Udacity Robotics Nanodegree

Project 4

Deep Learning Project: Follow Me

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**Objective:**

The object of this project is the build a fully convolutional neural network to use semantic segmentation to identify a target and follow it.

**Process:**

The network is developed using Jupyter Notebooks, Tensorflow, and Keras.

**Model Training and HyperParameters:**

Training Run #1:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Learning Rate | Batch Size | Epochs | Steps | Val Steps | Workers | Final IoU Score |
| 0.1 | 32 | 10 | 200 | 50 | 2 | 0.335 |

The first training run was a test to make sure the network was working properly, and the AWS instance was setup properly. Low numbers for batch size and epochs were chosen, as to not spend time excessive time in a setup run. This run allowed a baseline to be set for further training refinement.

Training Run #2:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Learning Rate | Batch Size | Epochs | Steps | Val Steps | Workers | Final IoU Score |
| 0.1 | 64 | 50 | 200 | 50 | 2 |  |

The second training run, the batch size was doubled from the previous and the number of epochs were set to 50. Based on the results of training run #1, the FCN did not have enough epochs to properly converge. By increasing the batch size, more images will be sent throught he network allowing a further refined solution.

**FCN Architecture:**

**Data Collection:**

**Final Results:**

**Files:**

GitHub repository: <https://github.com/fzero6/search-sample-return/tree/master>

Python files:

model\_training.ipynb

follower.py

preprocess\_ims.py

Other files:

Weights.hd5

**References:**

1. Udacity, "Introduction to Robotics," [Online]. Available: <https://classroom.udacity.com/nanodegrees/nd209/parts/c199593e-1e9a-4830-8e29-2c86f70f489e>.
2. <https://github.com/udacity/RoboND-Rover-Project>