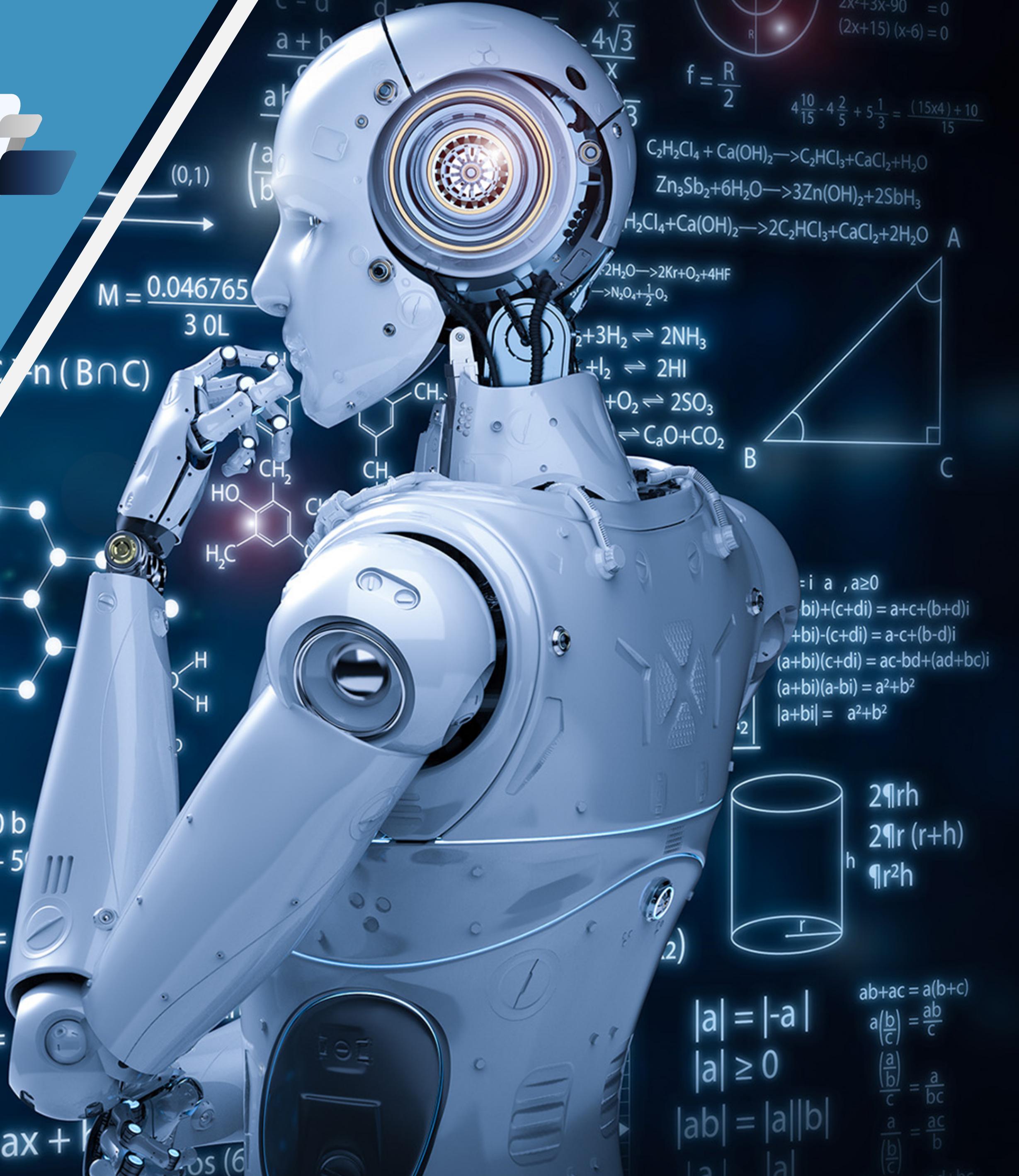


Day 28

深度學習與電腦視覺 學習馬拉松

cupay 陪跑專家：楊哲寧



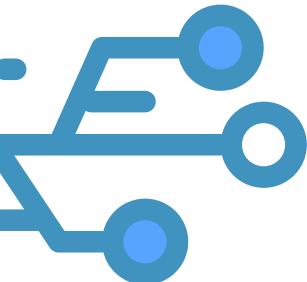
深度學習理論與實作

Non-Maximum Suppression (非極大抑制)

重要知識點



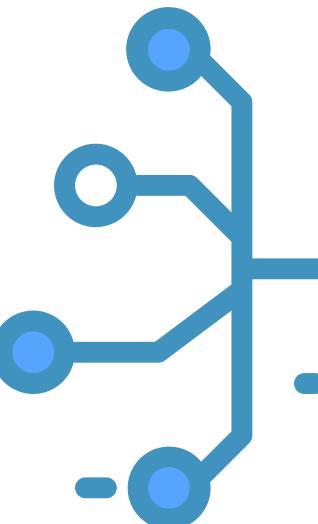
- 為什麼我們需要Non-Maximum Suppression (NMS) ?
- 不使用NMS會有什麼影響 ?
- NMS具體是如何運作的 ?

