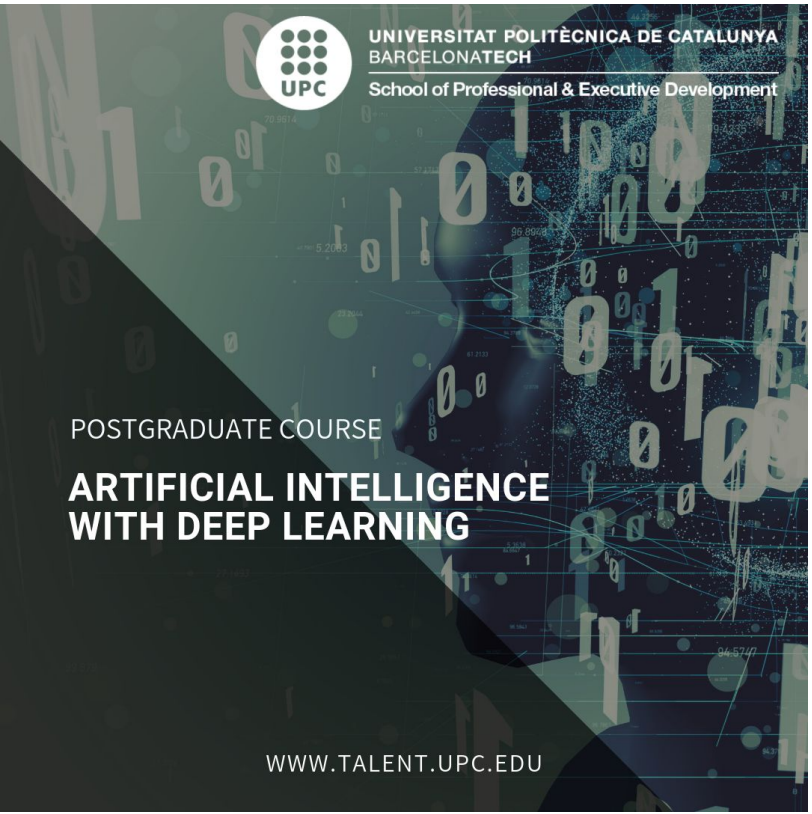


#DLUPC

Computer Vision 6

# Object Detection (Lab)

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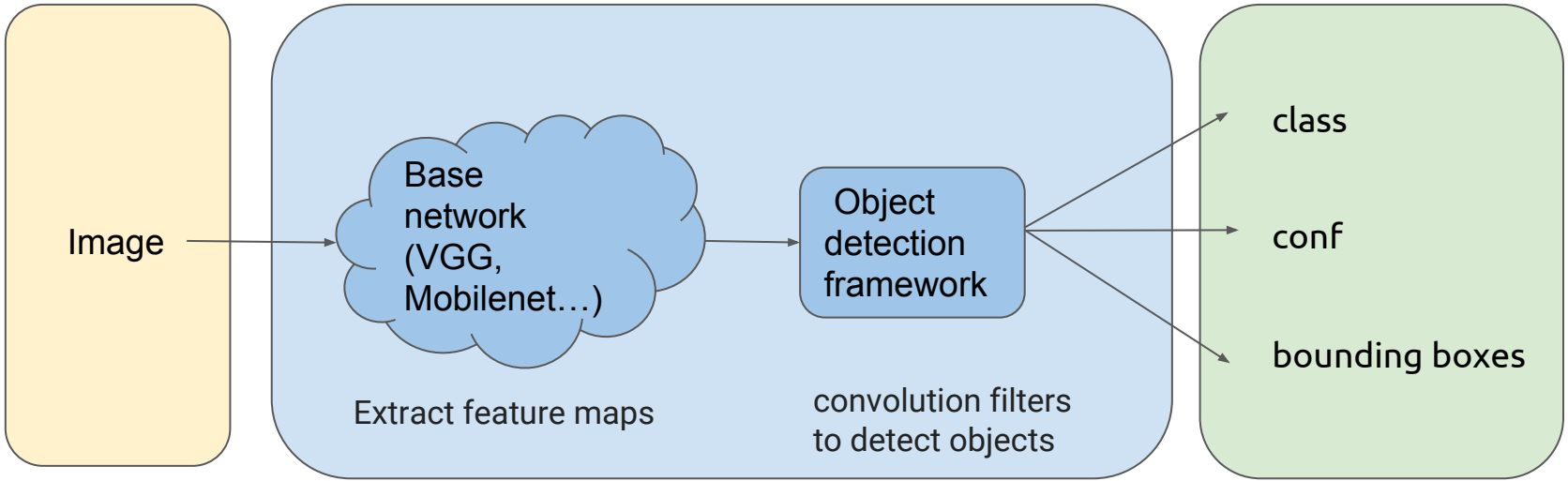
# SSD: Single Shot Multibox Detector

