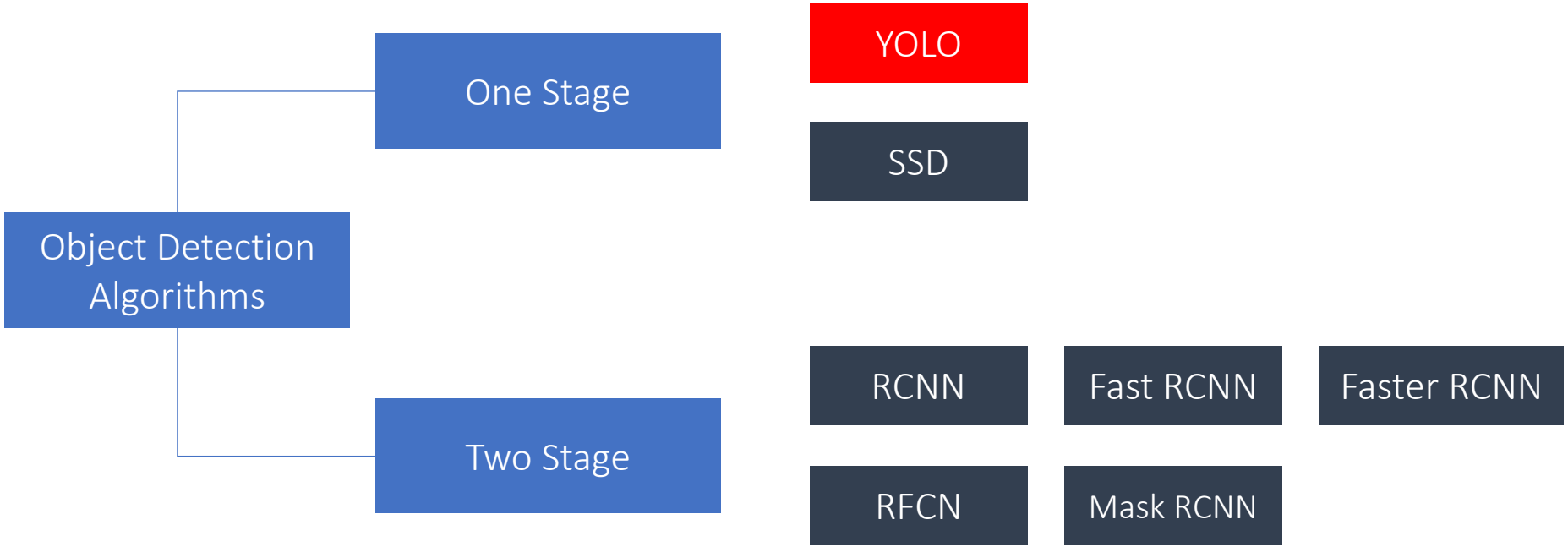
Object Detection with YOLO

Object Detection with YOLO

Overview of Algorithms

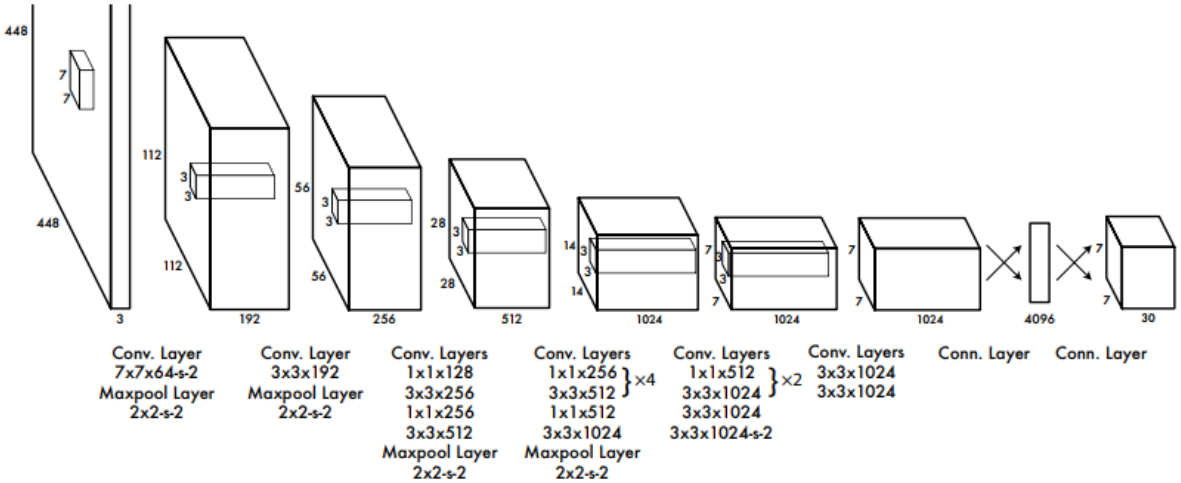
- Object Detection algorithms can be classified into one- and two-stage algorithms.



