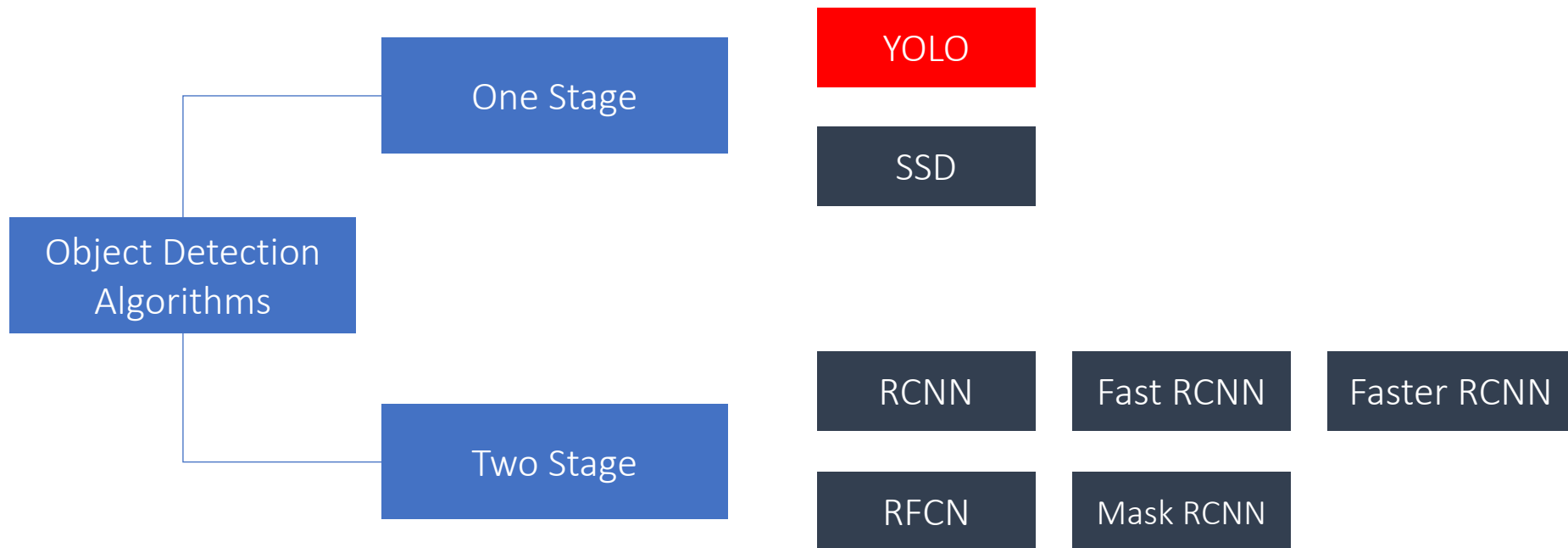


Object Detection with YOLO

Object Detection with YOLO

Overview of Algorithms

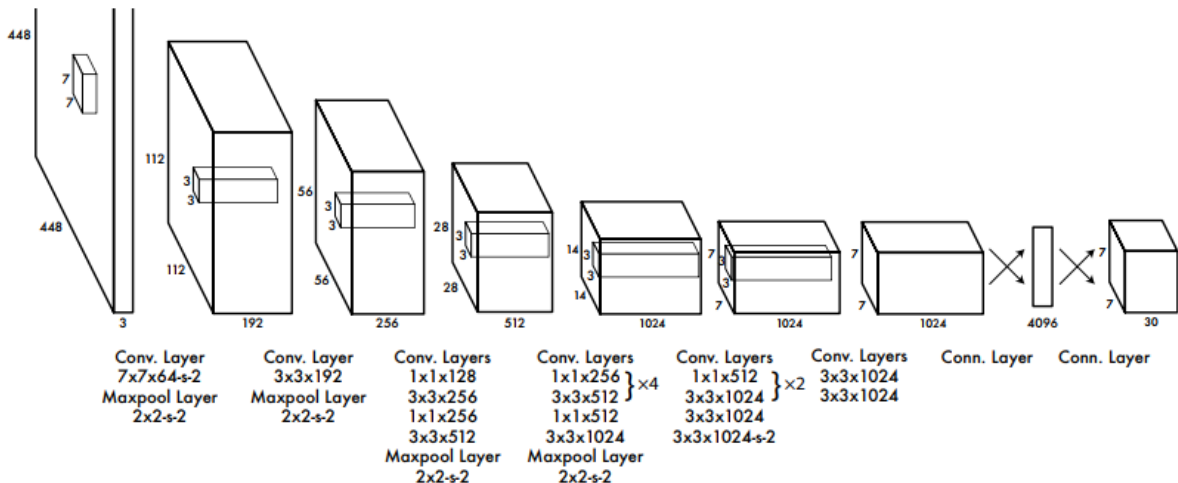
- Object Detection algorithms can be classified into one- and two-stage algorithms.



Object Detection with YOLO

Introduction

- YOLO...You only look once
- developed in 2016
- one-stage algorithm
- 24 CNN layers, 2 fully connected layers



Source: Redmon, Divvala, Girshick, Farhadi: „You Only Look Once: Unified, Real-Time Object Detection“

Object Detection with YOLO

How does it work?