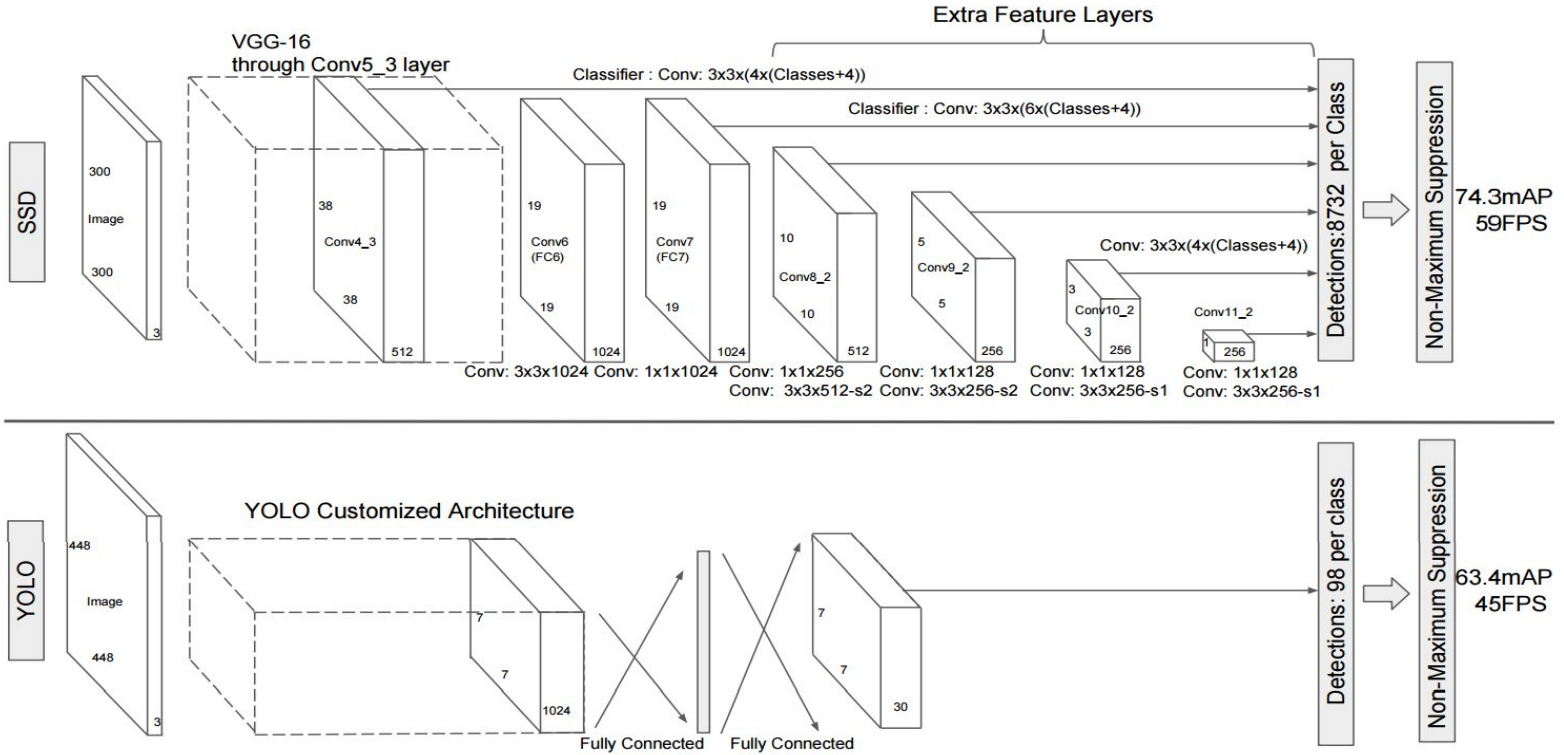
SSD is designed to be **independent of the base network**, and so it can run on top of pretty much any feature extractor.



