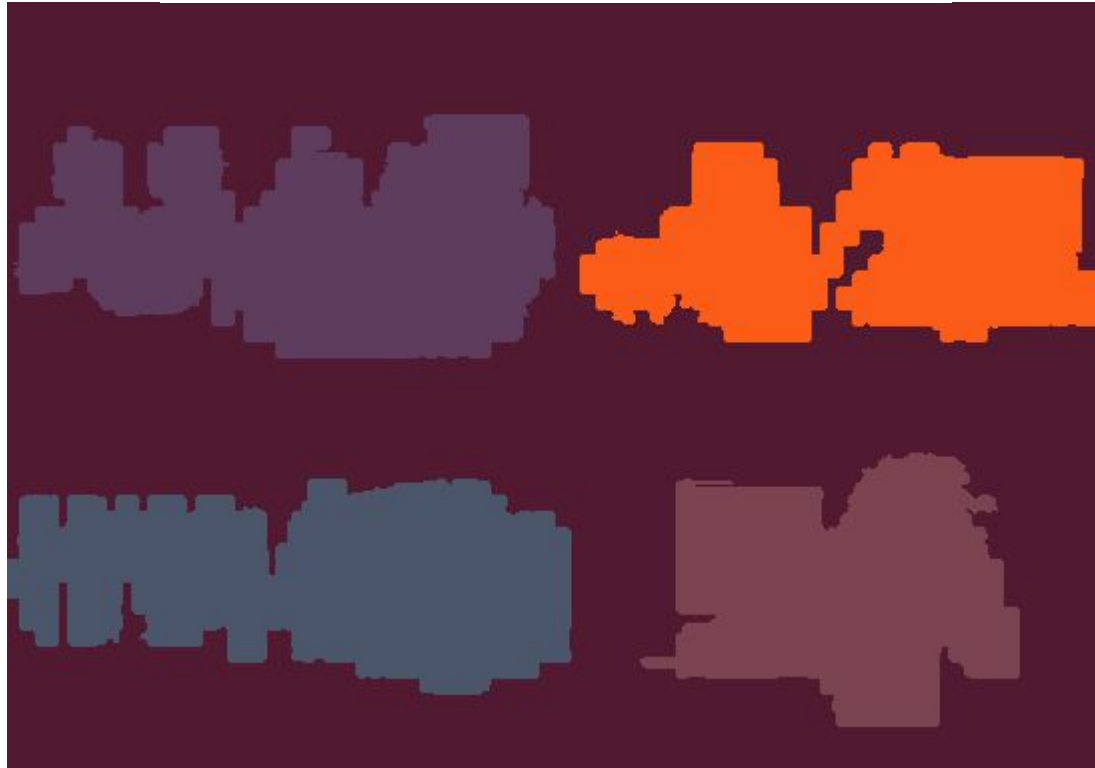


HOW GRAD SCHOOL IS JUST LIKE KINDERGARTEN



Selective Search for Object Recognition

Outline

1. Individual contribution of region similarity measures
2. Importance of good base segmentation
3. Box overlap correspondence to recognition

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1. Individual contribution of region similarity measures
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Similarity Measures

$$\begin{aligned} \text{sim}(r_i, r_j) = & a_c \sum_{k=1}^n \min(c_i^k, c_j^k) && \text{Color} \\ & + a_t \sum_{k=1}^n \min(t_i^k, t_j^k) && \text{Texture} \\ & + a_s \left(1 - \frac{\text{size}(r_i) + \text{size}(r_j)}{\text{size}(im)} \right) && \text{Size} \\ & + a_f \left(1 - \frac{\text{size}(BB_{ij}) - \text{size}(r_i) - \text{size}(r_j)}{\text{size}(im)} \right) && \text{Fill} \end{aligned}$$

