

# YOLO IN

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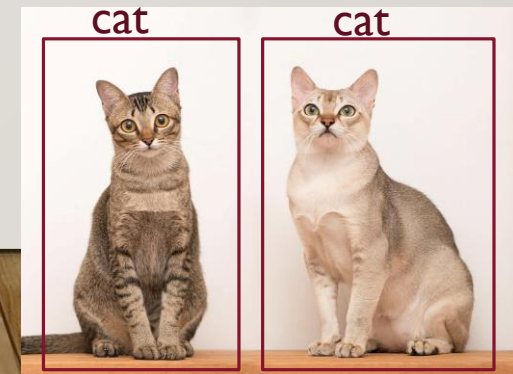


**SATRDAY '19**

# YOU ONLY LOOK ONCE (YOLO)

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- YOLO is a state-of-the-art **object detection algorithm** that was first introduced by Redmon et al in 2015.
- It involves the combination of **classification** (class labels) and **localisation** (bounding box coordinates) of objects found in an image.
- It is popularly known for it's speed because the algorithm requires only one forward pass to make detections.



# YOU ONLY LOOK ONCE (YOLO)

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## Summarised YOLO Process:

- ❑ **Step 1:** Overlay a  $K \times K$  grid on the image.
- ❑ **Step 2:** For each grid cell,  $N$  **bounding boxes**, the associated **localisation confidence scores**, and the **classification scores** are predicted.
- ❑ **Step 3:** A set threshold ( $p \in [0,1]$ ) is used to discard predicted bounding boxes with low localisation confidence scores.
- ❑ **Step 4:** The bounding box that corresponds to the highest combined localisation and classification score is selected to be the detection .

**LET'S YOLO IN R**

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# SETUP

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- Install *image.darknet* Package via github :

```
devtools::install_github("bnosac/image", subdir = "image.darknet",  
build_vignettes = TRUE)
```

- Required Libraries:

```
library(image.darknet)
```



# I. INSTANTIATE DETECTION MODEL

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**Function** : *image\_darknet\_model(...)*

**Arguments:**

- *type* = type of computer vision task (“detect” for object detection)
- *model* = file path to the model configuration
- *weights* = file path to the trained model weights
- *labels* = vector of labels

## 2. DETECT OBJECTS

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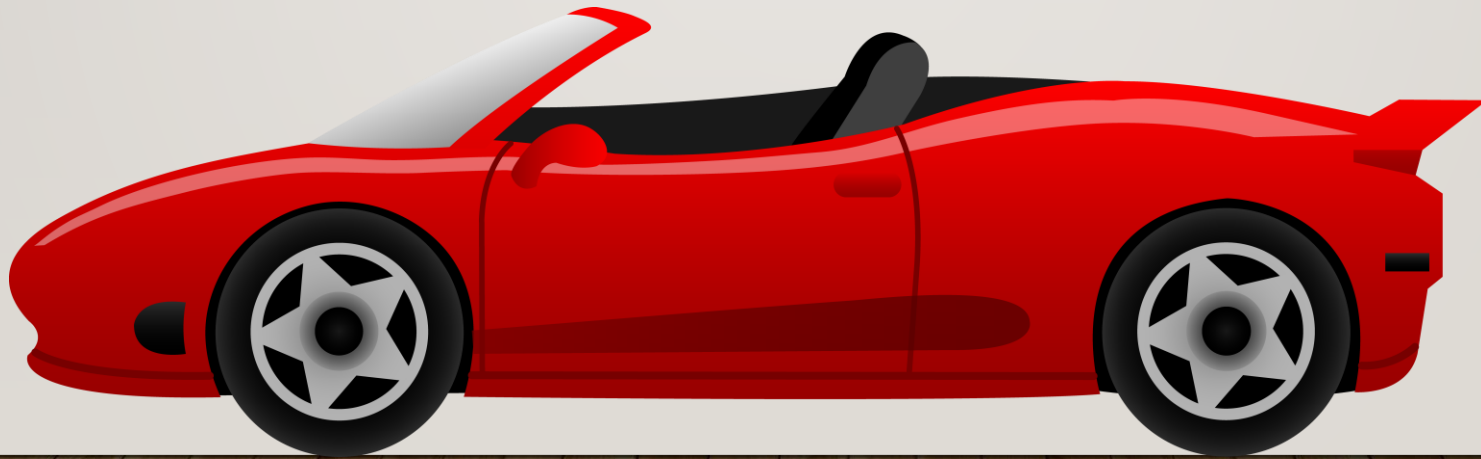
**Function :** *image\_darknet\_detect(...)*

**Arguments:**

- *file = image file path*
- *object = instantiated model object*
- *threshold = detection threshold*

# DEMO: CAR DETECTION

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# I. INSTANTIATE YOLO MODEL

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```
yolo_model = image_darknet_model(type = "detect",  
    model = "tiny-yolo-voc.cfg",  
    weights = system.file(package="image.darknet",  
        "models", "tiny-yolo-voc.weights"),  
    labels = c("car"))
```

## 2. DETECT CARS

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```
x = image_darknet_detect(file = "example.png" ,  
                           object = yolo_model ,  
                           threshold = 0.65)
```

# CAR DETECTION OUTPUT

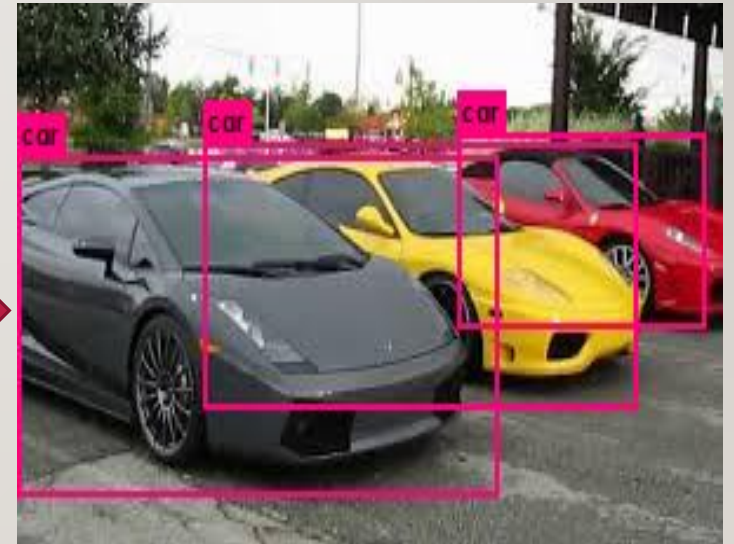
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Input



*image\_darknet\_detect*

Output



# REFERENCES

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- Redmon. J and Farhadi, A. 2016.  
YOLO9000: Better, Faster, Stronger. CoRR abs/1612.08242
- Redmon. J, et al. 2015. You Only Look Once: Unified, Real-Time Object Detection. CoRR abs/1506.02640
- <https://github.com/bnosac/image>
- Wijffels, J. 2017. Computer vision algorithms for R users.  
<https://github.com/bnosac/image/blob/master/presentation-user2017.pdf>

**THANK YOU**

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