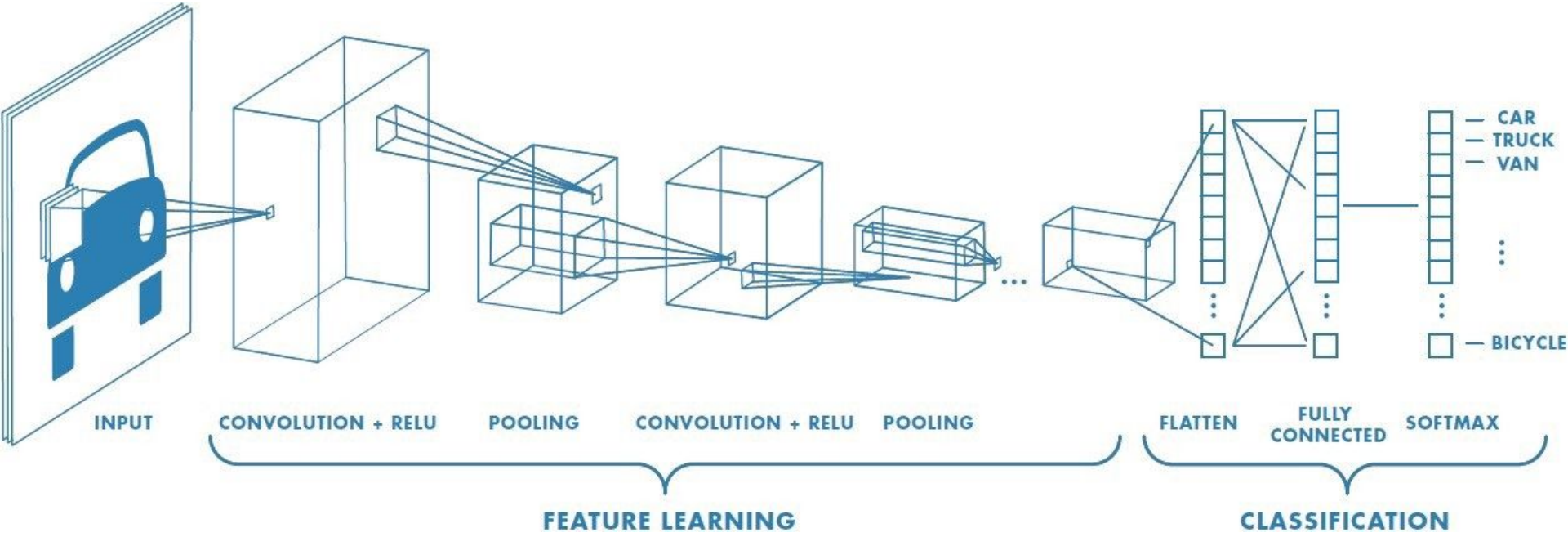
Practical AI: Image inderstanding

Stanislav Protasov for
Harbour.Space University

Agenda

- Deep convolutional network
- Faces
  - OpenCV
  - OpenFace
- Objects
  - YOLO
- Exam preparation

Convolutional networks



Well known frameworks

Torch

Caffe, Caffe2

TensorFlow

scikit-learn

Darknet

...

Model Zoos:

Places where you can find ANN **configurations** and/or **pretrained models**

TorchVision: http://pytorch.org/docs/master/torchvision/models.html

Caffe: https://github.com/BVLC/caffe/wiki/Model-Zoo

TensorFlow: https://github.com/tensorflow/models/blob/master/research/object_detection/g3doc/detection_model_zoo.md

