RL Project Report: Tennis

Learning Algorithm:

The learning algorithm implemented here is the deep deterministic policy gradient (DDPG) where neural networks are used for both actor and critic components to estimate the policy during training. The hyperparameters used include the following:

- Buffer Size: 1E5 (dictates how big the replay buffer is)
- Batch_Size: 256 (dictates how many samples to pull from replay buffer for training)
- Gamma: 0.99 (used as discount factor)
- Tau: 1E-3 (used to update neural network's parameters)
- Actor Learning Rate: 1E-4 (for actor neural network)
- Critic Learning Rate: 1E-3 (for critic neural network)
- Weight_Decay: 0 (L2 weight decay)

The learning algorithm uses two neural networks to estimate the policy and q values. The actor neural network contains:

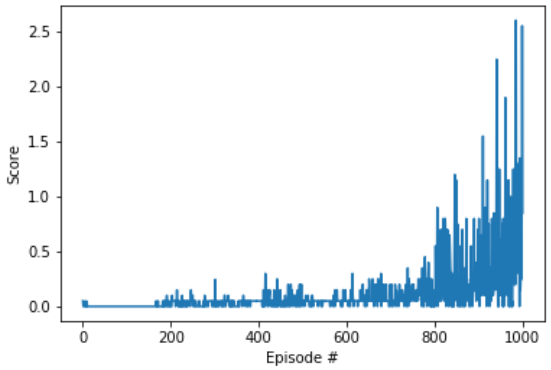
- Input Layer: state of the environment
- Batch Normalization Layer: 1D
- Hidden Layer 1: 64
- Hidden Layer 2: 64
- Output Layer: 2

The critic neural network contains:

- Input Layer: state of the environment
- Batch Normalization Layer: 1D
- Hidden Layer 1: 64
- Extra Processing: concatenate 64 units + action_size
- Hidden Layer 2: 64
- Output Layer: 1

ReLu activation is used throughout the neural network except the last layer of the actor in which tanh is used.

Plot of Rewards:



Plot above is the average score of 100 episodes as a function of episode #.

Future Works:

1. Hyperparameter tuning that can potentially help with faster training or achieving higher scores.
2. Explore other RL algorithms such as twin-delayed DDPG or soft actor-critic method.