# What is new?

Other detectors make predictions for only a single feature map while SSD **combines predictions** across multiple feature maps at different sizes.

# What is new?


Extra Feature Layers
VGG-16
through Conv5_3 layer
Classifier : Conv: 3x3x(4x(Classes+4))
Classifier : Conv: 3x3x(6x(Classes+4))
Conv: 3x3x(4x(Classes+4))
SSD
300
Image
300
3
38
Conv4_3
38
512
19
Conv6
(FC6)
19
1024
19
Conv7
(FC7)
19
1024
10
Conv8_2
10
512
5
Conv9_2
5
256
3
Conv10_2
3
256
Conv11_2
1
256
Detections:8732 per Class
Non-Maximum Suppression
74.3mAP
59FPS
Conv: 3x3x1024
Conv: 1x1x1024
Conv: 1x1x256
Conv: 3x3x512-s2
Conv: 1x1x128
Conv: 3x3x256-s2
Conv: 1x1x128
Conv: 3x3x256-s1
Conv: 1x1x128
Conv: 3x3x256-s1
YOLO Customized Architecture
YOLO
448
Image
448
3
7
7
1024
Fully Connected
Fully Connected
7
7
30
Detections: 98 per class
Non-Maximum Suppression
63.4mAP
45FPS

# Losses

- Cross entropy (softmax) for **classification**
- Smooth L1 for **localization**

# Dataset

- Pascal VOC 2007 (20 classes)
- Annotations:

  [xmin, ymin, xmax, ymax, one hot encoded classes]

# Prior boxes

We need a set of prior boxes.

The annotations are “encoded” using this prior boxes.

This “encoded” annotations and the images will be the input to our network.

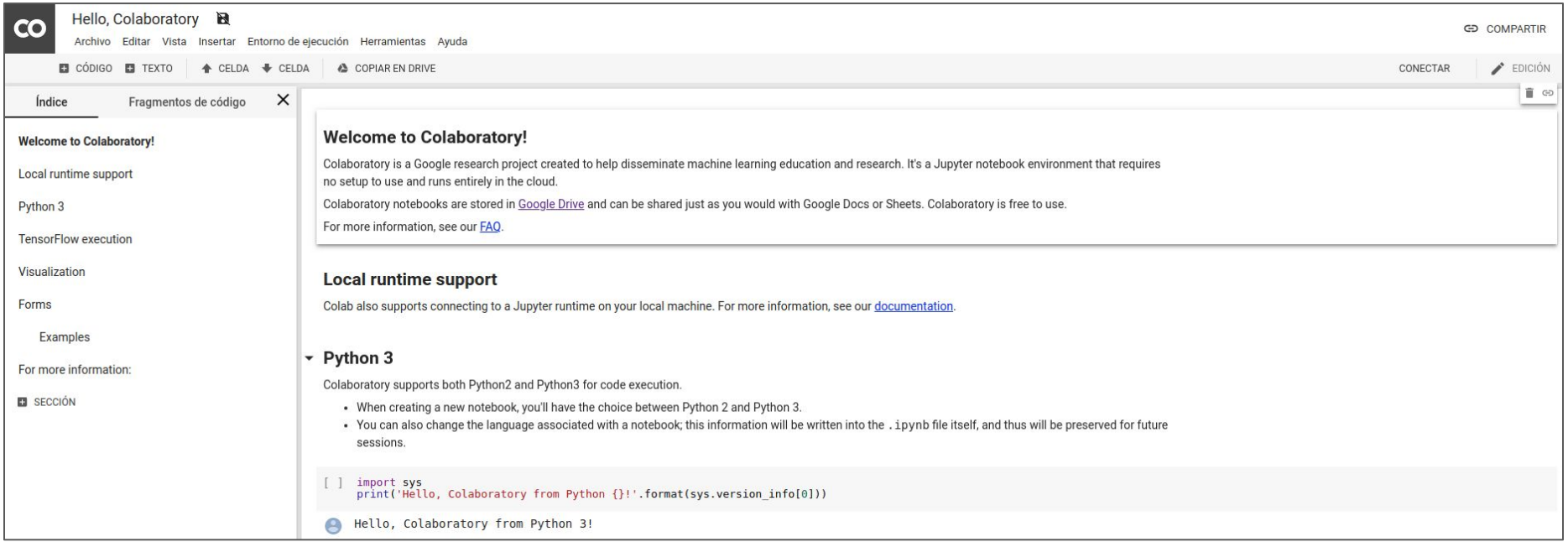
(The prior boxes that do not match with any ground truth bounding box are labeled as background)

