Crowdsourced object segmentation with a game

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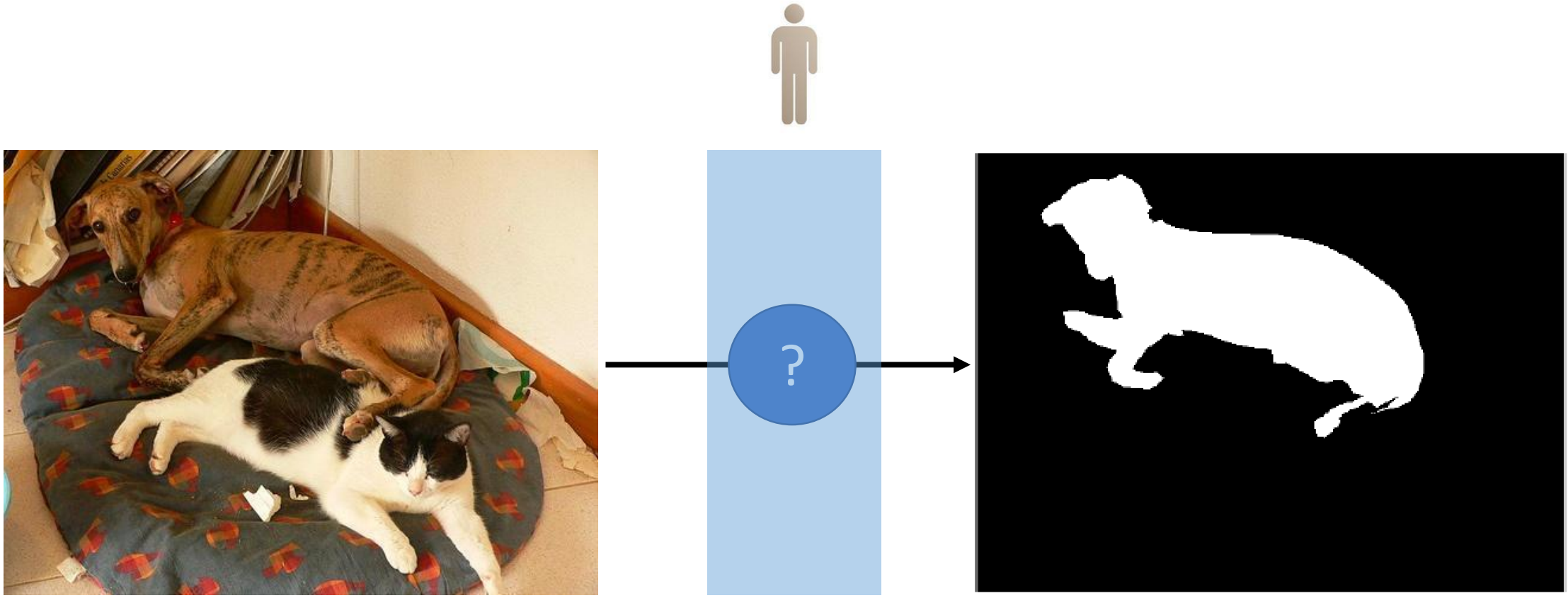
Oge Marques

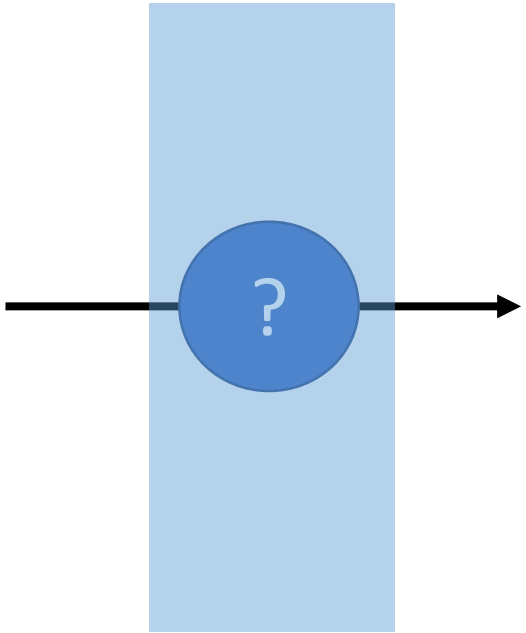
Outline

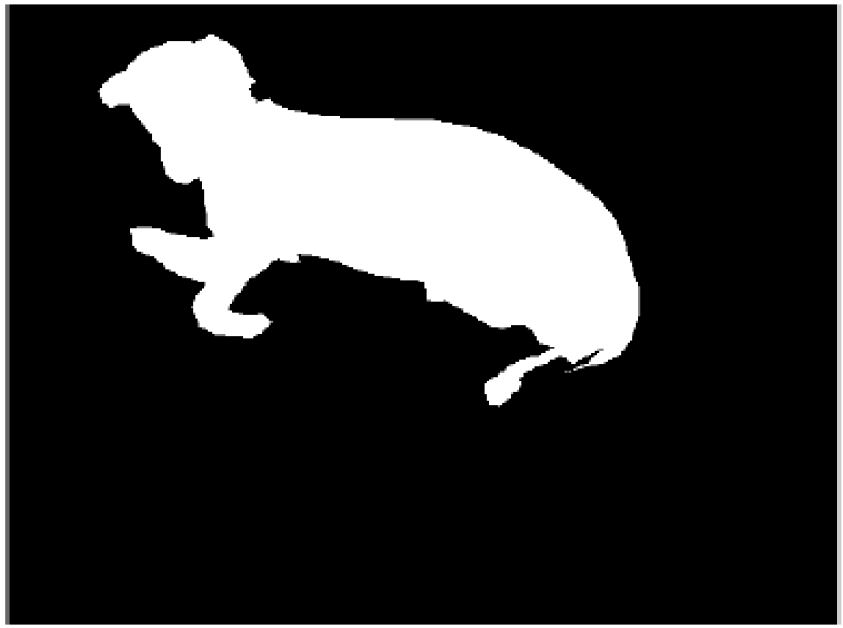
- **Motivation**
- Object Segmentation
- Experiments
- Results
- Conclusions
- Ongoing work

