OBJECT DETECTION USING YOLO

**Teammates**

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WHAT IS OBJECT DETECTION?

- Object detection is a computer vision technique that works to identify and locate objects within an image or video. Specifically, object detection draws bounding boxes around these detected objects, which allow us to locate where said objects are in (or how they move through) a given scene.
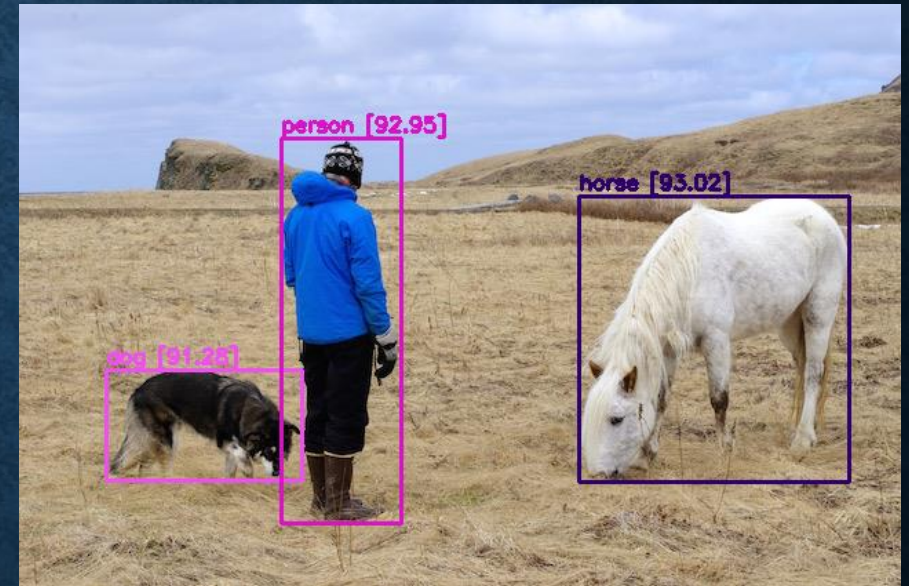
# WHY IS OBJECT DETECTION IMPORTANT?

Object detection's unique capabilities, we can see how it can be applied in a number of ways:

- Crowd counting

- Self-driving cars

- Video surveillance

- Face detection

- Anomaly detection

HOW DOES OBJECT DETECTION WORK?

Deep learning-based object detection models typically have two parts.
An **encoder** takes an image as input and runs it through a series of blocks and layers that learn to extract statistical features used to locate and label objects. Outputs from the encoder are then passed to a **decoder**, which predicts bounding boxes and labels for each object.

1. Input image   2. Extract region proposals (~2k)   3. Compute CNN features   4. Classify regions
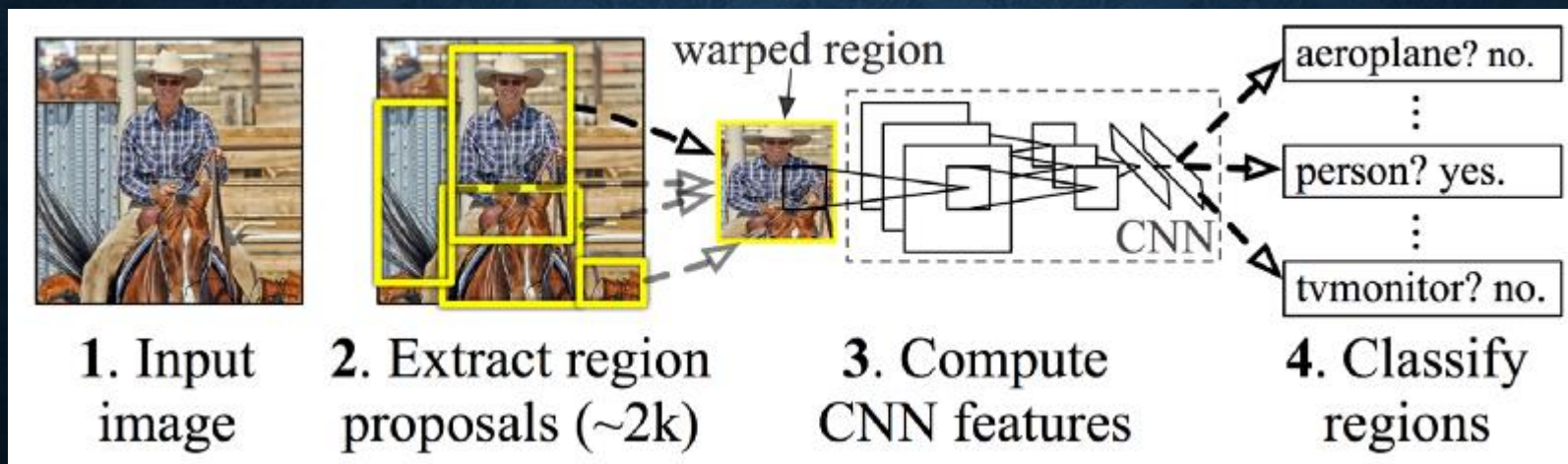
WHAT IS YOLO ?

