CAP5415 Computer Vision

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HEC-241

Thank you all!

Best of luck for your future endeavors!

Final exam

When?

- 12/02/2024 from 1:00PM - 2:00PM

Where?

- Same as mid-term

Notes:

- The questions pattern will be same as mid-term.
- It will count towards 20% of your total grade.
- Syllabus - Lecture 9: SIFT - Lecture 16: Instance segmentation
- Zoom link: will be provided.
- Video should be on for all students.
- Please keep your mic on mute. You can use mic to ask questions.

Reminder

- Student evaluation of course instruction (SPI)
  - Now available on Webcourse
  - Will be available for the next ~15 days
- Online questionnaire includes
  - ONLY eleven (11) questions
  - 9 multiple choice and 2 open comment questions

Questions?

Instance Segmentation

Lecture 16

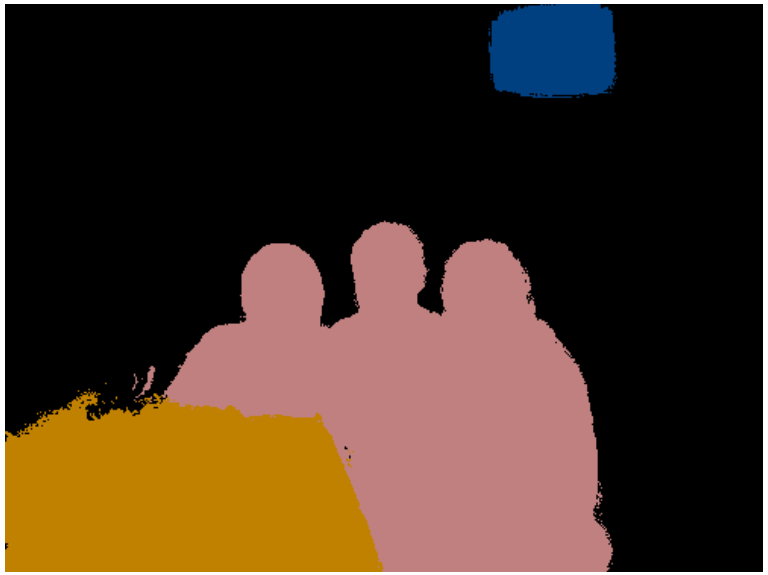
Instance Segmentation

- Segment each instance of the same class separately.