# The Lab

# Today's objectives

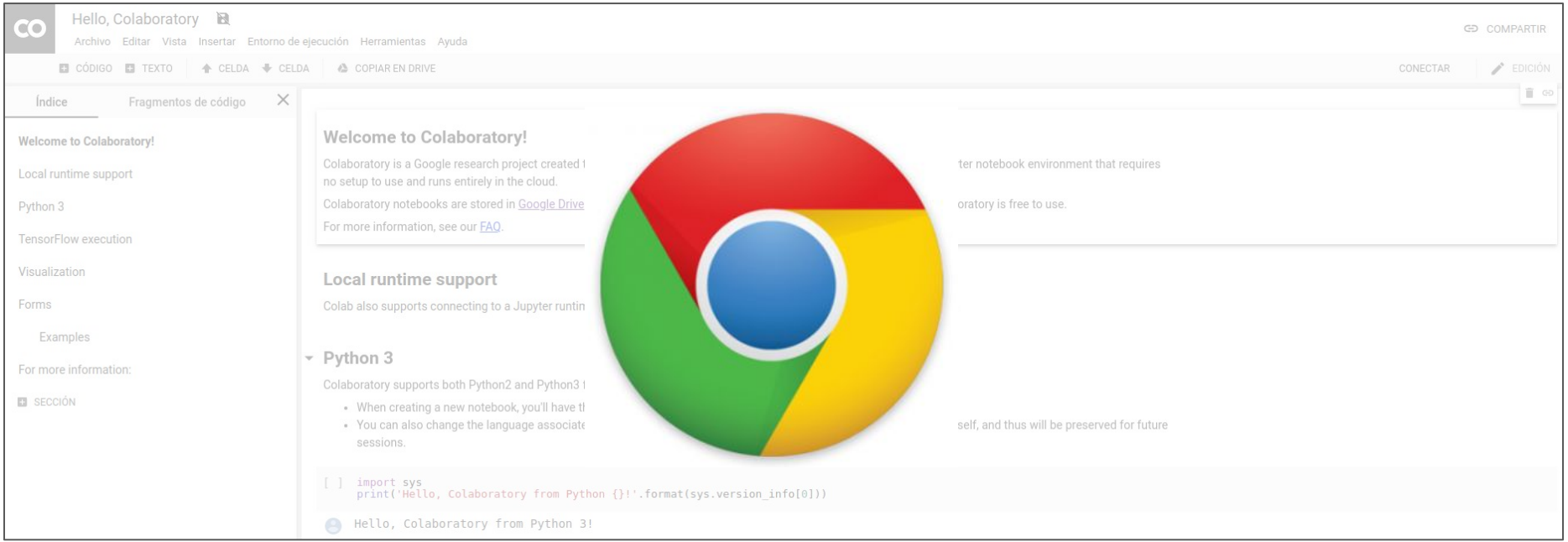
- Learn how to use SSD to detect objects.
- See the different steps that SSD requires for training and inference.
- Test SSD network loading weights

# Google Colab




https://colab.research.google.com/

# Google Colab




https://colab.research.google.com/

# Lab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VIRTUAL AESTHETICS

# Google Colab

1. Login in Colab with a Google account: yours or aidlupc2019@gmail.com (talentcenter)
2. Open the notebook of this lab session
3. Copy this notebook to your Drive to be able to run it (or open in draft mode if using aidlupc2019@gmail.com )
4. Change runtime type to work with GPU! Your trainings will be much faster :)