You Only Look Once (YOLO)

Real-time object detection

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Project Objectives

➔   Understand what is YOLO

➔   Structure of the project

➔   Train YOLO to detect Custom Objects: Door Detection

➔   Potential Application: Human Intrusion Detection

➔   Demo a working YOLO Detector in image/video

What is Yolo

- **Image/Video**
- **YOLOv3 trained on the COCO dataset**
  - consists of 80 labels, including People, Bicycles, Cars and trucks, Airplanes, Stop signs and fire hydrants, etc.

DEMO

Train YOLOv3 to Detect Custom Objects

Example: Door:

-> about 300 different images per category

-> quality of object detection greatly depends on labeling entire training set(MCIndoor20000 dataset)

Preparing YOLO configuration files:

-> YOLO needs certain specific files to know how and what to train

Training YOLO:

-> when should stop training the model: The average loss (error) value that gets reported after every training iteration should be as low as possible.

Figure: NFPA label
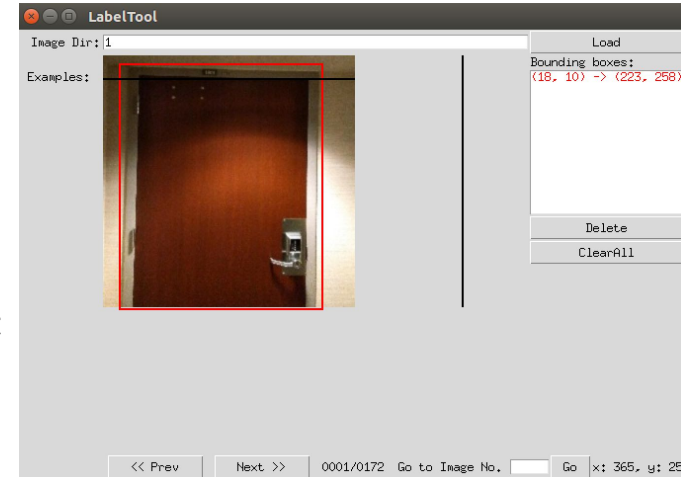
What next?

➔ Combine the customized door detection with person detection

➔ Potential Application: Human Intrusion detection
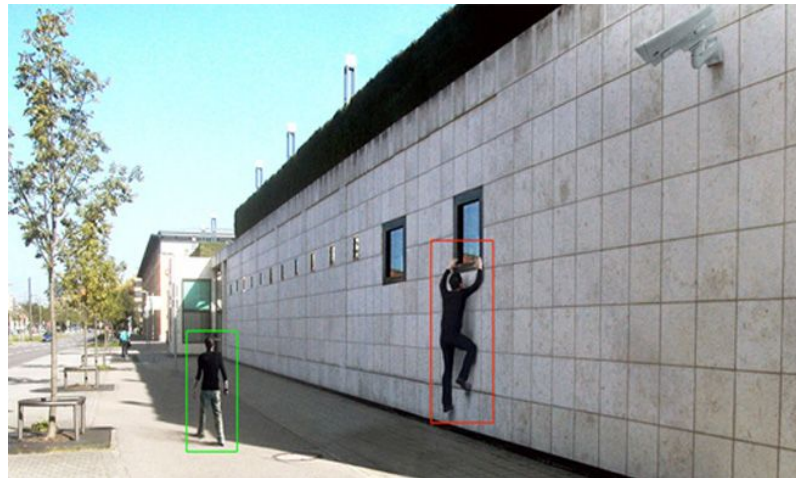
References

YOLO object detection with OpenCV - Adrian Rosebrock

How to train YOLOv2 to detect custom objects - Nils Tijtgat

Questions?

YOLO Object Detector

- **One-stage detector strategy**
  a) tend to be less accurate than two-stage detectors but are significantly faster.
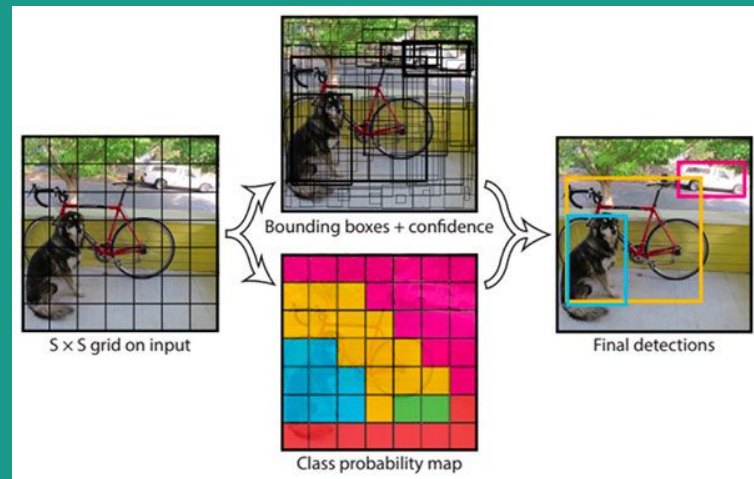 b) capable of super real-time object detection, obtaining 45 FPS on a GPU.

Figure: A simplified illustration of the YOLO object detector pipeline