DRLND - Navigation Project Report

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1 DQN Model Specifications

The deep RL model used to train the agent is a Deep-Q-Network with experience replay like the one learnt from the Udacity 2nd course module. Experience replay is a method that saves agent experience in batches and then learn from this experience in a random way rather than learn from ordered episode sequences. This technique is proven to improve the learning process a lot.

The Q-network used is a fully connected ANN consisting of 2 hidden layers with 128 nodes each. The table below lists all the hyperparameters used to achieve the results presented in the next section. The model parameters can also be found in the file dqn_agent.py and the associated jupyter notebook.

Parameters	**Value**	**Note**
Q-net Hidden Layers nb	2	-
Nodes nb	128	-
NN Batch size	64	-
Learning Rate	0.00005	-
Replay Buffer size	10000	-
Update Frequency	4	How often to update the network
Tau	0.003	For soft update of target parameters
Gamma	0.99	Discount factor

Table 1: Hyperparameters list

2 Results

The model learned its goal well and efficiently by solving the task in under 750 episodes. The task is considered solved when the agent achieves a mean score of >15 over 100 consecutive episodes. The plot below shows the reward history of the agent.

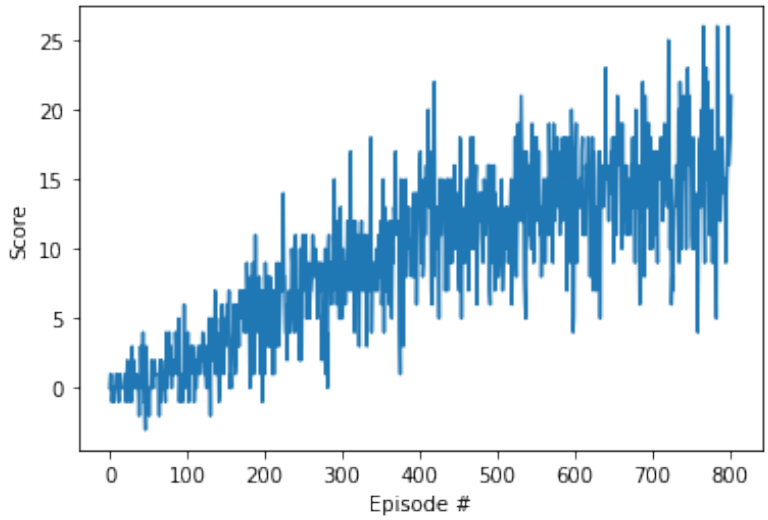

Figure 1: Training scores plot

3 Future work

To further improve the model, a Prioritized Experience Replay algorithm should be implemented as well as Dueling and Double DQN. This will make the model more sample-efficient and let it achieve better scores.