

TRAFFIC SIGN DETECTION



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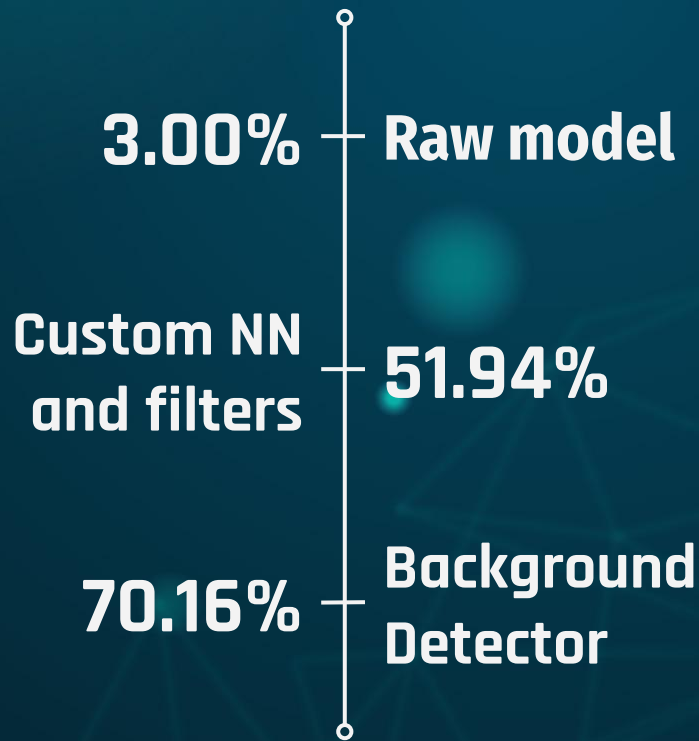
ALMA PARIAS GARCÍA



IDEAS

01	02		04
Filter by size and aspect ratio	Filter by position	Add new category	Auxiliar NN as background detector

OUR EVOLUTION



NEURAL NETWORK AND FILTERS

Boxes with $y > 50$ and $y < 600$ were removed

Position Filter

Size Filter

Remove boxes bigger than 200px per side



Our NN

0.96 of accuracy



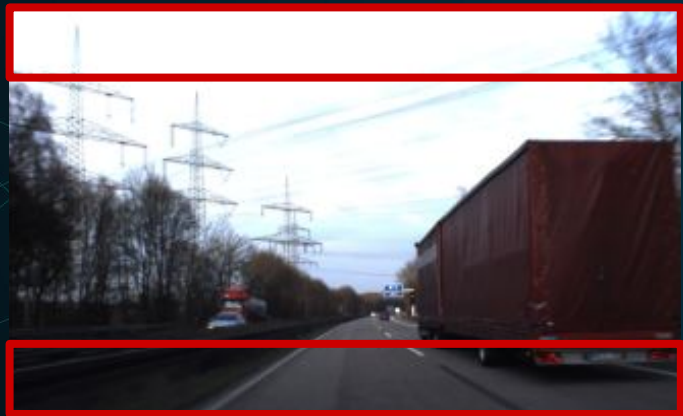
Remove figs with aspect ratio > 1.2 and < 0.8