The YOLO framework (You Only Look Once), deals with object detection in a different way. It takes the entire image in a single instance and predicts the bounding box coordinates and class probabilities for these boxes. **The biggest advantage of using YOLO is its superb speed** – it's incredibly fast and can process 45 frames per second. YOLO also understands generalized object representation.
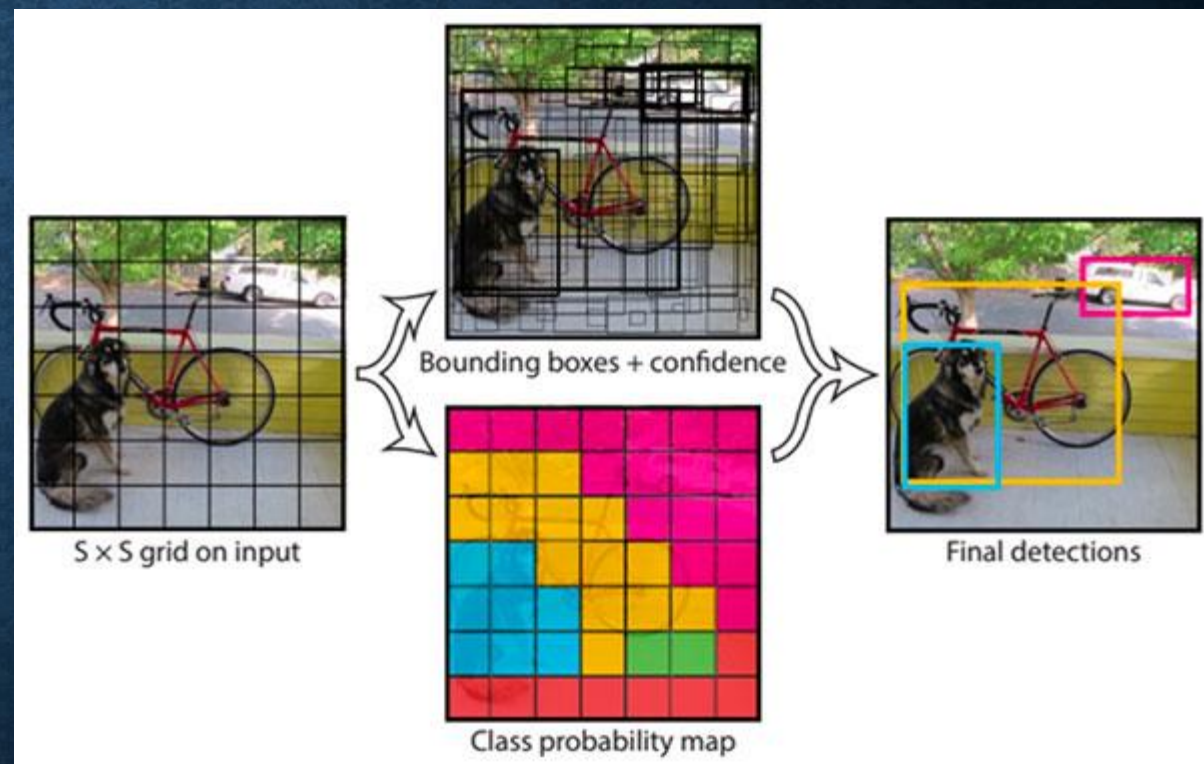
Training