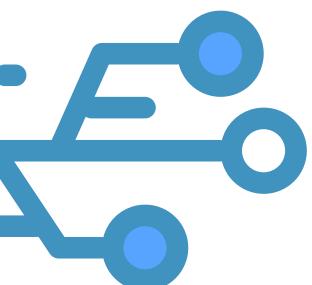


Non-Maximum Suppression



NMS被廣泛應用於 Object Detection 演算法中，主要是負責輸出『每個物件
信心程度最高的『Bounding Box』』，因此是在預測時才會使用。

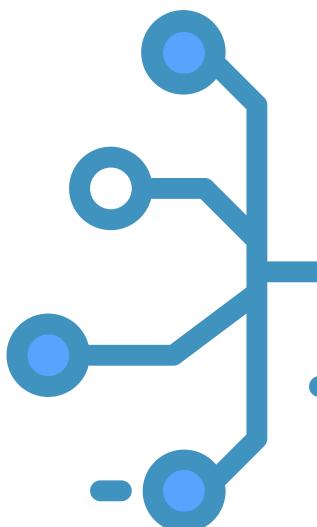
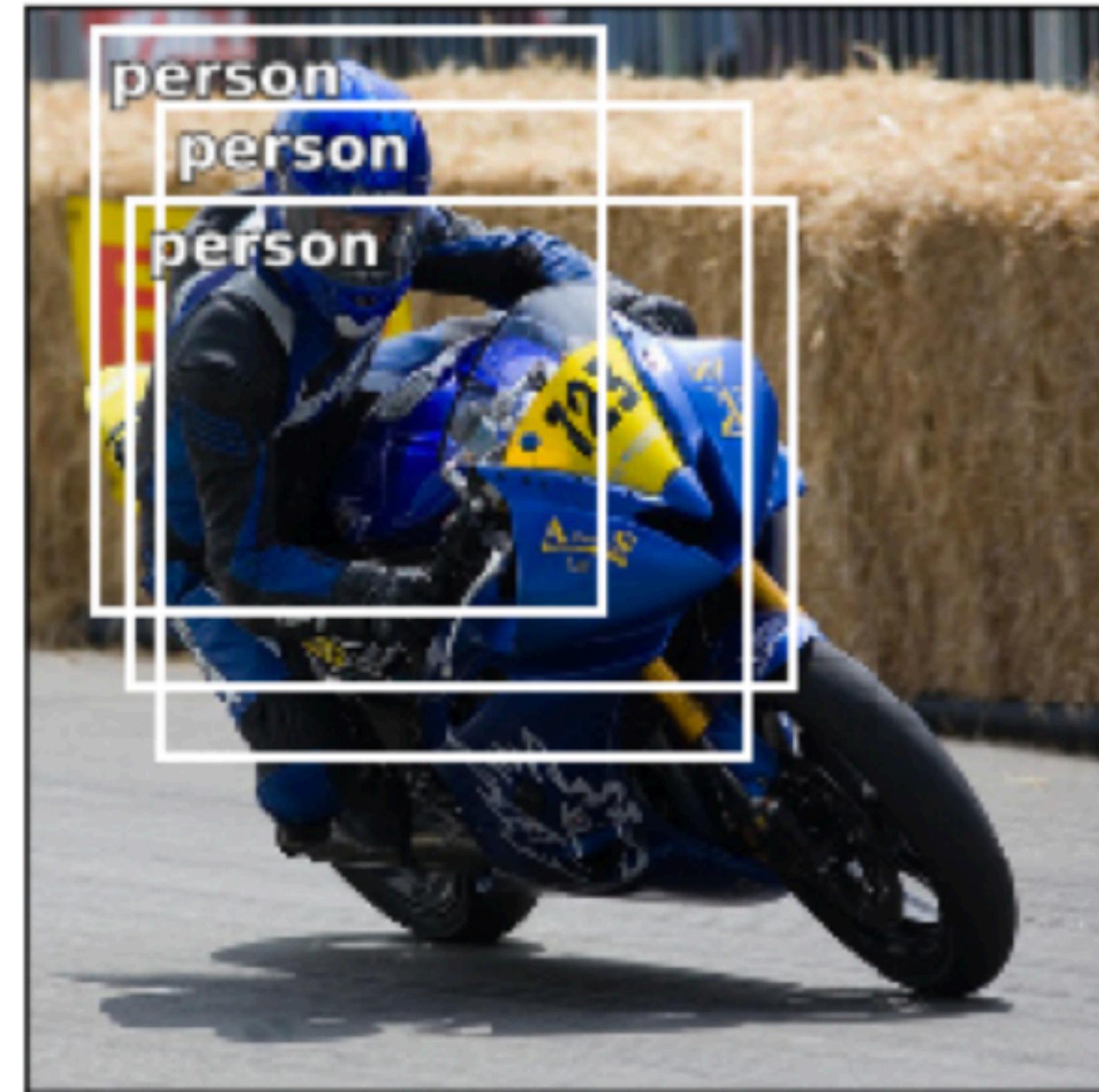
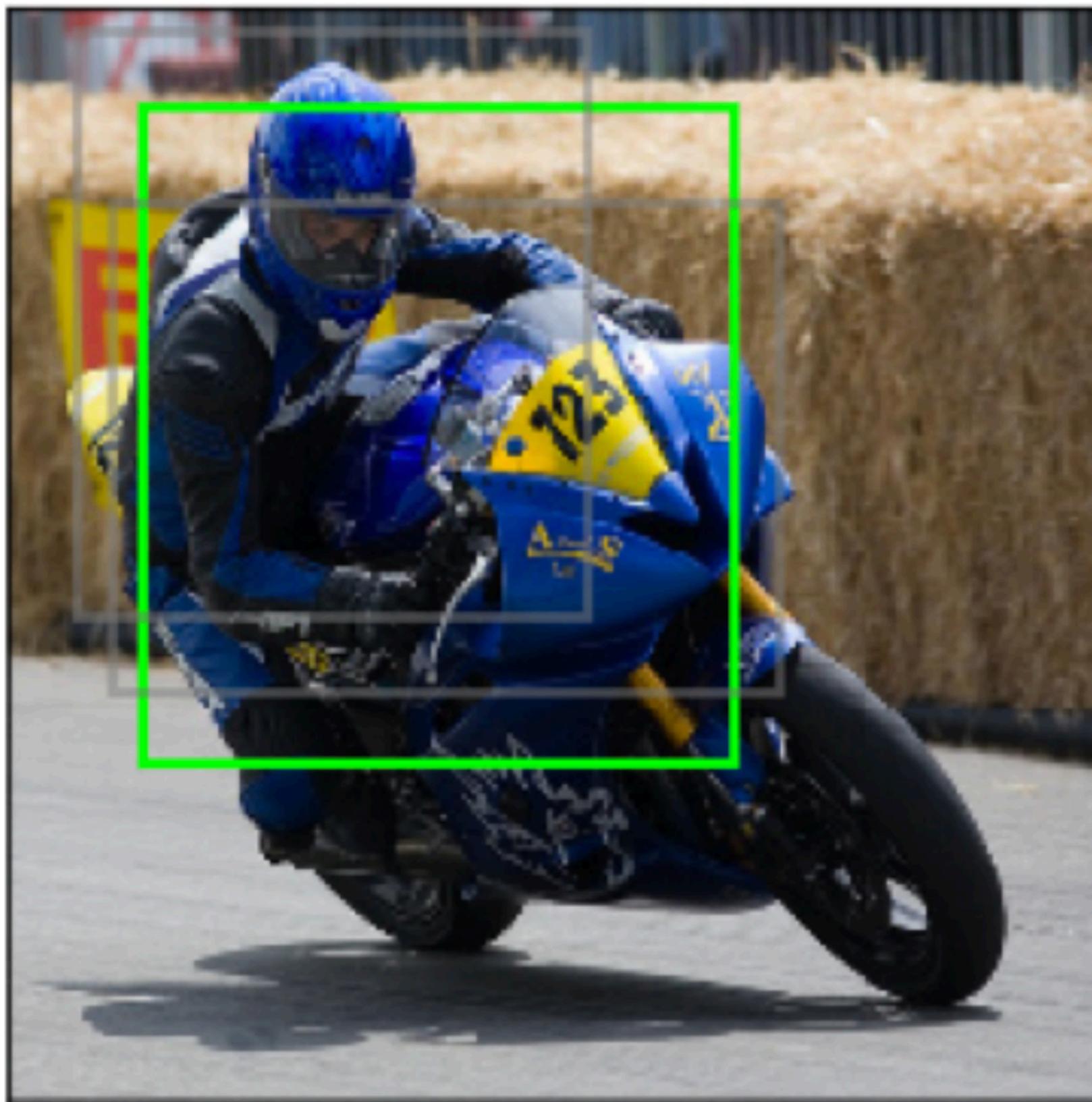


