Traffic Light Recognition Based On Tensorbox CNN Features

Updated 135 Days Ago All Users

Actions

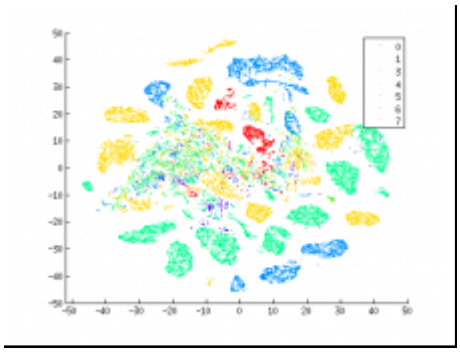
Last Author huyong

Subscribers *None*

Recognition with DL method using existing CNN features

Extract final features from Tensorbox

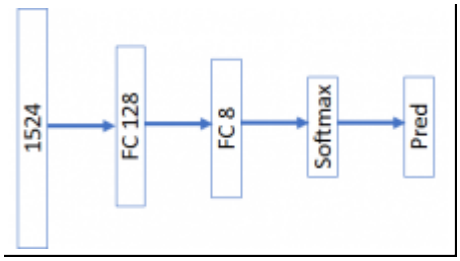
http://ec2-52-9-34-181.us-west-1.compute.amazonaws.com/T16



tsne visualization shows that these cases are highly seperatable.

Train a softmax classifier on extracted features

http://ec2-52-9-34-181.us-west-1.compute.amazonaws.com/T17?workflow=13



inner fc sizes	normalization	initializer stddev	weights regularizer	batch size	learning rate, decay	epoch
[128]	No	0.1	0.005	100	0.01*0.96**epoch	300
[]	Yes	0.1	0.05	64	0.01*0.99**epoch	300
[64, 16]	Yes	0.1	0.05	64	0.01*0.99**epoch	300

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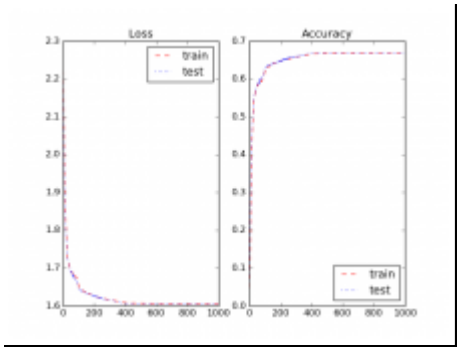
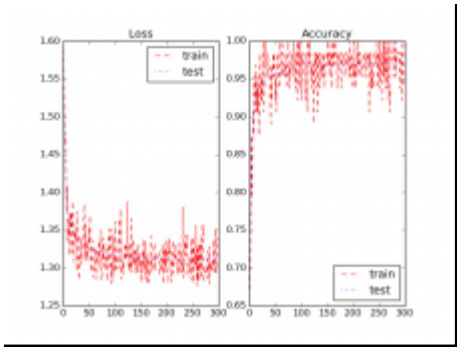
[ ]	Yes	0.1	0.03	64	0.01*0.99**epoch	300
[ ]	Yes	0.1	0.01	64	0.01*0.99**epoch	300
[ ]	Yes	0.1	0.005	64	0.01*0.99**epoch	300
[ ]	Yes	0.05	0.01	64	0.01*0.99**epoch	300
[ ]	Yes	0.005	0.01	64	0.01*0.99**epoch	300
[ ]	Yes	0.001	0.01	64	0.01*0.99**epoch	300

Without normalization, the best I got is



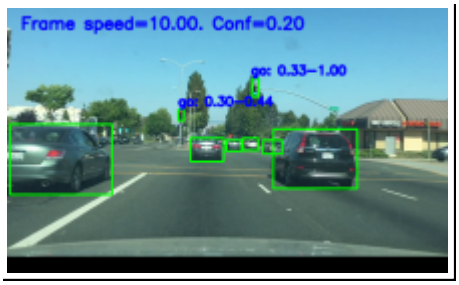
Here a 1524x128x8 fc layers + softmax are used. Batch size is set to be the training dataset size, initializer stddev = 5.0, weights regularizer = slim.l2(0.5)
With normalization and better parameters:



Lessons learned:

- Normalization is important
- Tensorbox output is highly abstract, no extra innner layers need
- Small batches are needed

TL classification + Tensorbox



Green lights detection is stable, while red lights are somehow tend to be recognized as other lights.

Data Augmentation

resampling	None	go	goLeft	stop	stopLeft	warning	warningLef
origin	4096	11929	415	16161	2650	437	255
augmentation	4096	11929	4565	16161	7950	4807	4590
RGW	4096	12344	0	19503	0	0	0

Further detections in the middle of frames for TLs in long distances.

Extra classification on middle grids of Tensorbox output feature map.