To train our object detector, we need to supervise its learning with bounding box annotations. We draw a box around each object that we want the detector to see and label each box with the object class that we would like the detector to predict.
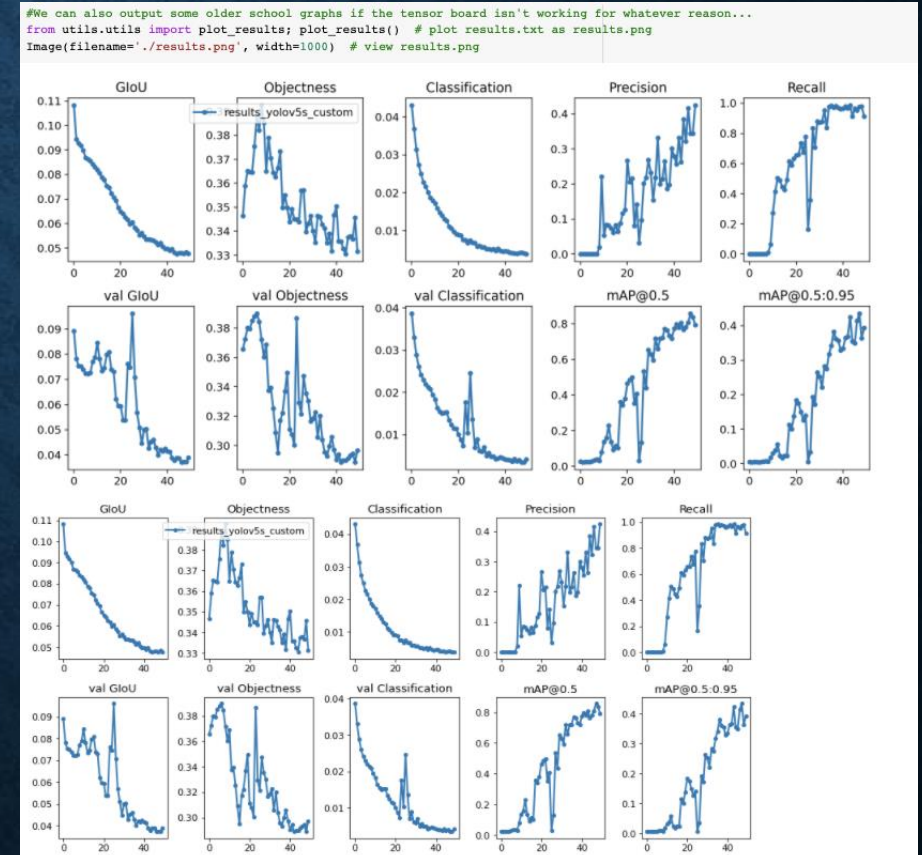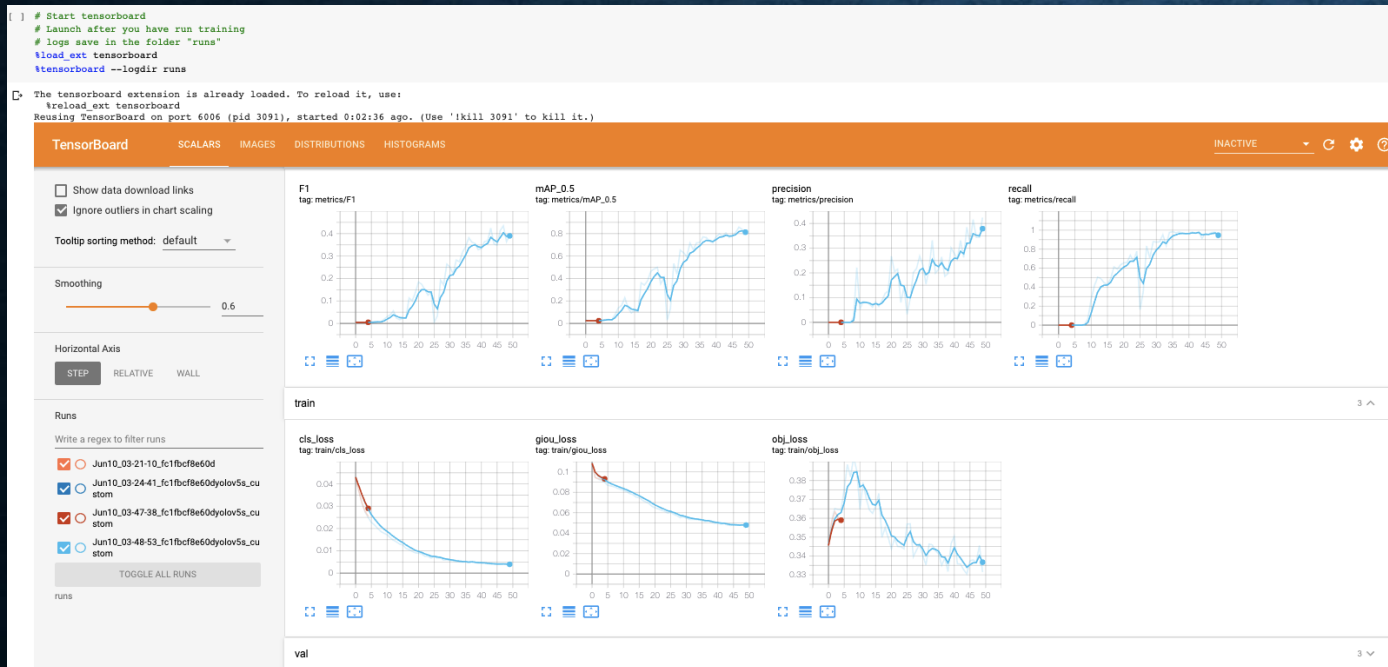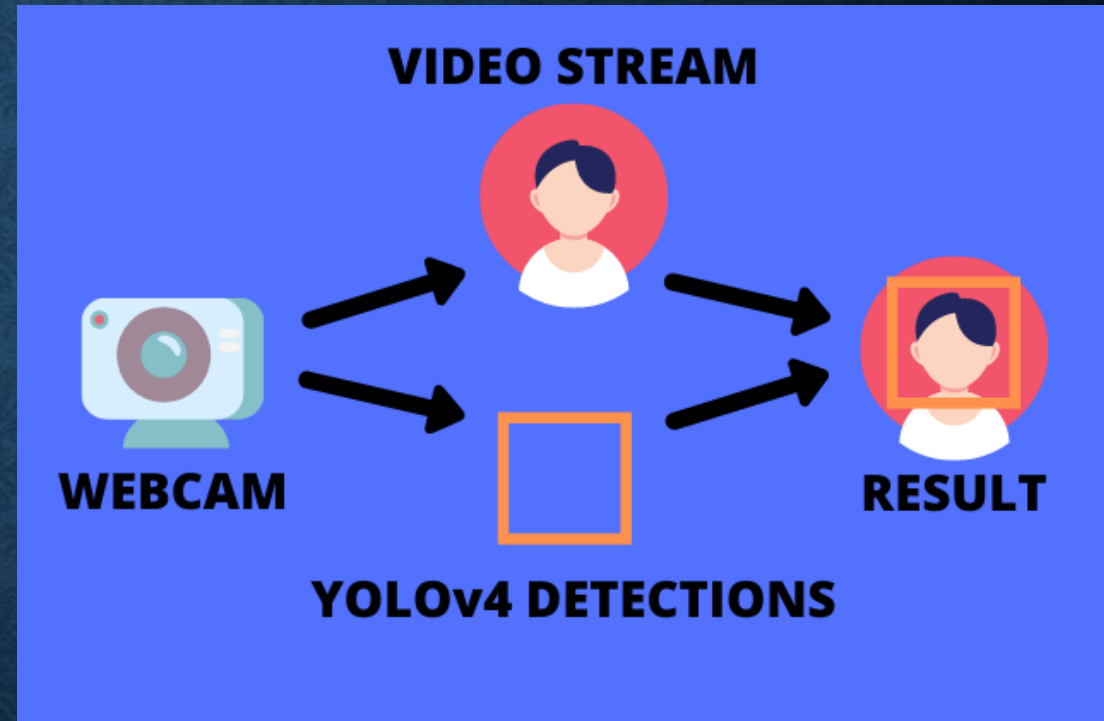
PROJECT RESULTS