Color Similarity



Color Similarity



Color Similarity



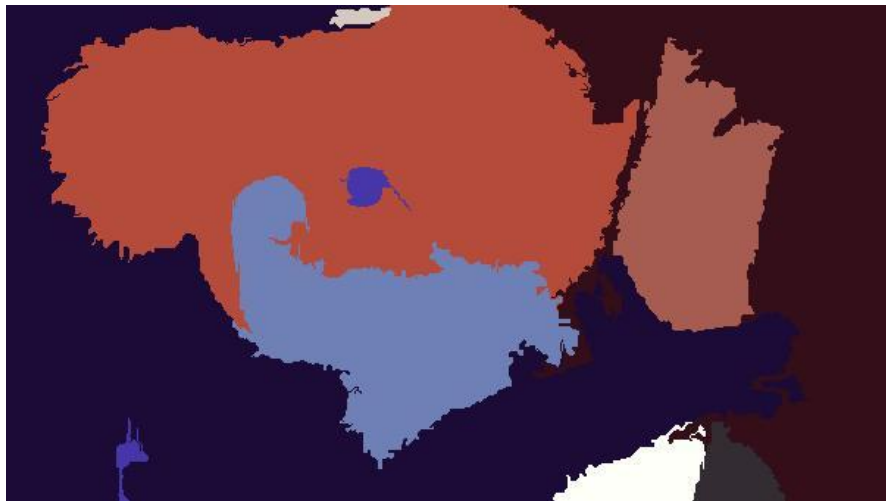
Color Similarity



Texture Similarity



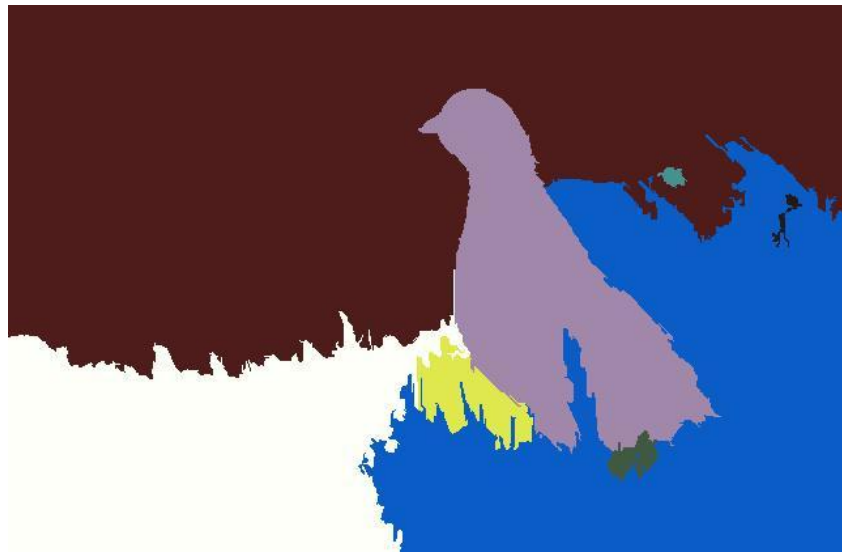
Texture Similarity



Texture Similarity



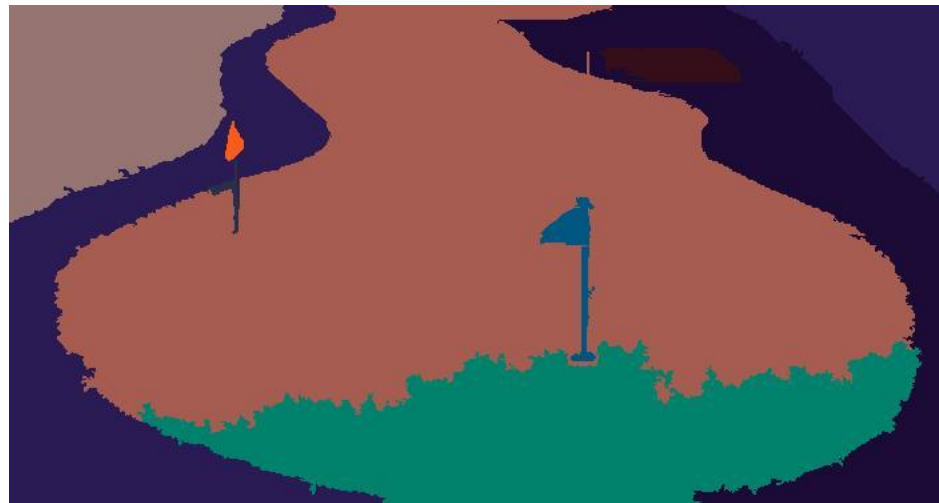
Texture Similarity



Size Similarity