Instance Segmentation

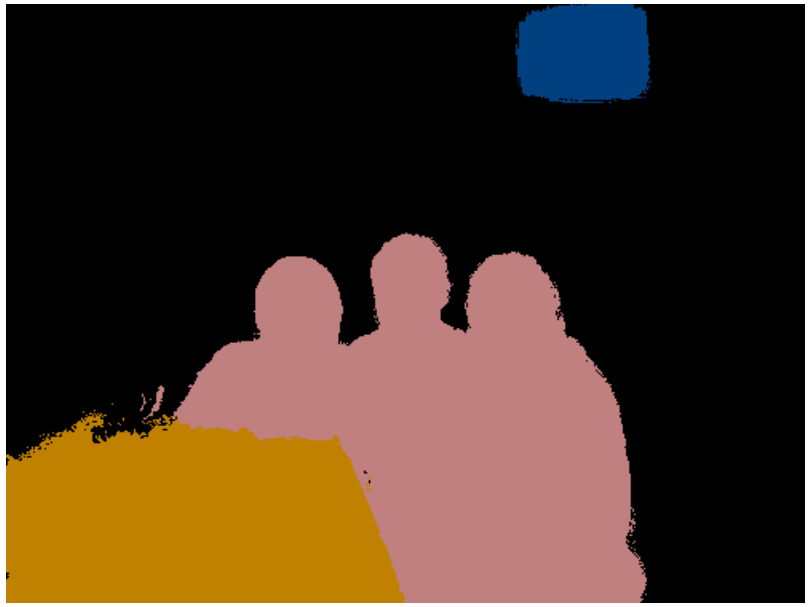

A simple solution



A simple solution

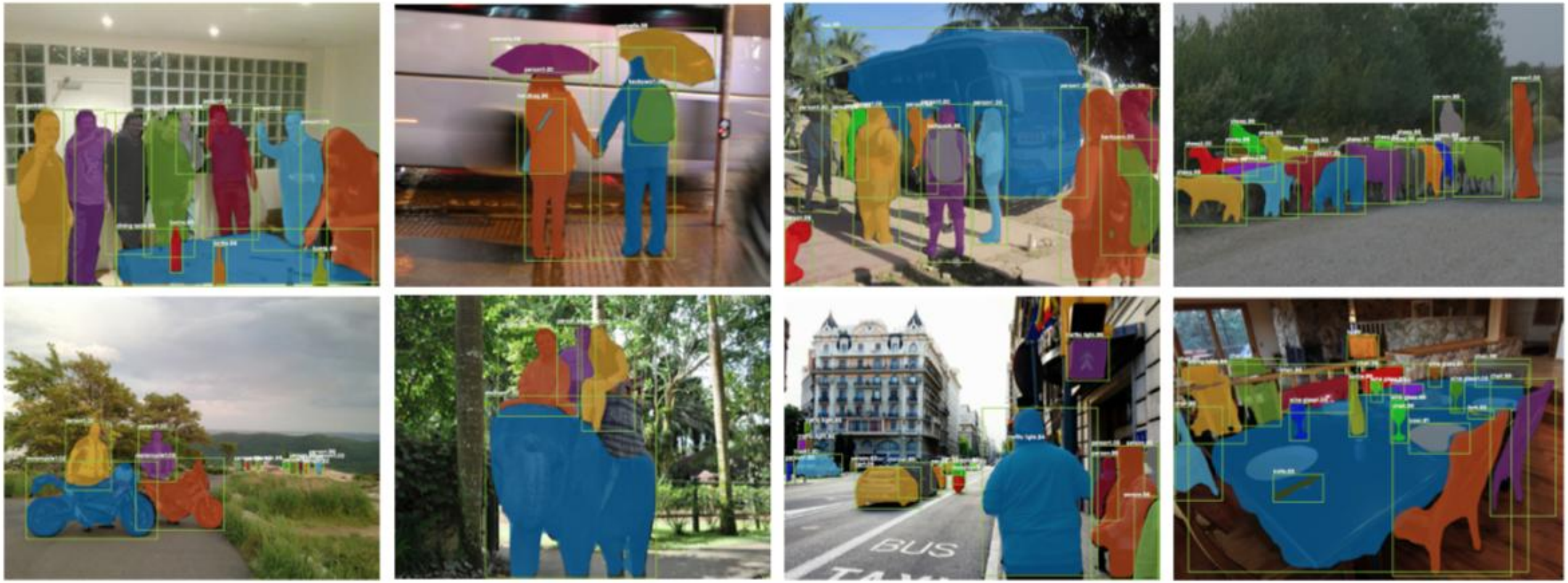
- Use results from object detection







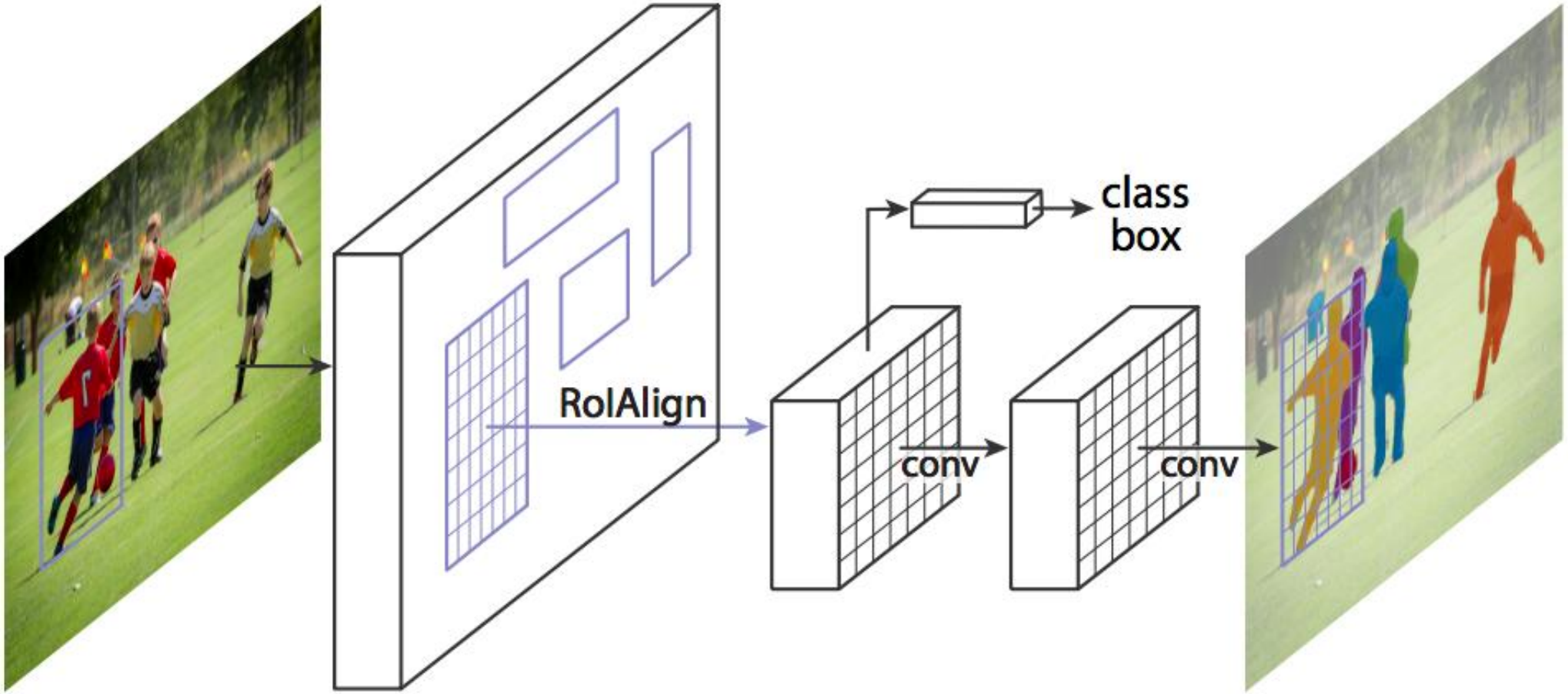
Mask - RCNN



K. He, G. Gkioxari, P. Dollar, and R. Girshick, Mask R-CNN, ICCV 2017 (Best Paper Award)

Mask R-CNN

- Mask R-CNN = Faster R-CNN + FCN on RoIs

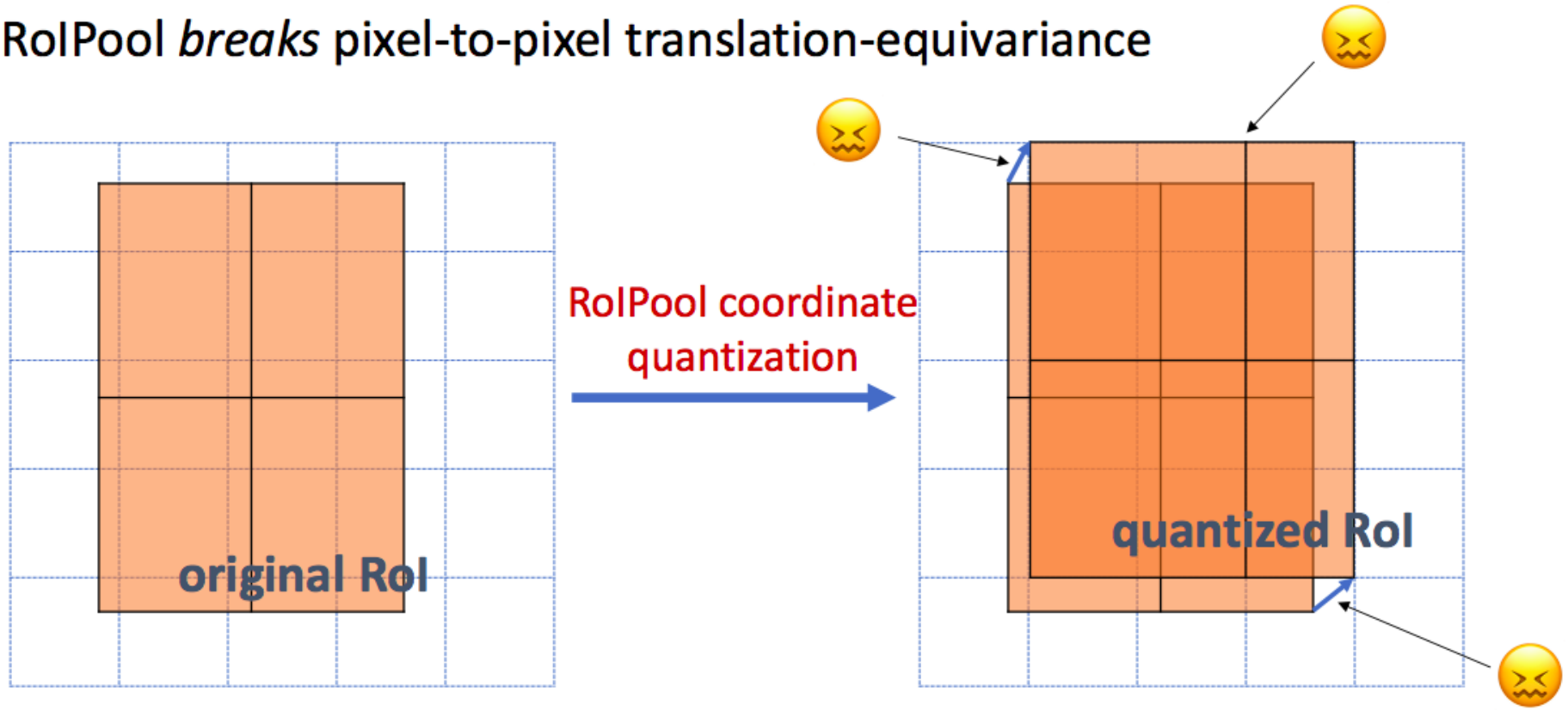


K. He, G. Gkioxari, P. Dollar, and R. Girshick, Mask R-CNN, ICCV 2017 (Best Paper Award)

RoIAlign vs. RoIPool

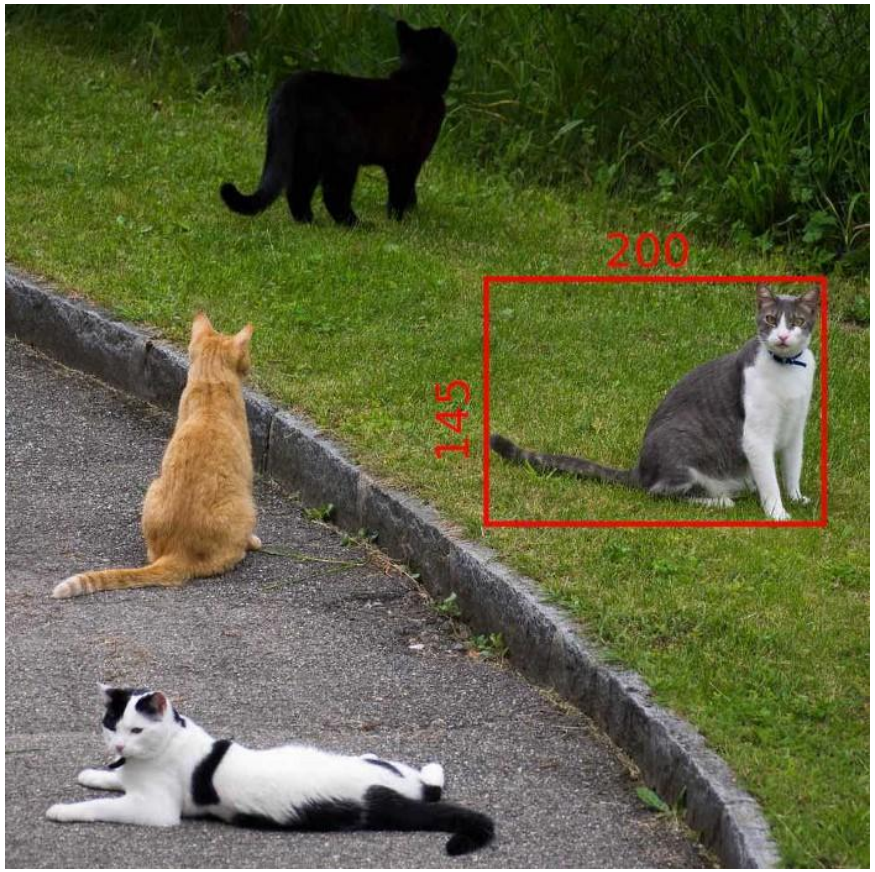
RoIPool: nearest neighbor quantization

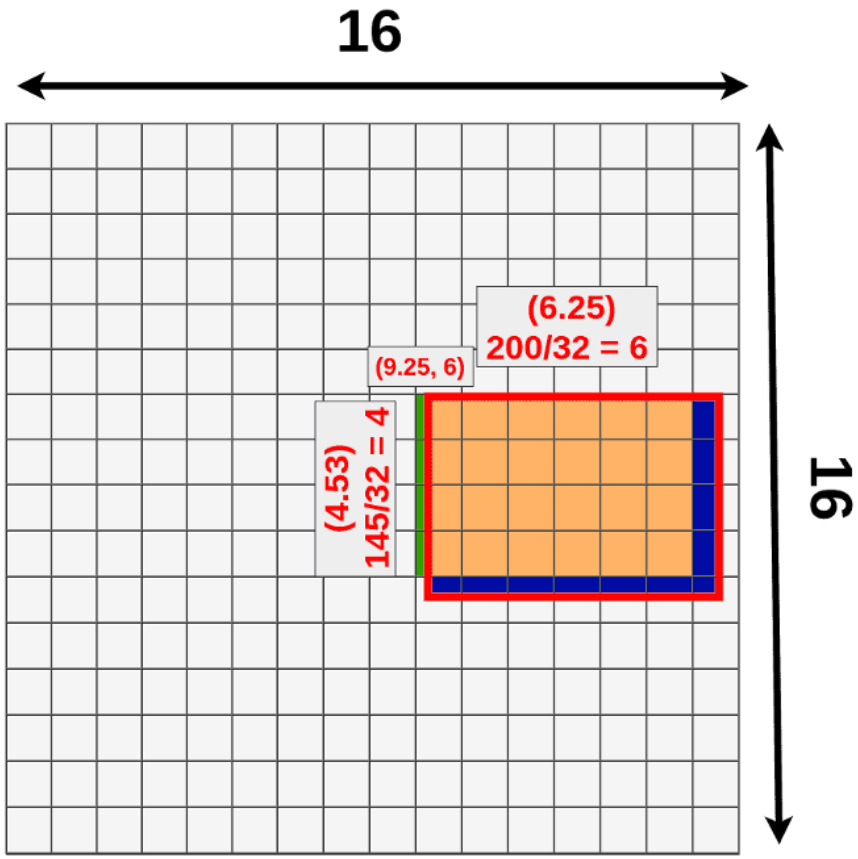
- RoIPool *breaks* pixel-to-pixel translation-equivariance