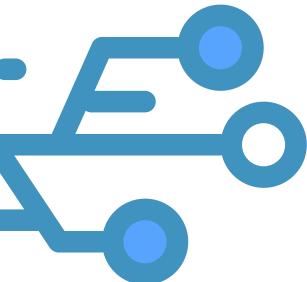


Non-Maximum Suppression



下左圖為一個我們常見的輸出結果，但真實的輸出其實是如右圖的狀況。

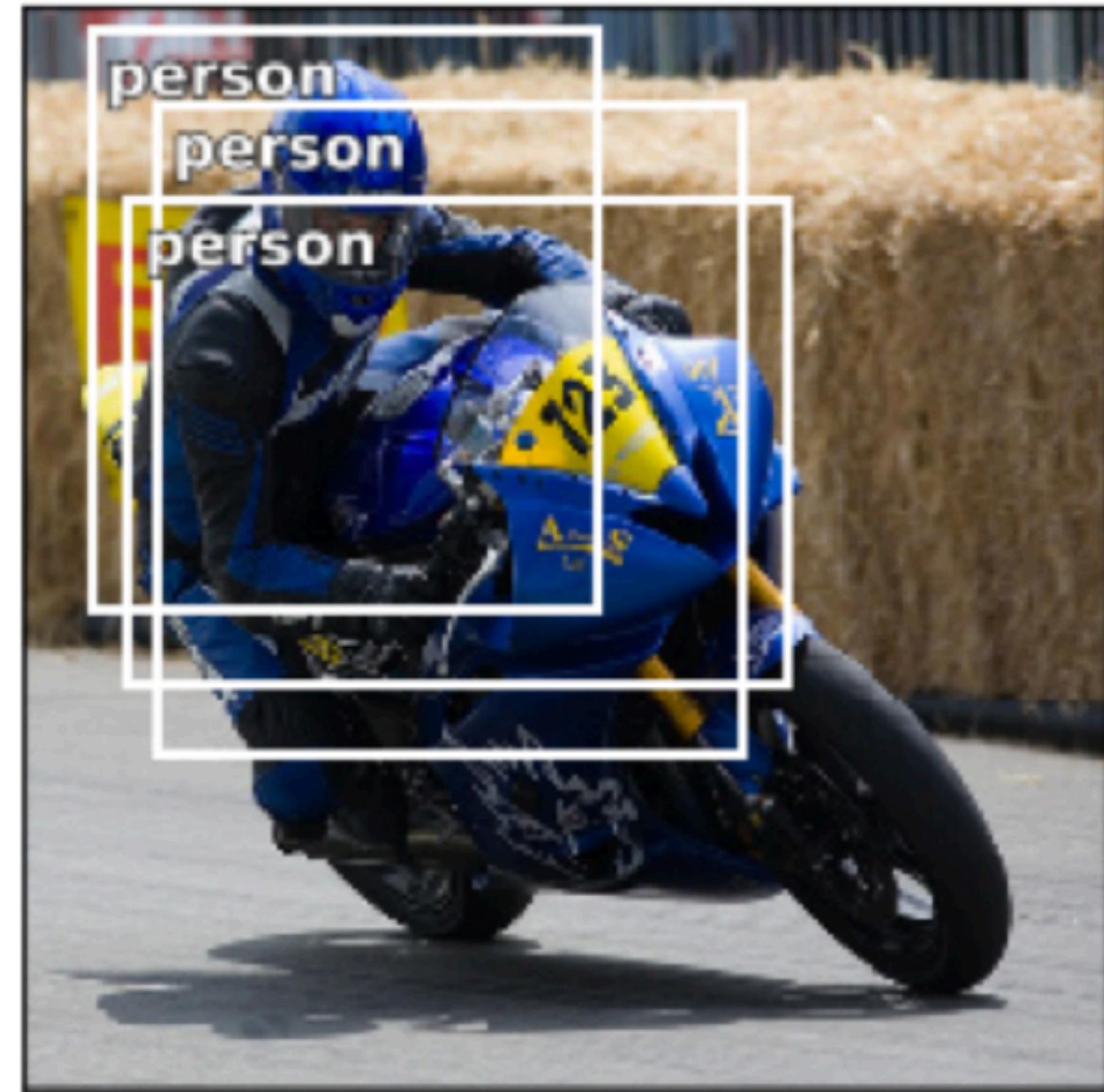




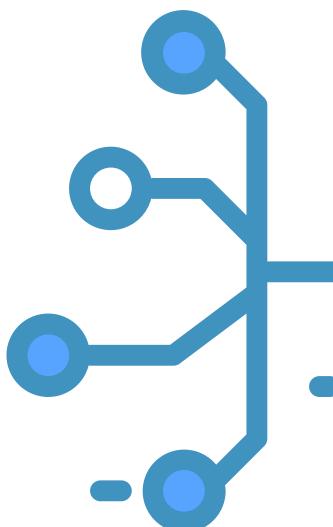
Non-Maximum Suppression

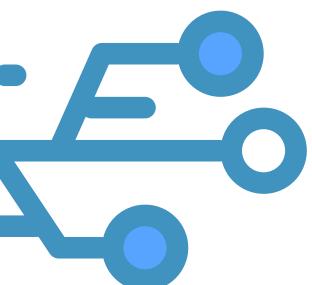


由於我們有很多的候選框，往往一個物件就會被好幾個候選框偵測，如果不使用 NMS 處理，輸出很可能會相當雜亂。



參考來源：[One-Stage Methods](#)