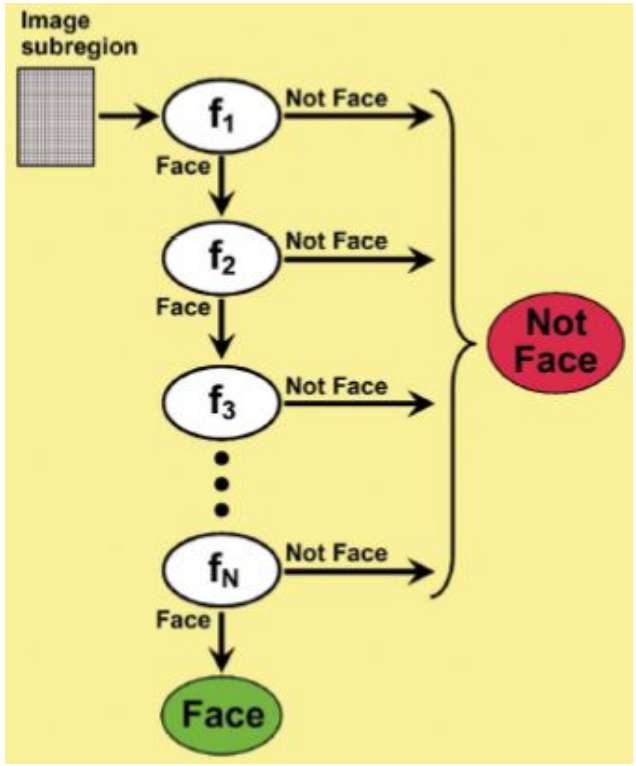
Darknet: https://pjreddie.com/darknet/yolo/

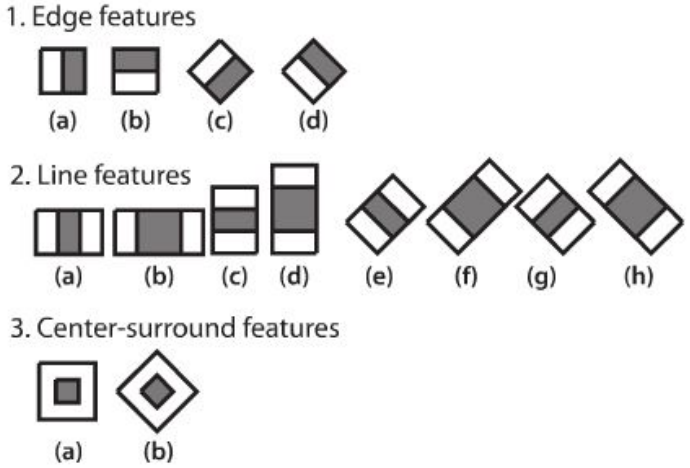
Faces

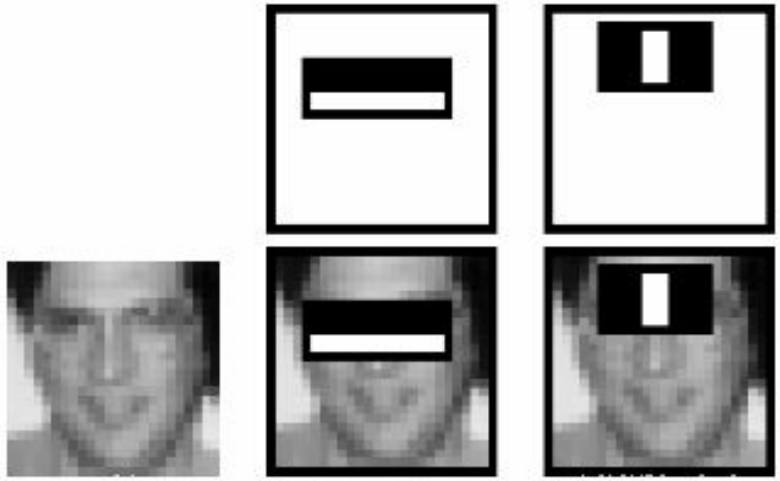
Haar cascades, Viola-Jones (AdaBoost for training)

You can train cascades by yourself.

Or you can use pre-trained models.







Lab #1. Face recognition

Using OpenCV detect faces on the selfie and display them separately.

Homework (advanced): face **recognition** with OpenFace

OpenFace = DLib + Torch + OpenFace

Implement **face recognition** *inside your class (or other small group).*

System should provide candidate name and confidence by webcam photo.

Use this script as a base for your code.