K. He, G. Gkioxari, P. Dollar, and R. Girshick, Mask R-CNN, ICCV 2017 (Best Paper Award)

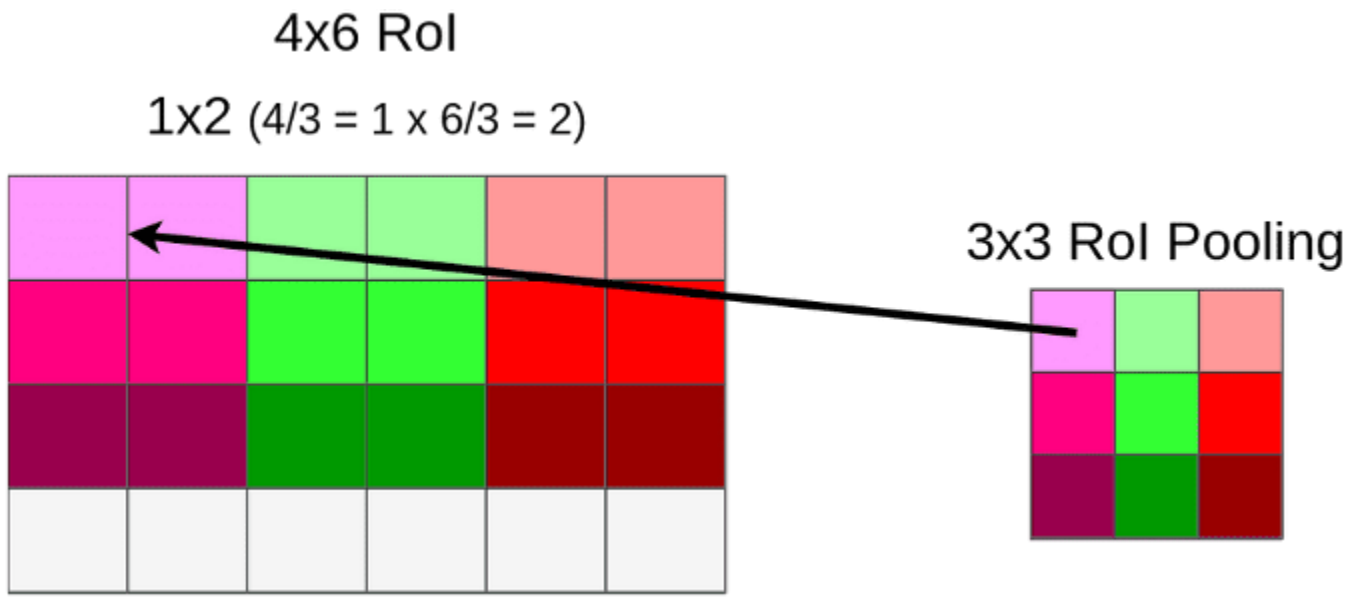
ROI-Pooling





https://tinyurl.com/y6xpm24d

ROI-Pooling



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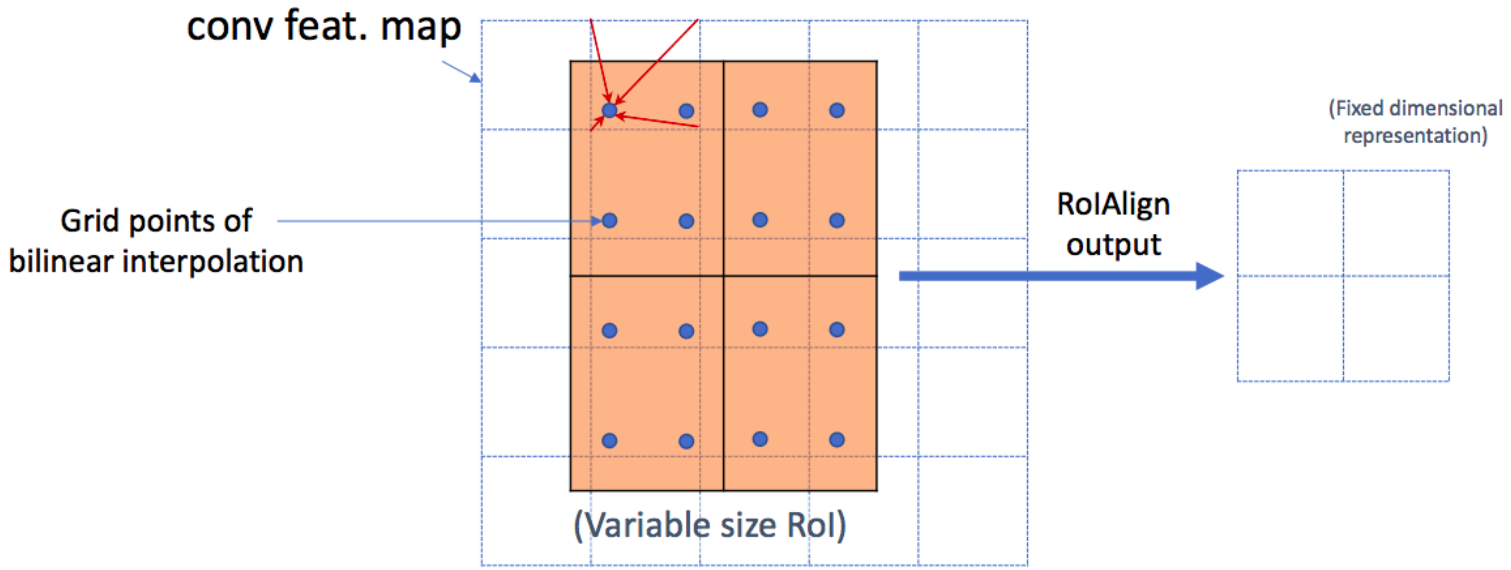
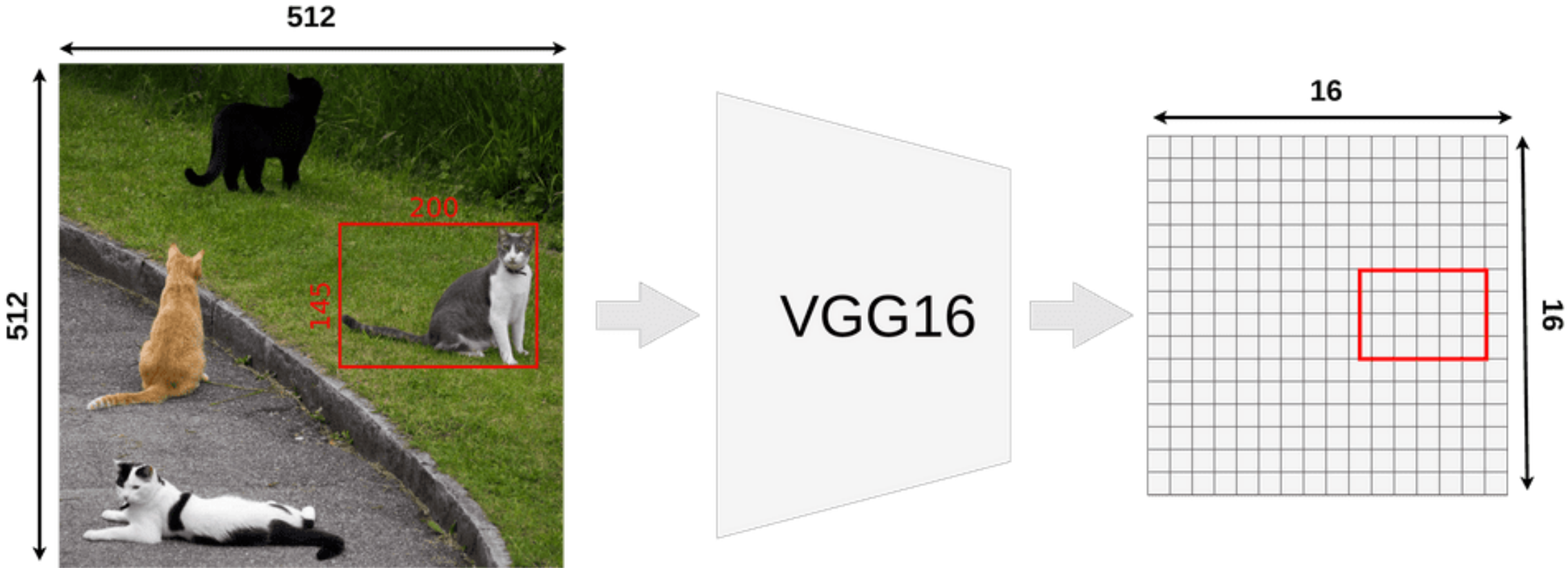
RoIAlign vs. RoIPool

- RoIPool: nearest neighbor quantization
- RoIAlign: bilinear interpolation



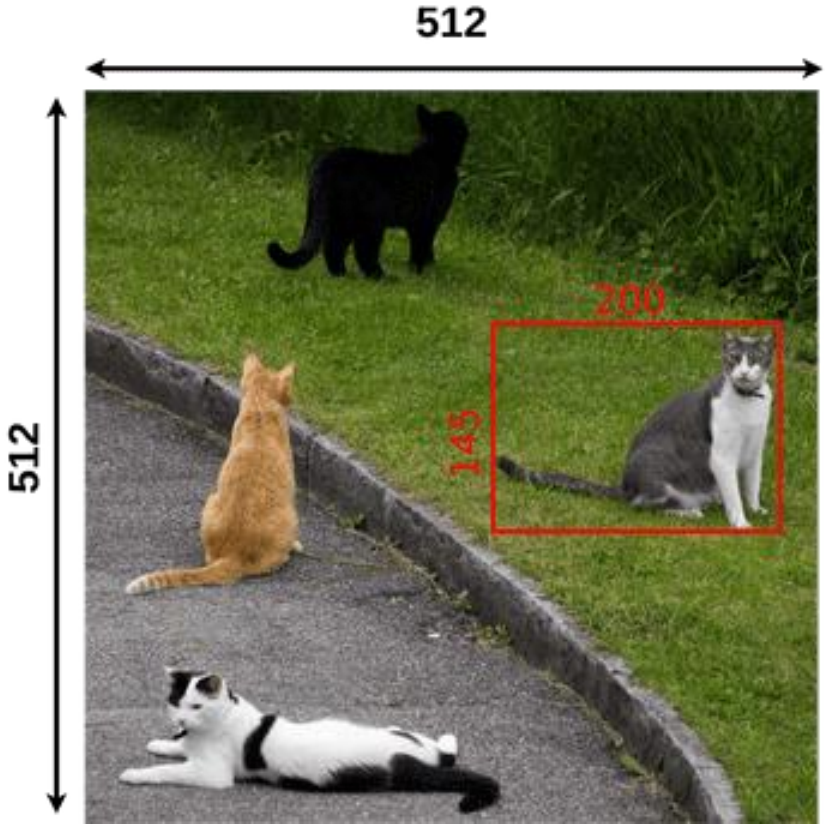
K. He, G. Gkioxari, P. Dollar, and R. Girshick, Mask R-CNN, ICCV 2017 (Best Paper Award)

