deeplearning.ai

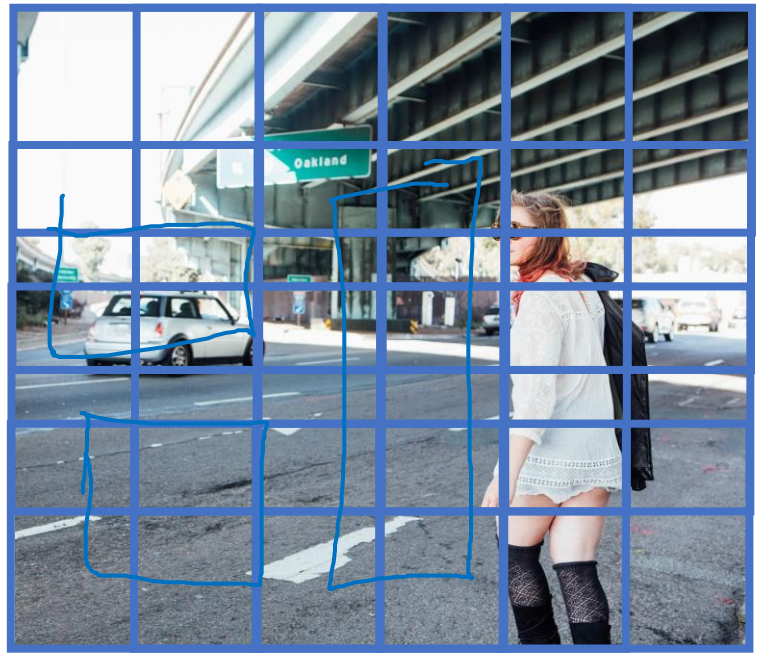
Object Detection

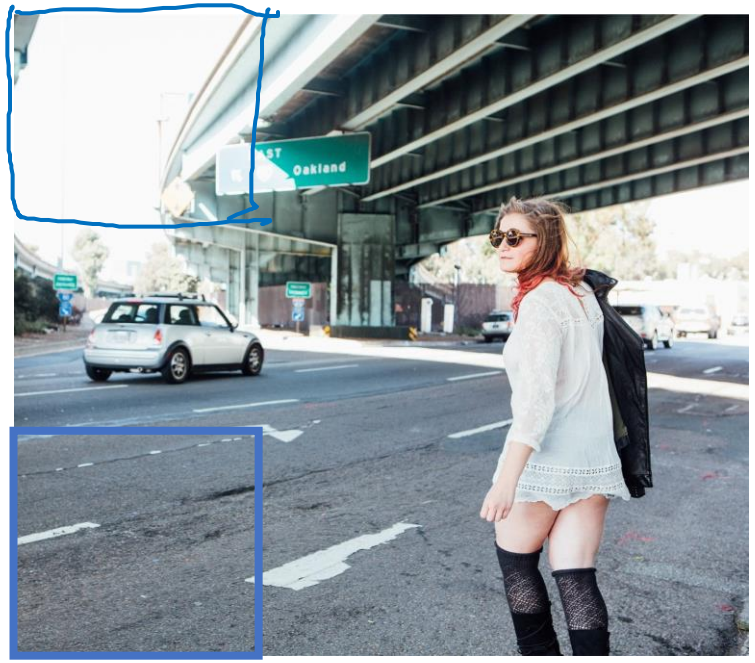
Region proposals (Optional)

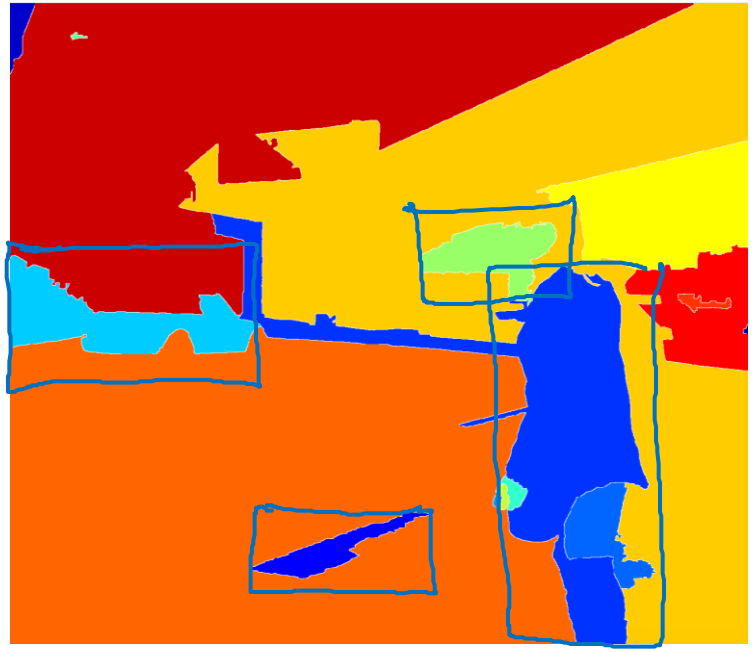
I tend to use the region proposal set of algorithms a bit less often, but nonetheless it has been an influential body of work and the idea that you might come across in your own work.

Region proposal: R-CNN

regions with CNN







Segmentation algorithm

~2,000

but one downside that the algorithm is just classifies a lot of regions where there's clearly no object.

[Girshik et. al, 2013, Rich feature hierarchies for accurate object detection and semantic segmentation]

Faster algorithms

So just to be clear the R-CNN algorithm doesn't just trust the bounding box it was given, it also outputs a bounding box of (bx by bh bw) in order to get a more accurate bounding box than whatever happened to surround the block that the image segmentation algorithm gave it. So it can get pretty accurate bounding boxes.

R-CNN: Propose regions. Classify proposed regions one at a time. Output label + bounding box.

Now, one downside of the R-CNN algorithm was that it's actually quite slow.

Fast R-CNN: Propose regions. Use convolution implementation of sliding windows to classify all the proposed regions.

It turns out that one of the problems with fast R-CNN algorithm is that the clustering step to propose the regions is still quite slow.

Faster R-CNN: Use convolutional network to propose regions.

uses a convolutional neural network instead of one of the more traditional segmentation algorithms to propose the blocks of the propose regions and that wound up running quite a bit faster than the fast R-CNN algorithm.
Although I think the faster R-CNN algorithm most implementations are usually still quite a bit slower than the YOLO algorithm.

[Girshik et. al, 2013. Rich feature hierarchies for accurate object detection and semantic segmentation]
[Girshik, 2015. Fast R-CNN]
[Ren et. al, 2016. Faster R-CNN: Towards real-time object detection with region proposal networks]