After we successfully Trained and
Tested we captured real time images
through the laptops camera
These are the images we captured,
here we can see clear object
detection of each object and all at a
time with accuracy given
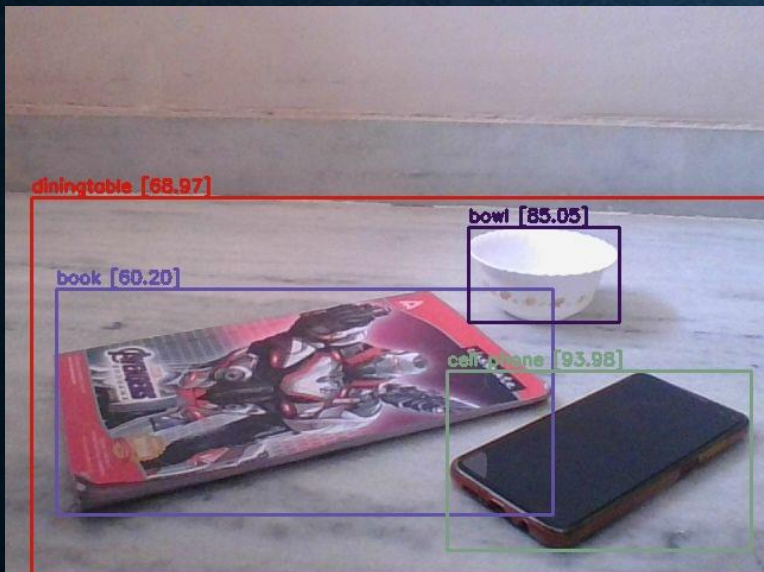
YOLOv4 on Webcam Videos

- Running YOLOv4 on webcam video is a little more complex than images. We need to start a video stream using our webcam as input. Then we run each frame through our YOLOv4 model and create an overlay image that contains bounding box of detection(s). We then overlay the bounding box image back onto the next frame of our video stream.

- YOLOv4 is so fast that it can run the detections in real-time!

Link to Project CODE

https://colab.research.google.com/drive/1YwD2TCRY8pY2B3nBey5-2yjxyLJC0slQ?usp=sharing

THANK YOU