Motivation



Motivation



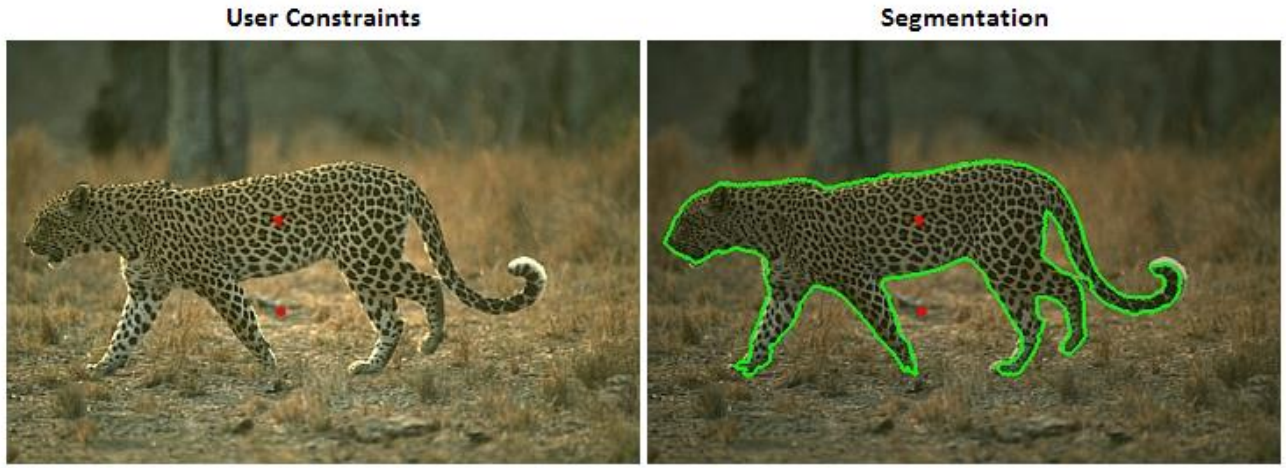


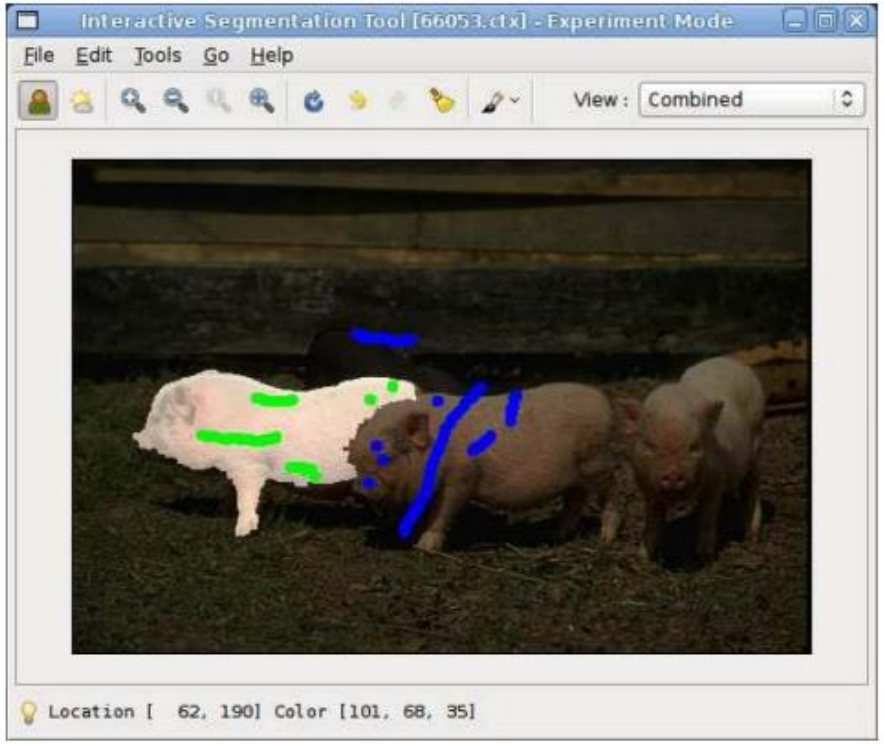
Semi-Supervised object segmentation

Rough segmentation

- B. C. Russell, A. Torralba, K. P. Murphy, and W. T. Freeman. Labelme: A database and web-based tool for image annotation. IJCV, 2008

