

Curso Inteligência Artificial: do Zero ao Infinito

Modelos YOLO

Universidade Federal de Mato Grosso

Agenda

1 Introdução

2 YOLO - You Only Look Once

3 Exemplo

4 Próximas Arquiteturas

Detecção de Objetos

Arquiteturas

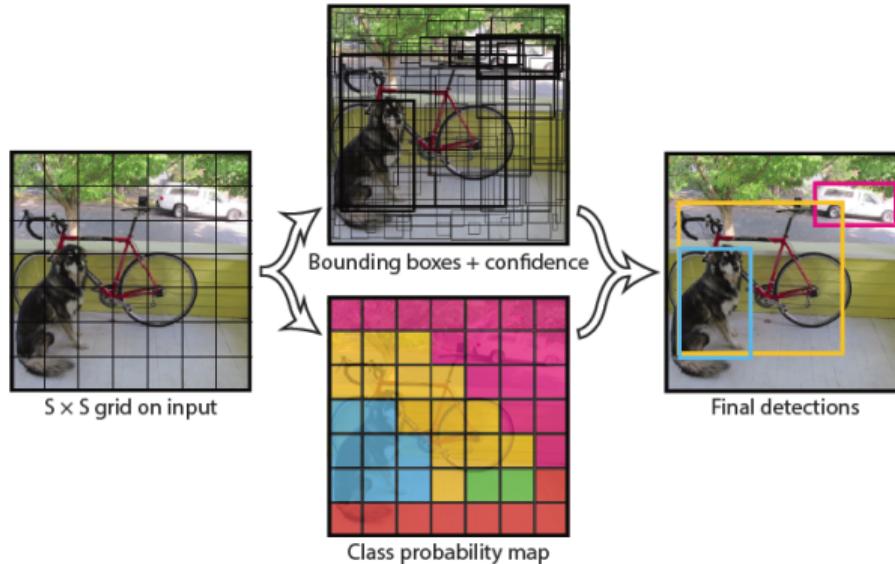
- **R-CNN** (Regions with Convolutional Network)
- **Fast-RCNN**
- **Faster-RCNN**
- **MobilNet**
- **SSD**

YOLO - You Only Look Once

- YOLO - You Only Look Once é uma rede neural *end-to-end* que utiliza uma estratégia diferentes dos demais algoritmos.
- Divide uma imagem em um $grid S \times S$, e cada célula do grid pode predizer 2 bounding boxes
- Utiliza uma rede separada para predizer as *Region Proposals*

Paper: A Gentle Introduction to Object Recognition With Deep Learning

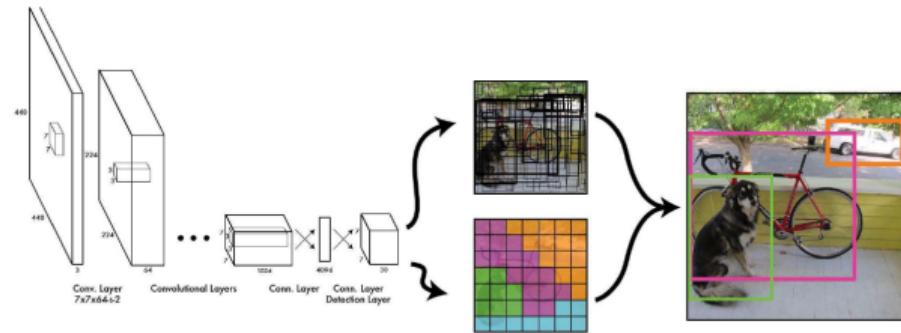
YOLO - You Only Look Once



Fonte: Review: YOLOv1 - You Only Look Once (Object Detection)

YOLO - You Only Look Once

Architecture



Fonte: Review: YOLOv1 - You Only Look Once (Object Detection)