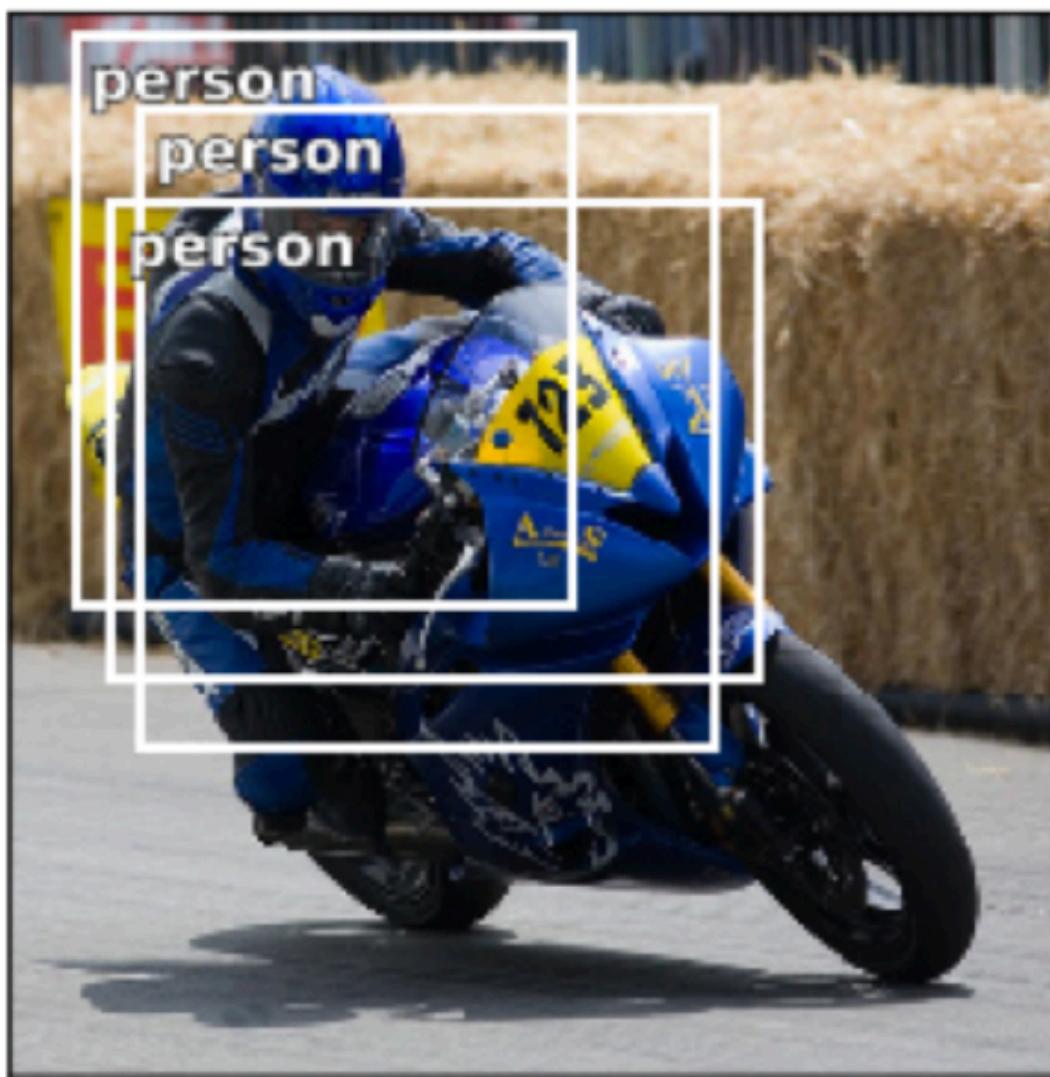


Non-Maximum Suppression

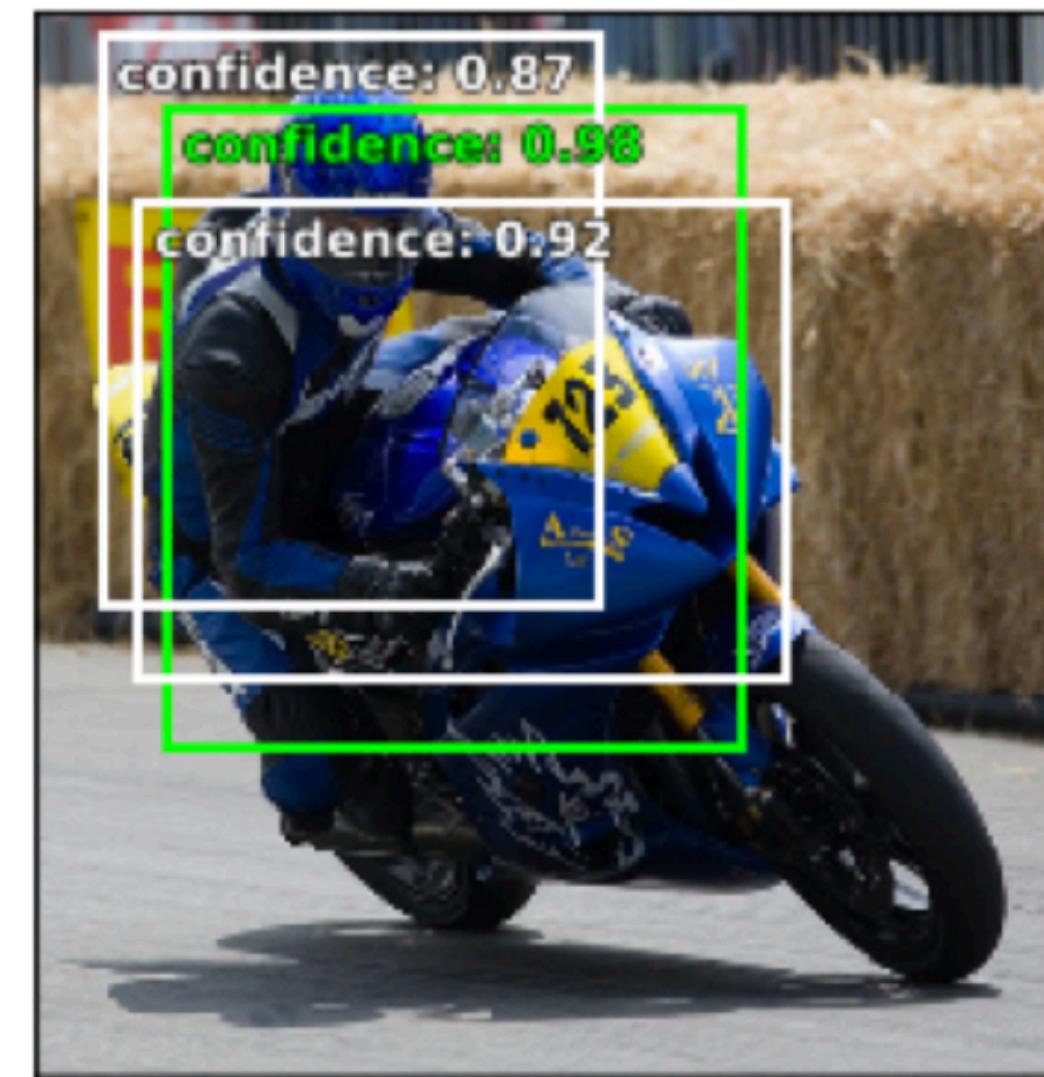


NMS 的具體步驟如下，讓我們來逐步分解：

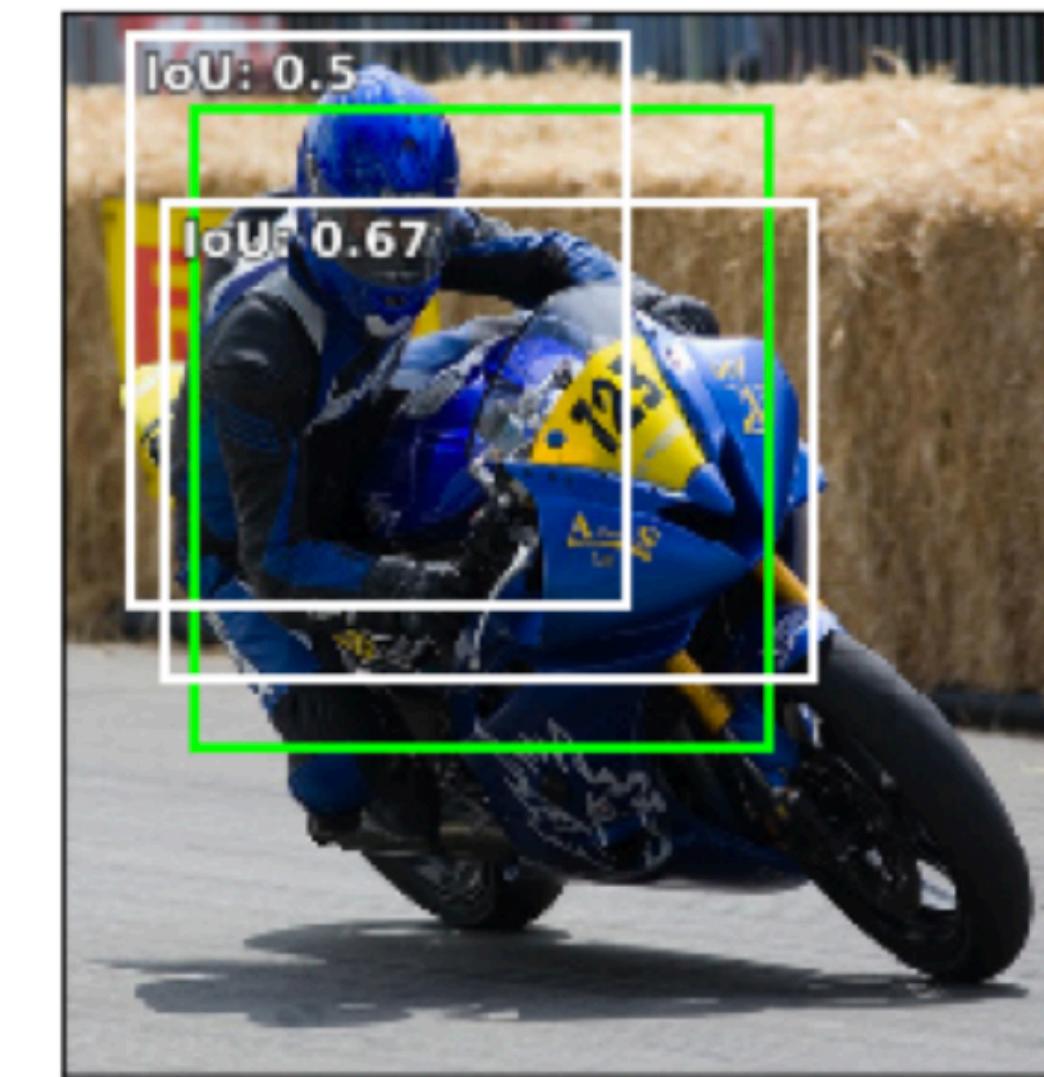
(1)