Semi-Supervised object segmentation





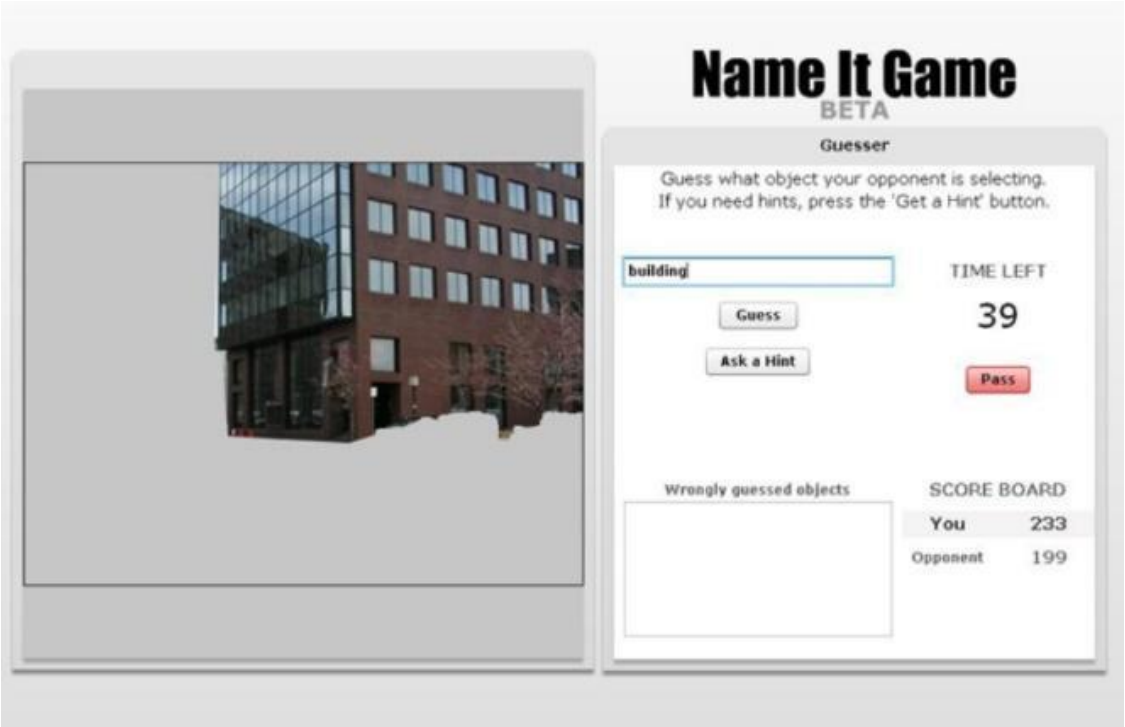
- P. Arbelaez and L. Cohen. Constrained image segmentation from hierarchical boundaries. In CVPR'08, 2008.
- 2) K. McGuinness and N. E. O'Connor. A comparative evaluation of interactive segmentation algorithms.

Semi-Supervised object segmentation

Boring task for users!