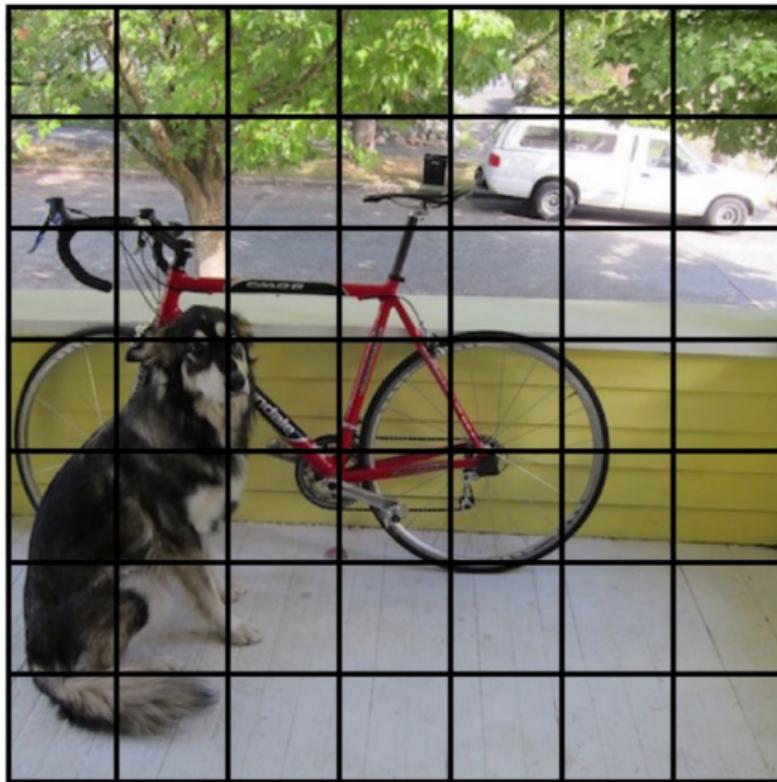
YOLO - You Only Look Once

Exemplo



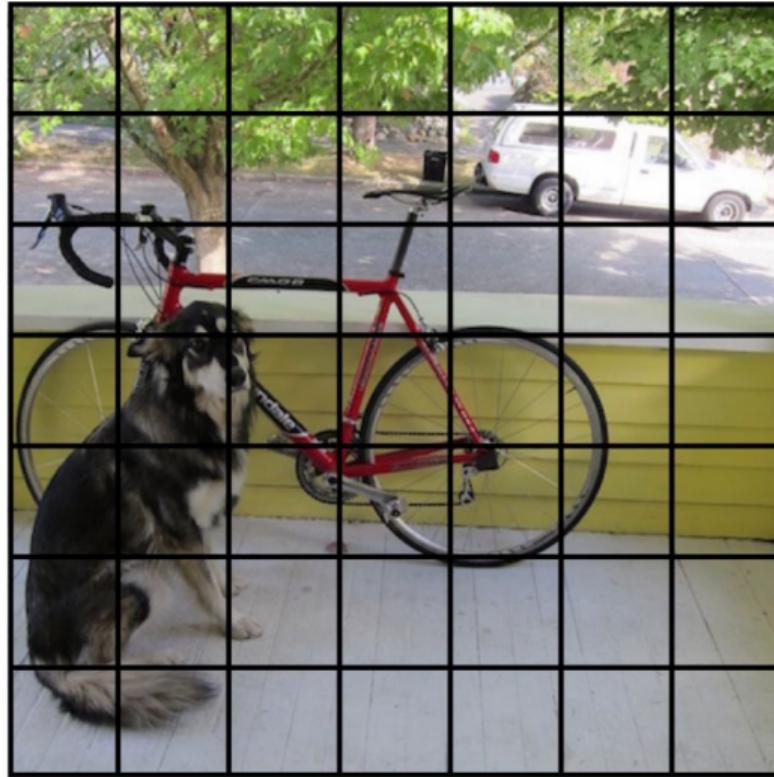
YOLO - You Only Look Once

Exemplo



YOLO - You Only Look Once

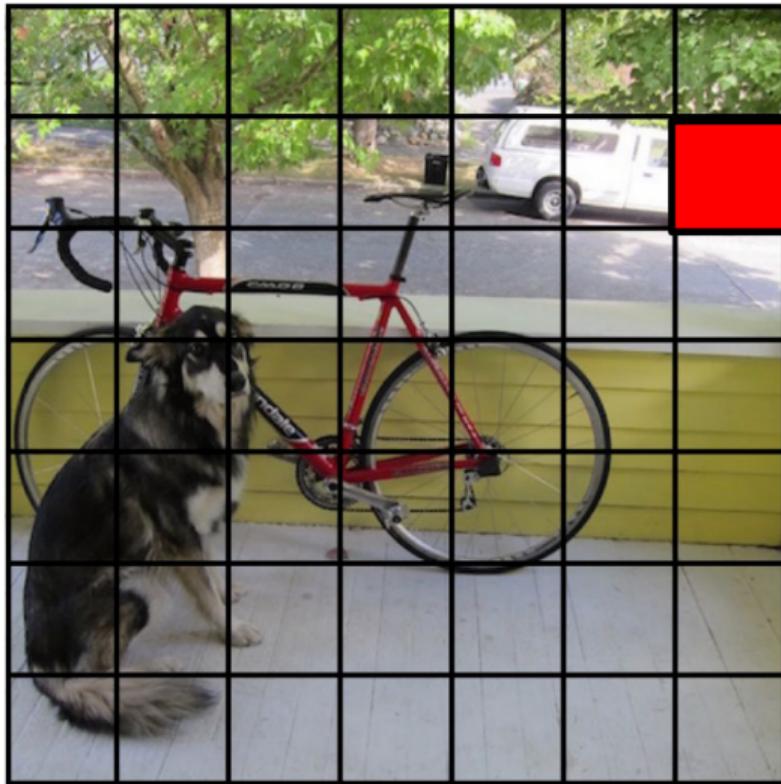
Exemplo