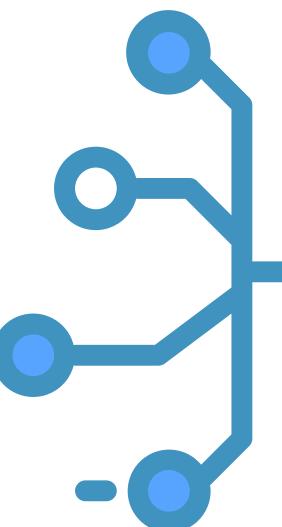
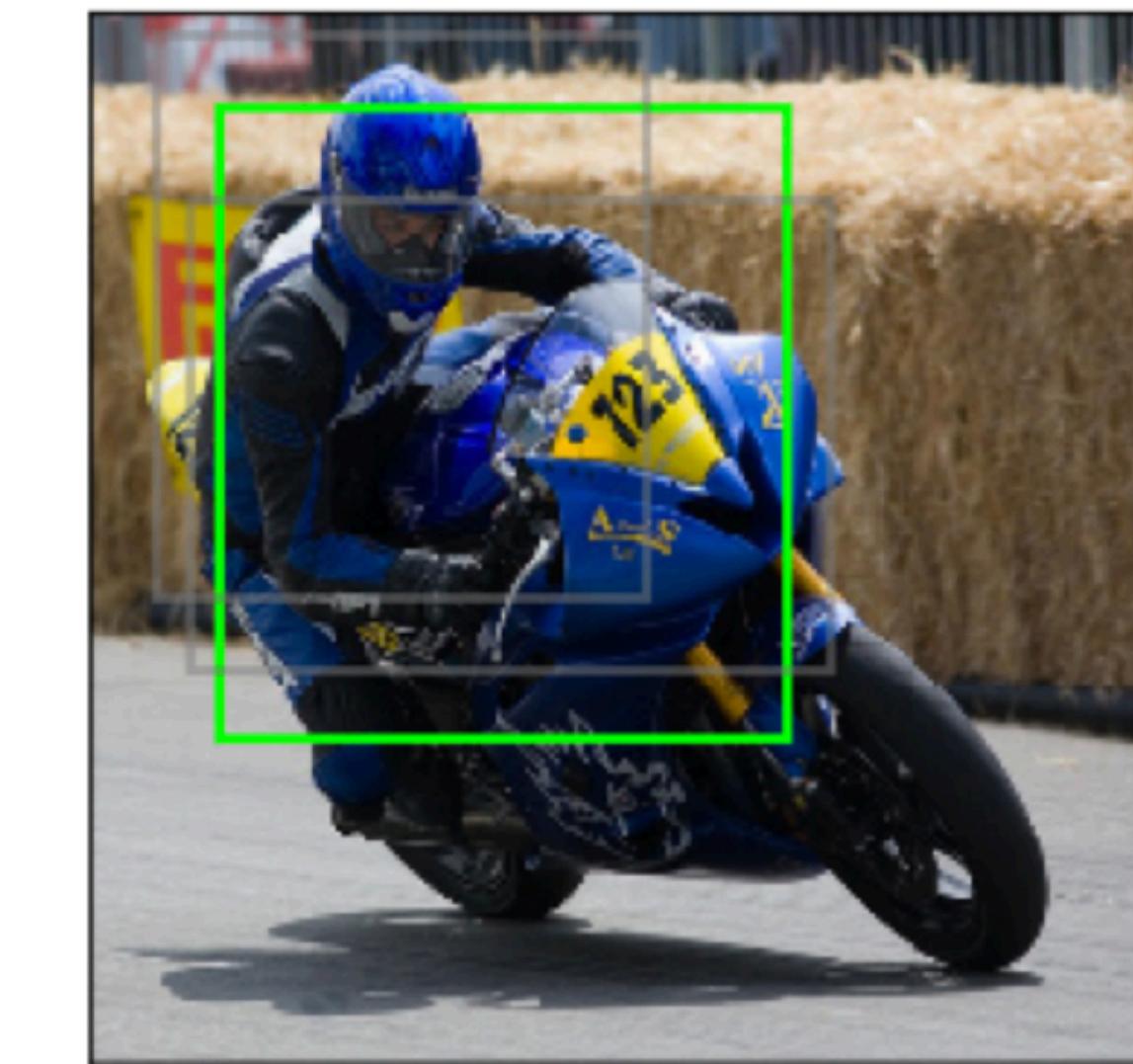
(2)

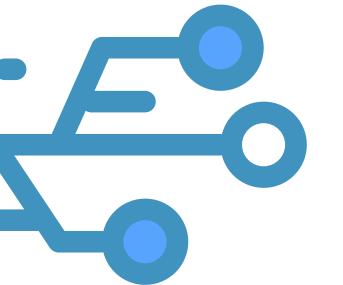


(3)



(4)



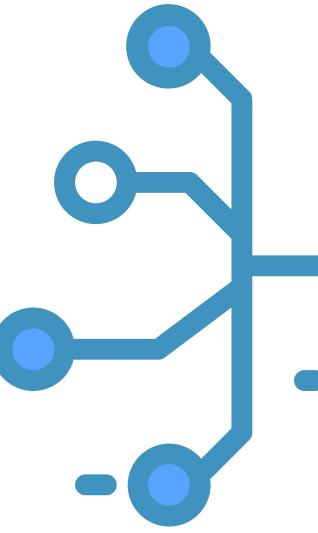
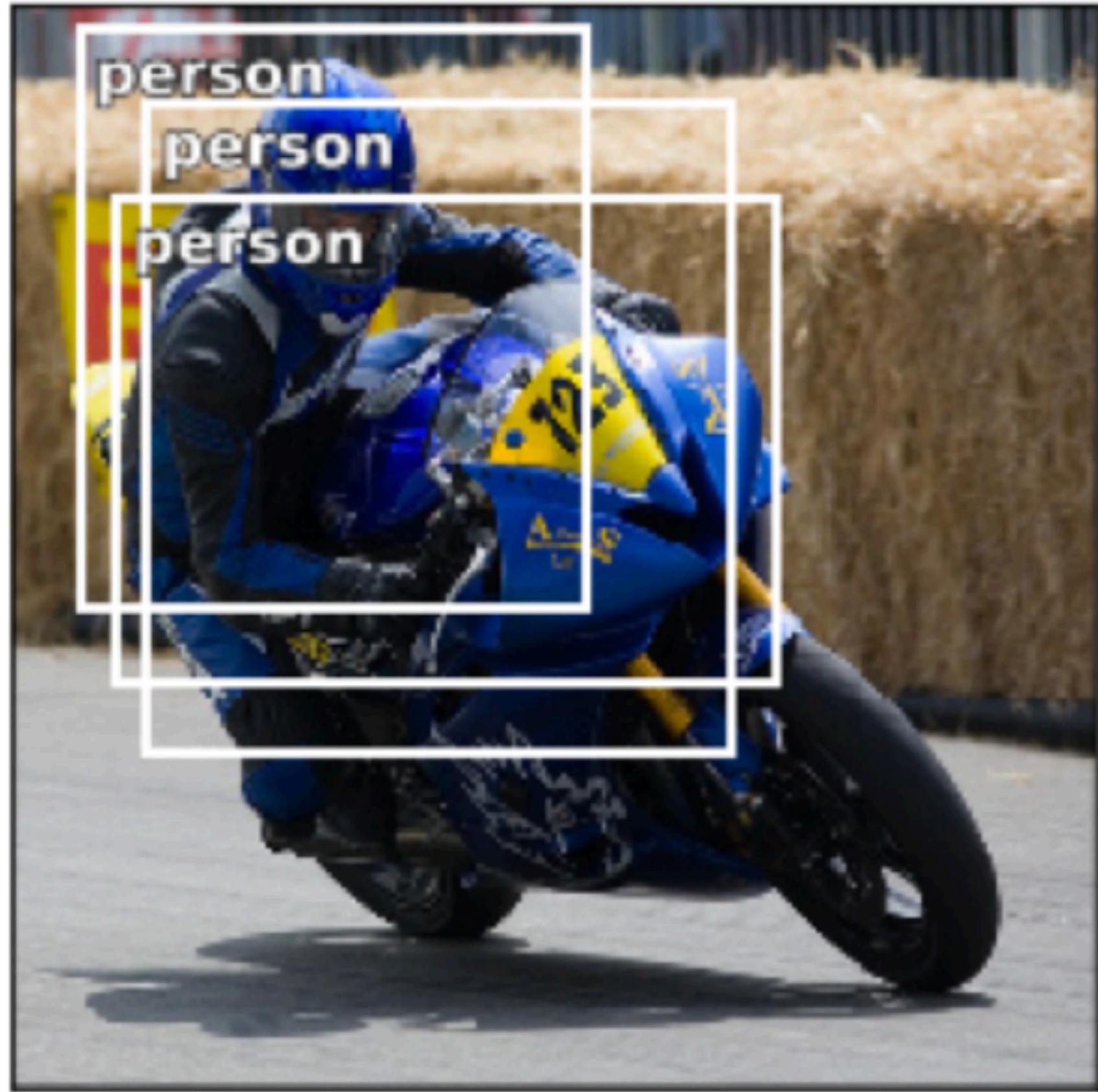


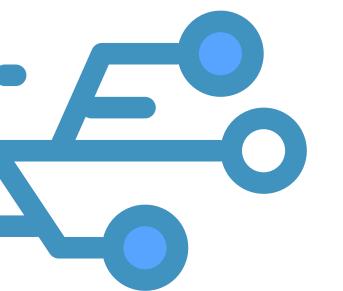
Non-Maximum Suppression - 第一步



第一步：由我們訓練的模型得到預測輸出，此時就可以先過濾掉信心度較低的預測框
(ex. confidence < 0.7)

(1)