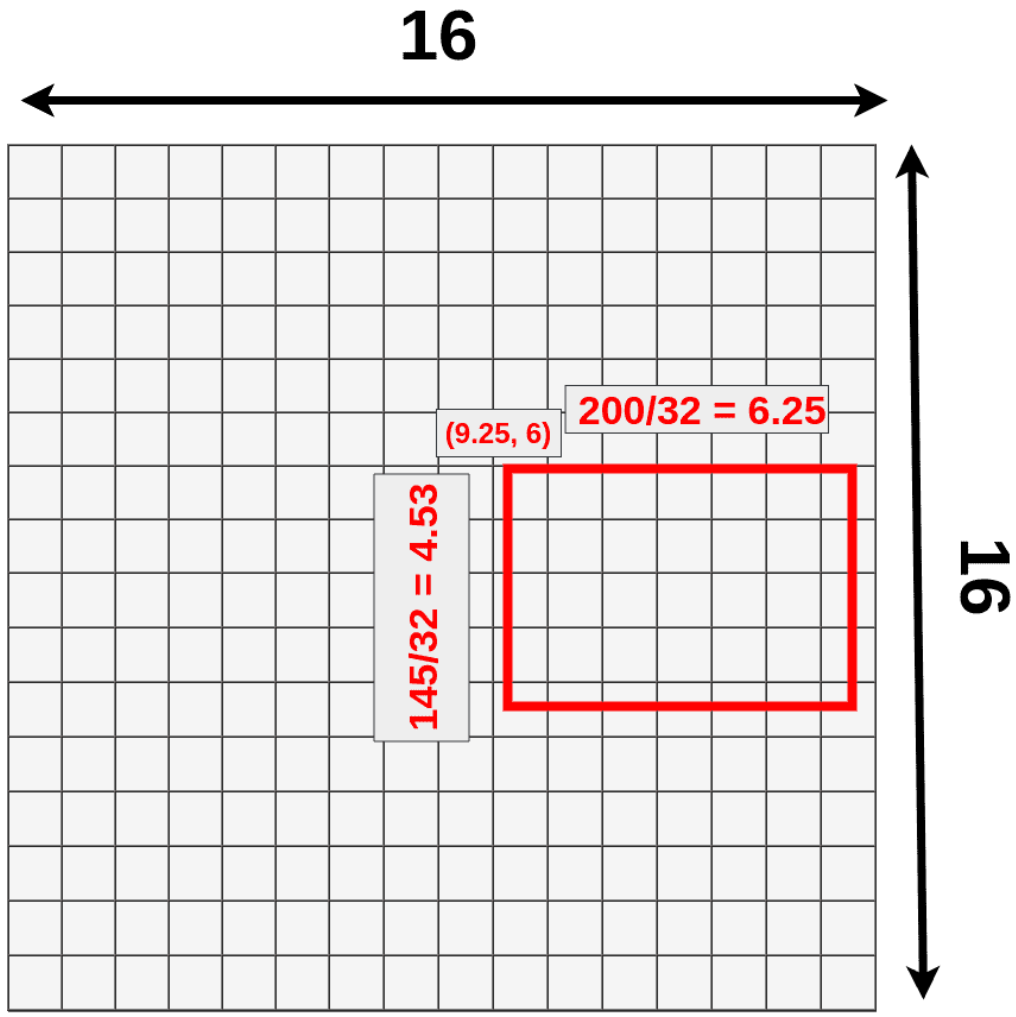
RoI-Align



https://towardsdatascience.com/understanding-region-of-interest-part-2-roi-align-and-roi-warp-f795196fc193

RoI-Align





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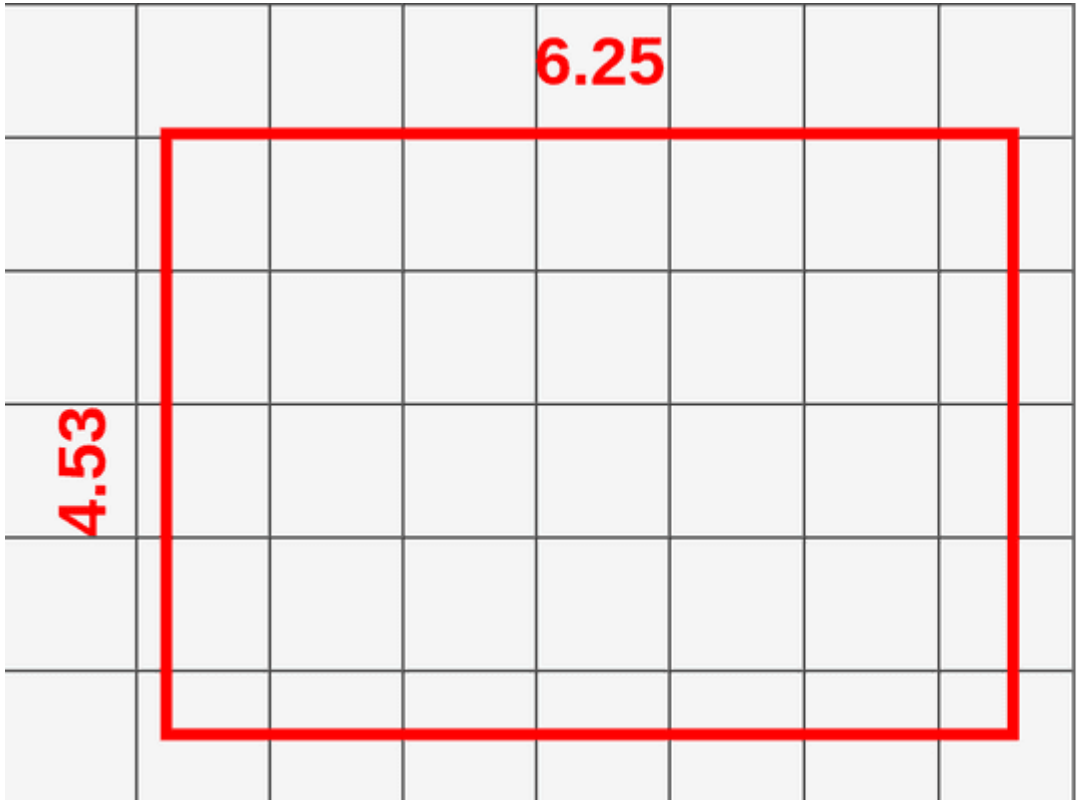
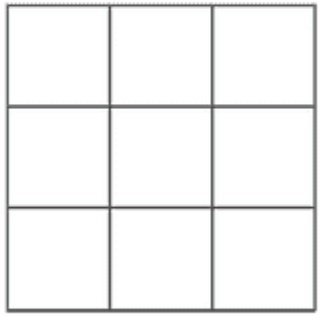
RoI-Align



3x3 RoI Pooling



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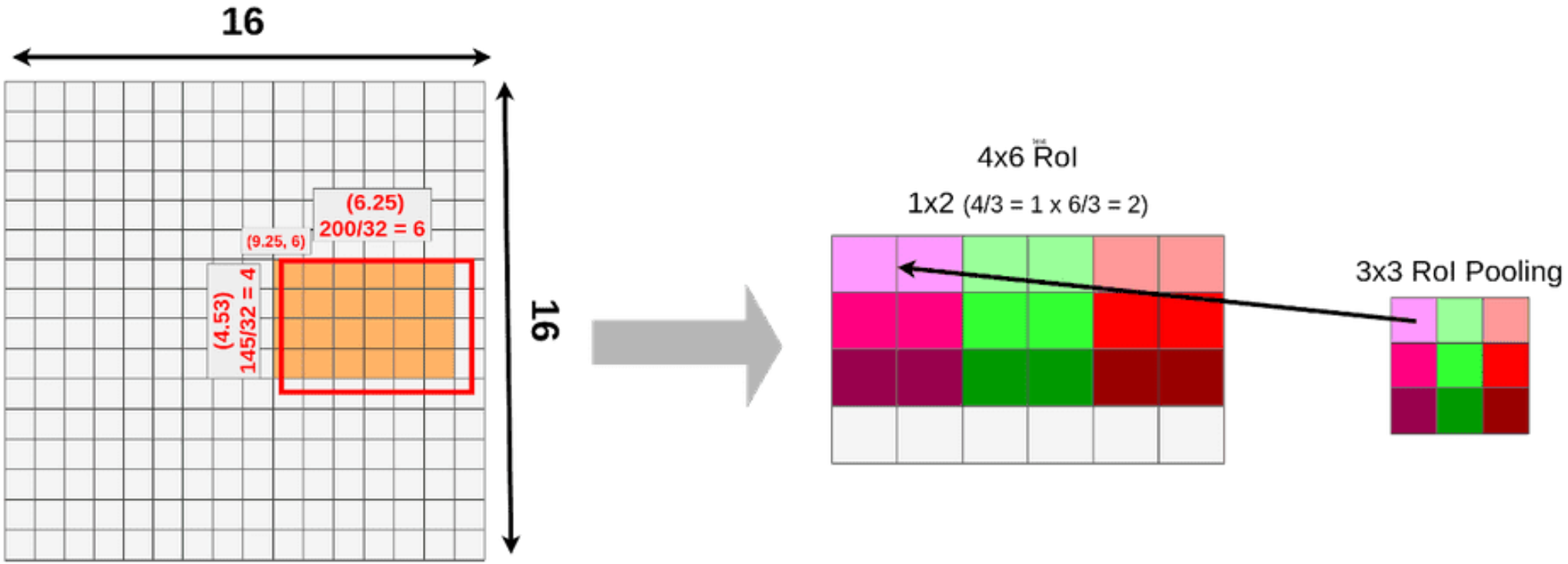
RoI-Align



