# Fish Detection

Yolov3 in an Industrial Env

# Summary

# Project and Data Introduction

In this project, we are working on detecting bigeye and yellowfin tunas on video feeds from fishing vessels. The task shall also include classifying the fish, as well as provide a rectangular bounding box around each fish.



```
img_id,bbox_id,x_min,x_max,y_min,y_max,label_name
94a95d88-23f0-11e9-aef8-6377a4c78e35,1,392,607,197,405,Human
94a95d88-23f0-11e9-aef8-6377a4c78e35,2,315,444,132,260,Human
94a95d88-23f0-11e9-aef8-6377a4c78e35,3,228,353,36,183,Human
94a95d88-23f0-11e9-aef8-6377a4c78e35,4,166,331,286,470,Human
94a95d88-23f0-11e9-aef8-6377a4c78e35,5,331,377,359,513,Yellowfin tuna
94a95d88-23f0-11e9-aef8-6377a4c78e35,6,156,191,513,589,Yellowfin tuna
94a95d88-23f0-11e9-aef8-6377a4c78e35,7,531,605,0,71,Human
94a95d88-23f0-11e9-aef8-6377a4c78e35,8,50,150,95,217,Human
94a95d88-23f0-11e9-aef8-6377a4c78e35,9,0,51,226,306,Human
94ac6e38-23f0-11e9-b635-cb6efd3bfc7b,1,318,625,367,488,Black marlin
94ac6e38-23f0-11e9-b635-cb6efd3bfc7b,2,120,291,361,472,Human
94ac6e38-23f0-11e9-b635-cb6efd3bfc7b,3,250,433,238,433,Human
```
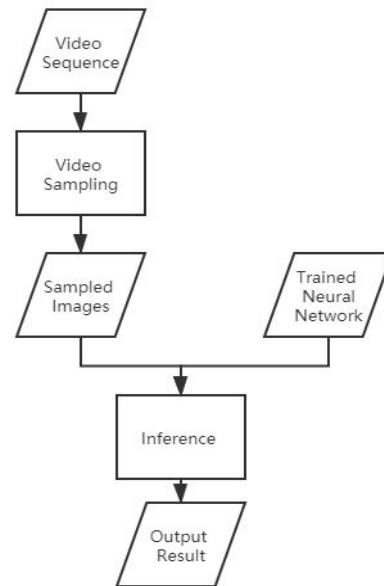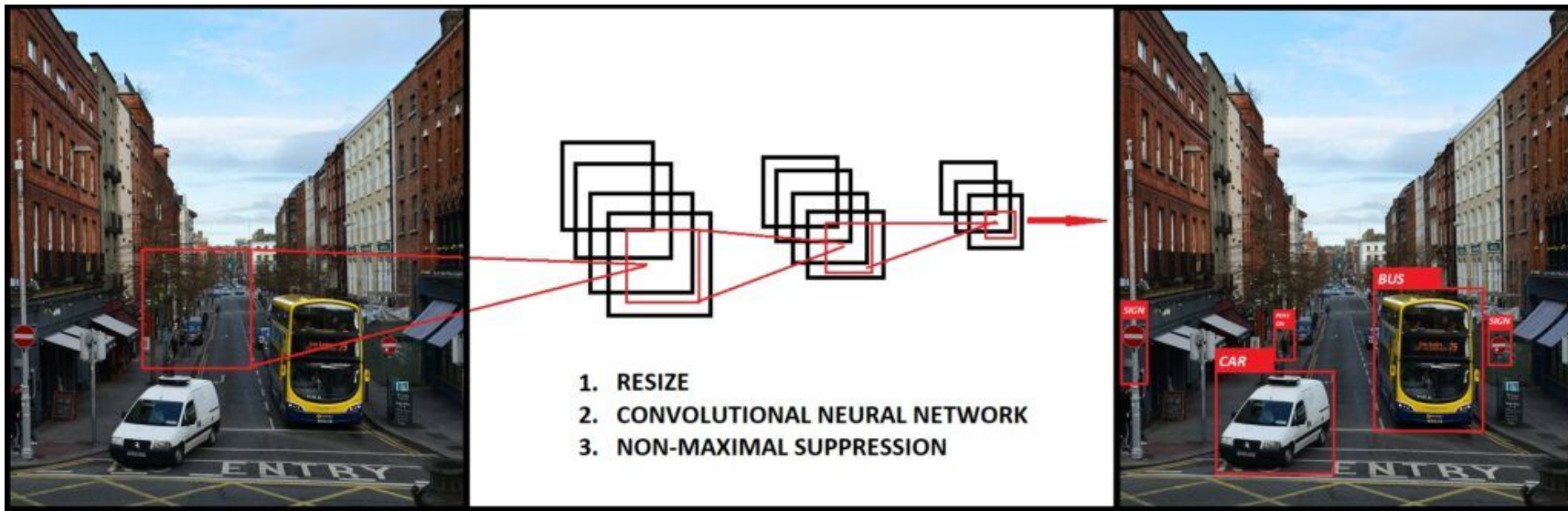
# Implementation Pipeline

