Computer Vision

Prof. Dr. rer. nat. Katarzyna Bozek

Journal Club

Journal Club

- Presentation of a paper in groups of 1–2 people
  - ~30 min presentation, followed by a discussion
  - 1–2 paper per slot

- Everybody should have skimmed over the paper beforehand
- Each student should have presented at least once
- Presentations will be taken into account for the final grade

Journal Club

- 1. Paper: "**The Watershed Transformation Applied to Image Segmentation**"
    - Technique used in image processing for segmenting objects
    - Mimics the process of flooding a landscape to identify catchments basins

- 2. Paper: "**Mean shift: a robust approach toward feature space analysis**"
    - Clustering algorithm
    - Identifies clusters in data without requiring prior assumptions about their shapes or sizes
    - Used for segmentation

- Presentations will take place on 02.05.2024

How to read a paper

How to Read a Paper – S. Keshav, 2007

How to read a paper

- Researchers read a lot of paper
    - Reviews
    - Catching up to state-of-the-art methods
    - Literature survey

- Can be very time consuming if not done in a systematic way

- Three-pass approach
    - Read the paper in (at max.) three passes
    - Number of passes depend the relevance of the pass before

First Pass

- Getting brief overview of the paper (~ 10 min.)
    - Title, abstract, introduction
    - Read the headings
    - Skim over the references
    - Conclusion

- Be able to tell the **Category** and the **Context** of the paper
- Do the assumption appear to be valid for you (**Correctness**)?
- Is it well written (**Clarity**)?
- What are the main **Contributions**?

Continue reading?

- Decide if the paper is still relevant for you

- Are you able to understand it?

- Maybe you decide the assumption of the author is invalid…

- The paper could also be out of your research, but just for this moment

If you decide the paper is relevant, valid and of interest => Second pass

2nd pass

- Second Pass (~ 1 hr.)
    - Reading the paper with greater care
    - But ignore details like proofs
    - Look at the illustrations in the paper (figures, diagrams, graphs)
    - Pay extra attentions to graphs
        - Are the axes labelled correctly?
        - Do the results include error bars?
        - This can be a hint on the quality of the paper and the effort the author put into it
    - Mark relevant unread references for future reading
    - Write down comments on the go

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2nd pass

3.1   Encoder and Decoder Stacks

Encoder: The encoder is composed of a stack of $N = 6$ identical layers. Each layer has two sub-layers. The first is a multi-head self-attention mechanism, and the second is a simple, position-wise fully connected feed-forward network. We employ a residual connection [11] around each of the two sub-layers, followed by layer normalization [1]. That is, the output of each sub-layer is $\text{LayerNorm}(x + \text{Sublayer}(x))$, where $\text{Sublayer}(x)$ is the function implemented by the sub-layer itself. To facilitate these residual connections, all sub-layers in the model, as well as the embedding layers, produce outputs of dimension $d_{\text{model}} = 512$.

After the 2nd pass

- You should comprehend the content of the paper

- Be able to summarize the main trust to a colleague (with supporting evidence)

- Even after this pass it can happen that you don't understand the paper

    - The subject is new to you

    - Unfamiliar with acronyms or terminology

    - The skipped details are way too relevant

    - The paper is written in a bad way…

- You can stop here eg. when you find this paper is interesting but outside your research scope

What if I don't get the paper?

- Well it depends on you…
- You can put it aside and hope you never need to look at it again
- Read it at another point in time
  - When you checked related work
  - Maybe the next morning with a fresh cup of coffee/tea
  - After talking to a colleague
  - Checking summaries
- Still continue with the 3rd pass

3rd pass

- Third Pass (> 1 hr.)
    - Fully understand the paper
    - Imagine you would like to re-implement the paper
    - This way you can identify hidden problems
    - Challenge every statement and assumption
    - Collect ideas for future work
    - For beginners it can take more than 4 hours
    - In the end you should be able to to identify every problem
    - Even missing citations

Additional Tips

- Check online resources
    - Many people review popular papers
    - This can clear up questions
    - Check for YouTube Videos of the authors
    - Check if they have a poster for the paper
    - Search for YouTube videos of other people (eg. Yannic Kilcher, Two Minute Papers, AI coffee break)
    - Use AI tools to summarize the paper (and to ask questions about it)

Additional Tips

- Use paper libraries like Mendeley or Zotero to manage your paper collections

- Write down notes digital, eg. using Obsidian

- For literature review

  - Use your local library (USB)

  - Use Google Scholar

- Check if the paper is a pre-print or if it is peer-reviewed