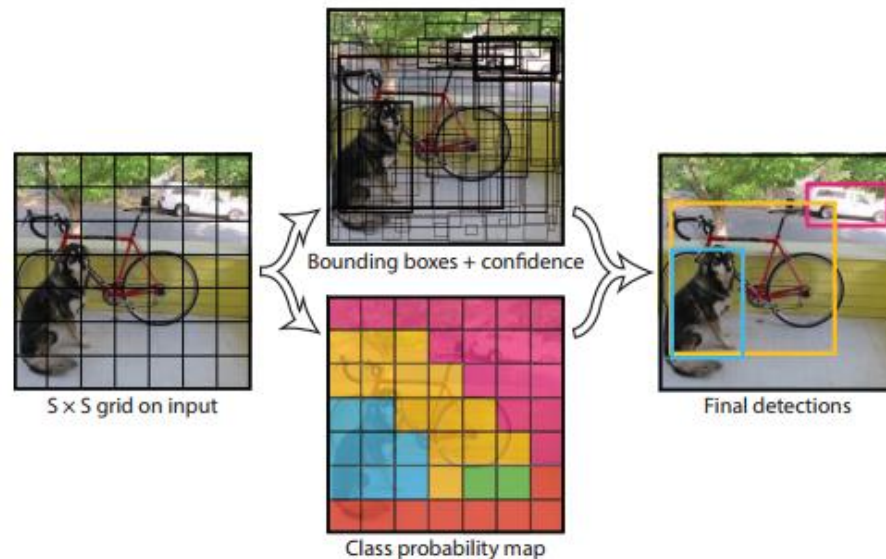
- one-stage: bounding boxes and classes predicted at the same time

Image divided
into grids

each grid predicts
bounding box and
confidence

each grid predicts
class probabilities

box confidences * class probabilities

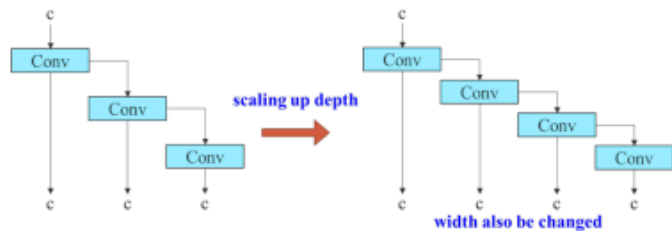


Source: Redmon, Divvala, Girshick, Farhadi: „You Only Look Once: Unified, Real-Time Object Detection“

Object Detection with YOLO

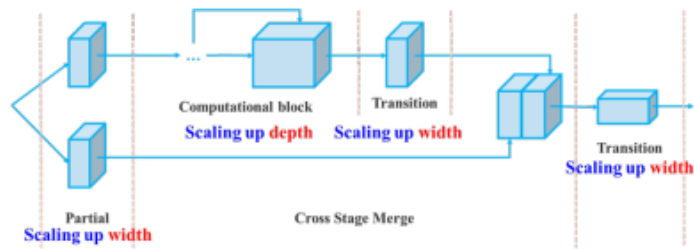
Which changes are included in YOLOv7 compared to earlier versions?

- YOLOv7 authors applied changes to network, e.g.
 - Extended Efficient Layer Aggregation
 - considers required memory for layers and the distance for gradient to back-propagate
 - Model Scaling
 - network depth and width are scaled and layers are concatenated

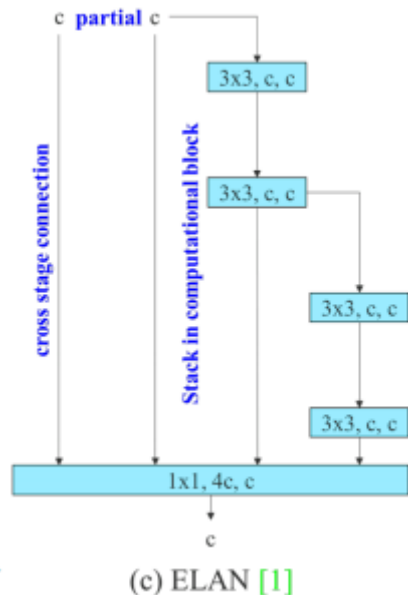


(a) concatenation-based model

(b) scaled-up concatenation-based model



(c) compound scaling up depth and width for concatenation-based model

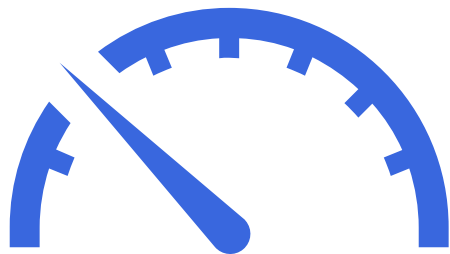


(c) ELAN [1]

Object Detection with YOLO

Limitations

lower accuracy compared to slower algorithms like Fast RCNN



problems with small objects which appear in groups



Source: <https://www.youtube.com/watch?v=yF1eJlLk7GI>