do Reinforcement Learning and there are many ways in which this can be improved.

- Instead of using a simple normal DQN use **double DQN**
- Instead of using a simple normal DQN use **dueling DQN**
- Order the replay buffer using **Prioritized Experience Replay**
- Instead of using a simple normal DQN use **noisy DQN**
- Etc.