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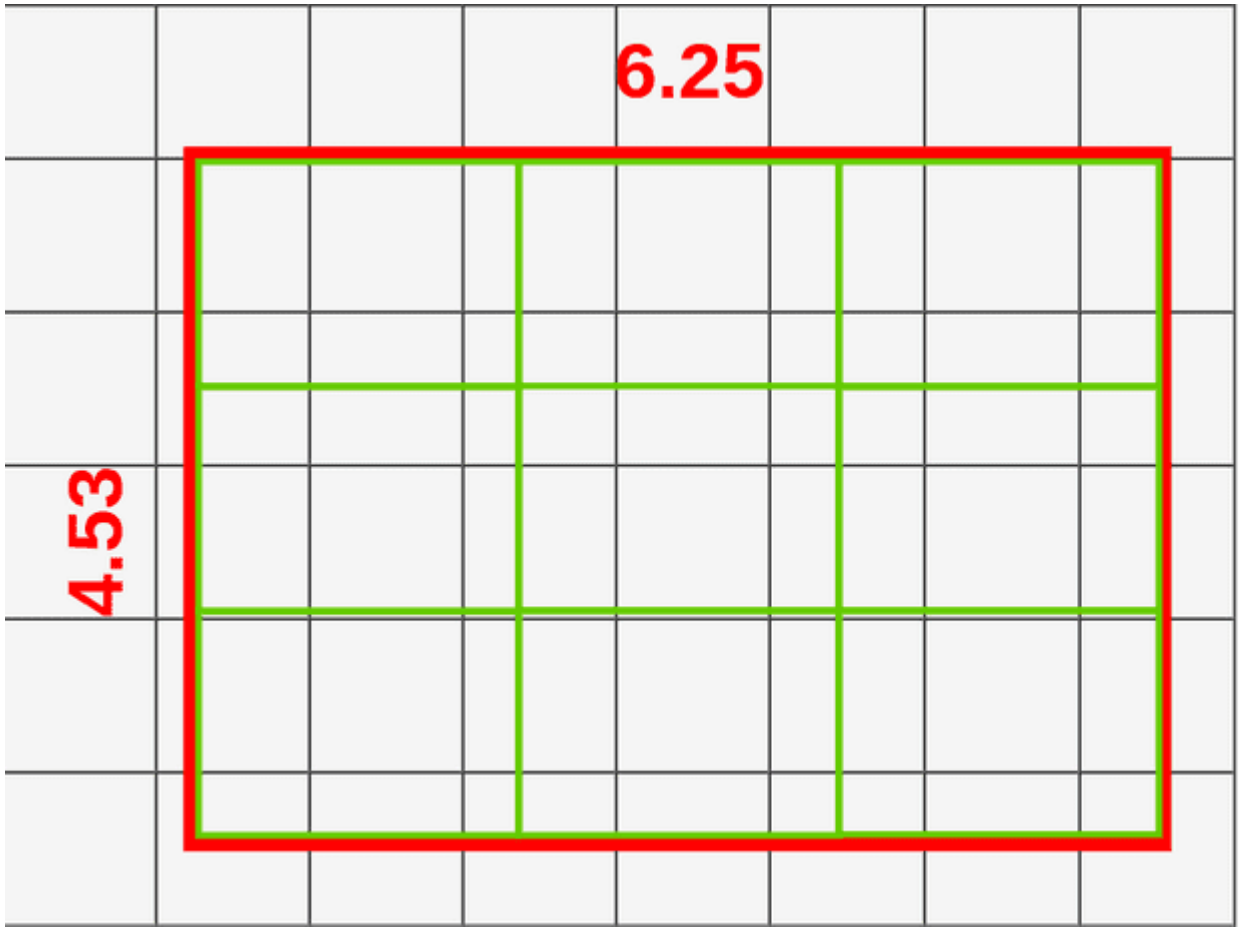
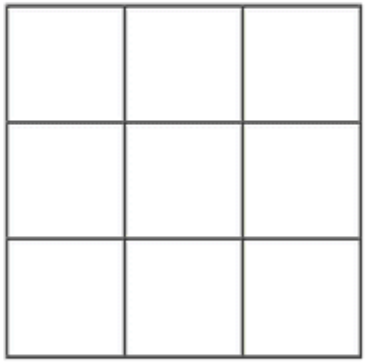
RoI-Align



3x3 RoI Pooling



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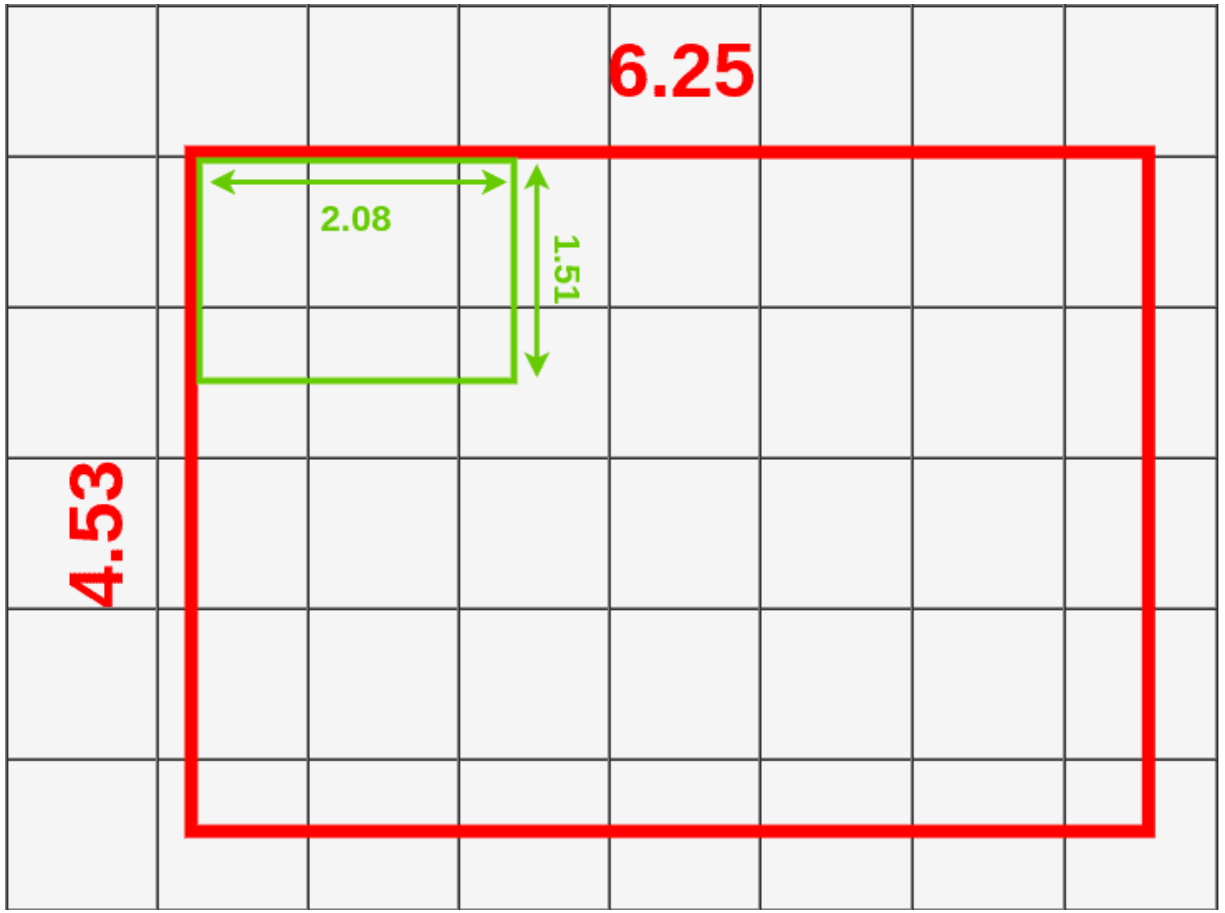
RoI-Align



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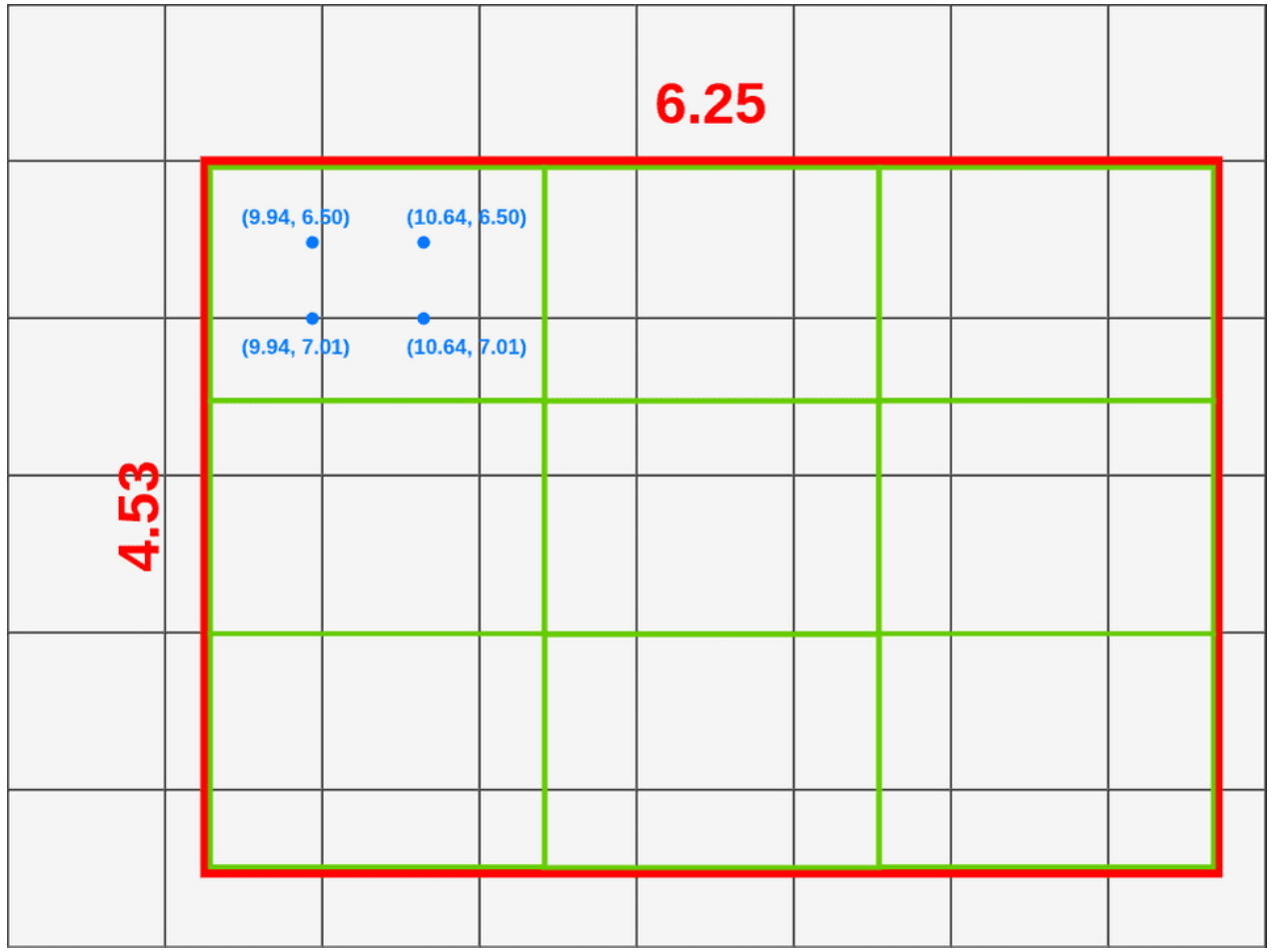
RoI-Align