7×7 grid

YOLO - You Only Look Once

Exemplo



YOLO - You Only Look Once

Exemplo



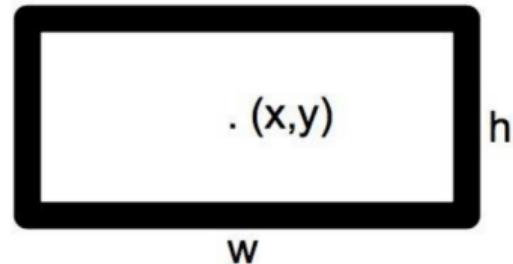
YOLO - You Only Look Once

Exemplo

$$B = 2$$



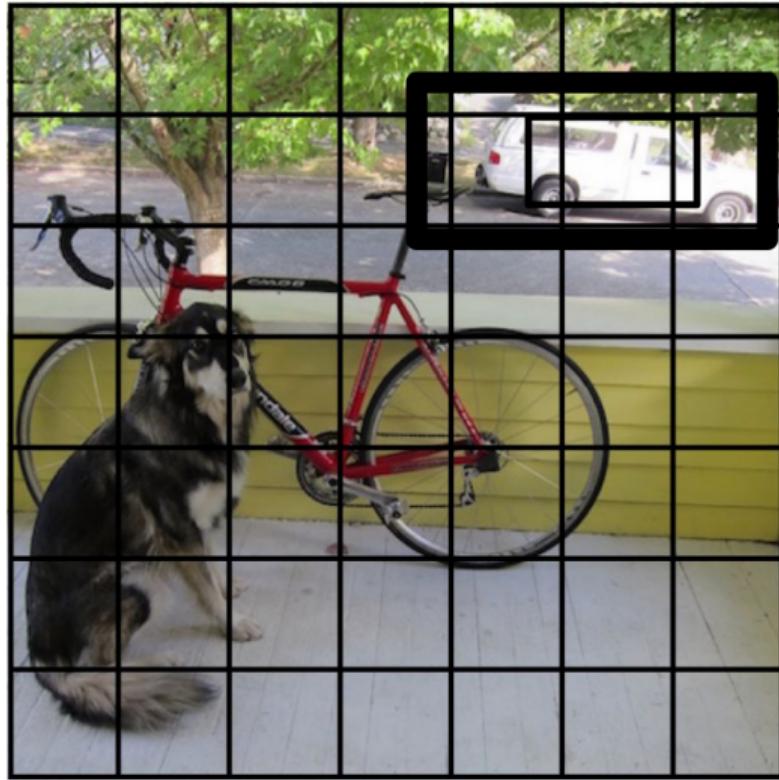
each box predict:



