

# object\_detection

March 7, 2023

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[ ]: from python.darknet import *  
from ctypes import *  
import cv2
```

```
[ ]: def detect_objects(path):  
  
    # load pre-trained YOLOv3 model & set up Darknet framework  
    net = load_net(b'cfg/yolov3.cfg', b'weights/yolov3.weights', 0)  
    meta = load_meta(b'cfg/coco.data')  
  
    # feed preprocessed image through YOLOv3 with darknet.detect  
    detections = detect(net, meta, path.encode('utf-8'), thresh=.5)  
  
    # return detected objects as a list of tuples,  
    # containing object class and its bounding box coordinates  
    return detections
```

```
[ ]: def draw_boxes(path, detections):  
  
    def convert(x, y, w, h):  
        x, y, w, h = int(x), int(y), int(w), int(h)  
        x1 = x - (w // 2) # top left x  
        y1 = y + (h // 2) # top left y  
        x2 = x + (w // 2) # bottom right x  
        y2 = y - (h // 2) # bottom right y  
        return x1, y1, x2, y2  
  
    # load image from input file path with OpenCV imread  
    image = cv2.imread(path)  
  
    # loop over the list of detected objects  
    for detection in detections:  
        object, confidence, (x, y, w, h) = detection  
        x1, y1, x2, y2 = convert(x, y, w, h)  
  
        # draw a rectangle around each object with cv2.rectangle  
        cv2.rectangle(image, (x1, y1), (x2, y2), (0, 255, 0), 2)  
        # put a caption at the corner of each box
```

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cv2.putText(image, f'{{object}}: {{confidence:.2%}}',
            (x1, y1 - 5), cv2.LINE_AA, 0.5, (0, 0, 255), 1)

# display image with bounding boxes with OpenCV imshow
cv2.imshow('object_detection', image)
cv2.waitKey(0)
cv2.destroyAllWindows()

# save image to data directory
cv2.imwrite('data/object_detection.jpg', image)

```

```

[ ]: if __name__ == "__main__":
    path = 'data/giraffe.jpg'
    r = detect_objects(path)
    draw_boxes(path, r)

```

layer	filters	size	input	output
0 conv	32	3 x 3 / 1	608 x 608 x 3	608 x 608 x 32 0.639
BFLOPs				
1 conv	64	3 x 3 / 2	608 x 608 x 32	304 x 304 x 64 3.407
BFLOPs				
2 conv	32	1 x 1 / 1	304 x 304 x 64	304 x 304 x 32 0.379
BFLOPs				
3 conv	64	3 x 3 / 1	304 x 304 x 32	304 x 304 x 64 3.407
BFLOPs				
4 res	1		304 x 304 x 64	304 x 304 x 64
5 conv	128	3 x 3 / 2	304 x 304 x 64	152 x 152 x 128 3.407
BFLOPs				
6 conv	64	1 x 1 / 1	152 x 152 x 128	152 x 152 x 64 0.379
BFLOPs				
7 conv	128	3 x 3 / 1	152 x 152 x 64	152 x 152 x 128 3.407
BFLOPs				
8 res	5		152 x 152 x 128	152 x 152 x 128
9 conv	64	1 x 1 / 1	152 x 152 x 128	152 x 152 x 64 0.379
BFLOPs				
10 conv	128	3 x 3 / 1	152 x 152 x 64	152 x 152 x 128 3.407
BFLOPs				
11 res	8		152 x 152 x 128	152 x 152 x 128
12 conv	256	3 x 3 / 2	152 x 152 x 128	76 x 76 x 256 3.407
BFLOPs				
13 conv	128	1 x 1 / 1	76 x 76 x 256	76 x 76 x 128 0.379
BFLOPs				
14 conv	256	3 x 3 / 1	76 x 76 x 128	76 x 76 x 256 3.407
BFLOPs				
15 res	12		76 x 76 x 256	76 x 76 x 256
16 conv	128	1 x 1 / 1	76 x 76 x 256	76 x 76 x 128 0.379
BFLOPs				
17 conv	256	3 x 3 / 1	76 x 76 x 128	76 x 76 x 256 3.407

