Tassilo J. Klein, Ph.D.

● GitHub ● Google Scholar ● LinkedIn ● WWW ● e-mail

EXECUTIVE SUMMARY

AI research scientist with strong publication record and background at the cross-section of academia and industry. Many years of experience in applying machine learning in (medical) computer vision and natural language processing.

RESEARCH INTERESTS

Machine Learning: Deep Learning, Unsupervised Learning, Self-supervised Learning

Natural Language Processing: Commonsense Reasoning, Computational Semantics

Computer Vision: Medical Imaging, Integration of Vision and Language

PROFESSIONAL EXPERIENCE

SAP SE, Berlin, Germany

Director of Research, SAP AI Research — Apr 2020 – present
Senior Research Scientist, SAP Machine Learning — Dec 2015 – Mar 2020

WissEL GmbH, Scientific Instruments, Starnberg, Germany

Software Developer — 1996 – 2007

EDUCATION

Massachusetts Institute of Technology (MIT), Cambridge, USA

Research Affiliate, Computer Science & Artificial Intelligence Lab. — Oct 2014 – Nov 2015
Adviser: Polina Golland

Brigham and Women's Hospital, Harvard Medical School, Boston, USA

Postdoctoral Research Fellow, Department of Radiology — Sep 2013 – Nov 2015
Adviser: Sandy Wells

Technische Universität München, Munich, Germany
Ph.D. (summa cum laude), Computer Science — May 2008 – Dec 2012
Adviser: Prof. Nassir Navab
Thesis: Statistical Image Processing of Medical Ultrasound Radio Frequency Data

Diploma/M.Sc. (summa cum laude), Computer Science — Apr 2004 – Apr 2008

Concordia University, Montreal, Canada Study abroad coursework in Computer Science Aug 2005 – Dec 2005

Ludwig-Maximilians-Universität München, Munich, Germany
Vordiplom/B.Sc, Computer Science — Oct 2001 – Apr 2004

HONORS & AWARDS

SAP Catalyst	2020
2nd place at the VizWiz Grand Challenge on VQA for Blind People at ECCV	2018
SAP Catalyst	2017
Business plan competition winner Harvard Healthcare Innovation & Commercialization (HIC), Harvard Medical School	2014
Two-year research scholarship, German Research Foundation (DFG)	2013
Student Travel Award (MICCAI)	2012
Business plan competition winner Center for Business Creation and Innovation at Technische Universität München	2011
Siemens Excellence Award for outstanding master's thesis	2008
Study abroad in Quebec tuition waiver scholarship (CREPUQ)	2005

SKILLS

Programming Languages: Python, C, C#, C++, CUDA, Java, MATLAB

Tools/Frameworks: PyTorch, TensorFlow, Spark, OpenCV, OpenGL

PATENTS

Focal Entropy for Privacy-Preservation
US Patent No. 17/147,362 (Filed) 2020

Privacy-preserving Representation Learning
US Patent No. 16/933,584 (Filed) 2020

Contrastive Self-Supervised Learning for Commonsense Reasoning
US Patent No. 16/912,319 (Filed) 2020

Learning graph-based priors for generalized zero-shot learning
US Patent No. 16/950,730 (Filed) 2020

Multimodal Self-Supervised Learning
US Patent No. 17/010,719 (Filed) 2020

Deep Question Generation
US Patent No. 17/010,721 (Filed) 2020

Weakly Supervised One-Shot Segmentation
US Patent No. 17/008,615 (Filed) 2020

Adversarial Learning for Multimodal Few-shot Learning
EU Patent No. 19180590.2 - 1207 (Filed) 2019

Cross-modal Generation for Fine-grained Recognition
EU Patent No. 19180588.6 - 1207 (Filed) 2019

BERT Attention for Reasoning
US Patent No. 16/695,037 Filed) 2019

Dynamic Generative Memory for Continual Learning
US Patent No. 16/711,134 (Filed) 2018

Self-paced Adversarial Training for Multimodal Few-shot Learning
US Patent No. 16/728,412 (Filed) 2019