Size Similarity



Size Similarity



Size Similarity



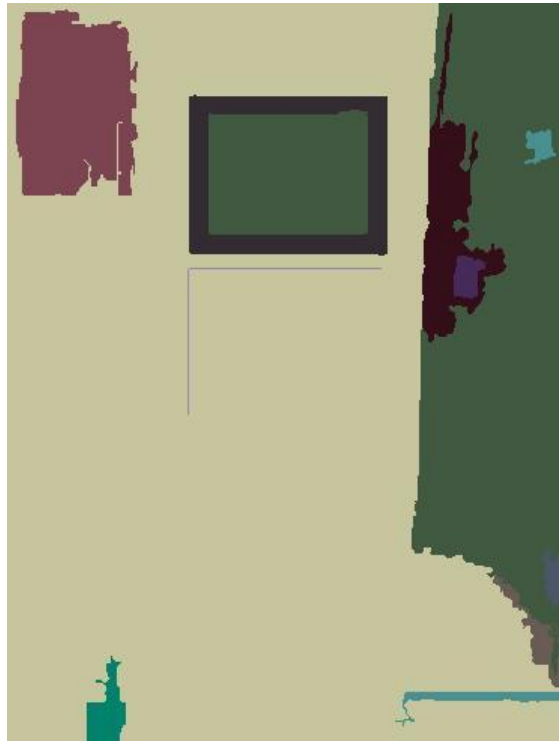
Fill Similarity



Fill Similarity



Fill Similarity



Outline

1. Individual contribution of region similarity measures
2. Importance of good base segmentation
3. Box overlap correspondence to recognition

