Real-Time Object Detection

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Introduction

Motivation:

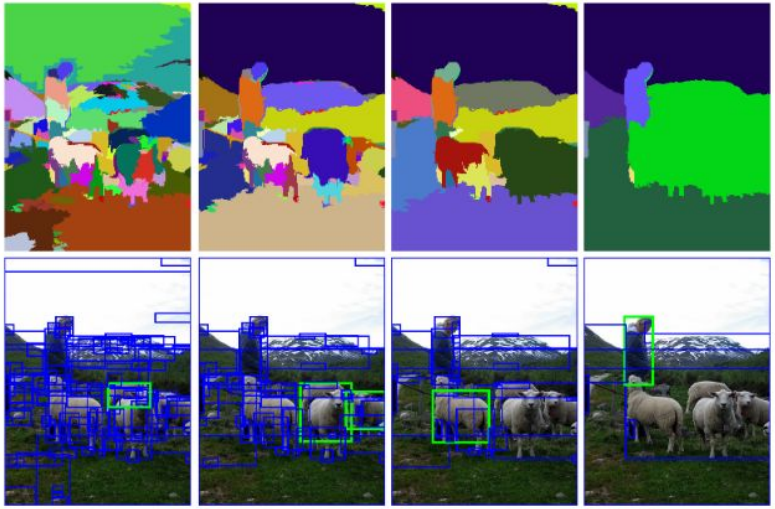
- Apply and optimize image classification techniques for real-time object detection for autonomous car
- Use low-cost hobbyist platform

Data and framework:

- 80,000+ self-driving car images (Udacity)
- Darknet site of YOLO project

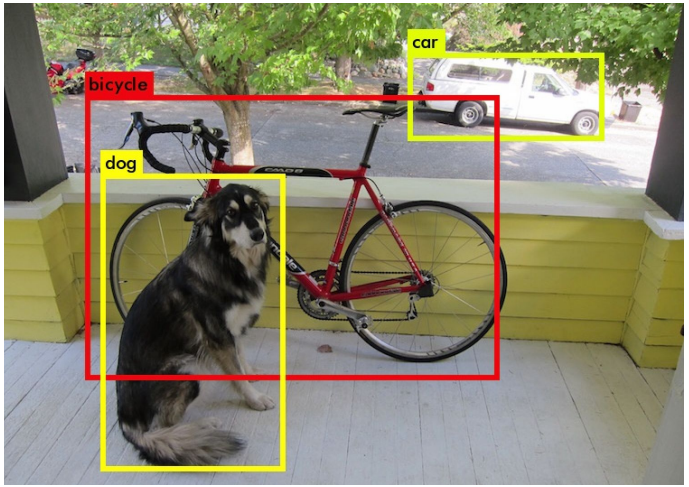
You Only Look Once (YOLO)

Old: regions with CNNs (R-CNN)



New: YOLO, single network evaluation

- 40-90 FPS on a Titan X
- > 100x faster than R-CNN
- 50% less background errors



Open Source

Raspberry Pi

- Built in wifi
- 1.2 GHz Quad Core ARM CPU
- 400 MHz GPU
- 1GB RAM
- $35(Pi) + $25(PiCam)

Challenge: resource constraints!

Raspberry Pi ≠ Titan X

References

1. J. Redmon and A. Farhadi. YOLO9000: better, faster, stronger. CoRR, abs/1612.08242, 2016. URL http://arxiv.org/abs/1612.08242 .
2. Nvidia. Titan x. URL https://www.nvidia.com/en-us/geforce/products/10series/ titan-x-pascal/ .
3. Seralo. Raspberrypi models comparison. 2018. URL http://socialcompare.com/en/comparison/raspberrypi-models-comparison .