

Stop Sign Detection

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Overview

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Problem

Accurately and rapidly identifying stop signs and their locations in images.



Method

Model

- YOLOv3 with Transfer Learning

Dataset

- LISA Traffic Sign Dataset
 - (From UCSD Andreas Møgelmo, Mohan M. Trivedi)

Results | Training | Duplicates



Results | Training | Incorrect



Results | Testing | No Detection



Results | Testing | Extra Detections



Results | Metrics | 300 Epochs

Metric	Train	Test
mAP	1.0	0.19
Precision	0.425	0.0924
Recall	1.0	0.229
F1 Score	0.597	0.132
Size	82	28
Speed	0.04 s / image	0.04 s / image

Challenges

- Data was frames pulled from videos
- Training would hang and get stuck
 - Needed to debug
- Tensorflow 2 v 1 issues
- Preprocessing the Traffic Sign data to work with YOLOv3
- Finding an appropriate dataset

Further Improvements

- Dataset
 - More varied images
 - Color images
 - Coco dataset
 - Data augmentation
- Longer Training Time
- Other methods
 - Multivariate Gaussian Classifier
 - SSD: <https://github.com/lufficc/SSD>
 - Fast RNN: <https://github.com/facebookresearch/detectron2>
- Exploring
 - Detecting more traffic signs
 - Detecting in videos

References

- YOLOv3 PyTorch Implementation
 - <https://github.com/eriklindernoren/PyTorch-YOLOv3>
- Andreas Møgelmo, Mohan M. Trivedi, and Thomas B. Moeslund, "Vision based Traffic Sign Detection and Analysis for Intelligent Driver Assistance Systems: Perspectives and Survey," IEEE Transactions on Intelligent Transportation Systems, 2012.

Project Code

uwu.run/go/stop-sign-detection-deep-learning

Questions?