Object Detection with YOLO

Introduction

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

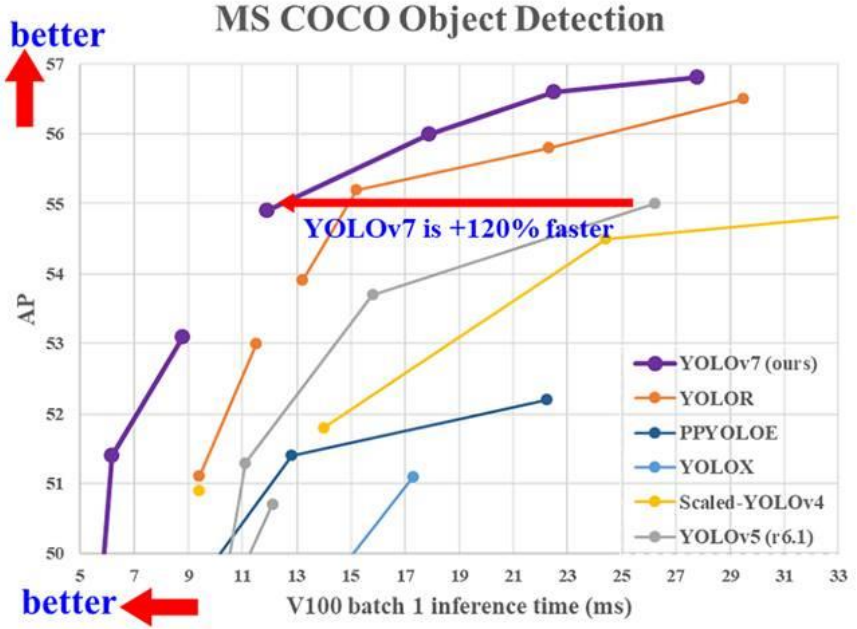


Source: Redmon, Divvala, Girshick, Farhadi: „You Only Look Once: Unified, Real-Time Object Detection“

Object Detection with YOLO

Why you should use YOLO?

- YOLOv7 outperforms many other algorithms in inference time.