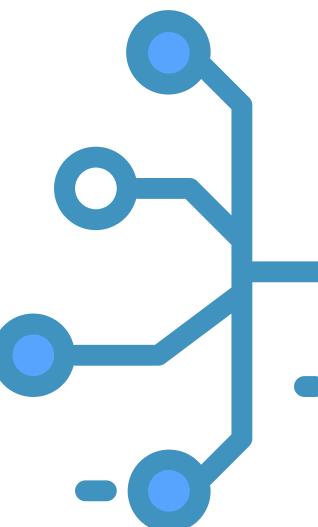
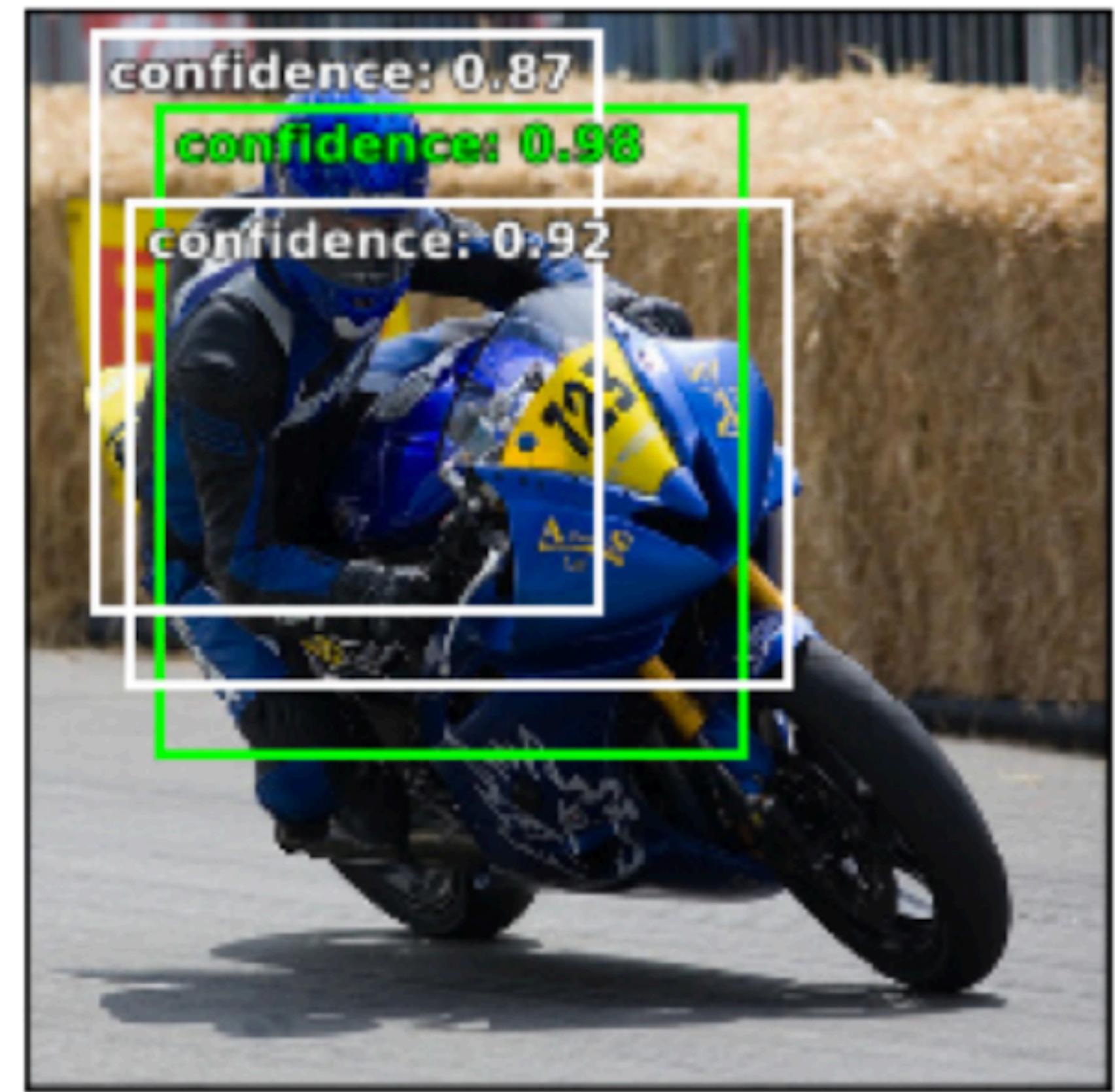


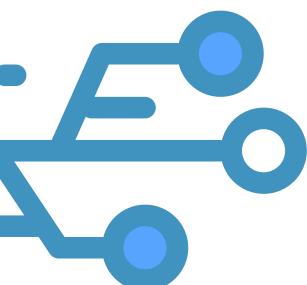
Non-Maximum Suppression - 第二步



第二步：此時選定信心程度最高的預測框，並計算其他預測框與選定預測框的 IOU。

(2)



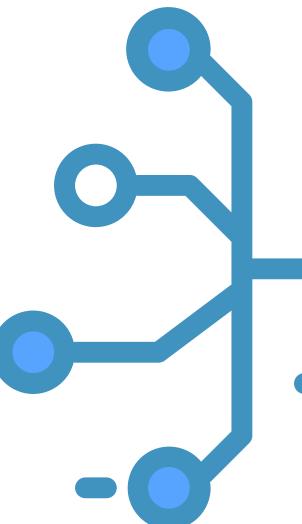
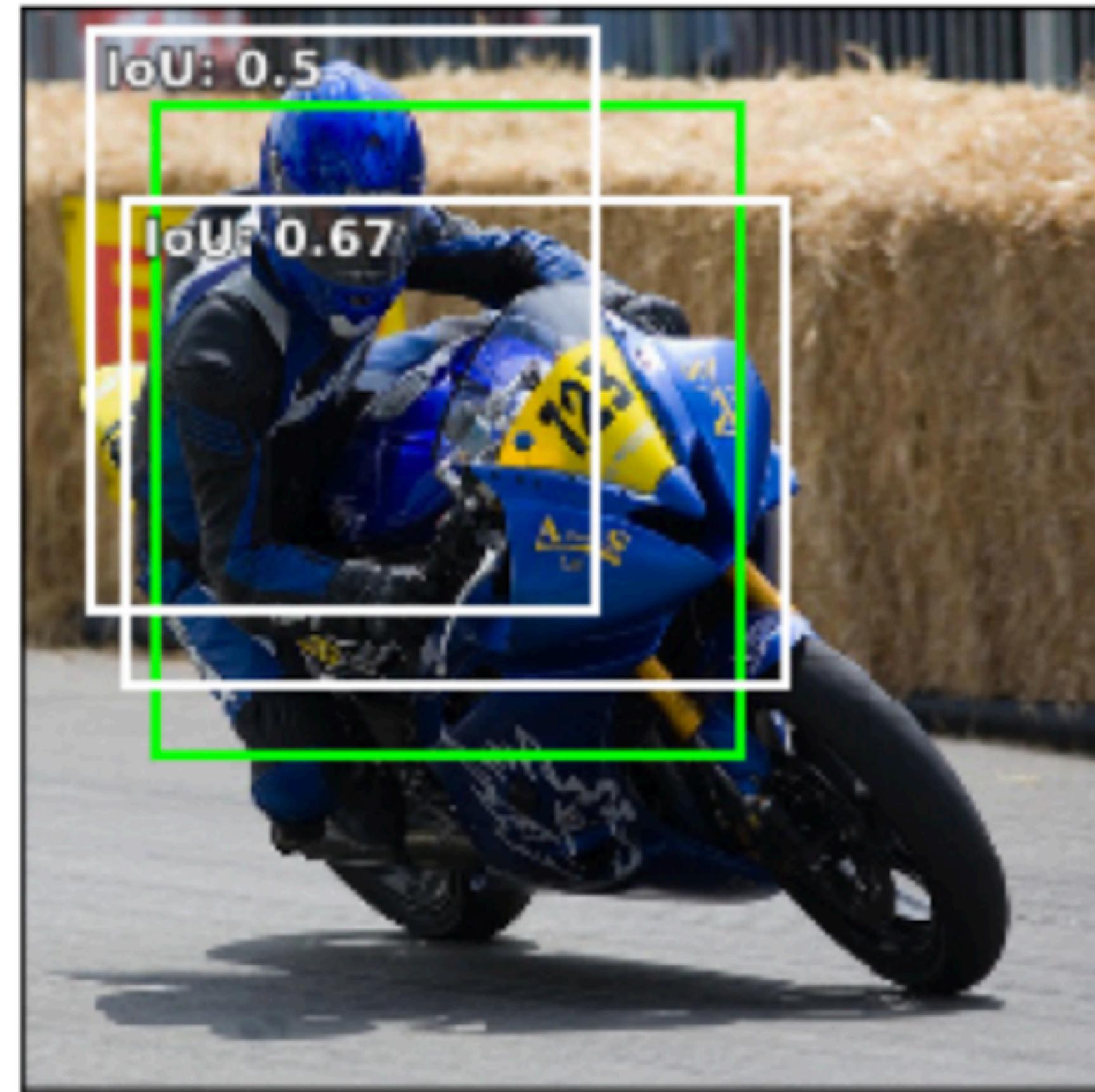


