



Recent Advances in the Verification of Neural Networks

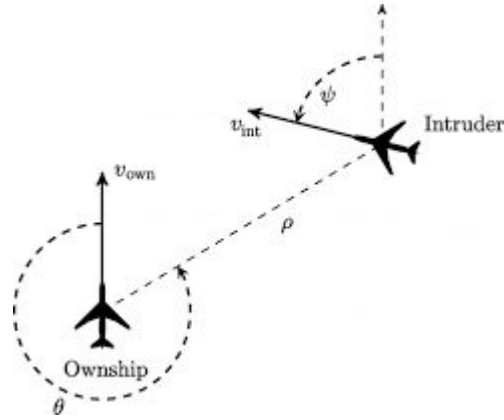
seminar pre-course meeting

Muqsit Azeem • Stefanie Mohr • Sabine Rieder • Prof. Jan Kretinsky

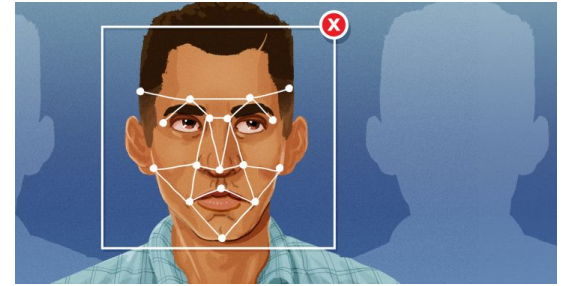
Why?



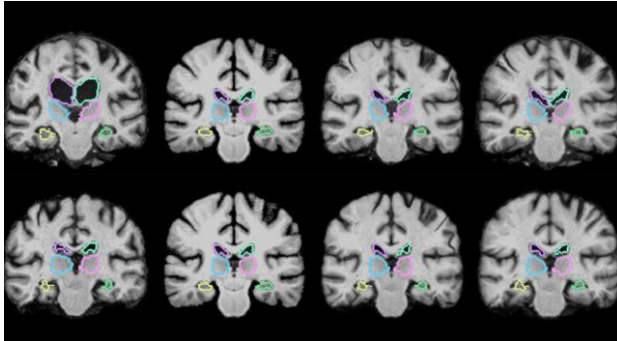
<https://netwalk.de/de/service-2/>



https://www.researchgate.net/figure/The-ACAS-Xu-System-adapted-from-Katz-et-al-2017_fig1_334695061



<https://mashable.com/article/amazon-rekognition-software-sense-fear>



<https://scitechdaily.com/machine-learning-algorithm-compares-3d-scans-up-to-1000-times-faster/>



deepl.com

What is verification?

[Verification and validation](#), in engineering or quality management systems, is the act of reviewing, inspecting or testing, in order to establish and document that a product, service or system meets regulatory or technical standards. [Wikipedia]

Schedule

- First meeting (~20.10.): introduction and scheduling
- Second meeting (TBD): teaser talks
- Final meeting (TBD, TBD): final presentations and discussions

Grading

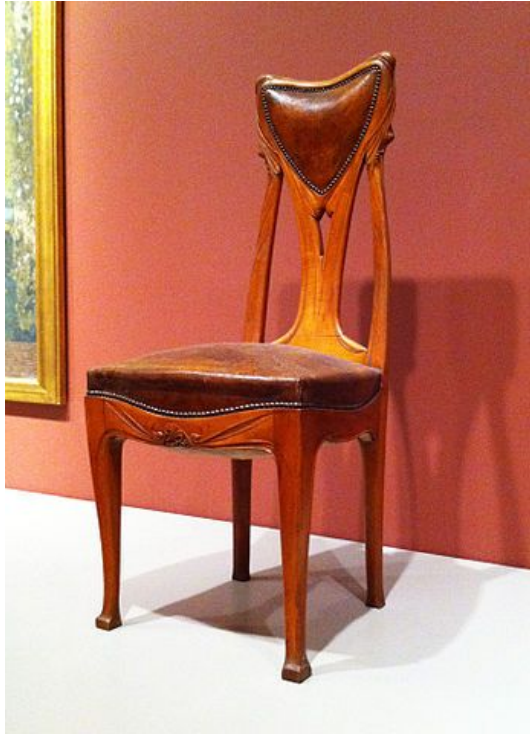
In the first meeting, you will receive the exact criteria, which we use to grade.

Your teaser talk is mandatory (you will fail the seminar if you don't participate), however, we do not grade it. It is meant for you to receive feedback.

Your final grade will be determined from

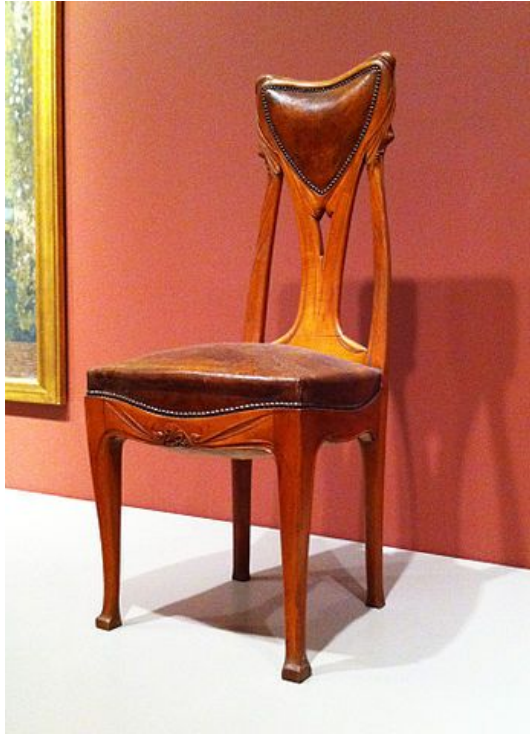
- written work (40%): extended abstract, 2-4 pages
- presentation (40%): talk of ~20min
- discussions (20%): participation, questions for the other talks, **chairing**

Chairing?



https://en.wikipedia.org/wiki/File:Side_Chair,_1900,_Hector_Guimard.jpg

Chairing?



- Introducing speaker
- Timing of the talk (and communicating with the speaker)
- Leading discussion

- Extended Abstracts \Longrightarrow 2 Questions

Schedule

- First meeting (~20.10.): Introduction and Scheduling.
- Second meeting (TBD): teaser talks
- Read extended abstracts, send questions
- Final meetings (TBD, TBD): Presentations and discussions (be chair once)

What next?

To be preferred in the matching, send a mail with your name and MatrNr to:

muqsit.azeem@tum.de **and** mohr@in.tum.de

Topics - Examples!

- **Neural Network Robustness as a Verification Property: A Principled Case Study** (Casadio, Komendatskaya, Daggitt, Kokke, Katz, Amir, Refaeli, CAV 22)
- **Impact of Colour on Robustness of Deep Neural Networks** (De, Pedersen, ICCV21)
- **Verification of Deep Convolutional Neural Networks Using ImageStars** (Tran, Xiang, Johnson, CAV 2020)
- **Complete Verification via Multi-Neuron Relaxation Guided Branch and Bound** (Ferrari, Müller, Jovanovic, Vechev, ICLR 2022)