Object Detection for Phone, Cigarette, and Seatbelt using Darknet

QuanDang

# Requirements:

* Chỉnh sửa source code C của Darknet để tối ưu mô hình Violence detection cho bài toán phát hiện Phone, Ciga, Seatbelt
* Constraints:
  + Accuracy > 90% (? For which dataset under which scenarios and using what metrics)
  + Conditions:
    - Light: 20 – 500 lux (Dataset prepared or not)
  + Inference Time (CPU only):
    - > 15 fps
  + Target hardware:
    - RAM: <= 200 MB
    - CPU: <= 7500 DMIPS - Dhrystone MIPS (Million Instructions per Second) – Should evaluate by DMIPS/MHz instead
    - Some suggested chips: Qualcomm SA6155P, Qualcomm SA8155P, Qualcomm SA8195P, Qualcomm SA8255P SA8775P => snapdragon automotive chips could be using with Snapdragon Neural Processing Engine SDK

# Schedule:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Task | Description | Start | End | Results |
| Train trên máy server | Input: Dataset  Output: weights file | 09/10 | 13/10 | [Done on github:](https://github.com/quandang246/Automotive_AI_project)  Automotive\_AI\_project/darknet/backup/yolov3-3c-3000-maxsteps\_final.weights |
| Đánh giá kết quả train và cải thiện | Input: weights  Output: chỉ số đánh giá mAP, .. | 14/10 | 20/10 |  |
| Deploy trên Raspberry Pi | Input: weight and config files  Output: runing pipline on device | 21/10 | 23/10 |  |
| Đánh giá FPS và tối ưu source code | Output: FPS, accuracy | 24/10 | 27/10 |  |
| Đánh giá tổng thể | Output: inference time, accuracy, … | 27/10 | 30/10 |  |

# Task Breakdown (doing):

* Train trên máy server:
  1. Xử lý dữ liệu (pre-processing)
  2. Config data, model
  3. Training
  4. Inference

# Problems:

* Label thiếu trong setbelt:
  1. Text file frame\_1254\_20241006\_123341.txt does not exist for frame\_1254\_20241006\_123341.jpg
  2. Text file frame\_1492\_20241006\_123341.txt does not exist for frame\_1492\_20241006\_123341.jpg
  3. Text file frame\_1253\_20241006\_123341.txt does not exist for frame\_1253\_20241006\_123341.jpg
  4. Text file frame\_0258\_20241006\_123341.txt does not exist for frame\_0258\_20241006\_123341.jpg
  5. Text file frame\_1491\_20241006\_123341.txt does not exist for frame\_1491\_20241006\_123341.jpg
* Label thiếu trong cigarette:
  1. Text file frame\_0111\_20241006\_123341.txt does not exist for frame\_0111\_20241006\_123341.jpg
  2. Text file frame\_0120\_20241006\_123341.txt does not exist for frame\_0120\_20241006\_123341.jpg
  3. Text file frame\_0210\_20241006\_122103.txt does not exist for frame\_0210\_20241006\_122103.jpg
  4. Text file frame\_0211\_20241006\_122103.txt does not exist for frame\_0211\_20241006\_122103.jpg

# References:

1. Pipeline: <https://github.com/jacksonxliu/YOLOv3-tiny-custom-object-detection>
2. OpenCV install:
   1. <https://phoenixnap.com/kb/installing-opencv-on-ubuntu>
   2. Fix pkg-config: <https://github.com/hybridgroup/gocv/issues/363>
3. Config model: <https://phamdinhkhanh.github.io/2020/03/10/DarknetGoogleColab.html>