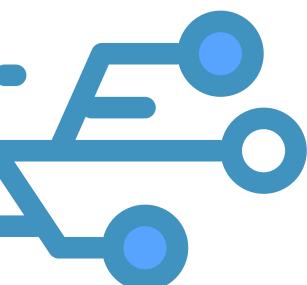
Non-Maximum Suppression - 第三步



第三步：當其他預測框與選定預測框重疊率大於一定值時（常見 0.5 、 0.7 ），我們將此框移除。

(3)



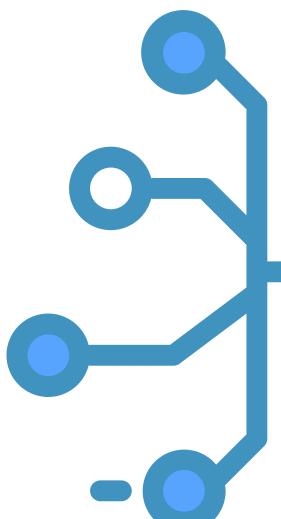
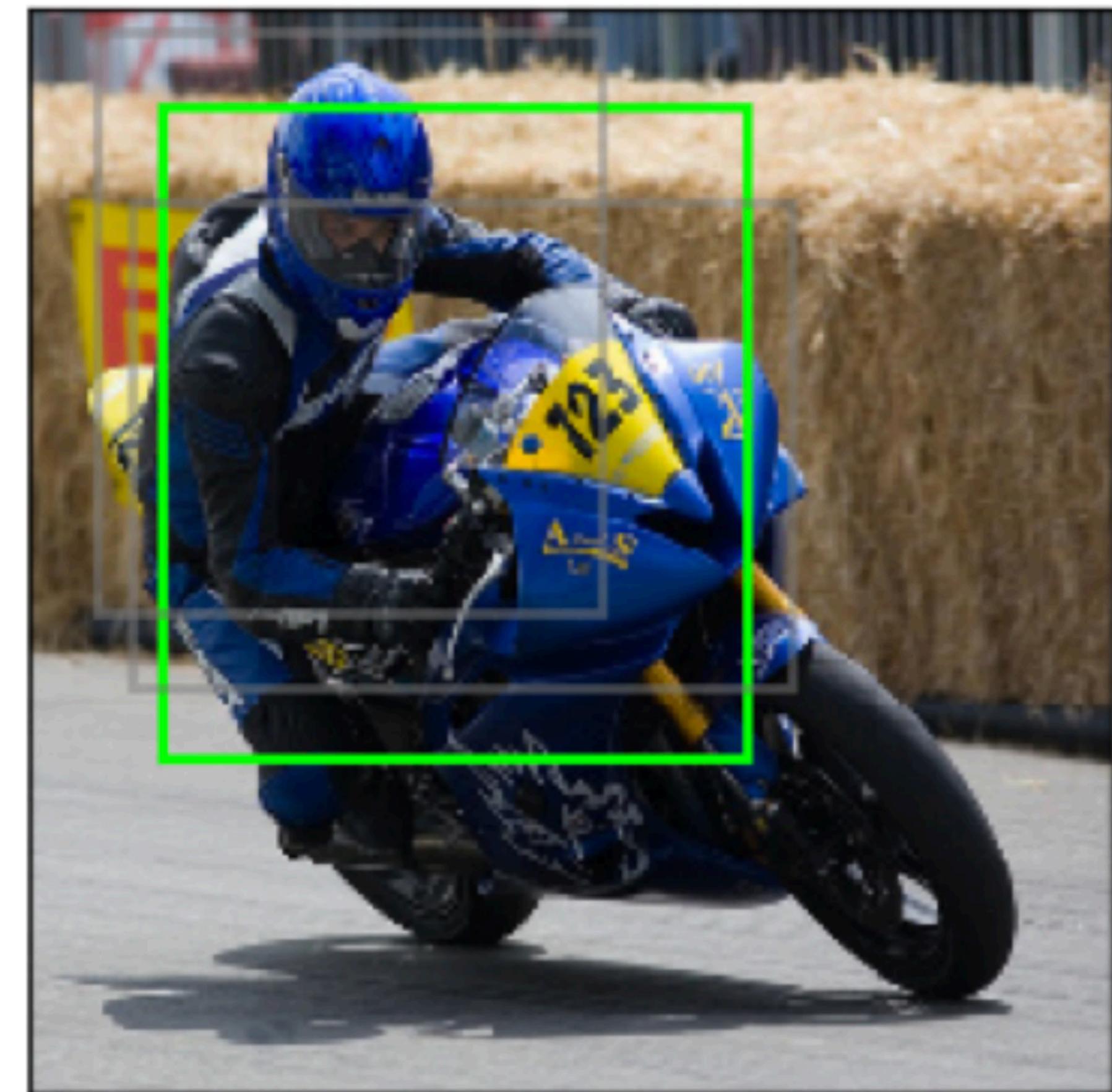


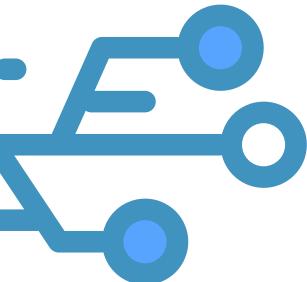
Non-Maximum Suppression - 第四步



第四步：得到第一個選定框，此時再重複第一步(選定框不在計算內)，直到無法再重複為止。

(3)