Training Phase
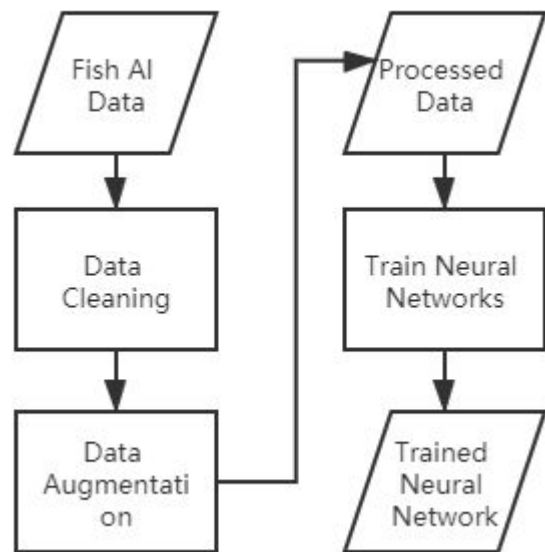
Fine Tuning Phase

# YouOnlyLookOnce V3

Yolo is a state-of-the-art object detection system (network). It was developed by Joseph Redmon and it is known for its speed, being much faster than R-CNN and others, we can achieve real-time object detection.



1. RESIZE
2. CONVOLUTIONAL NEURAL NETWORK
3. NON-MAXIMAL SUPPRESSION

# YouOnlyLookOnce V3

YOLO has reframed an object detection problem into a single regression problem.

It goes directly from image pixels, up to bounding box coordinates and class probabilities.

Hence, a single convolutional network predicts multiple bounding boxes and class probabilities for those boxes.



N x N grid input

Bounding boxes + confidence

Class probability map

Final detections
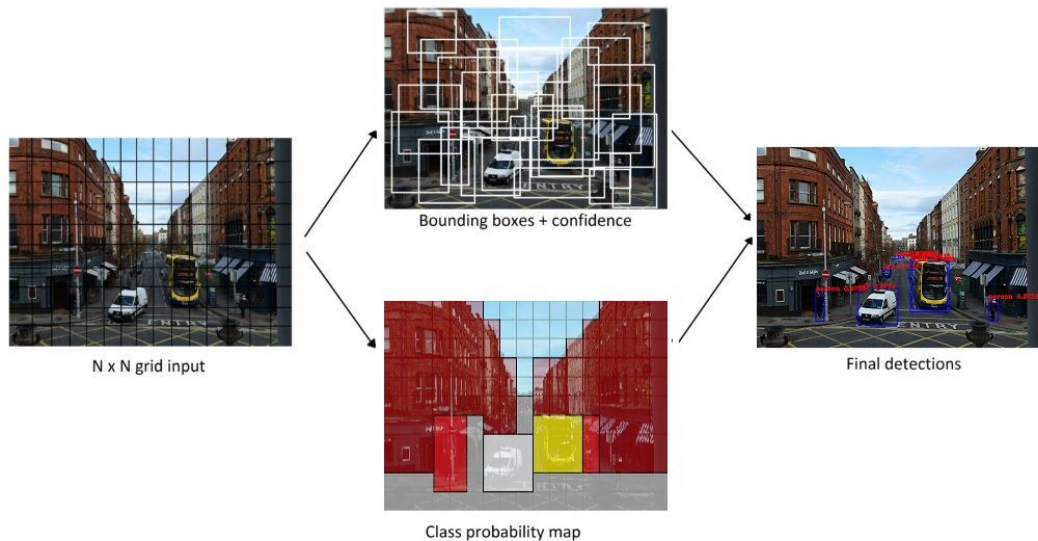
# YouOnlyLookOnce V3 Architecture
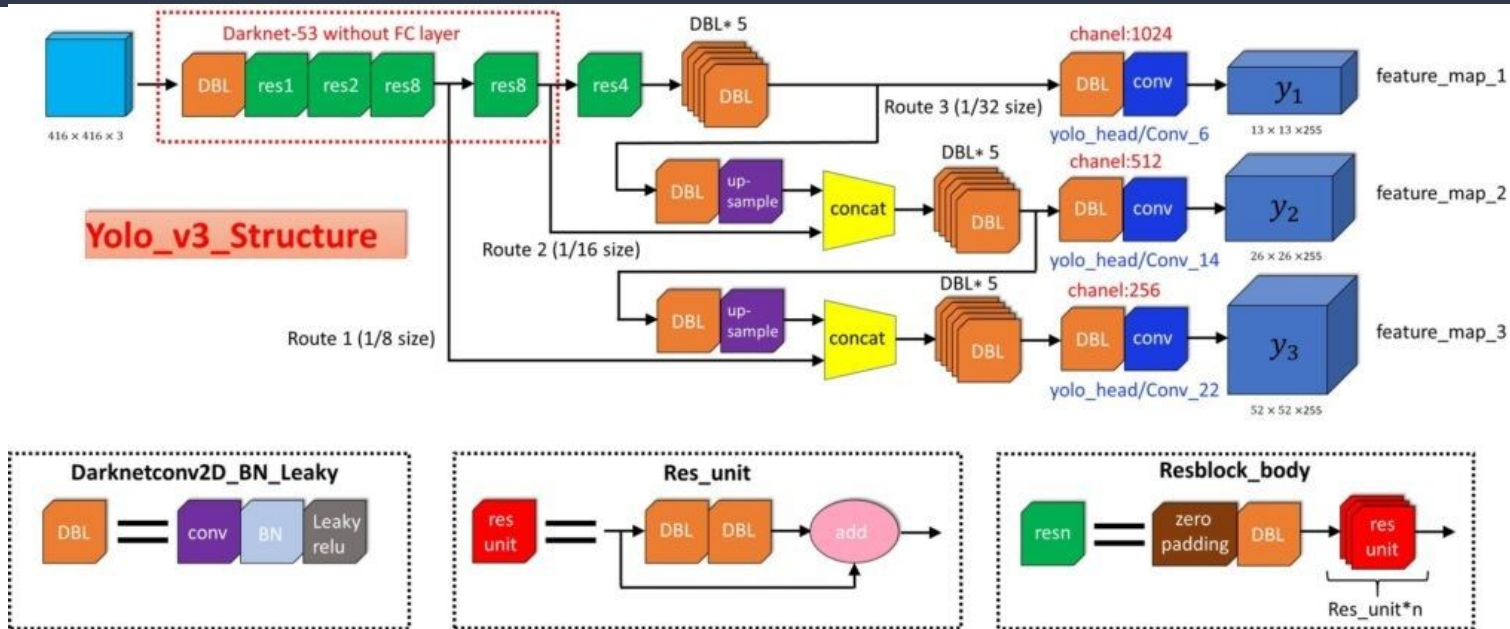


