

## Exercise: Experiments with YOLO

### 1. Learning goal

In the last exercises we read two of the three original YOLO papers. Now, enough of the theory! Let's try to get YOLO running on our own images and collect some practical experiences with it.

### 2. Get a YOLO implementation running

A description how to get YOLO, how to build it and how to run it can be found at

<https://pjreddie.com/darknet/yolo/>

I used a virtual machine (using VMWarePlayer) with Ubuntu Linux installed:

The first step is to get the source code and compile it:

```
git clone https://github.com/pjreddie/darknet
cd darknet
make
```

In order to avoid retraining the YOLO model from scratch, it is very comfortable to download pre-trained weights. Go into the cfg folder and type:

```
wget https://pjreddie.com/media/files/yolov3.weights
```

### Questions:

1.) What is Darknet?

2.) In which language is Darknet written?

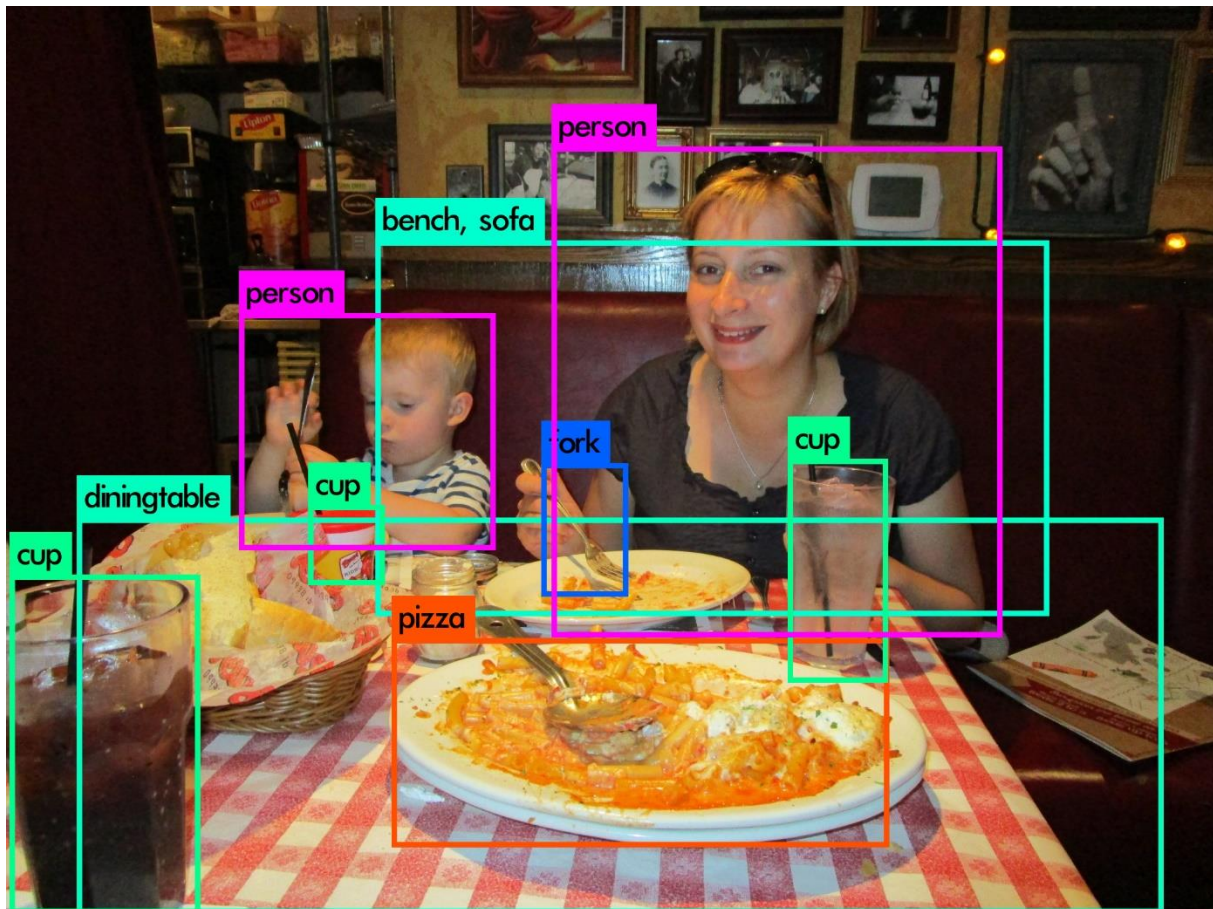
3.) How large is the pre-trained weights file for YOLO V3?