Non-Maximum Suppression-第一步



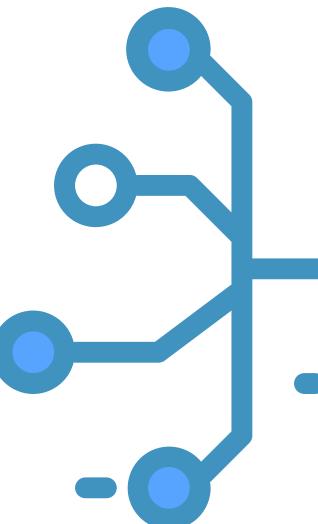
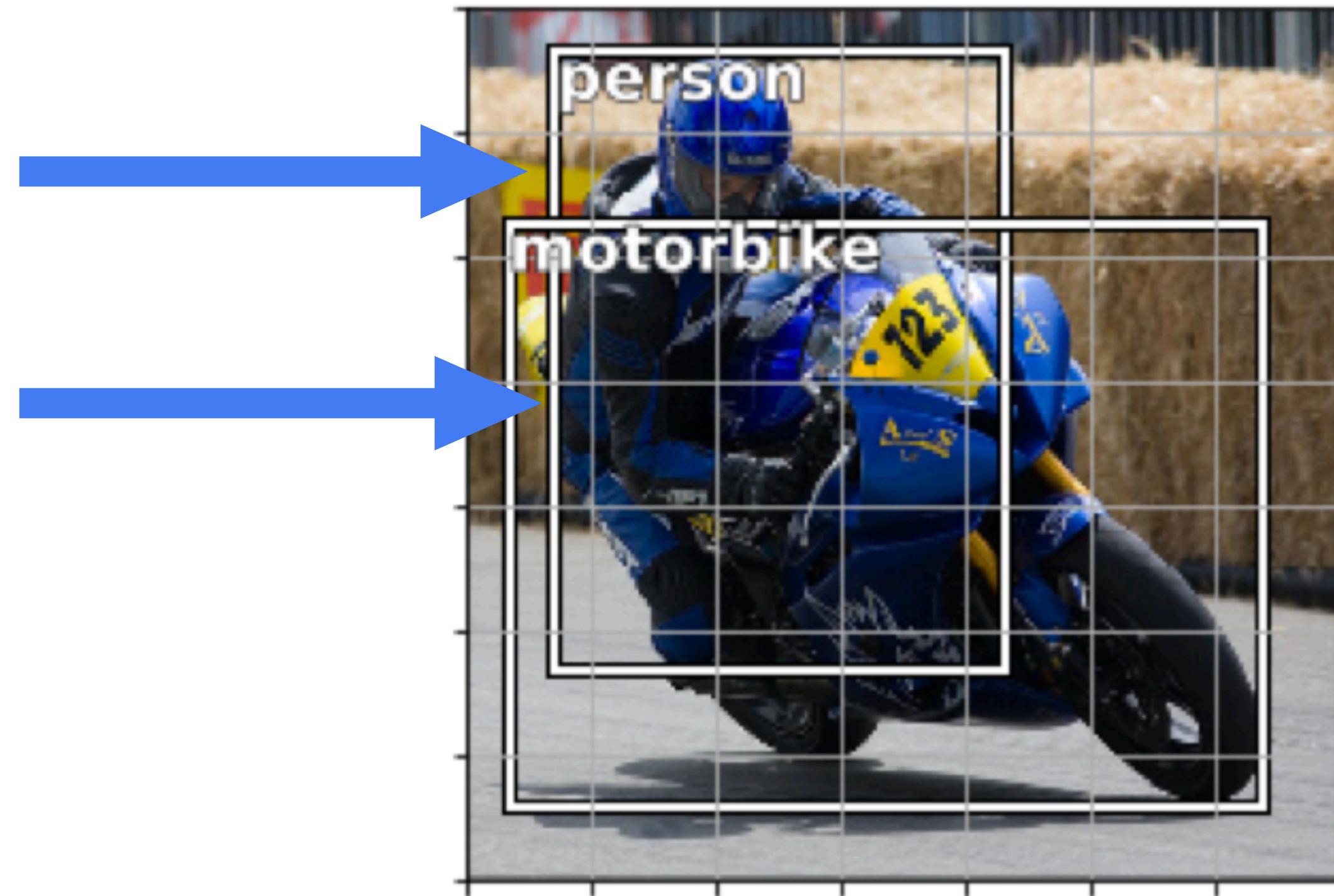
為何需要重複第一步？

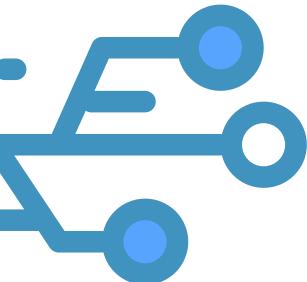
通常我們會預測多個物件，而不同物件都會有屬於自己信心程度最高的預測框，由於不同物件間的預設框間 IOU 不會太高，因此不會在上述第三步時被移除。

Confidence : 0.98

Confidence : 0.96

IOU : <0.5，因此一開始選定 0.98 的預測框，
0.96 的預設框並不會被移除。

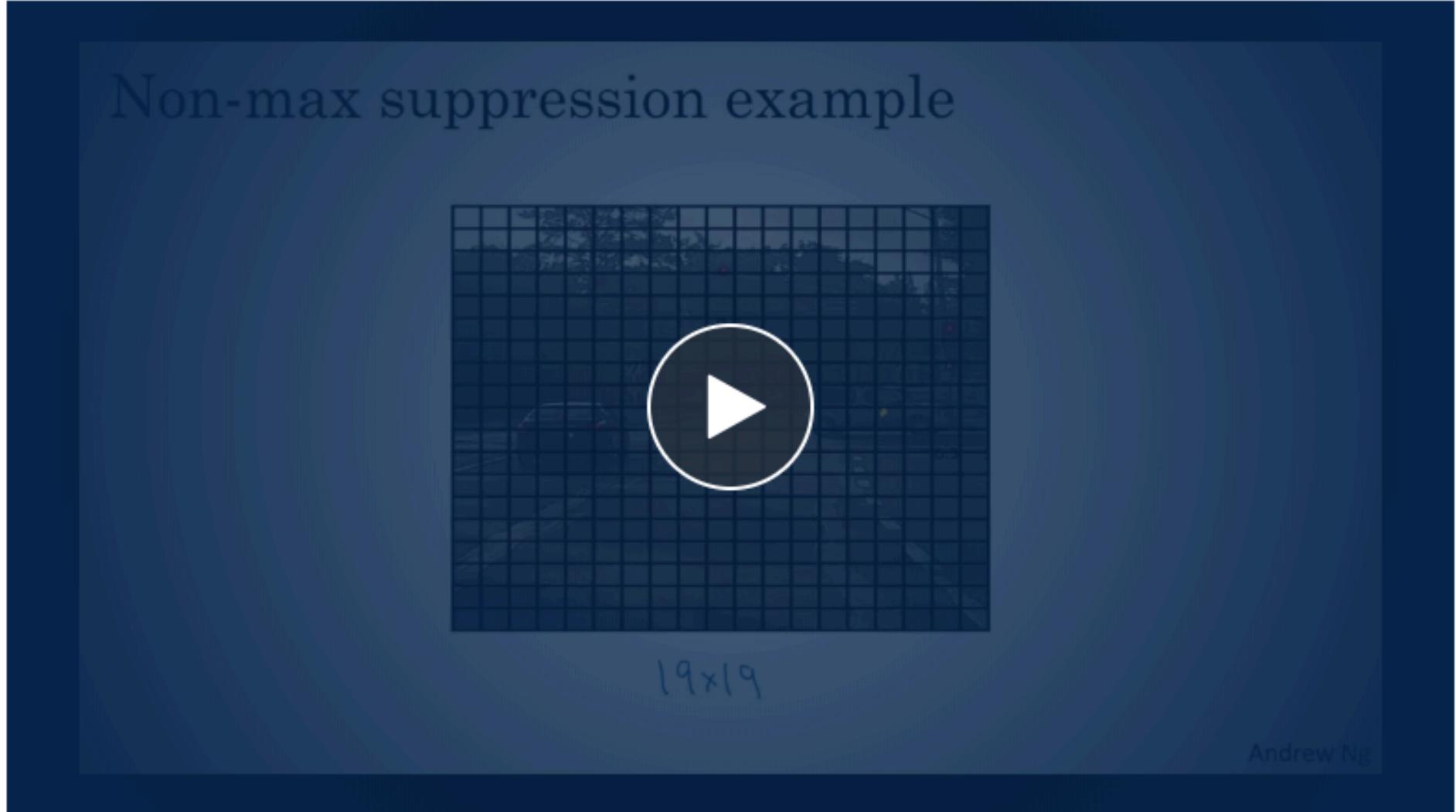




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Non-max Suppression



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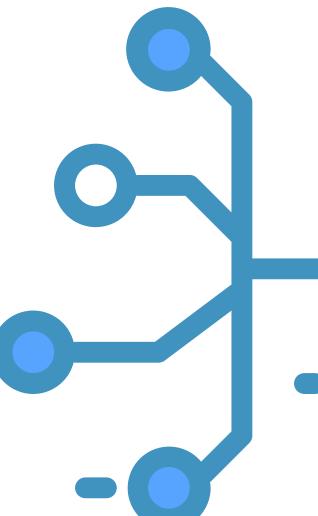
視頻腳本

This course will teach you how to build convolutional neural networks and apply it to image data. Thanks to deep learning, computer vision is working far better than just two years ago, and this is enabling numerous exciting applications ranging from safe autonomous driving, to accurate face recognition, to automatic reading of radiology images. You will:

- Understand how to build a convolutional neural network, including recent variations such as residual

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NMS 講解
連結



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