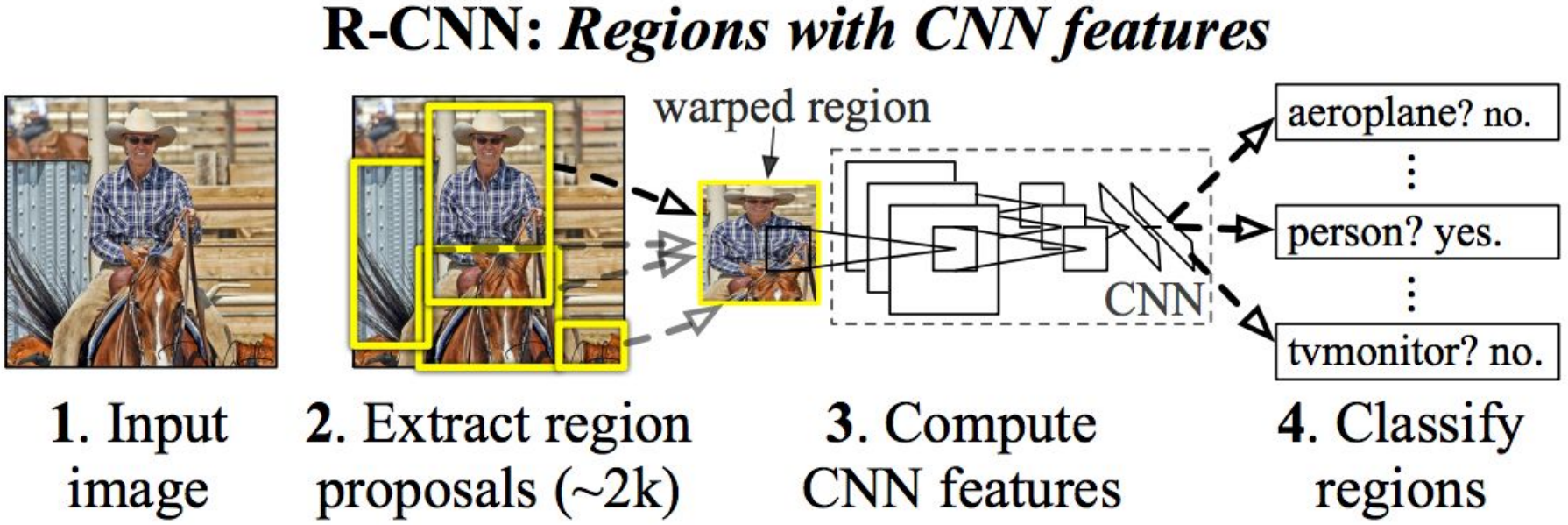
Networks with general abilities

R-CNN

Regions with CNN — the way to find ROI (region of interest) within and image

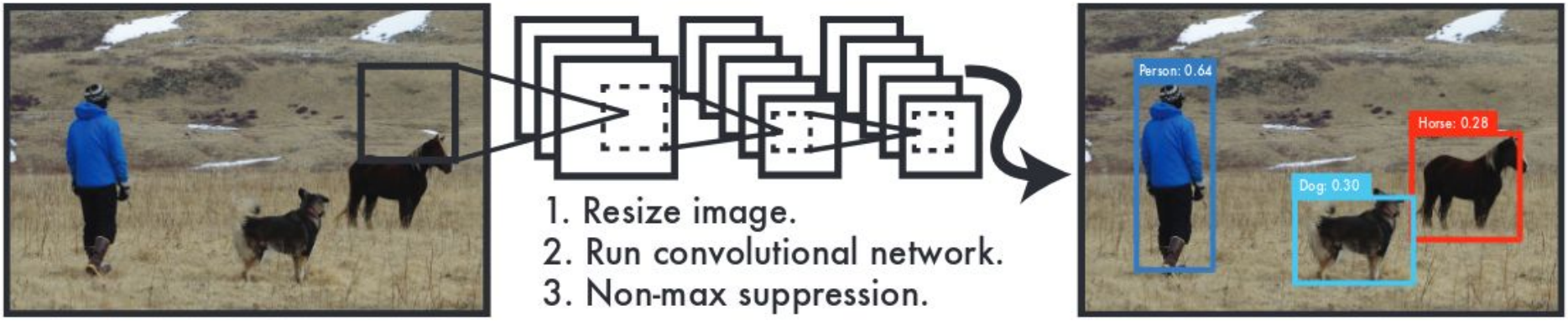
No need to check all possible patches with all possible scales (pyramid)

There are also Faster R-CNN and others



YOLO

Next step: do both steps with the same network



Lab #2: Use YOLOv3 to detect and objects

Setup darknet and YOLO network to find cars on the image

https://github.com/hsu-ai-course/hsu.ai/blob/master/code/14.%20darknet%20yolo3.ipynb

Homework

https://github.com/hsu-ai-course/hsu.ai/tree/master/homeworks/14