Low-Shot Learning from Imaginary 3D Model
US Patent No. 16/728,407 (Filed) 2019

JOURNAL PUBLICATIONS

Ahmadi, S.-A., Bötzel, K., Levin, J., Maiostre, J., **Klein, T.**, Wein, W., … Plate, A. (2020). Analyzing the co-localization of substantia nigra hyper-echogenicities and iron accumulation in parkinson's disease: A multi-modal atlas study with transcranial ultrasound and mri. *NeuroImage: Clinical*, *26*, 102185. (link)

Wachinger, C., Reuter, M., & **Klein, T.** (2018). Deepnat: Deep convolutional neural network for segmenting neuroanatomy. *NeuroImage*, *170*, 434 - 445. (link, code)

Becker, B. G., **Klein, T.**, Wachinger, C., Initiative, A. D. N., et al. (2018). Gaussian process uncertainty in age estimation as a measure of brain abnormality. *NeuroImage*, *175*, 246–258. (link)

Wachinger, C., Klein, T., & Navab, N. (2012). The 2d analytic signal for envelope detection and feature extraction on ultrasound images. *Medical Image Analysis*, *16*(6), 1073–1084. (link)

Karamalis, A., Wein, W., **Klein, T.**, & Navab, N. (2012). Ultrasound confidence maps using random walks. *Medical Image Analysis*, *16*(6), 1101 - 1112. (link)

Plate, A., Ahmadi, S.-A., Pauly, O., **Klein, T.**, Navab, N., & Bötzel, K. (2012). Three-dimensional sonographic examination of the midbrain for computer-aided diagnosis of movement disorders. *Ultrasound in medicine & biology*, *38*(12), 2041–2050. (link)

CONFERENCE PUBLICATIONS

Taleb, A., Lippert, C., **Klein, T.**, & Nabi, M. (2021). Multimodal self-supervised learning for medical image analysis. The 27th international conference on Information Processing in Medical Imaging (IPMI). (**to appear**)

Klein, T., & Nabi, M. (2020a). Contrastive self-supervised learning for commonsense reasoning. In *Proceedings of the 58th annual meeting of the association for computational linguistics*. Association for Computational Linguistics (ACL).

Berriel, R., Lathuili'ere, S., Nabi, M., **Klein, T**, Oliveira-Santos, T., Sebe, N., & Ricci, E. (2019). Budget-Aware Adapters for Multi-Domain Learning. The IEEE International Conference on Computer Vision (ICCV). (link)

Klein, T., & Nabi, M. (2019a, July). Attention is (not) all you need for commonsense reasoning. In *Proceedings of the 57th annual meeting of the association for computational linguistics* (pp. 4831–4836). Florence, Italy: Association for Computational Linguistics (ACL). (link,code)

Ostapenko, O., Puscas, M., **Klein, T.**, Jahnichen, P., & Nabi, M. (2019, June). Learning to remember: A synaptic plasticity driven framework for continual learning. The IEEE Conference on Computer Vision and Pattern Recognition (CVPR). (link,code)

Pahde, F., Puscas, M. M., Wolff, J., **Klein, T.**, Sebe, N., & Nabi, M. (2019). Low-shot learning from imaginary 3d model. In *IEEE winter conference on applications of computer vision, WACV 2019, waikoloa village, hi, usa, january 7-11, 2019* (pp. 978–985). (link)

Pahde, F., Ostapenko, O., Jähnichen, P., **Klein, T.**, & Nabi, M. (2018). Self-paced adversarial training for multimodal few-shot learning. *2019 IEEE Winter Conference on Applications of Computer Vision (WACV)*, 218-226. (link)

Pahde, F., Nabi, M., **Klein, T.**, & Jahnichen, P. (2018, Oct). Discriminative hallucination for multi-modal few-shot learning. In *2018 25th ieee international conference on image processing (icip)* (p. 156-160). (link)

Pahde, F., Jähnichen, P., **Klein, T.**, & Nabi, M. (2018). Cross-modal hallucination for few-shot fine-grained recognition. *arXiv preprint arXiv:1806.05147*. (link)

