Comma.AI Programming challenge

Goal: Predict the speed of the car from the video

Available: train.mp4 – 20400 frames at 20 fps.
test.mp4 – 10798 frames at 20 fps
train.txt – denotes speed of the car at each frame in separate lines

Deliverable: test.txt with mse <10 – 3

Requirements:

Python 3.6.10, cv2, sklearn, matplotlib, numpy

Method:

- Lucas Kanade Optical Flow Method
- Capture the road from dashcam: mask construction overlay on the frame
- Tracking Features
- Moving Average
- Gaussian Blur
- Calculate training and validation error
- Visualization

Process:

1) Pass all the arguments and initialize the parameters
2) Create dictionary for Lucas Kanade Optical flow calculation: Tracking and Extracting features initialized. Load training speed per frame values from text file.
3) Construct a mask on the frame, to focus on road for speed calculation.
4) Convert Color Frame -> Gray -> Gaussian Blur removing noise and boosting speed.
5) Calculate Optical Flow for every frame by using Shi-Tomasi Corner Detection.
6) Create a window of visualization of good key features.
7) Split the data into training and validation and calculate moving average for both datasets
8) Fit a Linear regression model and calculate Mean Square Error, hf factor.
9) Finally from the hf factor generated we predict speed for the test video and save it in a text file.

Appendix:
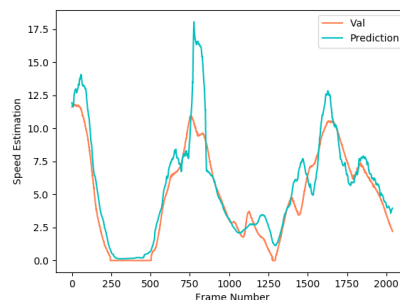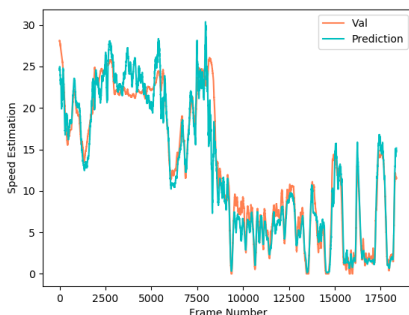

```
(py3) C:\Users\Aayushi Agarwal\Desktop\New Folder>python #
C:\Users\Aayushi Agarwal\Anaconda2\envs\py3\lib\site-packa
dule's documentation for alternative uses
  import imp
MSE calculated for trainining data 4.819540712956595
MSE calculated for validate data 2.7926422864503198
Saving predicted speeds in test.txt
```