**Output Format :**  S x S x [ B * (4+1+N°Classes)]

S : grid size (7 in our case)  4 : Predicted Bounding Box Coords

B : N° Scales (YoloV3 uses 3)  1 : Objectness of predicted BB

# Training Results



The loss curves
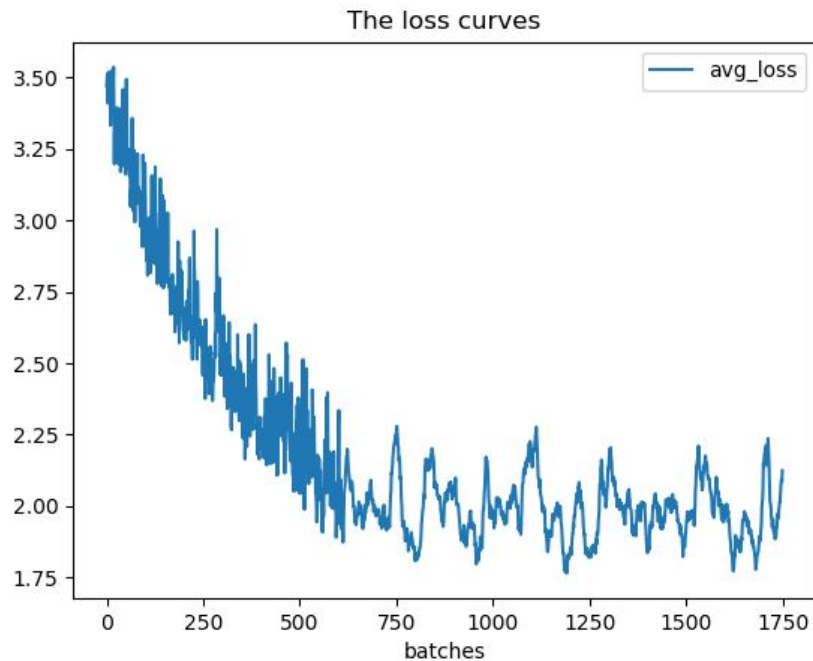
# Inference Results

# Thank You,

# Any Questions ?