

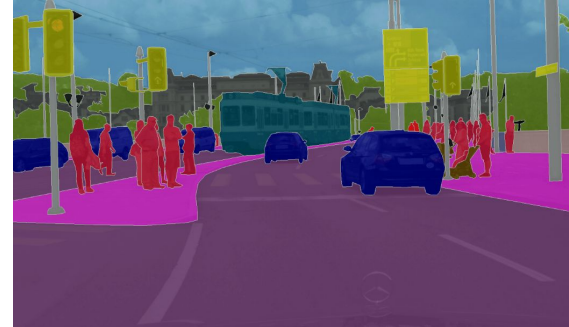
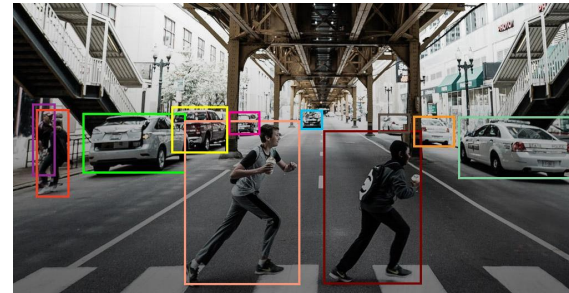
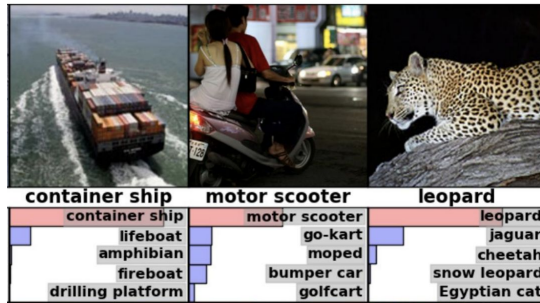
Seminar Vision Systems MA-INF 4208

23.07.2021

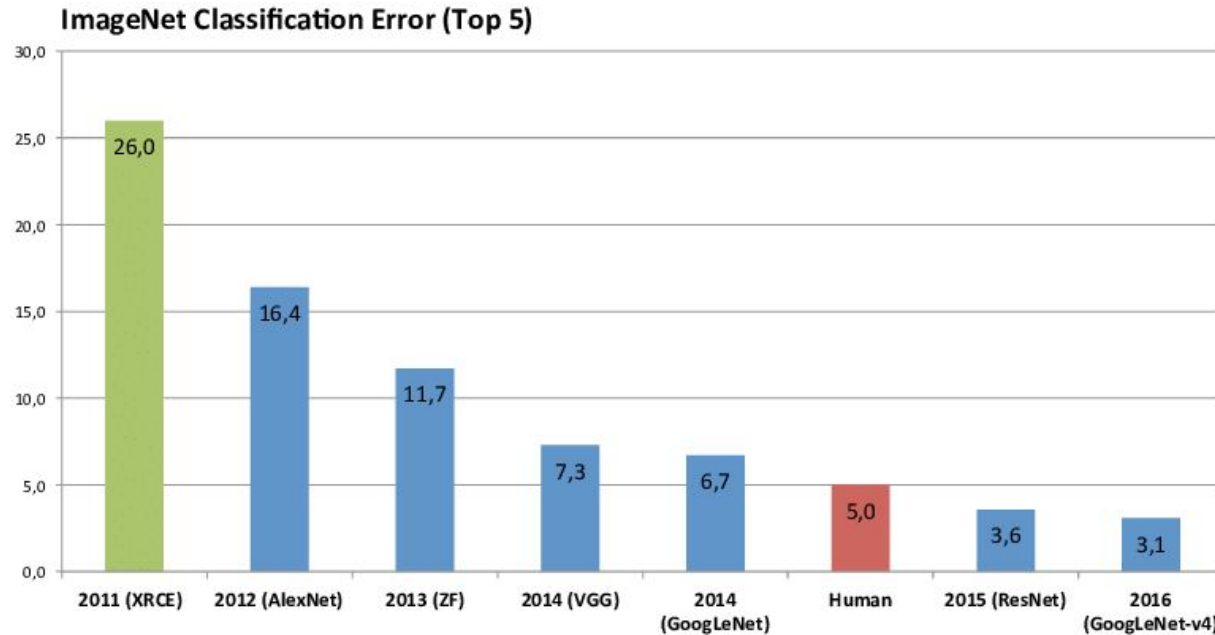
PROF. SVEN BEHNKE, ANGEL VILLAR-CORRALES

