

DEEP LEARNING LAB WS 18-19

EXERCISE-3 IMITATION LEARNING

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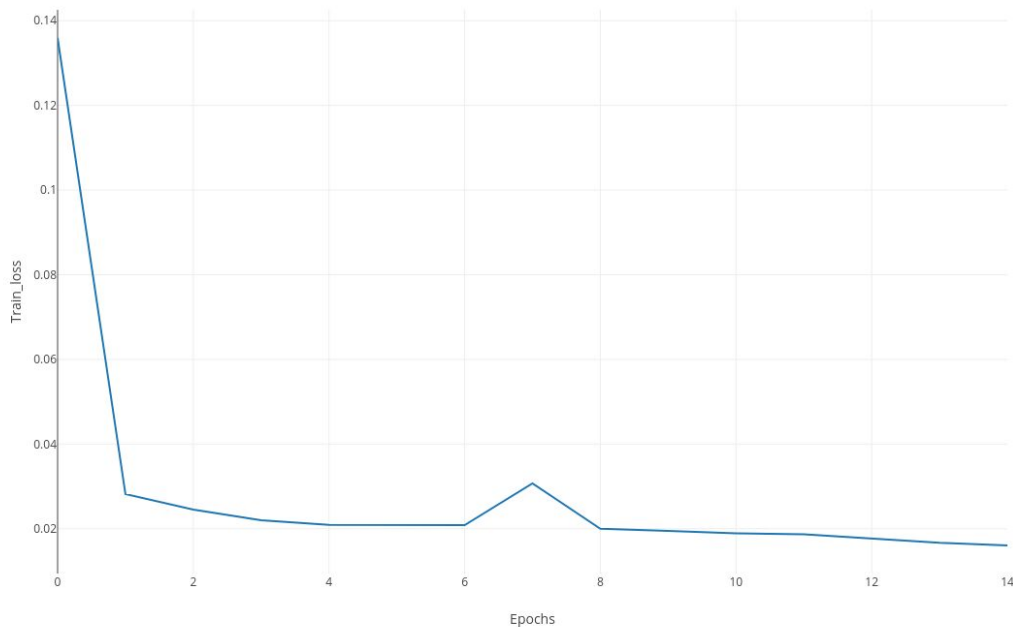
04-12-2018 University of Freiburg

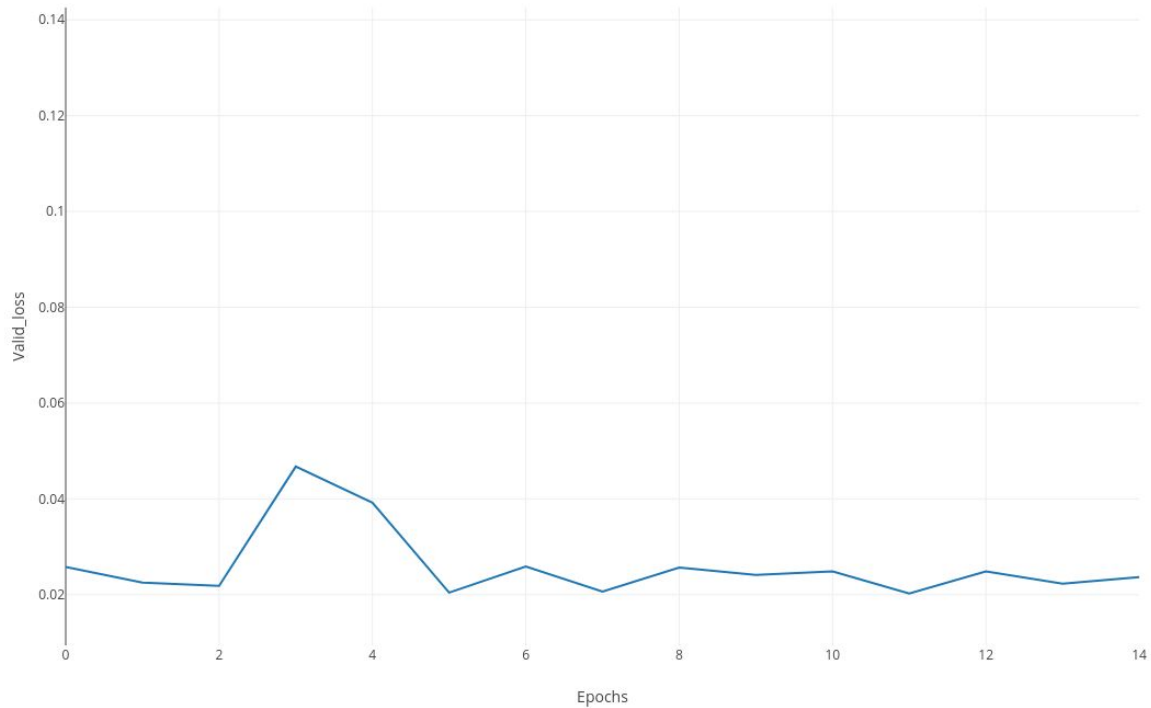
In this exercise we implemented a neural network to do imitation learning (behavior cloning) over the data collected by driving a car in the provided game.

We implemented a network of four convolutional network layers(conv 1: 32 4*4, cov 2: 64 3*3, conv 3: 64 3*3 and cov 4: 64 3*3), three fully connected layers(fc1: 512, fc2: 512 and fc3: 64), one dropout layer of 0.8 dropout and softmax.

For loss calculation mean squared error is used and optimization is done using Adam optimizer.

The training loss and validation loss is evaluated on tensorboard and the results of tensorboard are in 'Results' folder. Below are the plots.





While optimizing the hyperparameters, random search was used and the optimum batch_size was found to be 25 and learning rate of 0.0001439.

Below are my training and testing results:

Train results::

```
{"mean_all_episodes": 846.999999999759, "std_all_episodes": 1.2000000000012392,
"number_episodes": 2, "episode_rewards": [848.1999999999772, 845.7999999999747]}
```

Test results::

```
{"mean": 693.8533333332957, "episode_rewards": [695.2999999999499, 788.7999999999813,
816.3999999999907, 652.1999999999424, 493.7999999999157, 648.1999999999484,
690.299999999962, 678.0999999999517, 479.29999999991276, 743.6999999999874,
703.599999999996, 771.8999999999833, 711.3999999999719, 709.1999999999667,
825.5999999999775], "std": 96.86440603007827}
```

Over 15 test episodes.