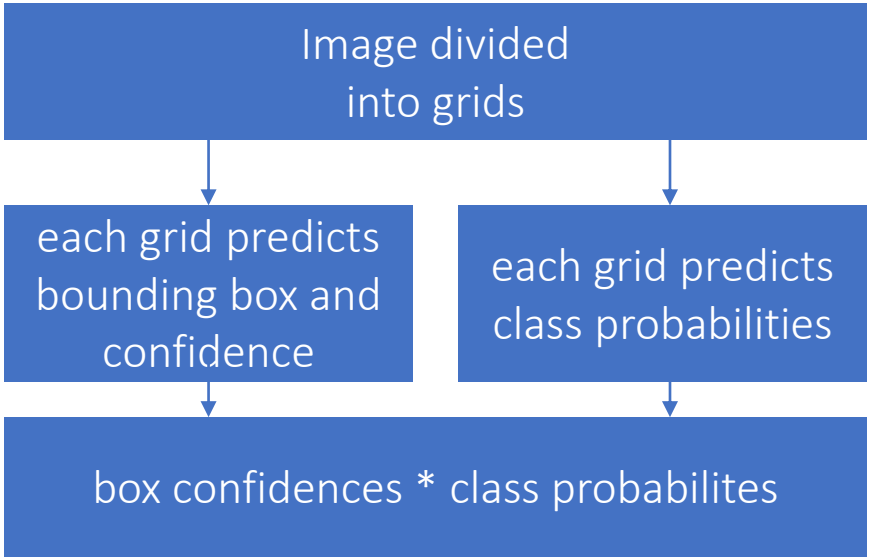


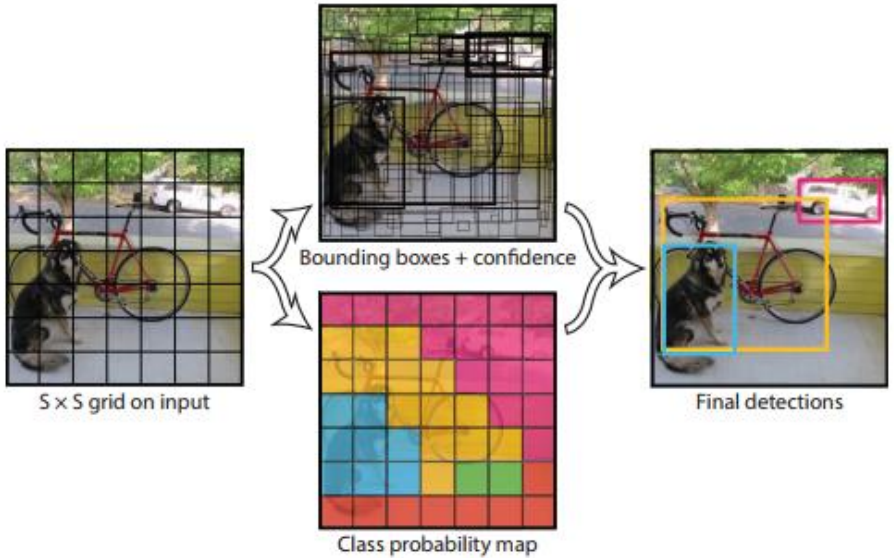
Source: Wang, Bochkovskiy, Liao: „YOLOv7: Trainable bag-of-freebies sets new state-of-the-art for real-time object detectors“, July 2022

Object Detection with YOLO

How does it work?

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



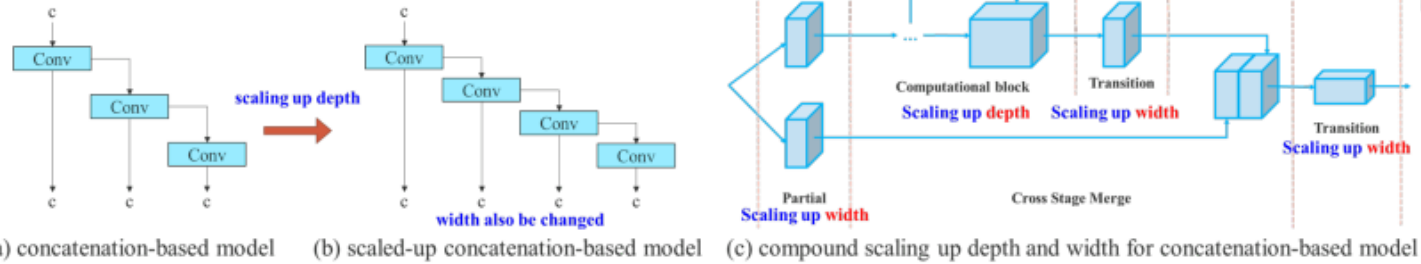


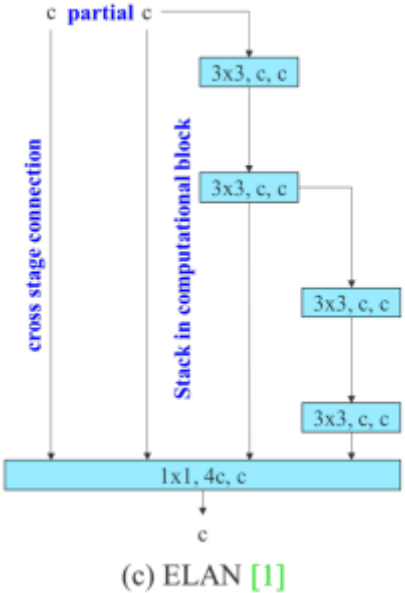
Source: Redmon, Divvala, Girshick, Farhadi: „You Only Look Once: Unified, Real-Time Object Detection“

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-propage
  - Model Scaling
    - network depth and width are scaled and layers are concatenated





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