Success Case



Success Case



Failure Cases



Failure Cases



Failure Cases



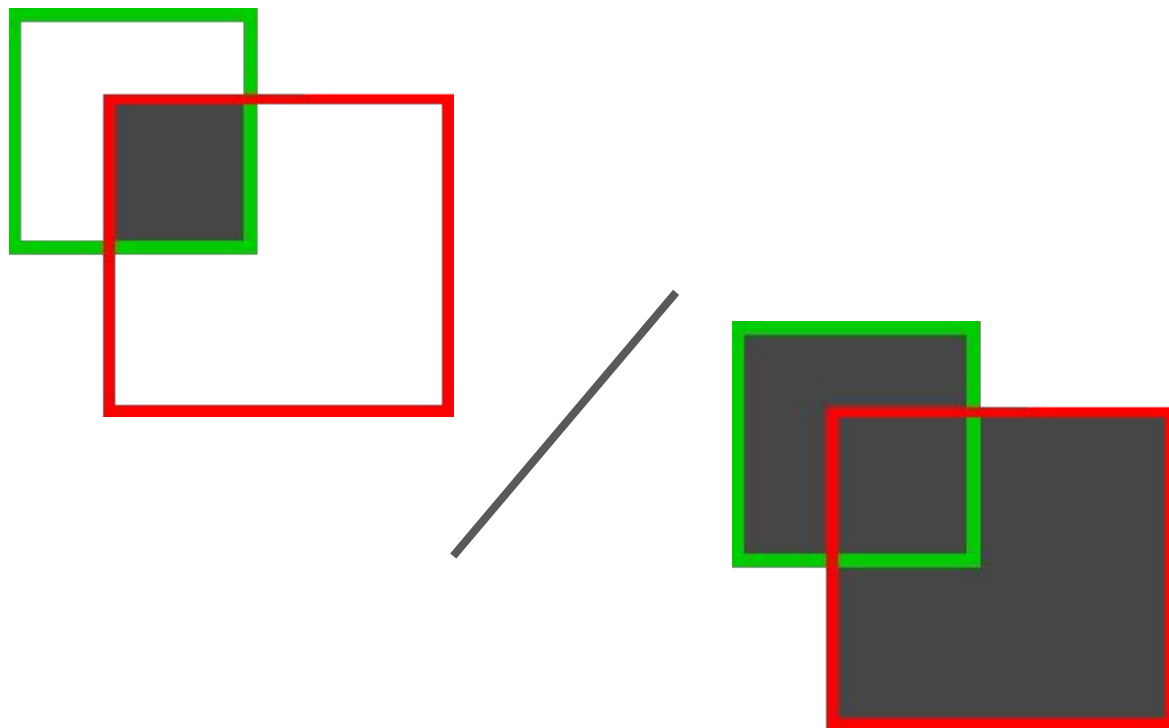
Failure Cases



Outline

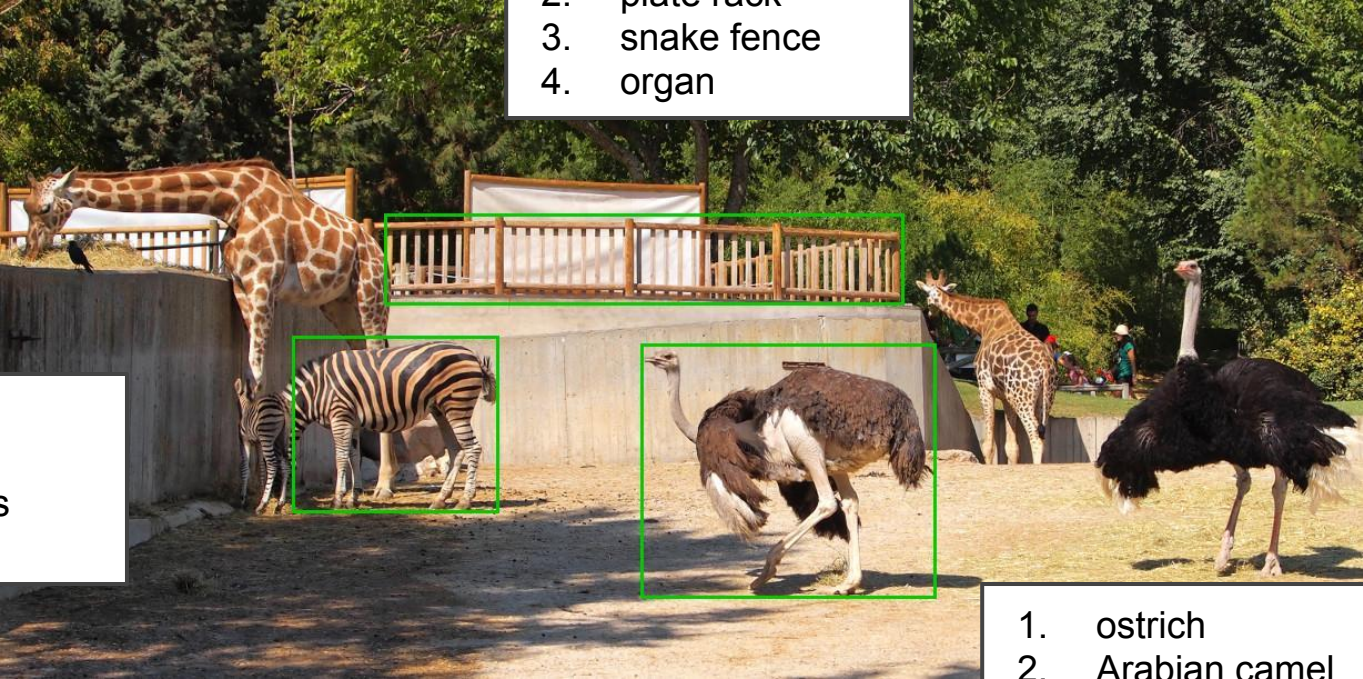
1. Individual contribution of region similarity measures
2. Importance of good base segmentation
3. **Box overlap correspondence to recognition**