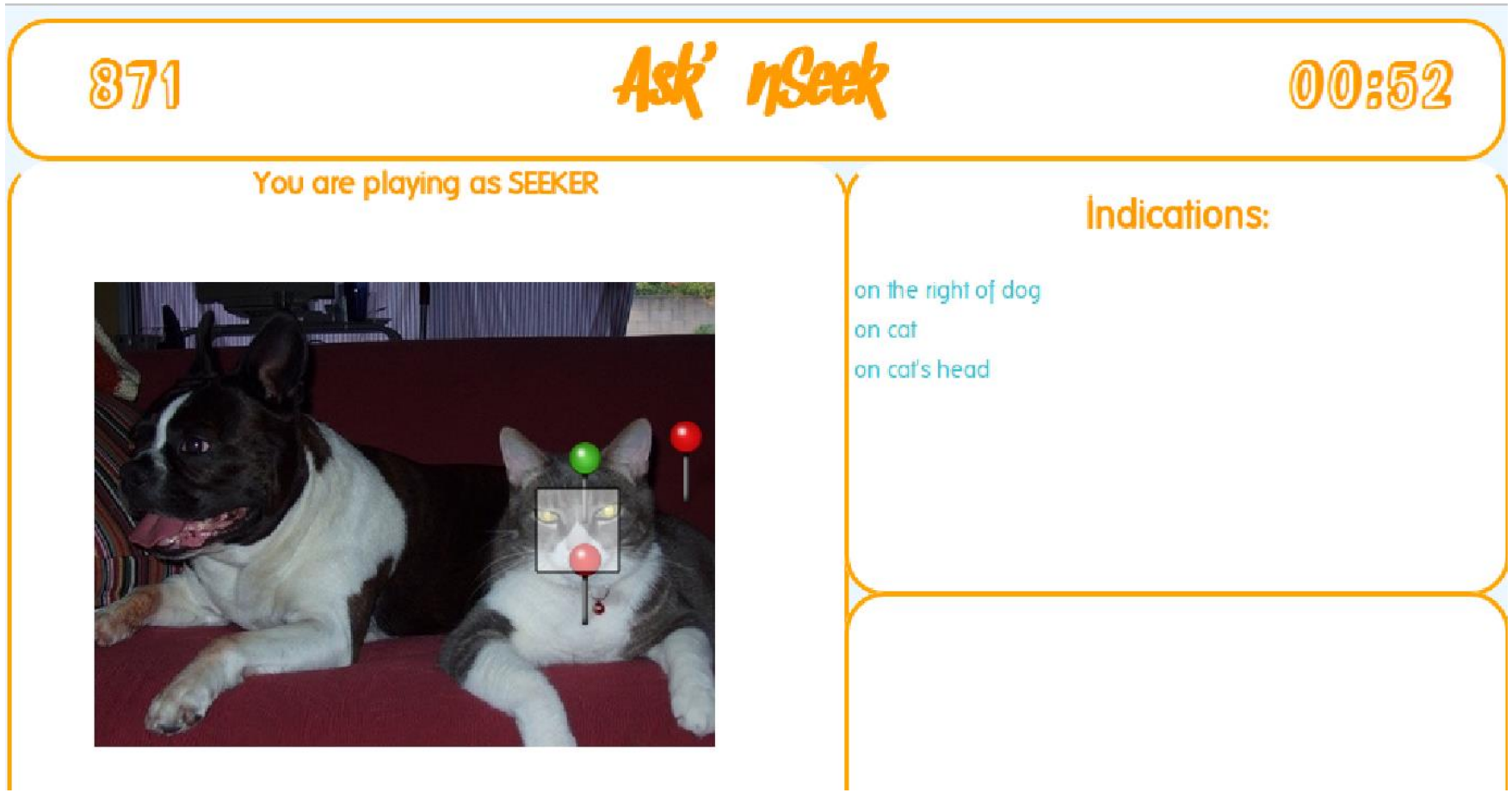
GAMES

Games with a purpose



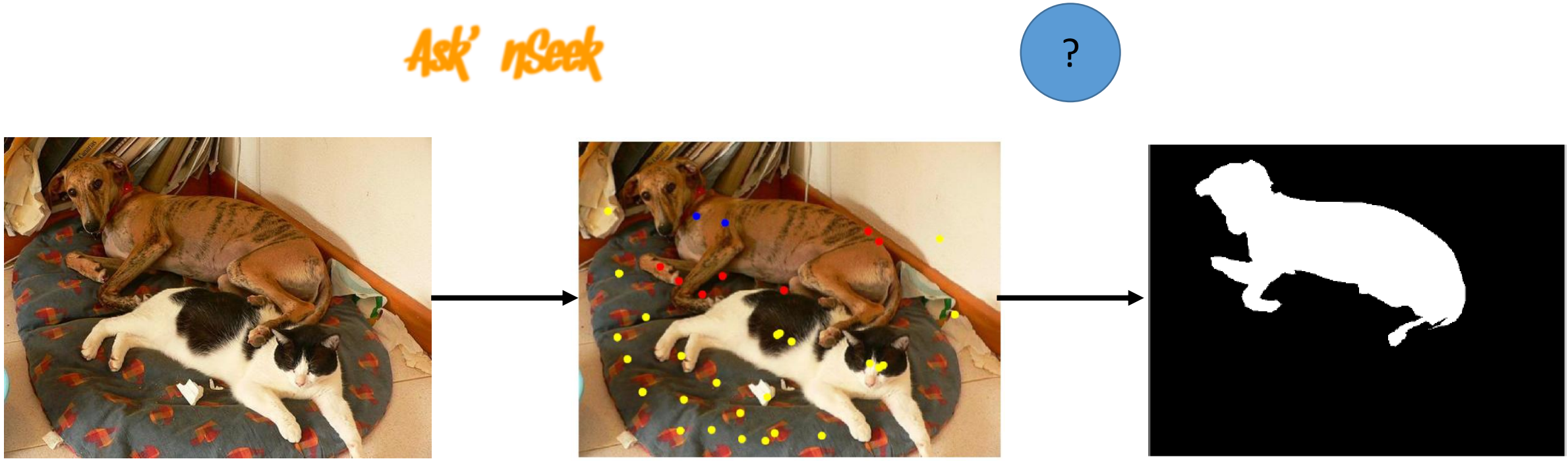
- J. Steggink and C. Snoek. Adding semantics to image-region annotations with the name-it-game. Multimedia Systems, 2011.
- L. von Ahn, R. Liu, and M. Blum. Peekaboom: a game for locating objects in images. In CHI'06, 2006.

Ask’nSeek



A. Carlier, O. Marques, and V. Charvillat. Ask'nseek: A new game for object detection and labeling. In ECCV'12 Workshops 2012.

Motivation



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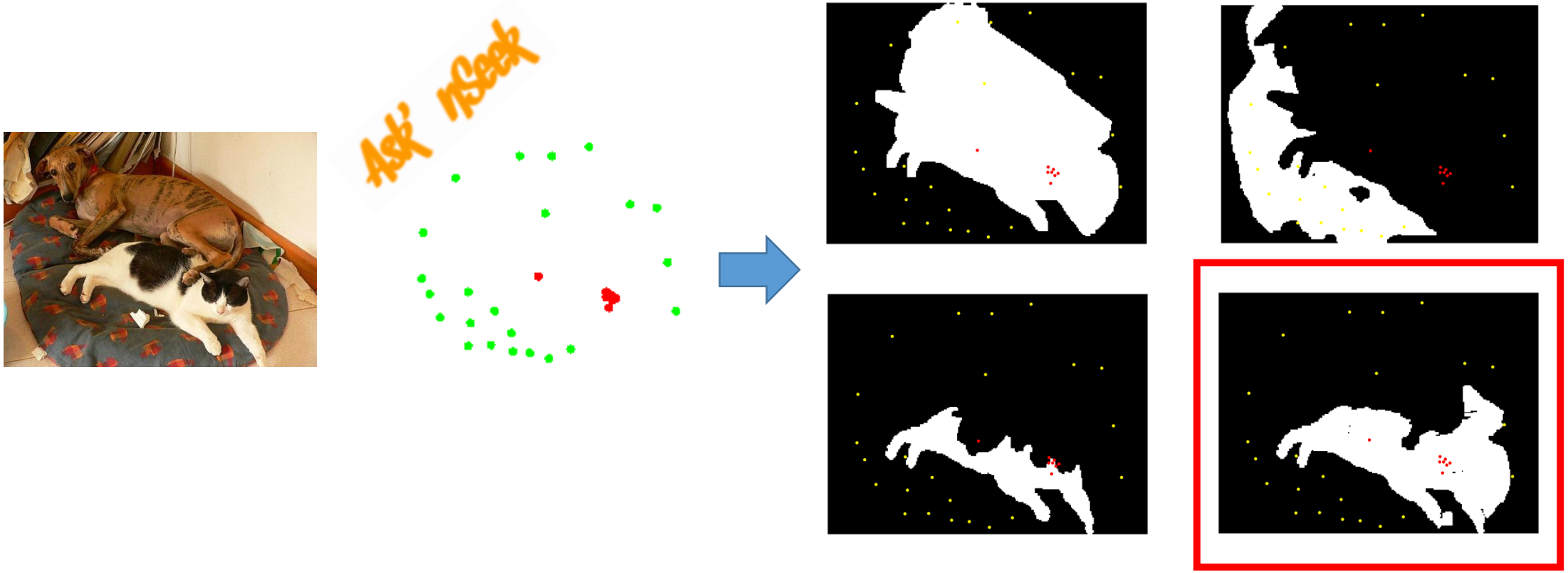
- Next steps

