Traffic signs recognition

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github.com/vanitas-vanitatum/traffic-sign-recognition

Data

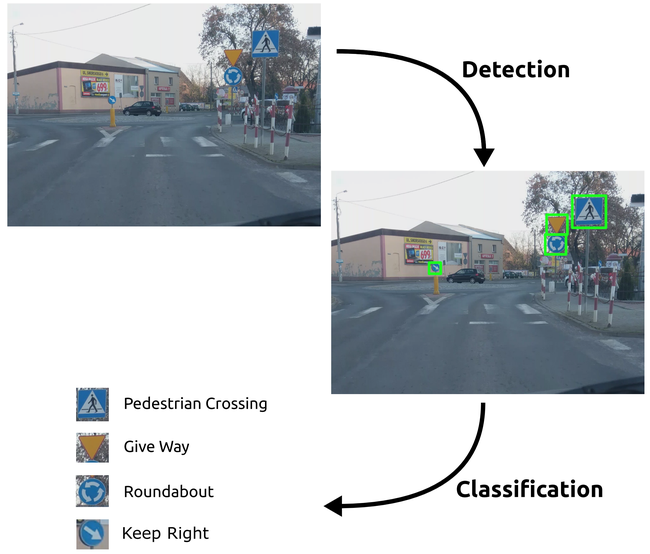
Detection:

- Tsinghua Traffic Sign Detection in the Wild
- LISA Traffic Sign Dataset
- Chinese Traffic Sign Detection Database

Classification:

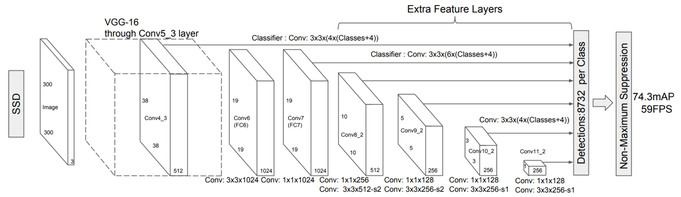
- BelgiumTS Dataset
- Chinese Traffic Sign Recogntion Database
- German Traffic Sign Recognition Benchmark

Pipeline

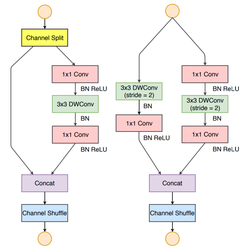


Models

Detector: SSDLite



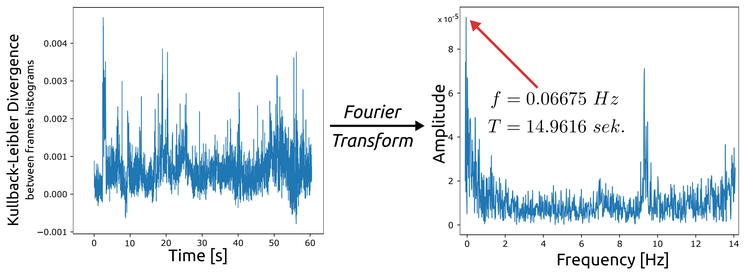
Classifier: ShuffleNetV2



Testing method

Number of errors in given period

assuming that video consists of periodical time windows.



$$\#errors = \#errors_{precision} + \#errors_{recall} + \#errors_{accuracy}$$

$$\#errors_{precision} = (1 - precision) \cdot \frac{t}{T}$$

$$\#errors_{recall} = (1 - recall) \cdot \frac{t}{T}$$

$$\#errors_{accuracy} = (1 - accuracy) \cdot \frac{t}{T}$$

Results

Errors per 1 hour

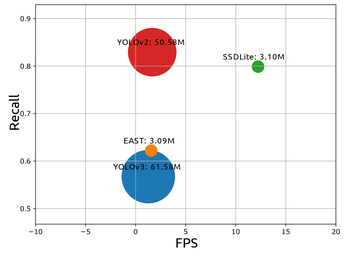
$$\#errors_{precision} = 4.8$$

$$\#errors_{recall} = 84$$

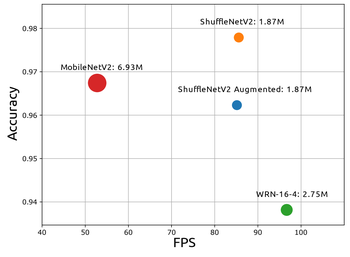
$$\#errors_{accuracy} = 4.8$$

$$\#errors = 93.6$$

Detectors



Classifiers



Literature

Wei Liu, Dragomir Anguelov, Dumitru Erhan, Christian Szegedy, Scott E. Reed, Cheng-YangFu, and Alexander C. Berg. SSD: single shot multibox detector.CoRR, abs/1512.02325, 2015.

Shaoqing Ren, Kaiming He, Ross B. Girshick, and Jian Sun. Faster R-CNN: towards real-timeobject detection with region proposal networks.CoRR, abs/1506.01497, 2015.

Joseph Redmon and Ali Farhadi. Yolov3: An incremental improvement.CoRR, abs/1804.02767,2018.

Joseph Redmon and Ali Farhadi. YOLO9000: better, faster, stronger.CoRR, abs/1612.08242,2016.

Tsung-Yi Lin, Priya Goyal, Ross B. Girshick, Kaiming He, and Piotr Dollár. Focal loss fordense object detection.CoRR, abs/1708.02002, 2017.

Ningning Ma, Xiangyu Zhang, Hai-Tao Zheng, and Jian Sun. Shufflenet V2: practical guidelinesfor efficient CNN architecture design.CoRR, abs/1807.11164, 2018.

Mark Sandler, Andrew G. Howard, Menglong Zhu, Andrey Zhmoginov, and Liang-Chieh Chen.Inverted residuals and linear bottlenecks: Mobile networks for classification, detection andsegmentation.CoRR, abs/1801.04381, 2018.