Rectangle Filter

Confidence Filter

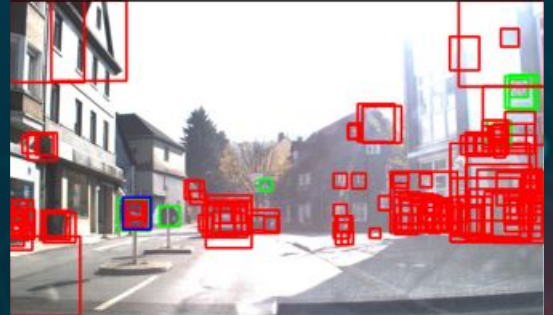
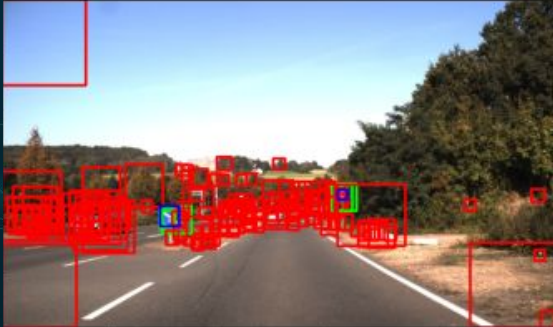
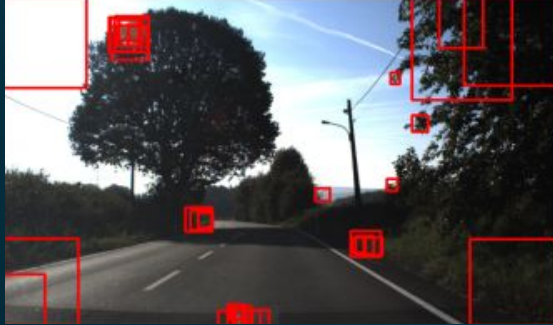
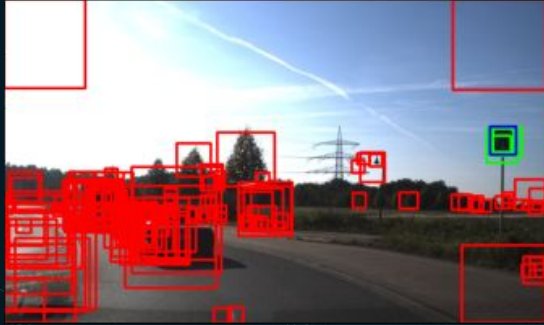
Removed boxes with less than 0.96 of confidence

BACKGROUND DETECTOR



- 1 | Extract box content from the up and down side of each picture (max 900)
- 2 | Add them to train, test and validation datasets
- 3 | Train a new NN with the new dataset
- 4 | Filter boxes detected as background

BACKGROUND DETECTOR



Not perfect but ok

Modification in the Region Proposal Network



TEST_PRE_NMS_TOPK = 9500 #8000 # The maximum number of positive samples taken during proposal generation, pre NMS

TEST_POST_NMS_TOPK = 2500 #1000 # The maximum number of positive samples taken during proposal generation, post NMS

PROPOSAL_NMS_THRESH = 0.5

Final Results



2193.56



70,16%

81.42% = 1 AP
81.86% = 10 AP
88.17% = 11 AP
79.65% = 12 AP
86.81% = 13 AP
92.64% = 14 AP
96.67% = 15 AP
100.00% = 16 AP
50.00% = 17 AP
71.81% = 18 AP
90.20% = 2 AP
50.00% = 22 AP
85.71% = 23 AP

0.00% = 24 AP
80.00% = 25 AP
66.67% = 26 AP
55.00% = 28 AP
100.00% = 29 AP
64.26% = 3 AP
100.00% = 30 AP
0.00% = 31 AP
52.22% = 32 AP
83.33% = 33 AP
80.95% = 34 AP
88.33% = 35 AP
100.00% = 36 AP

0.00% = 37 AP
69.18% = 38 AP
0.00% = 39 AP
79.67% = 4 AP
100.00% = 40 AP
0.00% = 41 AP
75.00% = 42 AP
72.54% = 5 AP
66.67% = 6 AP
95.00% = 7 AP
97.69% = 8 AP
84.47% = 9 AP
mAP = 70.16%

OTHER INTERESTING RESULT

Adding background class to CNN

Reducing the number of proposals

48.62%
in 305s

Conclusions

- Background detector could be better with a specialized dataset
- Very slight reduction of the execution time but using 2 neural networks instead of one
- Better filters could improve time and performance
- Better execution times would allow us to check more boxes and get the missing signs

Thanks for your time!

Any questions?