Master in Computer Vision Barcelona

M5 Project: Cross-modal Retrieval

Week 3

Challenges of Object Detection and Instance Segmentation

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M5 Project Stages and Schedule

Week 1 March 6-12	**P1: Introduction to Pytorch - Image Classification**
Week 2 March 13-19	**P2 & P3: Object Detection, Recognition and Segmentation**
Week 3 Marh 20 - 26	
Week 4 March 27 – April 3	**P4: Image Retrieval**
EASTER	
Week 5 April 17 - 23	**P5: Cross-modal Retrieval** **Deliverable: Report on object Detection and Segmentation, first version**
Week 6 April 24	**Deliverable: Presentation** **Deliverable: Report on object Detection and Segmentation, final version**

M5 – P3 Tasks

Week 3: Challenges of Object Detection and Instance Segmentation

Tasks

a. Detection and segmentation in Out-of-Context Dataset.
b. Detection in MSCOCO Dataset by transplanting new objects by co-occurrence.
c. Detection in MSCOCO Dataset by qualitatively Transplant.
d. Detection in MSCOCO Dataset by Feature interference.
e. Style transfer (optional)
f. Continue writing paper: Methodology and Experiments

Deliverable (for next week)

- **Github** repository with readme.md (code explanation & instructions)
- Presentation with all items listed in the tasks under the **Project presentation** title.
- **One summary slide** at the end of your presentation.
- **Report** on overlaf about object detection and segmentation.

M5 – P3 Tasks

Task (a): **Apply pre-trained MaskRCNN or FasterRCNN on COCO in Out-of-Context Dataset.**

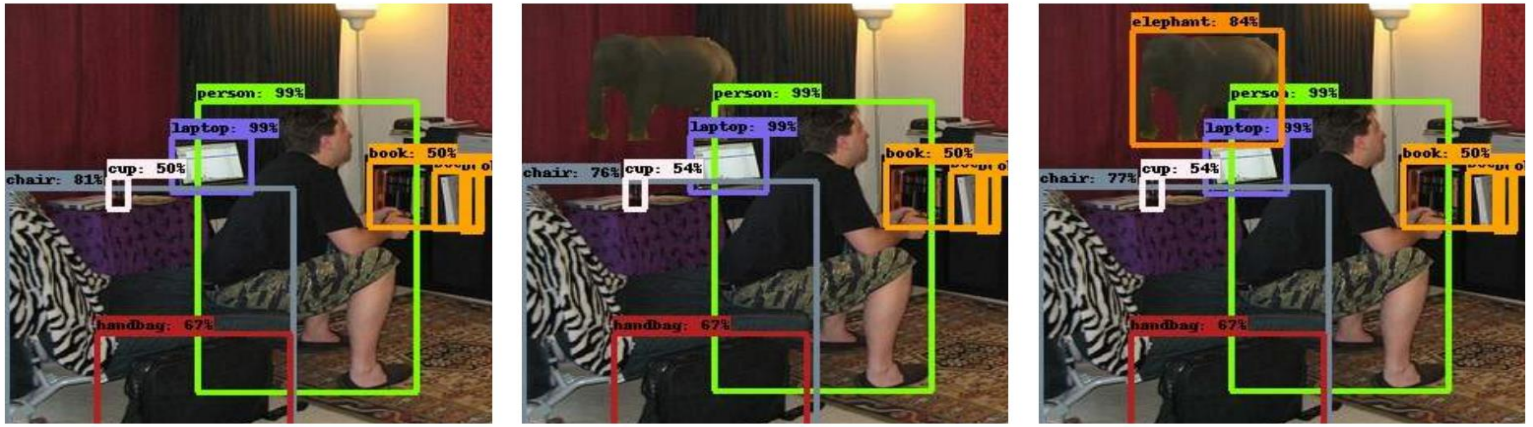
- Paper: Context Models and Out-of-context Objects.
- Get qualitative results on Out-of-Context Dataset.
  - Only 43 images in this dataset.
  - /home/mcv/datasets/out_of_context/

- Analyze the results. Why do you think it fails if it fails?