Box Overlaps



Box Overlaps

1. chime, gong
2. plate rack
3. snake fence
4. organ



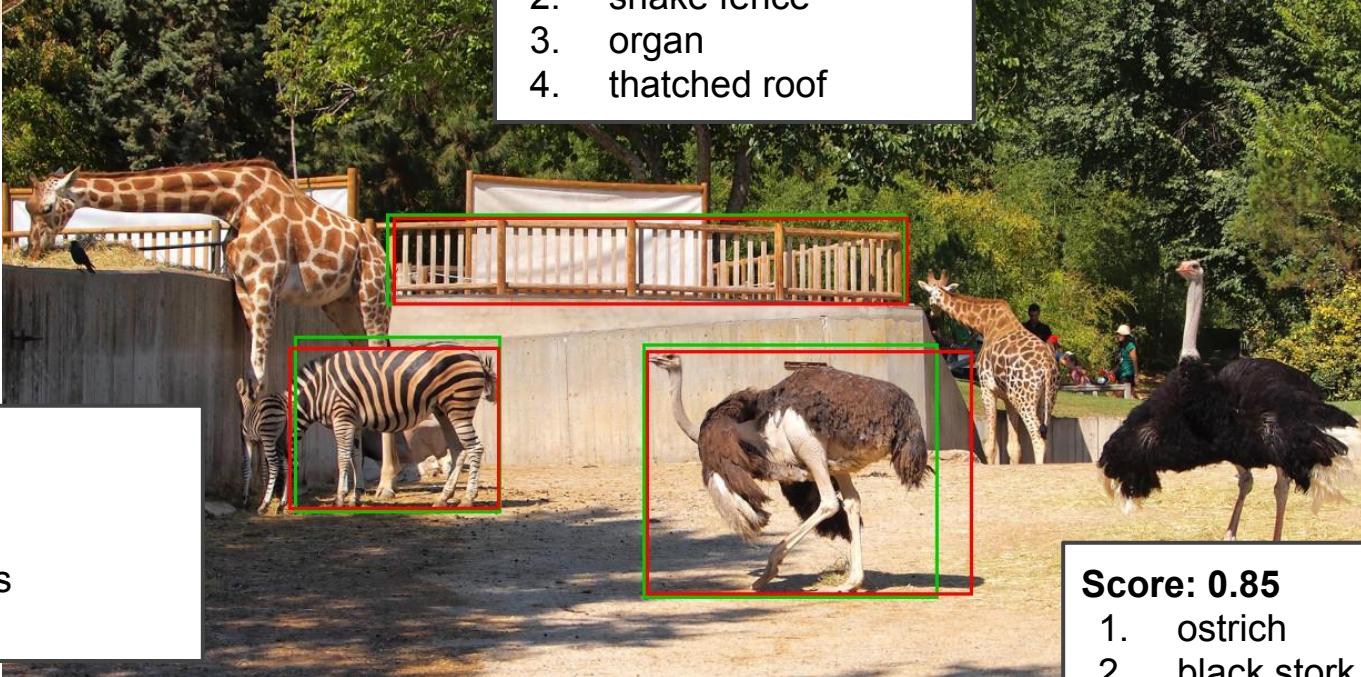
1. zebra
2. tiger
3. triceratops
4. tiger cat