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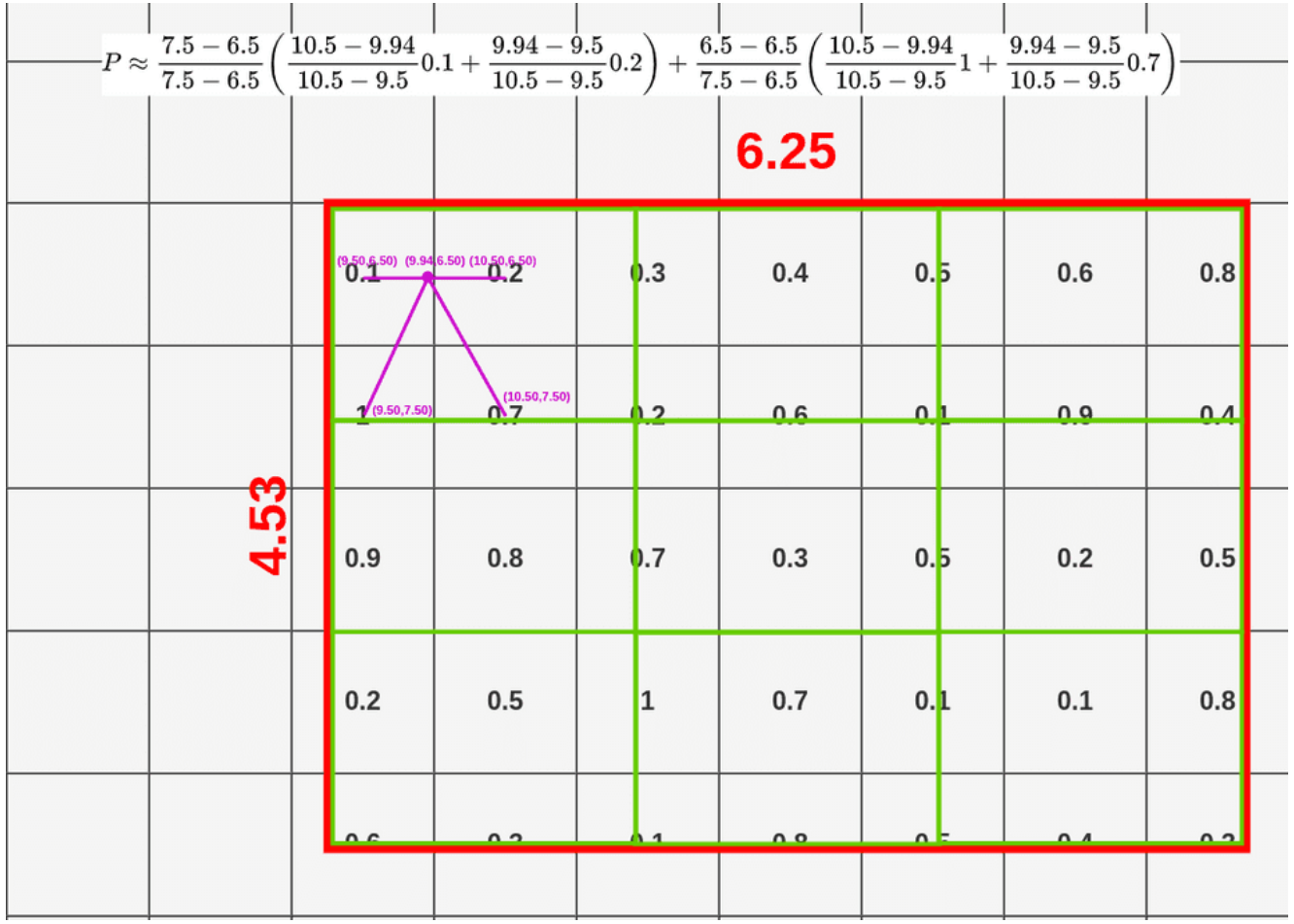
RoI-Align



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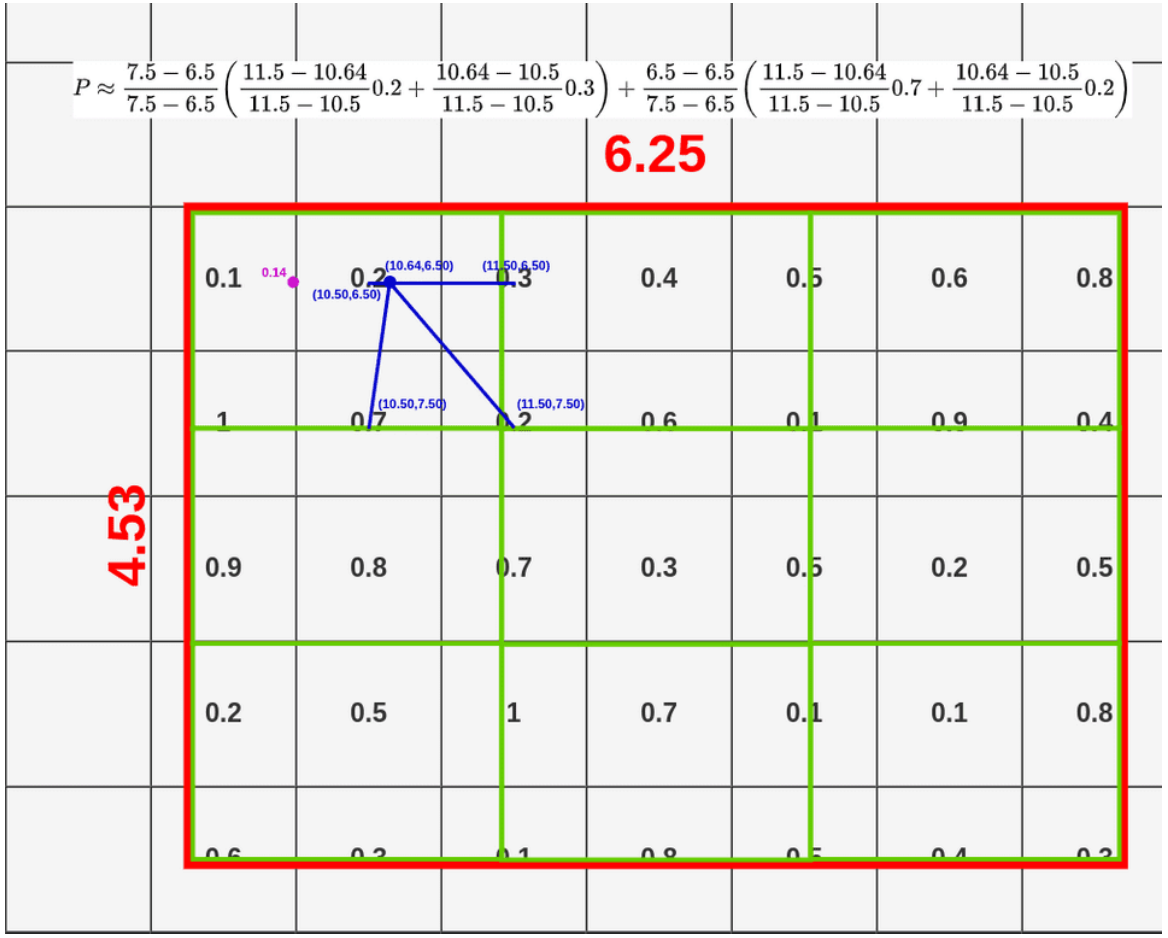
RoI-Align



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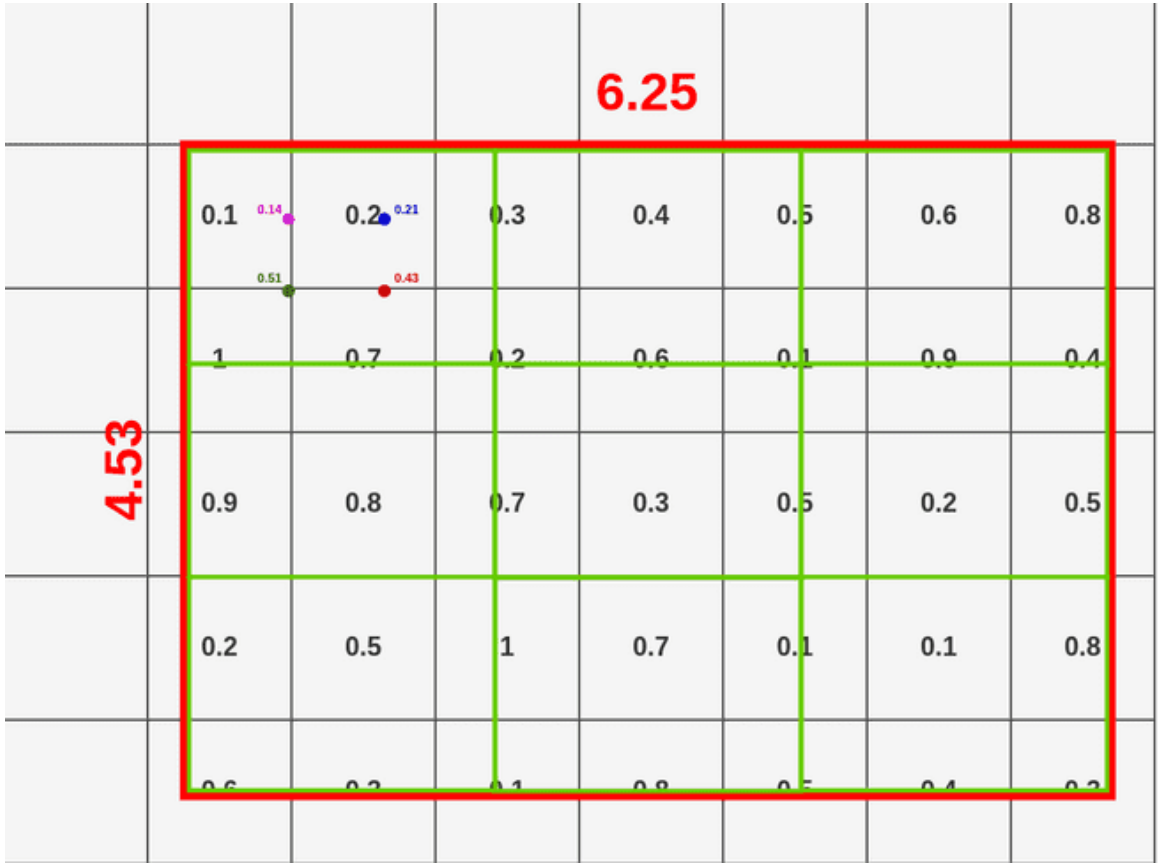
RoI-Align