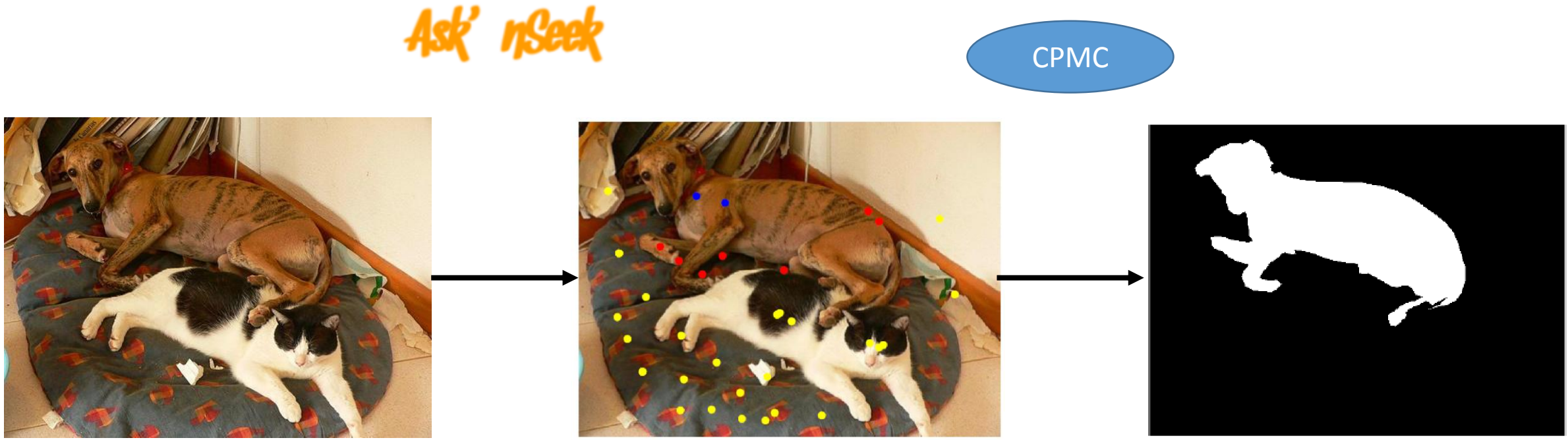
Constrained parametric min-cuts for automatic object segmentation (CPMC)

J. Carreira and C. Sminchisescu. Constrained parametric min-cuts for automatic object segmentation. In CVPR'10, 2010.

Constrained parametric min-cuts for automatic object segmentation



Motivation



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Experiments

How many clicks do we need to achieve a certain quality in the segmentation?

Test the algorithm for a large image dataset

Pascal VOC2010

PASCAL2
Pattern Analysis, Statistical Modelling and Computational Learning

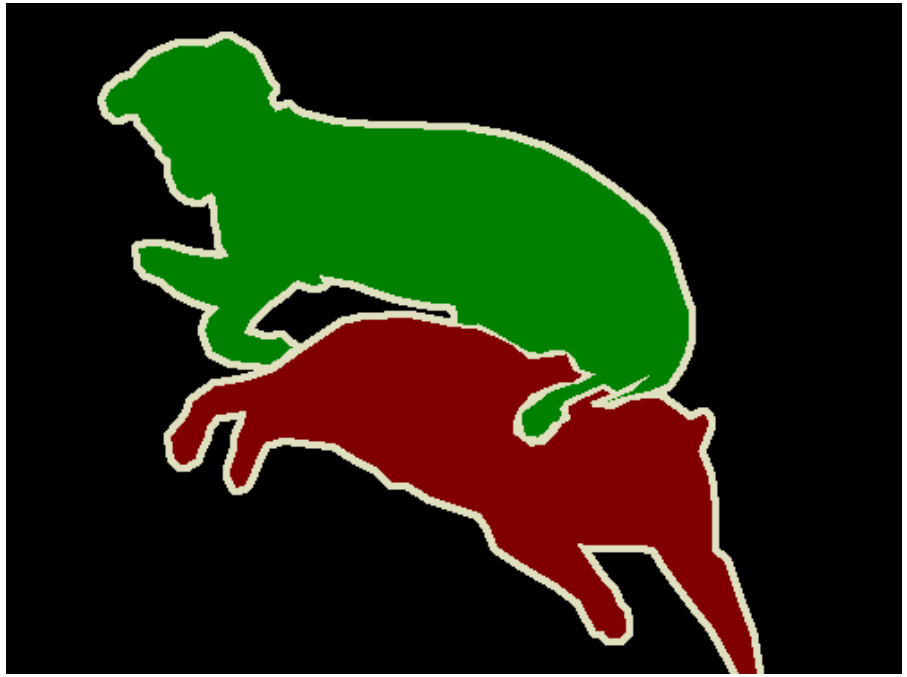
1928 images divided in:
Train (964)
Validation (964)

