Master in Computer Vision Barcelona

M5 Project: Cross-modal Retrieval

Week 3

Challenges of Object Detection and Instance Segmentation

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Week 3. Challenges of Object Detection and Instance Segmentation

Details on tasks, deliverables, and marks for this week

Week 1	**Introduction to Pytorch - Image Classification**
Week 2	**Object Detection, Recognition and Segmentation I**
Week 3	**Object Detection, Recognition and Segmentation II**
	Object Classification, Detection and Segmentation Report
Week 4	**Image Retrieval**
Week 5	**Cross-modal Retrieval**
Week 6	**Image and Cross-modal retrieval Report**
	Final Presentation

M5 Project: Goals per week

Week 3: Challenges of Object Detection and Instance Segmentation

Goals

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. Finish the Classification, Detection and Segmentation Report

Marks

(C) Achieve (b)-(c), (f) goals
(B) Achieve (b)-(d), (f) goals
(A) Achieve (a)-(f) goals

Deliverable (for next week)

- **Github** repository (code explanation & instructions)
- Presentation with information about models and results.
  - 1 minute slide presentation
- Report on overleaf about object detection and segmentation.

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

- Paper: Out-of-Context.
- 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?

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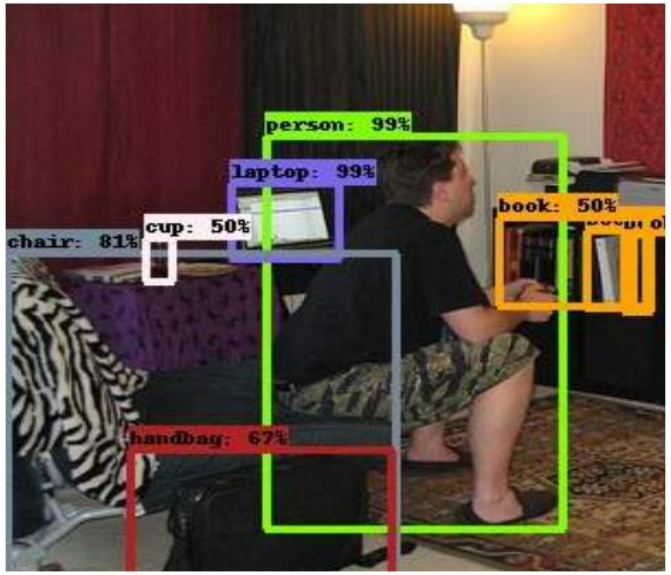
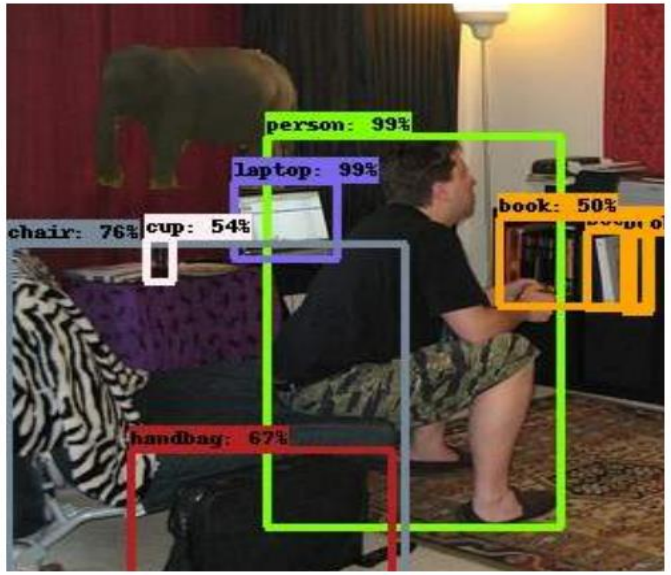
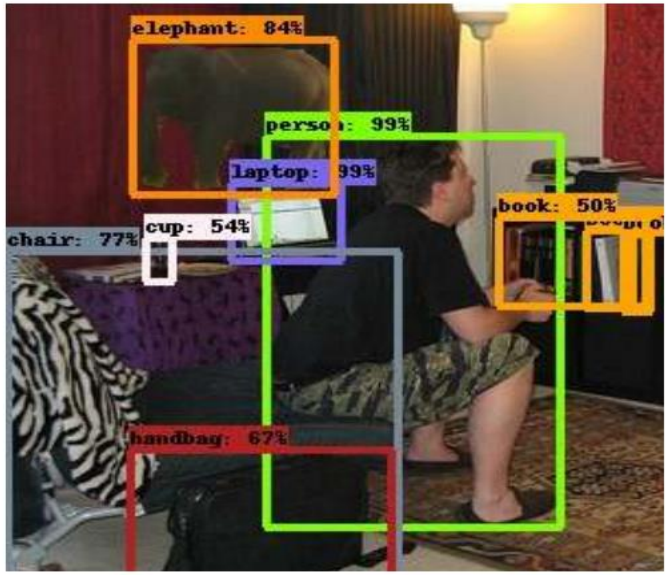
Task (b): **Apply pre-trained MaskRCNN or FasterRCNN on COCO. Transplanting new objects by co-occurrence**

- Paper: The Elephant in the room.
- Transplant objects from test set of COCO.
- Transplanting new objects according to Co-occurrence.
  - Refer to Figure 1 of the original paper.







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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.
- Qualitatively Transplant Existing Object.
  - Refer to Figure 2 of the original paper.
- Analyze the effect of the transplanted object
  - Different positions.
  - Progressive Intersection over Union on other objects.

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

- Paper: The Elephant in the room.
- Transplant objects from test set of COCO.
- Feature interference according to Co-occurrence of objects.
  - Refer to Figure 3 of the original paper.

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

- Paper: CNNs trained on ImageNet are biased to textures.
- Extend Experiments section with Style Transfer (paper).
  - 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

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Task (f): **Finish the first report.**

- Extend Experiments section with the new experiments.
- Include Abstract, Introduction and Conclusions sections.
- You need to include the most relevant findings on the main paper.
- You may include other experiments done as supplementary material.

- Compact the paper into a 4 pages two-column paper using the CVPR paper format.
  - References do not count for the 4-page limit.

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General tips

- The **weekly presentation** objective is to follow the **students' progress**. Therefore, extensive experiments are welcome. You should also include problems you faced and examples you find interesting.
- The final **report/paper** objective is to **summarize** your work and teach you how to write a paper. Only the most relevant experiments and qualitative results are expected. Those, from where you can get **relevant** conclusions.
- Don't limit the results section to show the results. You must compare and get some insights or conclusions of the results of your experiments.

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- **Code** on Github project

- Report your results in your **presentation**.
  - Remember **1 minute slide** to present.

- **Overleaf** link on your Github

Due date: Monday 28th March before 10:00 AM