M5 – P3 Tasks

Task (b): **Apply pre-trained MaskRCNN or FasterRCNN on COCO: Transplanting new objects by co-occurrence.**

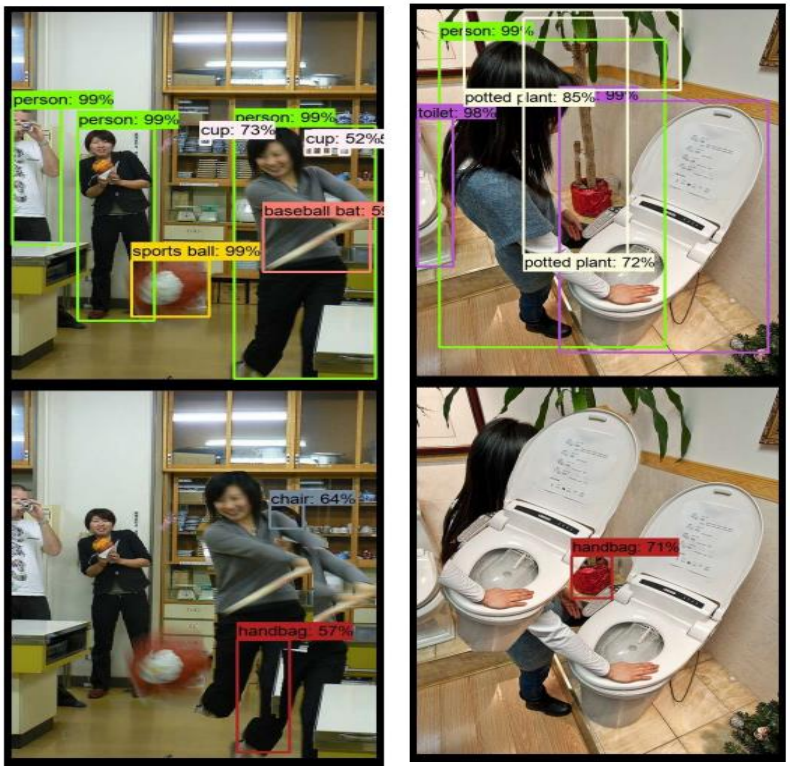
- Paper: The Elephant in the room.
- Transplant objects from test set of COCO.
  - Refer to Figure 1 of the original paper.
- Tip: Do it smartly. What are you trying to investigate?
  - Transplant new objects according to Co-occurrence.



M5 – P3 Tasks

Task (c): **Apply pre-trained MaskRCNN or FasterRCNN on COCO Qualitatively Transplant**

- Paper: The Elephant in the room.
- Transplant objects from test set of COCO.
  - Refer to Figure 2 of the original paper.
- Analyze the effect of the transplanted object
  - Different positions.
  - Progressive Intersection over Union on other objects.



M5 – P3 Tasks

Task (d): **Apply pre-trained MaskRCNN or FasterRCNN on COCO**

Feature Interference

- Paper: The Elephant in the room.
- Analyze the effect of feature interference:
  - Refer to Figure 3 of the original paper.

M5 – P3 Tasks

Task (e): **Apply Apply pre-trained MaskRCNN or FasterRCNN on images using Style transfer. (Optional)**

- Paper: CNNs trained on ImageNet are biased to textures.
- Apply Style Transfer (paper) and analyze the results.
  - Refer to Figure 1 of the original paper.

(a) Texture image

81.4%	**Indian elephant**
10.3%	indri
8.2%	black swan

(b) Content image

71.1%	**tabby cat**
17.3%	grey fox
3.3%	Siamese cat

(c) Texture-shape cue conflict

63.9%	**Indian elephant**
26.4%	indri
9.6%	black swan

M5 – P3 Tasks

Task (f): **Continue writing paper.**

- Abstract
- Introduction (½ page)
- Related Work (1 page)
- **Methodology (1 page with diagram)**
  - **Faster R-CNN & Mask R-CNN**
- **Experiments**
  - **Datasets**
  - **Metrics**
- Results
- Conclusion

Max: 6 pages w/o references

M5 – P3: Challenges of Object Det. and Seg.

Due date

27th of March, Monday, before 10:00 AM

Include **one** summary slide at the end of your presentation with main results and conclusions

- One member of the group members will have to present this slide in **1 minute** during the follow-up session next week.