Problem

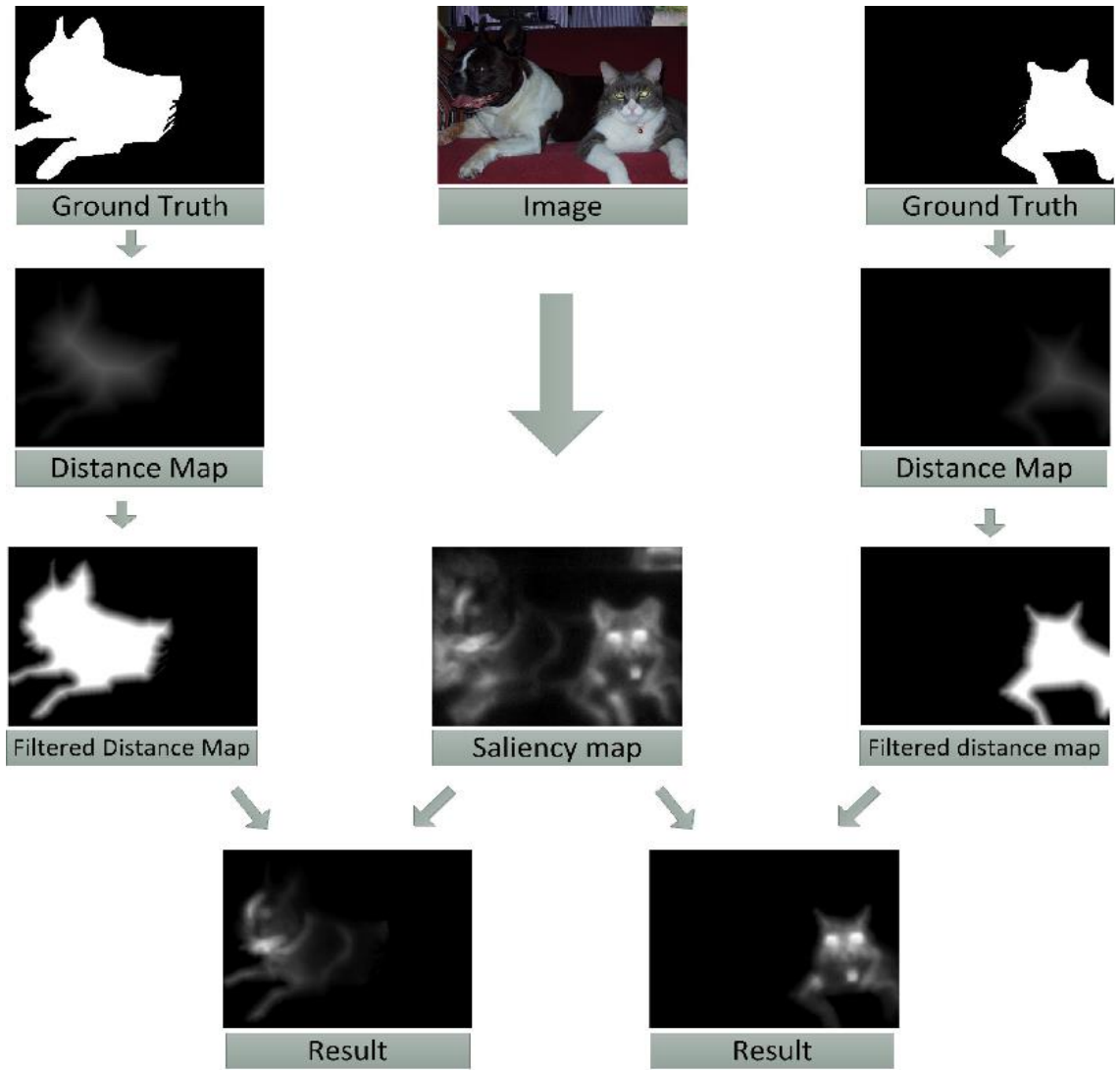
Simulator

Simulator

- The simulator generates points using the ground truth of the image.