1. ostrich
2. Arabian camel
3. black stork
4. llama

Box Overlaps

Score: 0.95

1. chime, gong
2. snake fence
3. organ
4. thatched roof



Score: 0.89

1. zebra
2. tiger
3. trcieratops
4. tiger cat

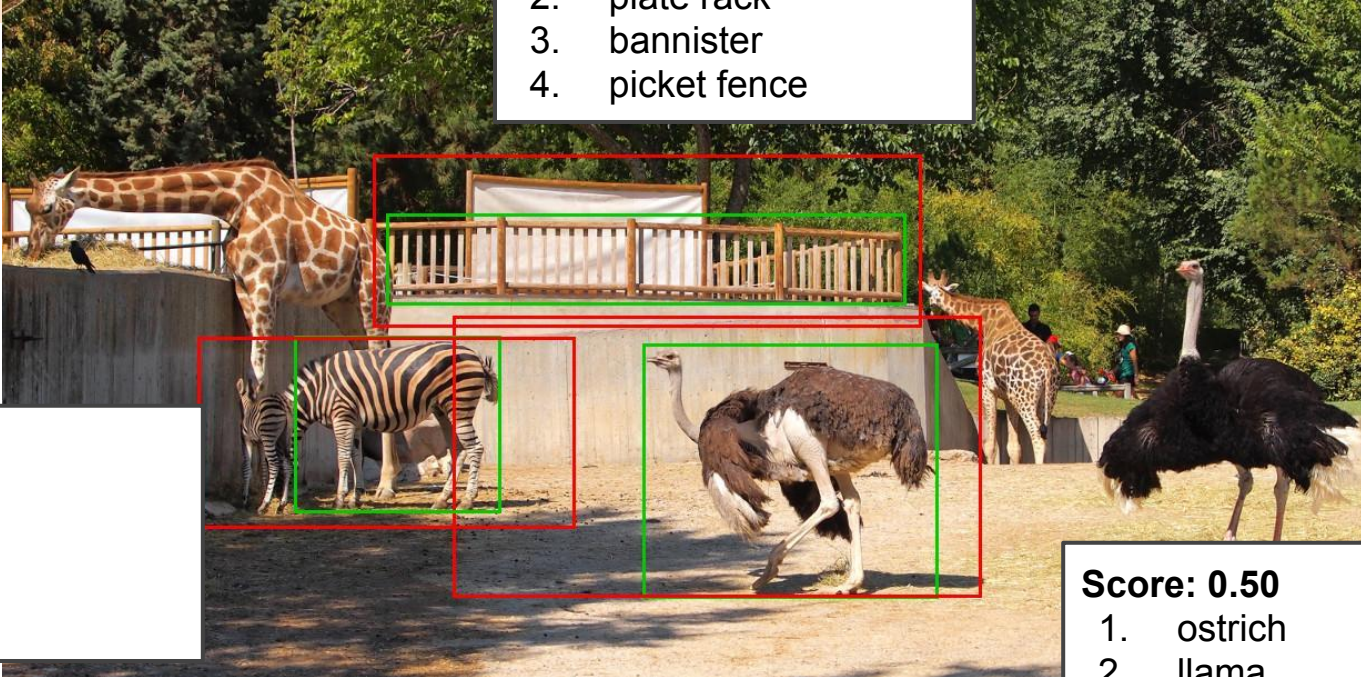
Score: 0.85

1. ostrich
2. black stork
3. vulture
4. Arabian camel

Box Overlaps

Score: 0.50

1. snake fence
2. plate rack
3. bannister
4. picket fence



Score: 0.50

1. zebra
2. tiger
3. gazelle
4. impala

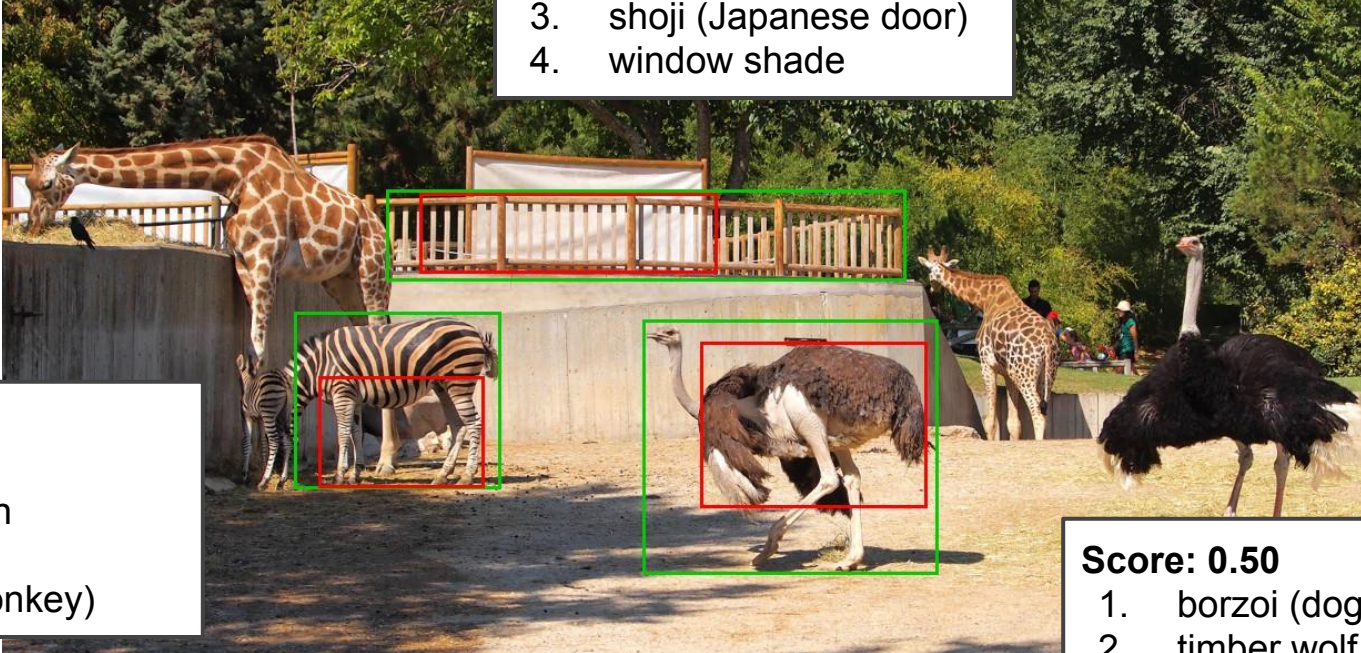
Score: 0.50

1. ostrich
2. llama
3. Arabian camel
4. vulture

Box Overlaps

Score: 0.50

1. plate rack
2. chime, gong
3. shoji (Japanese door)
4. window shade



Score: 0.51

1. zebra
2. fire screen
3. gazelle
4. patas (monkey)

Score: 0.50

1. borzoi (dog)
2. timber wolf
3. red wolf
4. badger

Issues

- Author released half p-code, half m-code.
- Optimal segmentation coloring problem.
- AlexNet output very sensitive to image patch size.

Sources

Code

- <http://koen.me/research/selectivesearch/>
- <http://caffe.berkeleyvision.org/>

Pictures

