

## Self Driving Behavior Cloning

This project is a deep neural network and convolution neural network to clone driving behavior. We train, validate the model using Keras. The model output is a steering angle that steers the vehicle autonomously around the test track.

### Included files

model.py python code to train the model

drive.py

model.h5 trained model

Report Behavior Cloning.pdf

run1.mp4 a video recording of the vehicle driving approximately one lap around the track

these were used to fulfil the project Rubric points of the project.

<https://review.udacity.com/#!/rubrics/1968/view>

### Goals of the project

Collect simulator data of good driving behavior.

Design a neural network model that predicts a steering angle from image data.

Verify functionality by using the above model to drive autonomously around the first track. The vehicle should stay on the road for an entire loop around the track.

Files in this directory and how to use them.

drive.py

drive.py is used to do the autonomous verification phase of the project. Once the model has been trained and saved [ use `model.save(filename.h5)` to save]. Then start the simulator using the autonomous mode.

At the prompt in the AWS simulator enter the following command to start the testing process:

```
python drive.py model.h5
```

To save the result of the autonomous test run use the following command and restart the simulator:

```
python drive.py model.h5 run1
```

The run1 argument specifies what folder to place images for the verification run.

To make a video of the image directory use the following command:

```
python video.py run2
```

The video file will be the directory name ( for this case run2.mp4).

What I did.

Worked on AWS system first, could not drive around the track, had lots of reliability issues with the AWS. Then went to my win 7 machine and install all of the relevant files, got a windows simulator from Barisk( my Mentor).

I then started out on two methods, which neither seemed to work these methods were outline in a paper by Bahadir YILMAZ "Behavior Cloning (Udacity Self Driving Car Project) – Generator Bottleneck Problem in using GPU" . I found very late in the term that I had a version TensorFlow that was not correct, after some experimentation I settle on version 1.10, because of time I did not persue the generator solution. Just the conventional solution that loaded all of the images into the computer memory.