BFLOPs											
18 res	15			76 x	76 x	256	->	76 x	76 x	256	
19 conv	128	1 x 1 / 1		76 x	76 x	256	->	76 x	76 x	128	0.379
BFLOPs											
20 conv	256	3 x 3 / 1		76 x	76 x	128	->	76 x	76 x	256	3.407
BFLOPs											
21 res	18			76 x	76 x	256	->	76 x	76 x	256	
22 conv	128	1 x 1 / 1		76 x	76 x	256	->	76 x	76 x	128	0.379
BFLOPs											
23 conv	256	3 x 3 / 1		76 x	76 x	128	->	76 x	76 x	256	3.407
BFLOPs											
24 res	21			76 x	76 x	256	->	76 x	76 x	256	
25 conv	128	1 x 1 / 1		76 x	76 x	256	->	76 x	76 x	128	0.379
BFLOPs											
26 conv	256	3 x 3 / 1		76 x	76 x	128	->	76 x	76 x	256	3.407
BFLOPs											
27 res	24			76 x	76 x	256	->	76 x	76 x	256	
28 conv	128	1 x 1 / 1		76 x	76 x	256	->	76 x	76 x	128	0.379
BFLOPs											
29 conv	256	3 x 3 / 1		76 x	76 x	128	->	76 x	76 x	256	3.407
BFLOPs											
30 res	27			76 x	76 x	256	->	76 x	76 x	256	
31 conv	128	1 x 1 / 1		76 x	76 x	256	->	76 x	76 x	128	0.379
BFLOPs											
32 conv	256	3 x 3 / 1		76 x	76 x	128	->	76 x	76 x	256	3.407
BFLOPs											
33 res	30			76 x	76 x	256	->	76 x	76 x	256	
34 conv	128	1 x 1 / 1		76 x	76 x	256	->	76 x	76 x	128	0.379
BFLOPs											
35 conv	256	3 x 3 / 1		76 x	76 x	128	->	76 x	76 x	256	3.407
BFLOPs											
36 res	33			76 x	76 x	256	->	76 x	76 x	256	
37 conv	512	3 x 3 / 2		76 x	76 x	256	->	38 x	38 x	512	3.407
BFLOPs											
38 conv	256	1 x 1 / 1		38 x	38 x	512	->	38 x	38 x	256	0.379
BFLOPs											
39 conv	512	3 x 3 / 1		38 x	38 x	256	->	38 x	38 x	512	3.407
BFLOPs											
40 res	37			38 x	38 x	512	->	38 x	38 x	512	
41 conv	256	1 x 1 / 1		38 x	38 x	512	->	38 x	38 x	256	0.379
BFLOPs											
42 conv	512	3 x 3 / 1		38 x	38 x	256	->	38 x	38 x	512	3.407
BFLOPs											
43 res	40			38 x	38 x	512	->	38 x	38 x	512	
44 conv	256	1 x 1 / 1		38 x	38 x	512	->	38 x	38 x	256	0.379
BFLOPs											
45 conv	512	3 x 3 / 1		38 x	38 x	256	->	38 x	38 x	512	3.407
BFLOPs											

46 res	43			38 x	38 x 512	->	38 x	38 x 512	
47 conv	256	1 x 1 / 1		38 x	38 x 512	->	38 x	38 x 256	0.379
BFLOPs									
48 conv	512	3 x 3 / 1		38 x	38 x 256	->	38 x	38 x 512	3.407
BFLOPs									
49 res	46			38 x	38 x 512	->	38 x	38 x 512	
50 conv	256	1 x 1 / 1		38 x	38 x 512	->	38 x	38 x 256	0.379
BFLOPs									
51 conv	512	3 x 3 / 1		38 x	38 x 256	->	38 x	38 x 512	3.407
BFLOPs									
52 res	49			38 x	38 x 512	->	38 x	38 x 512	
53 conv	256	1 x 1 / 1		38 x	38 x 512	->	38 x	38 x 256	0.379
BFLOPs									
54 conv	512	3 x 3 / 1		38 x	38 x 256	->	38 x	38 x 512	3.407
BFLOPs									
55 res	52			38 x	38 x 512	->	38 x	38 x 512	
56 conv	256	1 x 1 / 1		38 x	38 x 512	->	38 x	38 x 256	0.379
BFLOPs									
57 conv	512	3 x 3 / 1		38 x	38 x 256	->	38 x	38 x 512	3.407
BFLOPs									
58 res	55			38 x	38 x 512	->	38 x	38 x 512	
59 conv	256	1 x 1 / 1		38 x	38 x 512	->	38 x	38 x 256	0.379
BFLOPs									
60 conv	512	3 x 3 / 1		38 x	38 x 256	->	38 x	38 x 512	3.407
BFLOPs									
61 res	58			38 x	38 x 512	->	38 x	38 x 512	
62 conv	1024	3 x 3 / 2		38 x	38 x 512	->	19 x	19 x1024	3.407
BFLOPs									
63 conv	512	1 x 1 / 1		19 x	19 x1024	->	19 x	19 x 512	0.379
BFLOPs									
64 conv	1024	3 x 3 / 1		19 x	19 x 512	->	19 x	19 x1024	3.407
BFLOPs									
65 res	62			19 x	19 x1024	->	19 x	19 x1024	
66 conv	512	1 x 1 / 1		19 x	19 x1024	->	19 x	19 x 512	0.379
BFLOPs									
67 conv	1024	3 x 3 / 1		19 x	19 x 512	->	19 x	19 x1024	3.407
BFLOPs									
68 res	65			19 x	19 x1024	->	19 x	19 x1024	
69 conv	512	1 x 1 / 1		19 x	19 x1024	->	19 x	19 x 512	0.379
BFLOPs									
70 conv	1024	3 x 3 / 1		19 x	19 x 512	->	19 x	19 x1024	3.407
BFLOPs									
71 res	68			19 x	19 x1024	->	19 x	19 x1024	
72 conv	512	1 x 1 / 1		19 x	19 x1024	->	19 x	19 x 512	0.379
BFLOPs									
73 conv	1024	3 x 3 / 1		19 x	19 x 512	->	19 x	19 x1024	3.407
BFLOPs									
74 res	71			19 x	19 x1024	->	19 x	19 x1024	