$P(\text{Object})$: probability that
the box contains an object

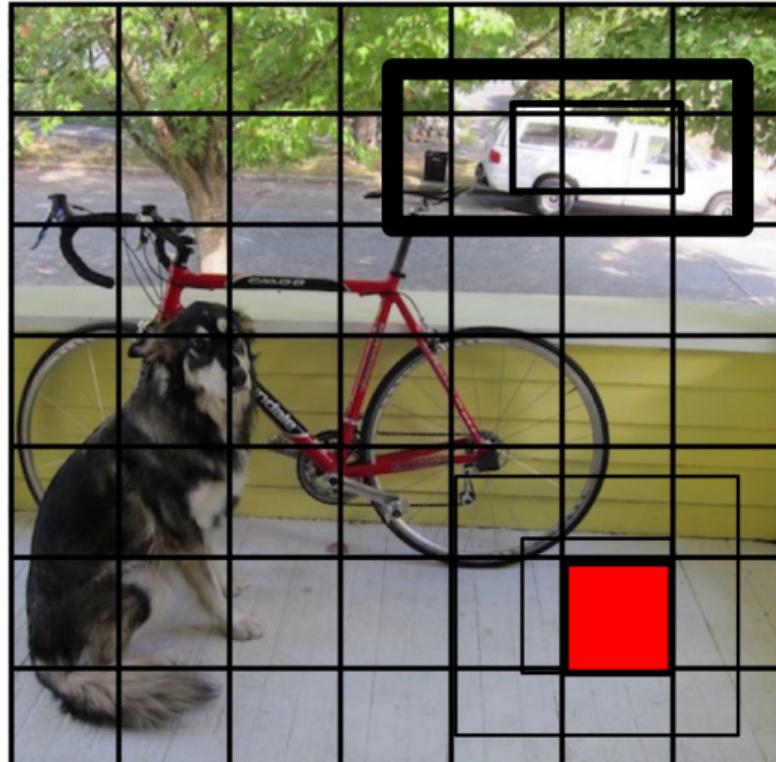
YOLO - You Only Look Once

Exemplo



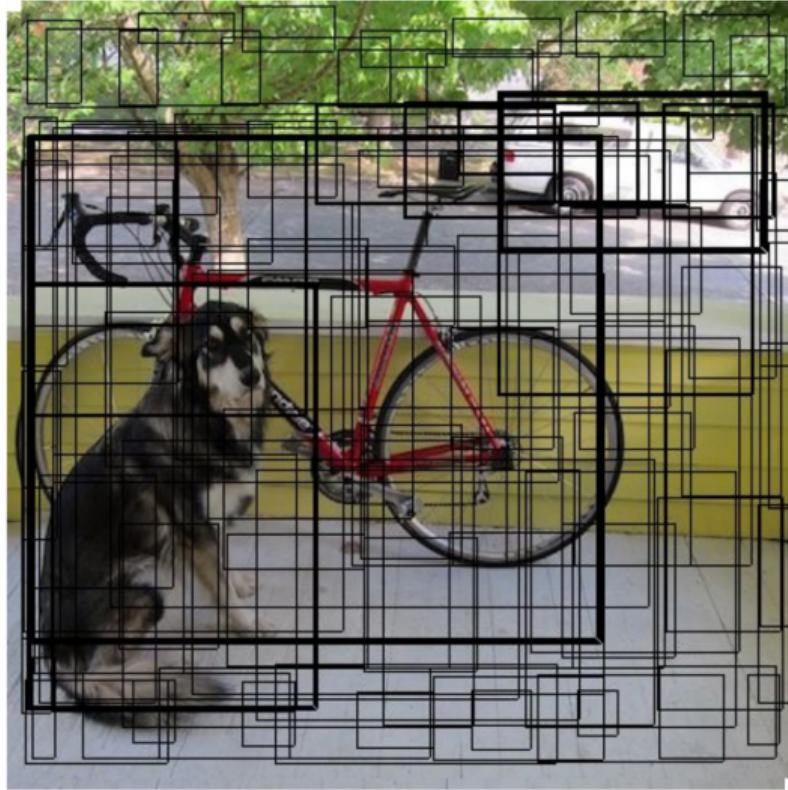
YOLO - You Only Look Once

Exemplo



YOLO - You Only Look Once

Exemplo



YOLO - You Only Look Once

Exemplo

Bicycle

Car

Dog

Dining
Table



YOLO - You Only Look Once

Exemplo

Bicycle

Car

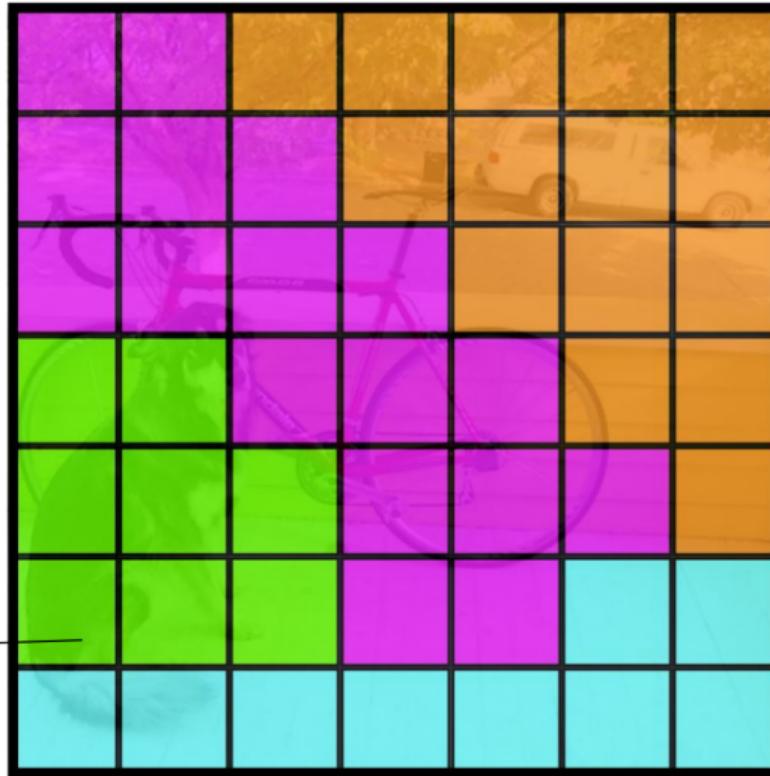
Dog

Eg.

Dog = 0.8

Cat = 0

Bike = 0



Dining
Table

YOLO - You Only Look Once

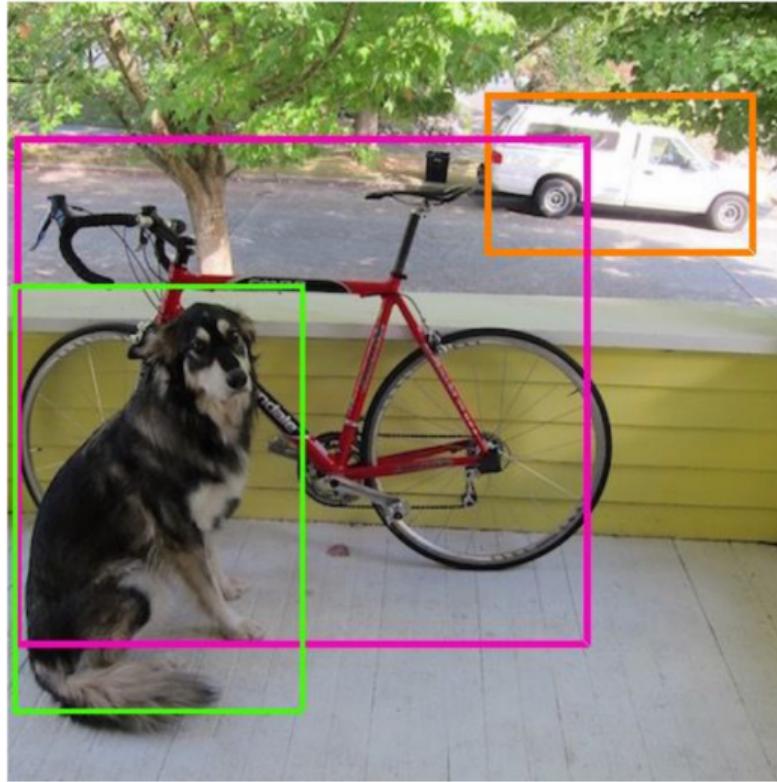
Exemplo



$$\begin{aligned} P(\text{class}|\text{Object}) * P(\text{Object}) \\ = P(\text{class}) \end{aligned}$$

YOLO - You Only Look Once

Exemplo



Detecção de Objetos

Arquiteturas

- **RetinaNet**
- **SqueezeDet**

Referencias

- YOLO Explained
 - ▶ <https://medium.com/analytics-vidhya/yolo-explained-5b6f4564f31>
- Understanding YOLO and YOLOv2
 - ▶ <https://manalelaidouni.github.io/Understanding%20YOLO%20and%20YOLOv2.html>
- YOLO V3 Explained
 - ▶ <https://towardsdatascience.com/yolo-v3-explained-ff5b850390f>
- Explanation of YOLO V4 a one stage detector
 - ▶ <https://becominghuman.ai/explaining-yolov4-a-one-stage-detector-cdac0826cbd7>
- Introduction to YOLOv5 Object Detection with Tutorial
 - ▶ <https://machinelearningknowledge.ai/introduction-to-yolov5-object-detection-with-tutorial/>
- Your Comprehensive Guide to the YOLO Family of Models
 - ▶ <https://blog.roboflow.com/guide-to-yolo-models/>
- YOLOv5, End-to-End object detector project on custom dataset
 - ▶ <https://towardsdatascience.com/yolov5-end-to-end-object-detector-project-on-custom-dataset-5d9cc2c95921>

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