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The Age of Deep Learning



The Age of Deep Learning



The Age of Deep Learning



In this seminar...

- Acquire/improve ability to:
 - deal with scientific publications (e.g., papers)
 - write a scientific report
 - present a scientific topic to an audience
 - engage technical topics

 Important skills for Master Thesis!

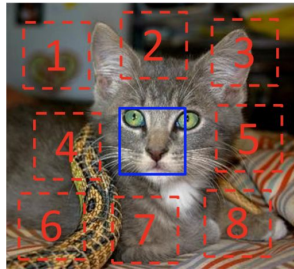
In this seminar

- Discuss trending topics in deep learning and computer vision
- We will cover the following topics
 - Self-Supervised Learning
 - Advances in Neural Network Architectures
 - Unsupervised Object and Class Discovery

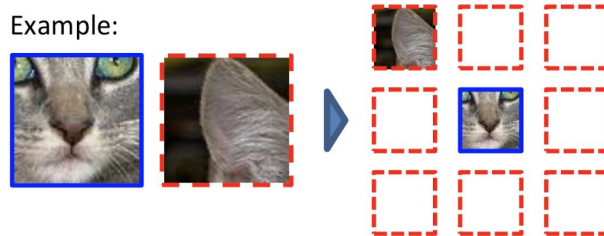
Paper List: <https://www.ais.uni-bonn.de/SS21/SeminarVision/PaperList.pdf>

Self-Supervised Learning

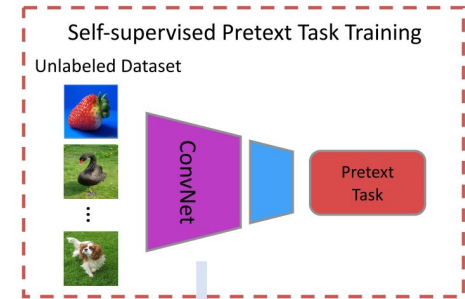
- Subcategory of unsupervised learning
- Use pretext task to train in a supervised fashion
- Hot-topic in deep learning community
 - Comparable to supervised pretraining
 - No need for manual annotations



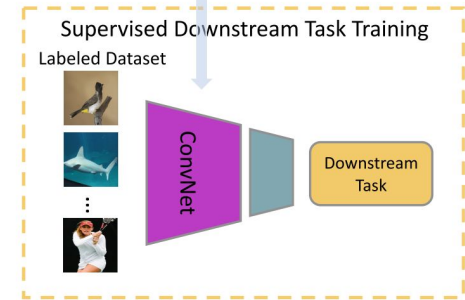
Example:



<https://arxiv.org/pdf/1505.05192.pdf>



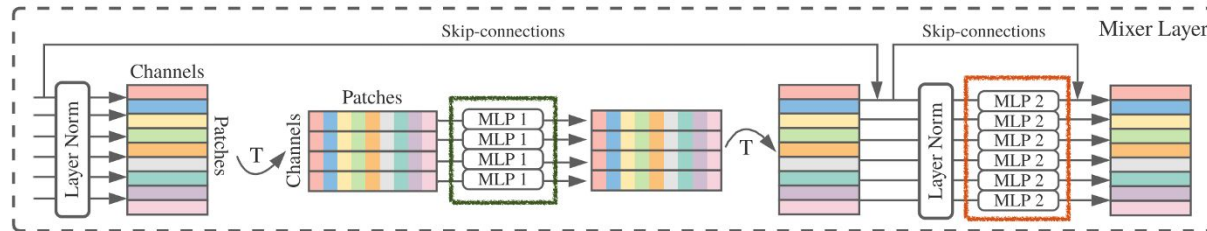
Knowledge Transfer



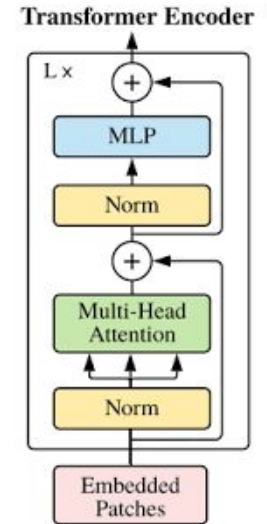
<https://vishal-keshav.github.io/publication/curriculum-learning>

Advances in Neural Network Architectures

- Recent advances in architectural designs
- Novel architectures compete with CNNs in computer vision
 - Transformers
 - MLP-Mixers
 - Big-CNNs
 - Hybrid Architectures



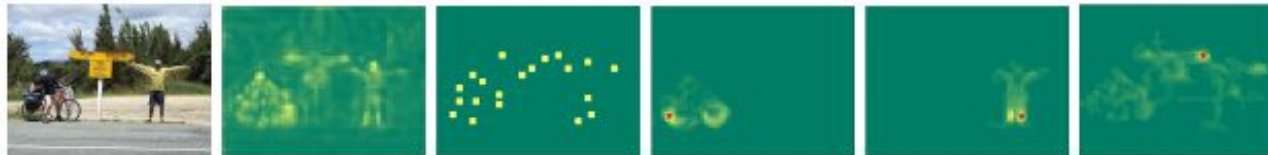
<https://arxiv.org/abs/2105.01601>



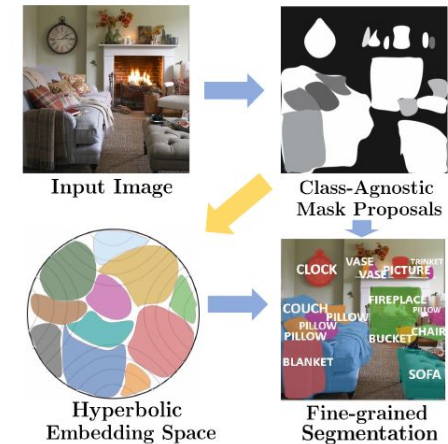
<https://arxiv.org/abs/2010.11929>

Unsupervised Object Discovery

- Finding salient objects in images without any source of supervision
- Challenging, though promising, research direction
- Tools and ideas:
 - Pretrained models
 - Classical computer vision for pseudo labelling
 - Self-supervised learning



<https://arxiv.org/abs/2007.02662>




<https://arxiv.org/abs/2104.01257>

Select your topic

- Use the Doodle to select a paper to review
 - Link on Seminar Website at 13:00
 - First come first serve
- Register in BASIS
- Send me an email at villar@ais.uni-bonn.de
 - Your name
 - Matricule number
 - Your selected topic

Deliverables

- Presentation (Thursday 23.09.21)
 - 30 min presentation
 - 15 min discussion
- Report (one week after presentation)
 - LaTeX template
 - 8-12 pages
 - Brief but readable and informative
 - BibTex citations

 Arrange a meeting with me \approx 2 weeks before the presentation to check the preliminary materials for the presentation and report.

Report

- Well structured:
 - Abstract
 - Introduction, methods, results, conclusion, ...
 - Tables and figures
 - Correct citations

- Your own scientific opinion:
 - What are the weak points of the paper?
 - What is missing?
 - Are comparisons fair and believable?
 - Possible future steps?

We don't want a copy of the paper!

Grading

- 50%: Presentation
 - Quality of the presentation slides
 - Presentation skills
 - Ability to answer questions
- 50%: Report
 - Overall quality of the report
 - Critical thinking and own discussion
 - Understanding of the concept

Questions?