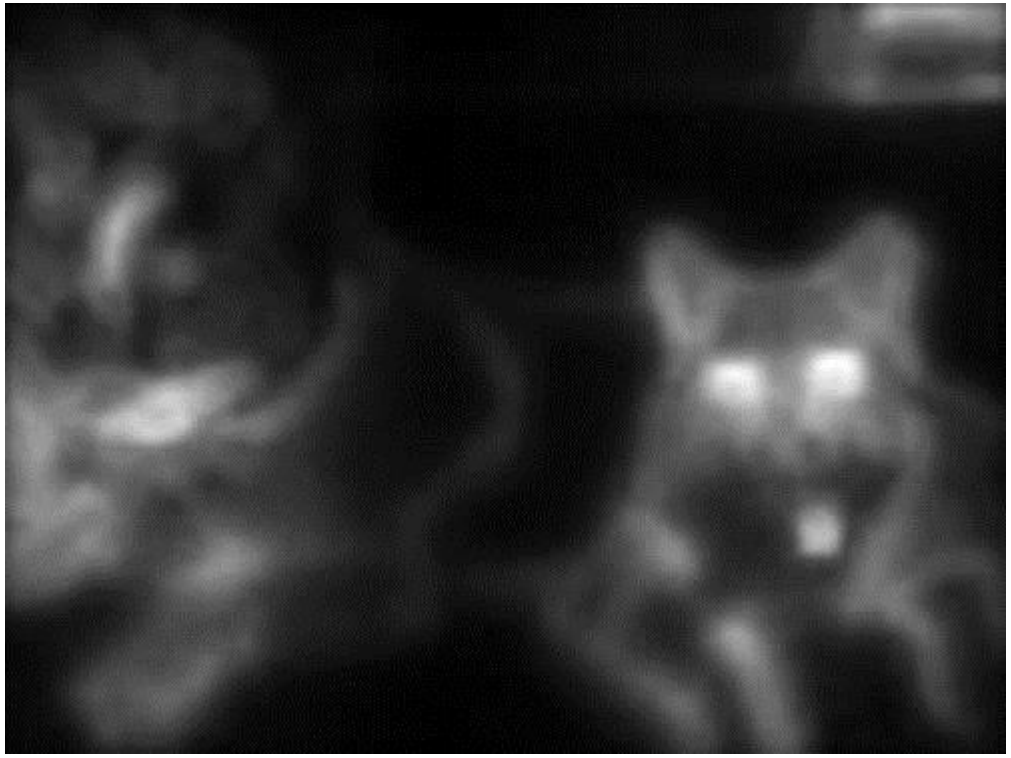


Simulator: Location of clicks



S. Goferman, L. Zelnik-Manor, and A. Tal. Context-aware saliency detection. PAMI, 2012.

Simulator: Foreground/Background ratio



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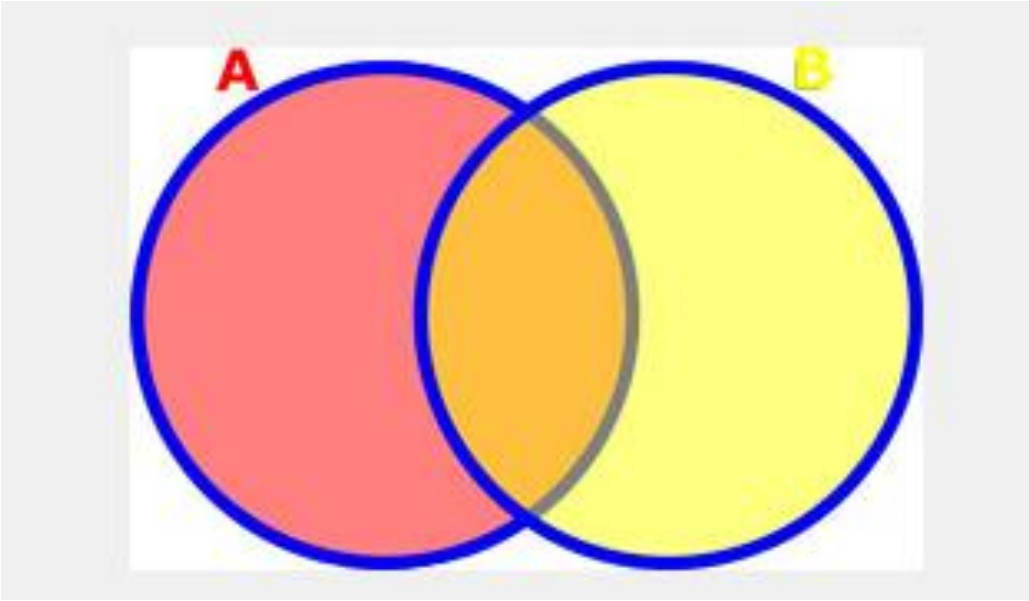
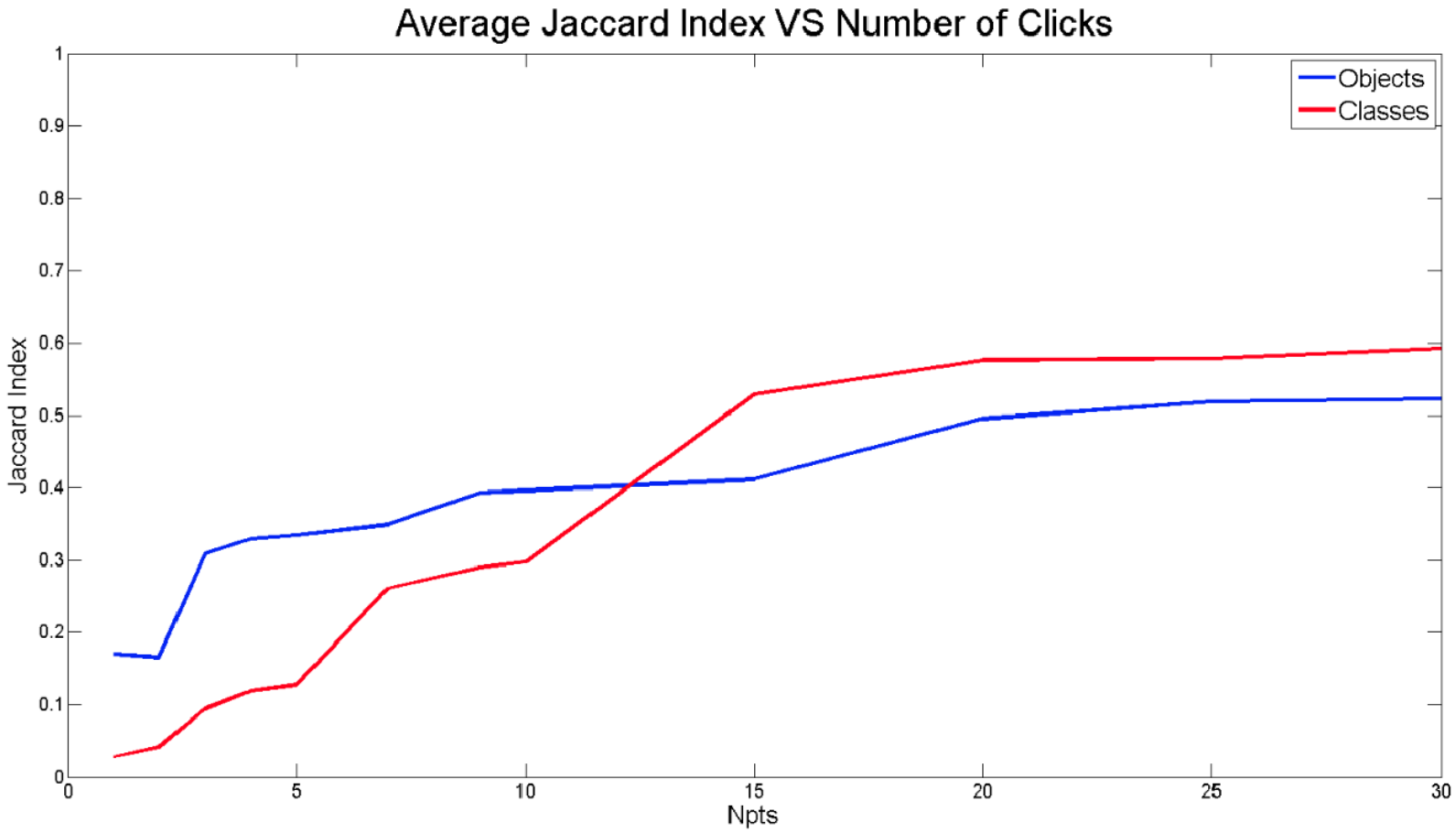
Jaccard index

