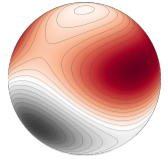




UNIVERSITÄT  
HEIDELBERG  
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SEIT 1386



# Organizational Meeting

## Seminar: Mathematical Machine Learning

Summer Semester 2023

# Introduction



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- Language: English
- Intended for Master students

# Concept of the Seminar

- Read and analyze **scientific papers**.
- Many-to-Many Role-Playing Format from <https://colinraffel.com/blog/role-playing-seminar.html>:
- One paper per meeting.
- Take a specific role.
- Discuss the paper together.

## Roles: Reviewer

Assume that the paper has not been published yet and is currently submitted to a top conference where you've been assigned as a peer reviewer. Complete a **full review** of the paper answering all prompts of the official review form of the top venue in this research area, e.g. <https://www.jmlr.org/reviewer-guide.html>. This includes recommending whether to **accept or reject** the paper.

## Roles: Archaeologist

Some time in the future: This paper was found buried under ground in the desert. You're an archaeologist who must determine where this paper sits in the **context** of previous and subsequent work. Find and report on one **older** paper cited within the current paper that substantially influenced the current paper and one **newer** paper that cites this current paper.

## Roles: Researcher

You're a researcher who is working on a new project in this area. Propose an imaginary **follow-up project** enabled by the the existence and progress made of the current paper.

## Roles: Hacker

You're a hacker who needs a demo of this paper ASAP. **Implement** a small part or simplified version of the main algorithm in the paper on a small dataset or toy problem. Prepare to share the core code of the algorithm to the class and demo your implementation. Do **not** simply download and run an existing implementation – though you are welcome to use (and give credit to) an existing implementation for “backbone” code.



## Roles: Private Investigator

You are a detective who needs to run a background check on the **paper's authors**. Where have they worked? What did they study? What previous projects might have led them to working on this one? What motivated them to work on this project? Feel free to contact the authors, but remember to be courteous, polite, and on-topic.

- participation in class (75%)
  - In the beginning every person gives a 5 minute report from their role perspective.
  - Afterwards we have a scientific discussion of the paper.
- written documentation (25%)
  - Describe your role and preparation process for each week.
  - Write max. 10 pages in total.
  - Submit the code from the time you had the "Hacker" role.
  - Use the Template.

# Mandatory

- Participation in **all** meetings.
- Submit your written documentation within the deadline (one week after last meeting, i.e. **July 19, 2023** at the end of the day german time).

1. Diederik P. Kingma and Jimmy Ba. “Adam: a method for stochastic optimization”. In: *3rd International Conference on Learning Representations, ICLR 2015, San Diego, CA, USA, May 7–9, 2015, Conference Track Proceedings*. Ed. by Yoshua Bengio and Yann LeCun. 2015. arXiv: 1412.6980
2. Alex Krizhevsky, Ilya Sutskever, and Geoffrey E. Hinton. “ImageNet classification with deep convolutional neural networks”. In: *Communications of the ACM* 60.6 (May 2017), pp. 84–90. DOI: 10.1145/3065386
3. Kaiming He et al. “Deep residual learning for image recognition”. In: *2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. IEEE, June 2016. DOI: 10.1109/cvpr.2016.90. arXiv: 1512.03385
4. Ashish Vaswani et al. “Attention is all you need”. In: *Advances in Neural Information Processing Systems*. Ed. by I. Guyon et al. Vol. 30. Curran Associates, Inc., 2017. arXiv: 1706.03762. URL: [https://proceedings.neurips.cc/paper\\_files/paper/2017/file/3f5ee243547dee91fbd053c1c4a845aa-Paper.pdf](https://proceedings.neurips.cc/paper_files/paper/2017/file/3f5ee243547dee91fbd053c1c4a845aa-Paper.pdf)
5. Alec Radford et al. *Improving language understanding by generative pre-training*. Tech. rep. 2018. URL: [https://s3-us-west-2.amazonaws.com/openai-assets/research-covers/language-unsupervised/language\\_understanding\\_paper.pdf](https://s3-us-west-2.amazonaws.com/openai-assets/research-covers/language-unsupervised/language_understanding_paper.pdf)

- Today: Distribution of roles
  - Accepting a role is the **binding** registration for the seminar.
- Starting in May: 5 meetings à 90 minutes
- weekday and time:  
**Wed. 16:30-18:00 (17.5., 7.6., 14.6., 28.6., 12.7.)**

# Assigning Roles

	Paper 1	Paper 2	Paper 3	Paper 4	Paper 5
Reviewer	1	9	7	5	3
Reviewer	2	4	6	8	10
Archaeologist	3	1	9	7	5
Archaeologist	4	6	8	10	2
Researcher	5	3	1	9	7
Researcher	6	8	10	2	4
Hacker	7	5	3	1	9
Hacker	8	10	2	4	6
Private Investigator	9	7	5	3	1
Private Investigator	10	2	4	6	8

# What's next?

- Resources are online:  
<https://scoop.iwr.uni-heidelberg.de/teaching/2023ss/seminar-mathematical-machine-learning/>
- These slides will be shared on the website.

# Questions?