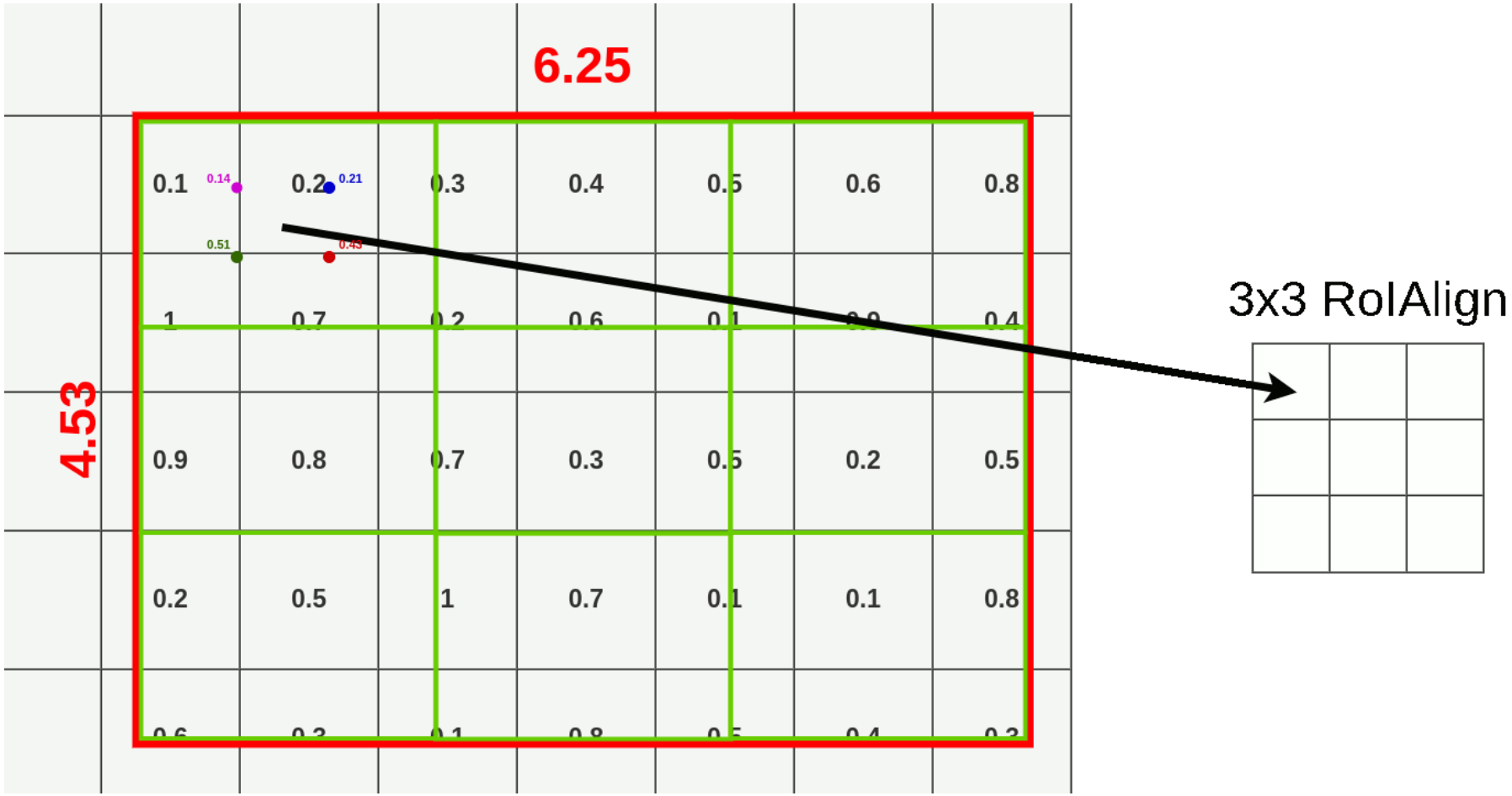
1x1 = MAX(0.14, 0.21, 0.51, 0.43) = 0.51

3x3 RoIAlign

0.51		

https://towardsdatascience.com/understanding-region-of-interest-part-2-roi-align-and-roi-warp-f795196fc193

RoI-Align



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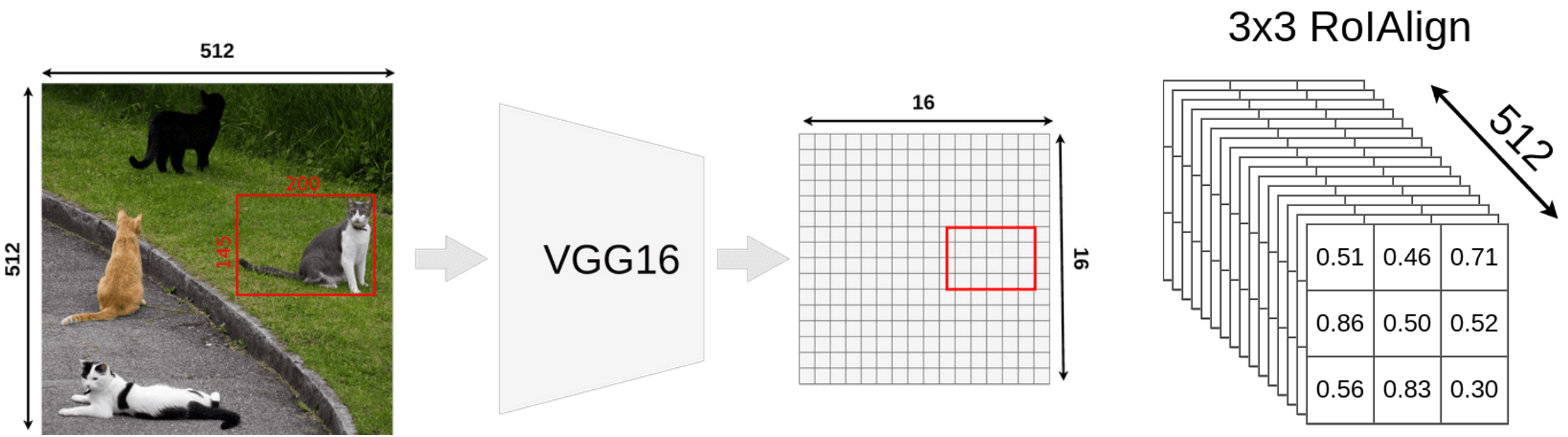
RoI-Align



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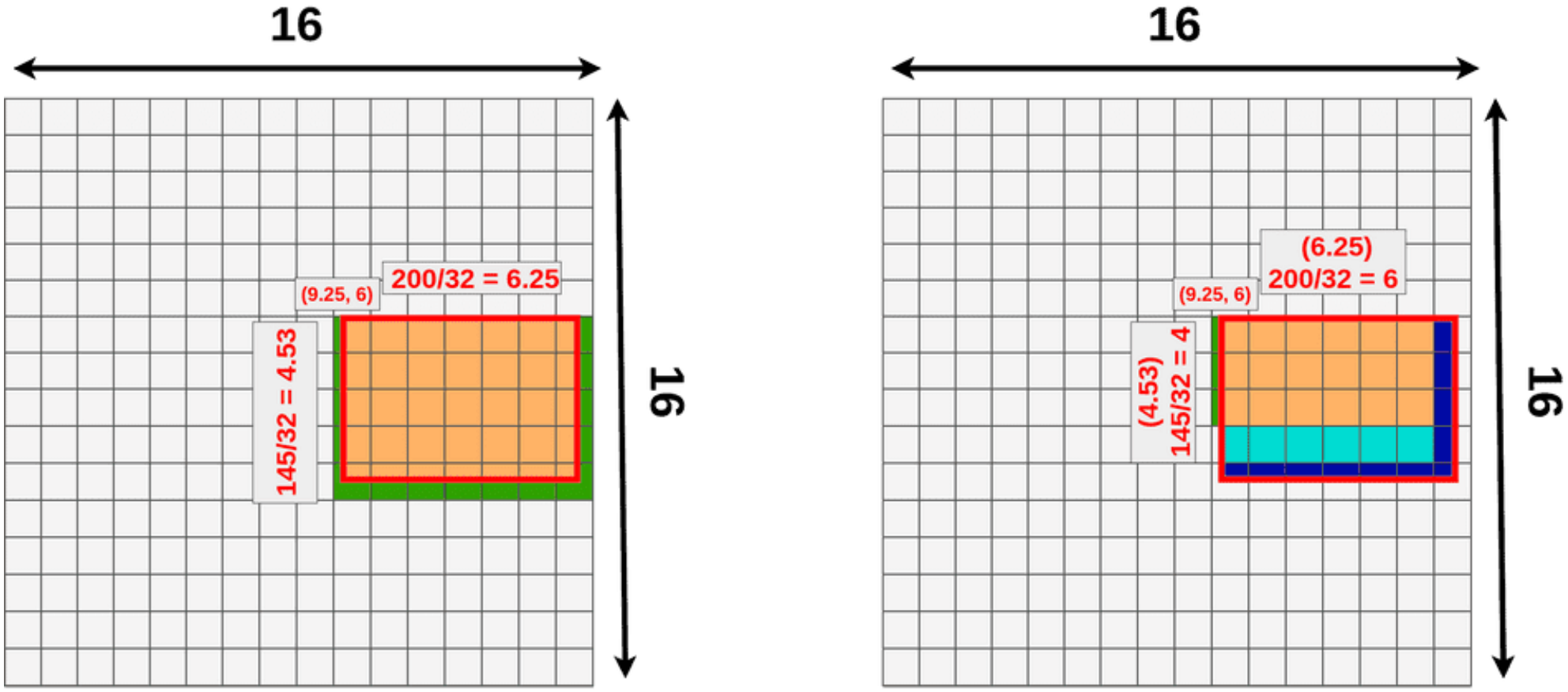
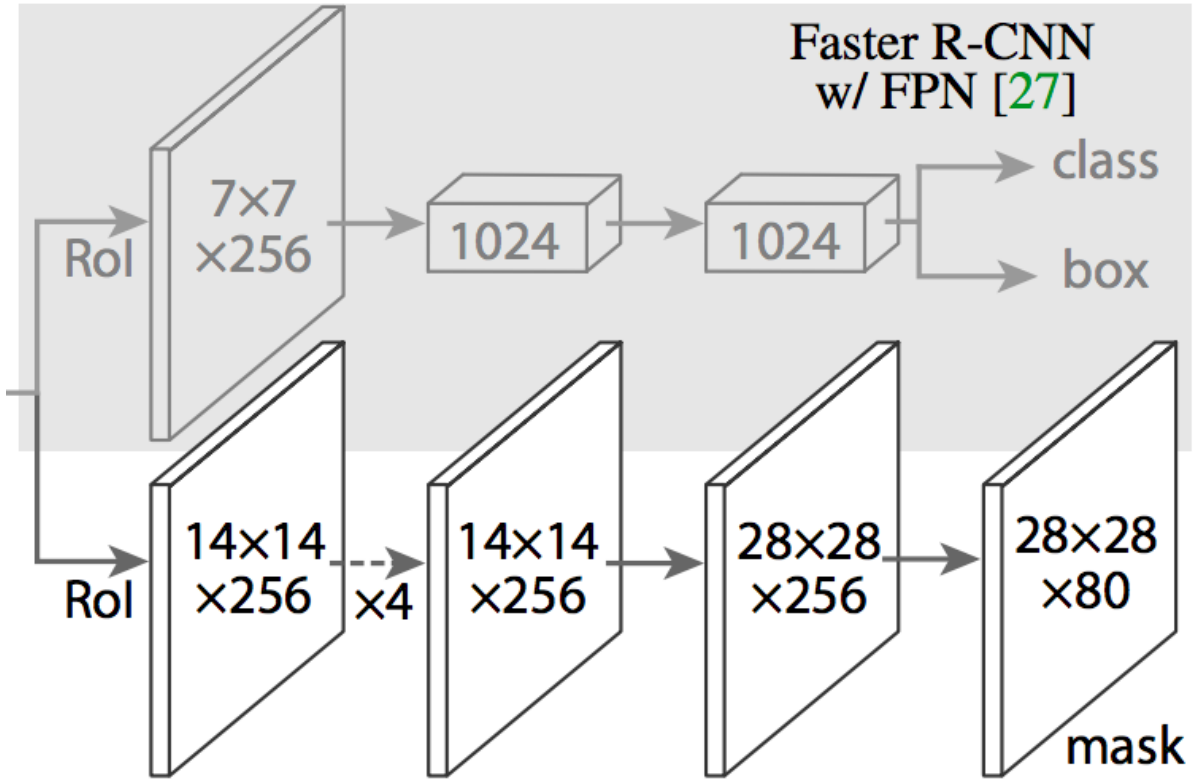
RoI-Align vs RoI-Pooling