- PASCAL Visual Object Class Challenge 2007: <http://host.robots.ox.ac.uk/pascal/VOC/voc2007/index.html>
- <http://artisanhardware.com/wp-content/uploads/2015/09/47c6ebf4-7a3e-4345-acb5-6a23c9b0b405.jpg>
- <https://upload.wikimedia.org/wikipedia/en/9/93/Pacersoriginallogo.gif>
- http://animaliaz-life.com/data_images/koala/koala4.jpg
- <http://www.synlawngolf.com/wp-content/gallery/golf-installations/golf-027.jpg>
- <https://indierevolver.files.wordpress.com/2015/07/chewbacca-han-solo-e1436634523782.jpg>
- http://cdn0.sbnation.com/imported_assets/196372/200803231600576549171-p2.jpeg
- <http://www.planetizen.com/files/images/ChicagoEl.jpg>
- <https://www.flickr.com/photos/128888346@N02/24927420741>
- https://upload.wikimedia.org/wikipedia/commons/5/52/Madrid_Zoo.jpg

Appendix

Initial Segmentations



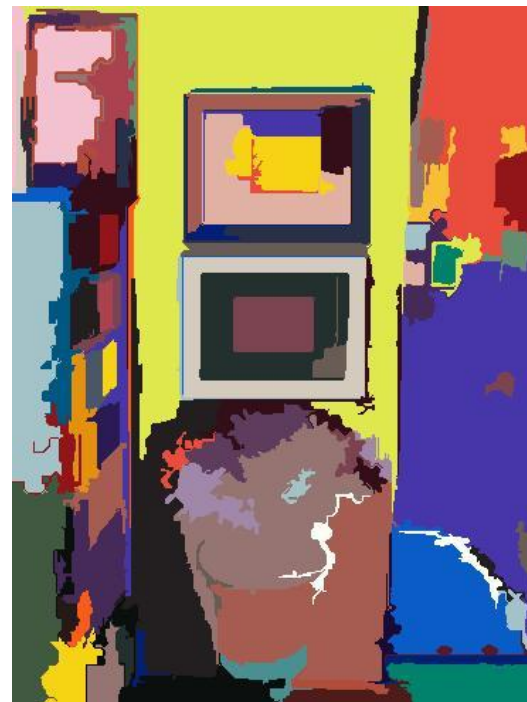
Initial Segmentations



Initial Segmentations



Initial Segmentations



Box Overlap



1. oxcart
2. ox
3. horse cart
4. zebra
5. llama
6. bighorn sheep
7. ram
8. water buffalo
9. warthog
10. dogsled