### Digging Deeper into Object Detection

While optional, we encourage you to take a look at the following articles and papers to learn more about the topics covered in this lesson.

Here are some good places to start if you would like to learn more about object detection metrics:

* Article: [Classification: Precision and Recall](https://developers.google.com/machine-learning/crash-course/classification/precision-and-recall)
* Article: [Intersection over Union (IoU) for Object Detection](https://www.pyimagesearch.com/2016/11/07/intersection-over-union-iou-for-object-detection/)
* Article: [mAP (mean Average Precision) for Object Detection](https://jonathan-hui.medium.com/map-mean-average-precision-for-object-detection-45c121a31173)
* Paper: [The PASCAL Visual Object Classes (VOC) Challenge](http://host.robots.ox.ac.uk/pascal/VOC/pubs/everingham10.pdf)
* Article: [COCO Detection Evaluation Metrics](https://cocodataset.org/#detection-eval)

Here are some additional articles that examine the most popular object detection models:

* Article (3-part series): [Design Choices, Lessons Learned and Trends for Object Detections?](https://jonathan-hui.medium.com/design-choices-lessons-learned-and-trends-for-object-detections-4f48b59ec5ff)
* Article: [An Overview of Object Detection: One-Stage Methods](https://www.jeremyjordan.me/object-detection-one-stage/)
* Article: [Real-time Object Detection with YOLO, YOLOv2 and now YOLOv3](https://jonathan-hui.medium.com/real-time-object-detection-with-yolo-yolov2-28b1b93e2088)

The following papers are good references if you want to dig into the details of various object detection architectures:

* [Rich feature hierarchies for accurate object detection and semantic segmentation (R-CNN)](https://arxiv.org/pdf/1311.2524.pdf)
* [Fast R-CNN](https://arxiv.org/pdf/1504.08083.pdf)
* [Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks](https://arxiv.org/pdf/1506.01497.pdf)
* [SSD: Single Shot MultiBox Detector](https://arxiv.org/pdf/1512.02325.pdf)
* [Feature Pyramid Networks for Object Detection](https://arxiv.org/pdf/1612.03144.pdf)
* [YOLOv4: Optimal Speed and Accuracy of Object Detection](https://arxiv.org/pdf/2004.10934.pdf)
* [Speed/accuracy trade-offs for modern convolutional object detectors](https://arxiv.org/pdf/1611.10012.pdf)