### 4. Get a first prediction for one of your own images

Copy a test image test1.JPG to the data folder. Then go to the darknet main folder and type:

```
./darknet detect cfg/yolov3.cfg cfg/yolov3.weights data/test1.JPG
```

Here is what I got for my first test image:



That's impressive!

### Questions:

4.) Where can I find the resulting image with the predicted bounded boxes?

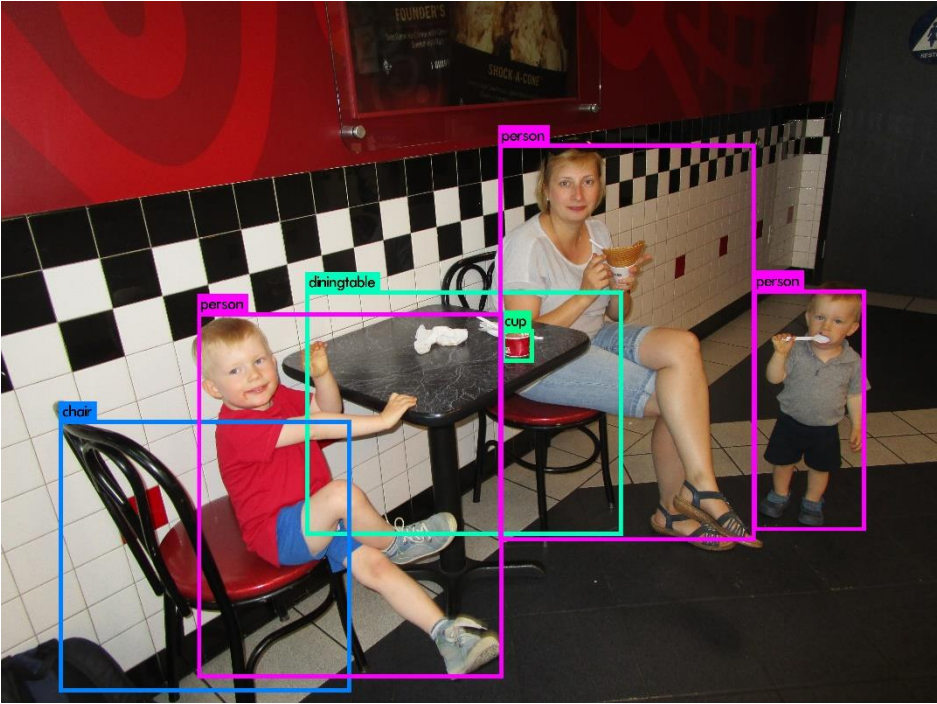
5.) How much time does it take on your computer to process one image?

6.) How many different classes does this pre-trained YOLO V3 detector "know" and which classes can we expect it to detect at all?

## 5. Predictions for a series of test images

You can enter the paths to a series of images if you leave out the last argument (image name):

```
./darknet detect cfg/yolov3.cfg cfg/yolov3.weights
```



Darknet will ask you for each individual image file.

## 6. Predictions with a smaller variant of YOLO V3

There is also a smaller YOLO V3 model variant, which can be used to process images faster:

```
wget https://pjreddie.com/media/files/yolov3-tiny.weights
```

### Questions:

**7.) How fast is the detection now on your CPU?**

**8.) How does the detection performance change?**

## 7. Limits of YOLO V3

Try to find out where YOLO V3 has problems to detect objects. For this, download test images from the WWW for which you expect YOLO V3 to have problems. Save some of the prediction images to show your fellow students where YOLO V3 fails.

### Questions:

**9.) When does YOLO V3 fail?**