75 conv	512	1 x 1 / 1	19 x 19 x1024	->	19 x 19 x 512	0.379
BFLOPs						
76 conv	1024	3 x 3 / 1	19 x 19 x 512	->	19 x 19 x1024	3.407
BFLOPs						
77 conv	512	1 x 1 / 1	19 x 19 x1024	->	19 x 19 x 512	0.379
BFLOPs						
78 conv	1024	3 x 3 / 1	19 x 19 x 512	->	19 x 19 x1024	3.407
BFLOPs						
79 conv	512	1 x 1 / 1	19 x 19 x1024	->	19 x 19 x 512	0.379
BFLOPs						
80 conv	1024	3 x 3 / 1	19 x 19 x 512	->	19 x 19 x1024	3.407
BFLOPs						
81 conv	255	1 x 1 / 1	19 x 19 x1024	->	19 x 19 x 255	0.189
BFLOPs						
82 yolo						
83 route	79					
84 conv	256	1 x 1 / 1	19 x 19 x 512	->	19 x 19 x 256	0.095
BFLOPs						
85 upsample		2x	19 x 19 x 256	->	38 x 38 x 256	
86 route	85 61					
87 conv	256	1 x 1 / 1	38 x 38 x 768	->	38 x 38 x 256	0.568
BFLOPs						
88 conv	512	3 x 3 / 1	38 x 38 x 256	->	38 x 38 x 512	3.407
BFLOPs						
89 conv	256	1 x 1 / 1	38 x 38 x 512	->	38 x 38 x 256	0.379
BFLOPs						
90 conv	512	3 x 3 / 1	38 x 38 x 256	->	38 x 38 x 512	3.407
BFLOPs						
91 conv	256	1 x 1 / 1	38 x 38 x 512	->	38 x 38 x 256	0.379
BFLOPs						
92 conv	512	3 x 3 / 1	38 x 38 x 256	->	38 x 38 x 512	3.407
BFLOPs						
93 conv	255	1 x 1 / 1	38 x 38 x 512	->	38 x 38 x 255	0.377
BFLOPs						
94 yolo						
95 route	91					
96 conv	128	1 x 1 / 1	38 x 38 x 256	->	38 x 38 x 128	0.095
BFLOPs						
97 upsample		2x	38 x 38 x 128	->	76 x 76 x 128	
98 route	97 36					
99 conv	128	1 x 1 / 1	76 x 76 x 384	->	76 x 76 x 128	0.568
BFLOPs						
100 conv	256	3 x 3 / 1	76 x 76 x 128	->	76 x 76 x 256	3.407
BFLOPs						
101 conv	128	1 x 1 / 1	76 x 76 x 256	->	76 x 76 x 128	0.379
BFLOPs						
102 conv	256	3 x 3 / 1	76 x 76 x 128	->	76 x 76 x 256	3.407
BFLOPs						

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    103 conv    128  1 x 1 / 1    76 x  76 x 256  ->   76 x  76 x 128  0.379
BFLOPs
    104 conv    256  3 x 3 / 1    76 x  76 x 128  ->   76 x  76 x 256  3.407
BFLOPs
    105 conv    255  1 x 1 / 1    76 x  76 x 256  ->   76 x  76 x 255  0.754
BFLOPs
    106 yolo
Loading weights from weights/yolov3.weights...Done!

```