Gutiérrez, B., Peter, L., **Klein, T.**, & Wachinger, C. (2017). A multi-armed bandit to smartly select a training set from big medical data. In (pp. 38–45). International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). (link)

Klein, T., & Wells, W. M. (2015). Rf ultrasound distribution-based confidence maps. In (pp. 595–602). International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). (link)

Klein, T., Hansson, M., & Navab, N. (2012). Modeling of multi-view 3d freehand radio frequency ultrasound. In (pp. 422–429). International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). (link)

Wachinger, C., **Klein, T.**, & Navab, N. (2011). The 2d analytic signal on rf and b-mode ultrasound images. In (pp. 359–370). Biennial International Conference on Information Processing in Medical Imaging (MICCAI). (link)

Klein, T., Hansson, M., & Navab, N. (2011). Spatial statistics based feature descriptor for rf ultrasound data. In (pp. 33–36). 2011 IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI). (link)

Ahmadi, S.-A., Baust, M., Karamalis, A., Plate, A., Boetzel, K., **Klein, T.**, & Navab, N. (2011). Midbrain segmentation in transcranial 3d ultrasound for parkinson diagnosis. In G. Fichtinger, A. Martel, & T. Peters (Eds.), (pp. 362–369). Berlin, Heidelberg: Medical Image Computing and Computer-Assisted Intervention – MICCAI 2011. (link)

Ahmadi, S.-A., **Klein, T.**, Navab, N., Roth, R., Shamir, R. R., Joskowicz, L., … Foroni, R. I. (2009). Advanced planning and intra-operative validation for robot-assisted keyhole neurosurgery in robocast. In (pp. 1–7). 2009 International Conference on Advanced Robotics (ICRA). (link)

Klein, T., Traub, J., Hautmann, H., Ahmadian, A., & Navab, N. (2007). Fiducial-free registration procedure for navigated bronchoscopy. In N. Ayache, S. Ourselin, & A. Maeder (Eds.), (pp. 475–482). Berlin, Heidelberg: Medical Image Computing and Computer-Assisted Intervention – MICCAI 2007. (link)

WORKSHOP PUBLICATIONS

Taleb, A., Lippert, C., Nabi, M., & **Klein, T.** (2019, December). Multimodal self-supervised learning for medical image analysis. *Conference on Neural Information Processing Systems (NeuIPS 2019), Workshop on Medical Imaging meets NeurIPS*. (**Spotlight**) (link)

Raza, H., Ravanbakhsh, M., **Klein, Tassilo**, & Nabi, M. (2019, Oct). Weakly supervised one shot segmentation. In *The ieee international conference on computer vision (iccv) workshops.* (**Spotlight**) (link)

Ostapenko, O., Puscas, M., **Klein, T.**, Jahnichen, P., & Nabi, M. (2018). Learning to remember what to remember: A synaptic plasticity driven framework. *Conference on Neural Information Processing Systems (NeuIPS 2018), Workshop on Continual Learning*. (link)

Salama, A., Ostapenko, O., Nabi, M., & **Klein, T.** (2018). Pruning at a glance: A structured class-blind pruning technique for model compression. *Conference on Neural Information Processing Systems (NeuIPS 2018), Workshop on Compact Deep Neural Networks with industrial applications*. (**Spotlight**) (link)

Dushi, D., Pezzelle, S., **Klein, T.**, & Nabi, M. (2018). *When the distribution is the answer: An analysis of the responses in vizwiz.*

Geyer, R. C., **Klein, T.**, & Nabi, M. (2017, December). Differentially Private Federated Learning: A Client Level Perspective. *Conference on Neural Information Processing Systems (NIPS 2017), Workshop on Machine Learning on the Phone and other Consumer Devices*. (**Spotlight**) (link,code)

PRE-PRINTS REPORTS

Klein, T., & Nabi, M. (2020b). *Privacy-preserving representation learning by disentanglement.* (link)

Klein, T., & Nabi, M. (2019b). *Learning to answer by learning to ask: Getting the best of gpt-2 and bert worlds.* (link)