https://towardsdatascience.com/understanding-region-of-interest-part-2-roi-align-and-roi-warp-f795196fc193

Mask R-CNN

- From RoIAlign features, predict class label, bounding box, and segmentation mask



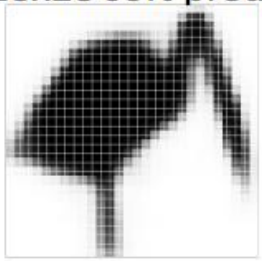
K. He, G. Gkioxari, P. Dollar, and R. Girshick, Mask R-CNN, ICCV 2017 (Best Paper Award)

Mask R-CNN



Validation image with box detection shown in red

28x28 soft prediction



Resized Soft prediction



Final mask



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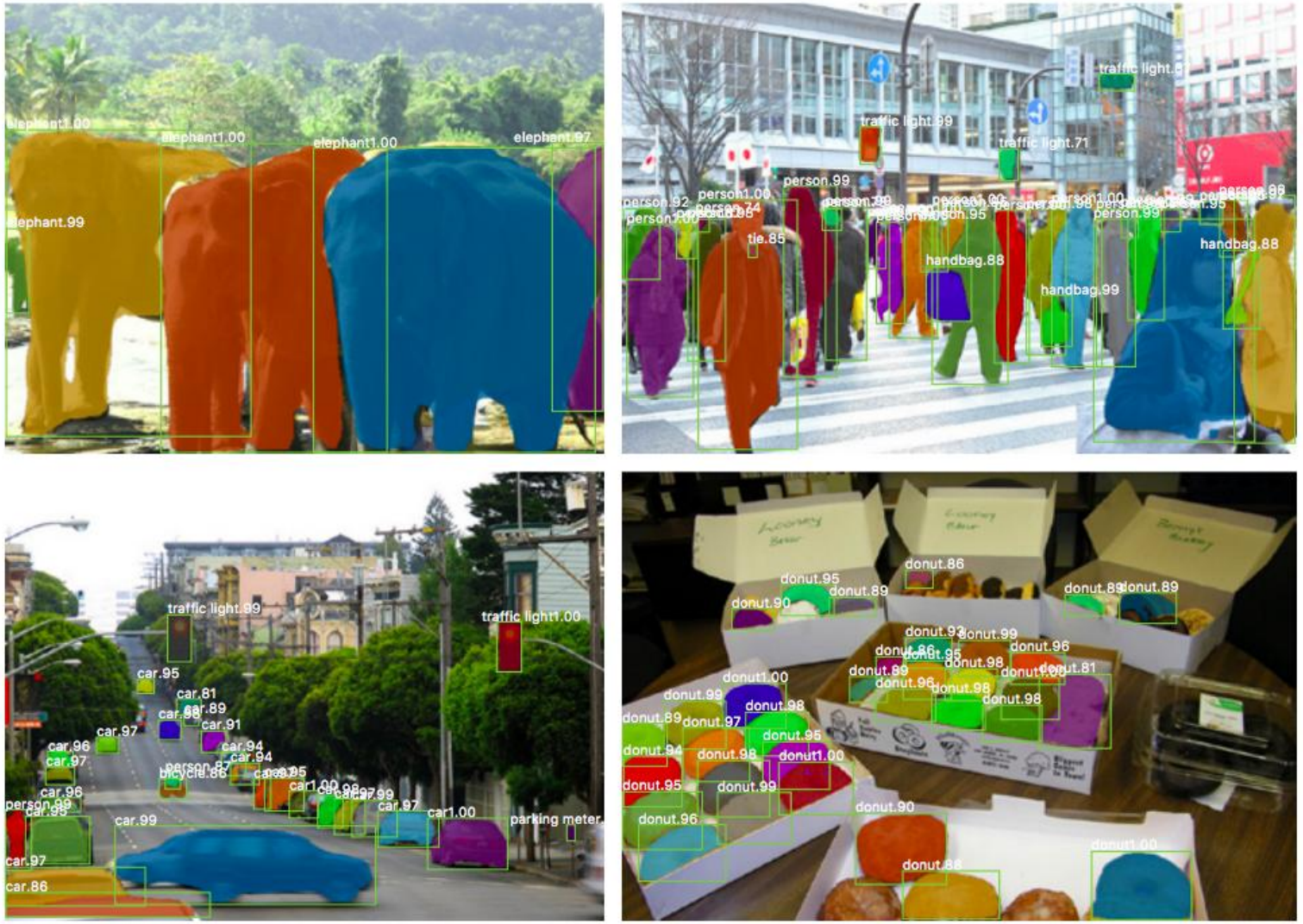
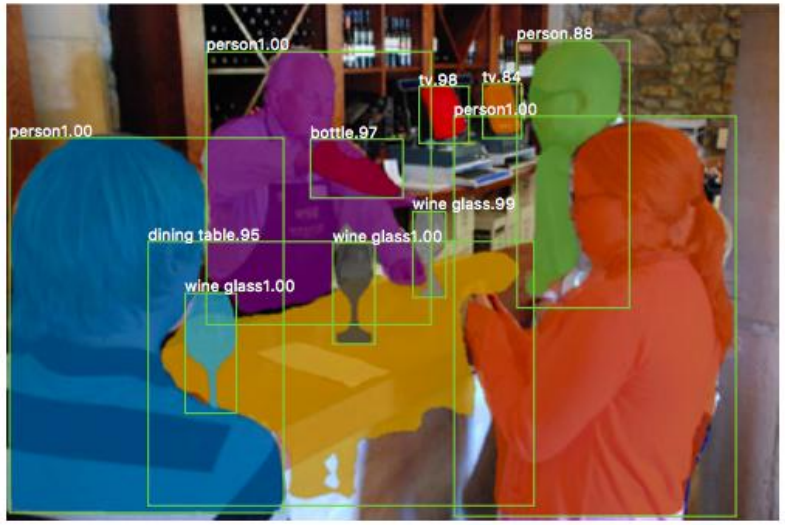
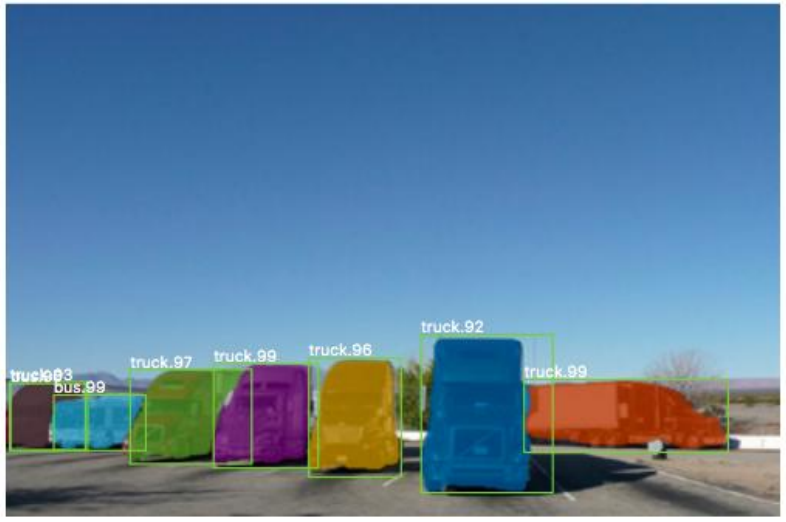
Example results

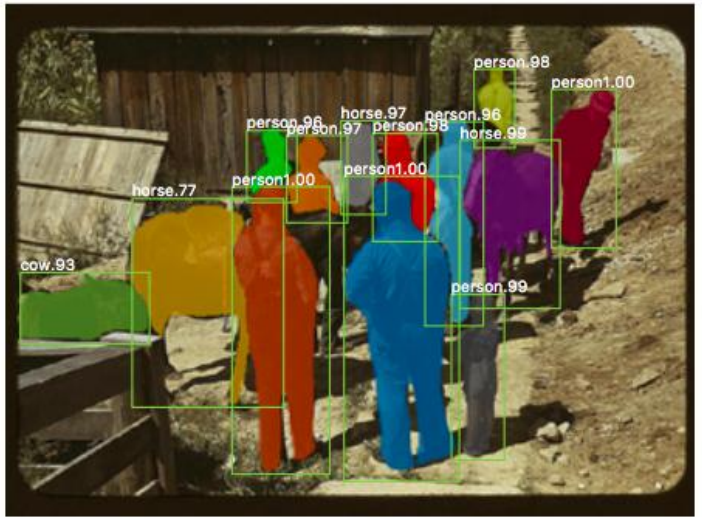


Example results









Questions?

Sources for this lecture include materials from works by Sedat Ozer, Ulas Bagci, and Svetlana Lazebnik