$$J(A,B) = \frac{|A \cap B|}{|A \cup B|}.$$



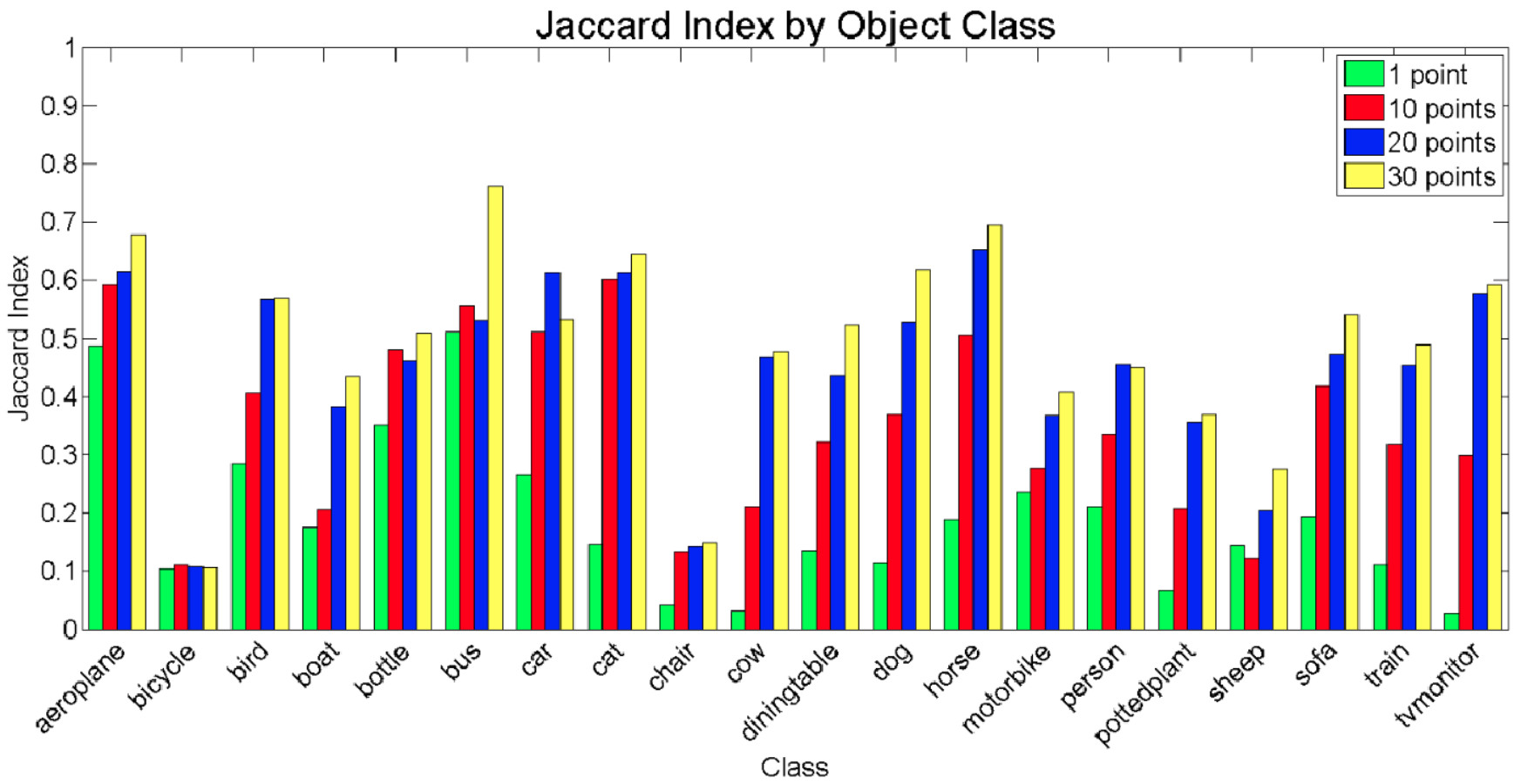
Measure of similarity between the segmentation result and the ground truth mask

Results



Using Pascal VOC2010 (Validation)

Results



Using Pascal VOC2010 (Validation)

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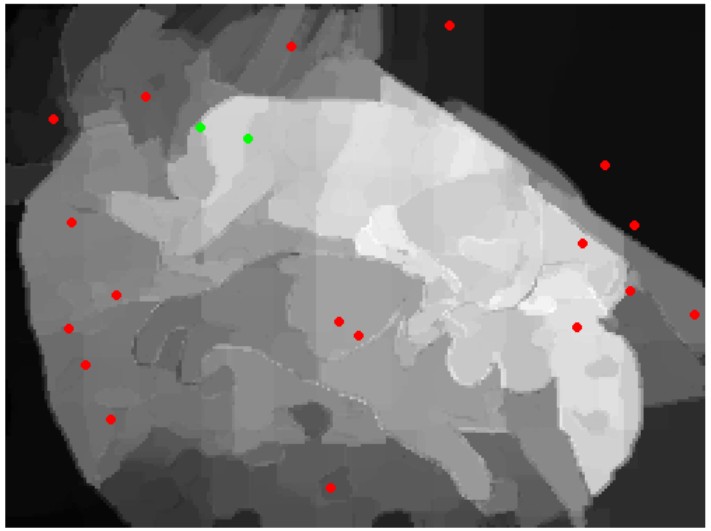
Conclusions

- Realistic simulator to process large amounts of data.
- Estimation of the expected AVERAGE Jaccard index by clicks.
- Inter-class variance of results.

Ongoing Work

Ongoing Work

- Image segmentation
  - CPMC candidates



- Label propagation through hierarchical partitions (eg. UCM, BPT…)
- Grabcut + Superpixels

Ongoing Work

- Data collection
  - Awarded with $250 in CrowdMM Competition (ACM MM Barcelona 2013).

microWorkers
work & earn or offer a micro job

- Already more than 1500 games collected with 100 users

More on that in our poster!

Questions, suggestions…

Thank you for your attention

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