Dr.-Ing. Jan-Christoph Klie

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Machine learning and software engineer with a PhD in natural language processing. Expert in evaluating and improving training data annotation efficiency and quality; my research and solutions enable quicker and more cost-effective data collection for new and exciting applications. I enjoy bringing ML and LLM research into production. Problem solver and lifelong learner.

EDUCATION

TU DARMSTADT
PH.D. IN COMPUTER SCIENCE
Jan 2018 - Apr 2024 | Darmstadt, DE
Thesis Topic: *Improving NLP Annotation Quality and Efficiency*, supervised by Prof. Dr. Iryna Gurevych

TU DARMSTADT
M.SC. IN COMPUTER SCIENCE
Oct 2014 - Oct 2017 | Darmstadt, DE
Robotics, reinforcement learning, computer vision, natural language processing and software engineering. Minor in control theory.

DHBW MANNHEIM
B.SC. IN COMPUTER SCIENCE
Oct 2011 - Sep 2014 | Mannheim, DE
Integrated degree program with IBM.

SKILLS

PROGRAMMING
Experienced:
Java • LATEX • Python • TypeScript

Advanced:
C/C++ • HTML/CSS • Rust • Go • Kotlin

Elementary:
R • MatLab

TOOLS
Experienced:
Docker • Pytorch • transformers • spaCy sklearn • pandas • numpy • RAG

Advanced:
AWS • CloudFormation • React • Spring Android • Jenkins • Puppet • SQL • k8s

Elementary:
Terraform • Azure • Spark • Airflow

LANGUAGES

German   ● ● ● ● ●
English   ● ● ● ● ●
Chinese   ● ● ● ○ ○
Vietnamese ● ○ ○ ○ ○

WORK EXPERIENCE

Amazon   APPLIED SCIENTIST
Jan 2025 - now | Berlin, Germany
As part of the Amazon Nova team, I train state-of-the-art foundation models to deliver frontier intelligence and industry-leading price performance. This involves reseearch in data aquisition model architectures, training regimes and more.

Python | NLP | LLM | Evaluation | Machine Learning | Gen AI | Pytorch | Spark

Union Investment   MACHINE LEARNING RESEARCH CONSULTING
Aug 2024 - Dec 2024 | Frankfurt, Germany | Freelance
Coached a team of data scientists and machine learning engineers on recent trends and best practices in deep learning, natural language processing and data science. Prepared demos, presentations and executive summaries.

Python | NLP | LLM | RAG | Evaluation | Machine Learning | Gen AI | Data Science | k8s

Apple   MACHINE LEARNING AND SOFTWARE ENGINEER
Feb 2023 - Jul 2024 | Heidelberg, Germany | Freelance
Provided data science, fullstack software and ML engineering services to improve data annotation efficiency and quality, especially annotation quality evaluation.

- Defined, validated and implemented metrics and scoring functions for several modalities like image, OCR, keypoint, RLHF and video annotation.
- Proposed and lead building a LLM as a judge prototype to automatically estimate RLHF data quality. This will reduce RLHF data annotation cost substantially while not negatively affecting or even improving quality.
- Coached the team on LLM theory, ecosystem, prompting and fine tuning.
- Researched, proposed and implemented statistical quality control to estimate confidences in quality estimates, to compute sample sizes and to estimate prevalences from a combination of imperfect classifiers during synthetic consensus. This resulted in an ACL 2024 publication.
- Built prototypes for internal tooling and moonshots, for instance clustering annotation event stream data to analyze and group annotator behaviour.

Python | NLP | CV | OCR | LLM | Statistics | AWS | Pytorch | TypeScript | React

UKP Lab, TU Darmstadt   RESEARCH PROGRAMMER&SYSADMIN LEAD
Jan 2018 – May 2023 | Darmstadt, Germany

This was the position funding my Ph.D studies in natural language processing.

- Conducted research in interactive machine learning and improving data annotation efficiency/quality. Landed several publications in A-tier venues.
- Worked on the INCEpTION project, a Java-based, extensible text annotation platform offering annotation assistance and knowledge management.
- Lead the system administration team that provides the IT for around 60 people in our lab (mail, chat, personal hardware, compute, support) so that they have the infrastructure and compute available for their research.
- Managed and participated in the IT modernization of our lab, including building a Slurm GPU cluster, rolling out modern monitoring using Prometheus and Grafana, introducing a new chat platform, migrating and deprecating old services, digitizing workflows.
- Supervised sysadmin apprentices, student helper and thesis students.

Python | Java | NLP | Spring | Slurm | DevOps | MLOps | LLM | Pytorch | Deep Learning

INTERNSHIPS

Apple | RESEARCH INTERN
May 2022 – Sep 2022 | Heidelberg, Germany

In this internship, I was tasked to come up with and implement methods to improve annotation efficiency and quality. Among other things, I evaluated annotation error detection for OCR data annotation tasks using deep learning. I also investigated sample size computation and reduction for quality estimation through manual inspection for desired statistical guarantees.

Python | Pytorch | Statistics | OpenCV | OCR | Data Annotation | Deep Learning

PART-TIME OCCUPATIONS

Senacor | STUDENT SOFTWARE DEVELOPER ONLINE PAYMENT SYSTEM
Aug 2016 – Sep 2017 | Frankfurt, Germany

Worked on a new online payment system backed by the largest banks in Germany.

Java | Spring | Android | Scrum | Event Sourcing | CQRS | Microservices

RMR, TU Darmstadt | STUDENT SOFTWARE DEVELOPMENT ROBOTICS
Jul 2015 – Mar 2016 | Darmstadt, Germany

Developed a ROS package for a stereo camera mounted on Robotinos as well as a marker-based localization system leveraging four ceiling cameras.

Python | C++ | Computer Vision | OpenCV | ROS | Matlab | Aruco

IBM NGNCC via KONTIP | STUDENT SOFTWARE DEVELOPER IoT
Oct 2014 – Jul 2016 | Frankfurt, Germany

Built a scalable IoT-Middleware to connect sensors and actuators of any manufacturer. Starting point was the platform developed during my B.Sc. thesis.

C++ | Java | Arduino | Python | SIP | Linux | PostgreSQL | LoRa

CERTIFICATIONS

- AWS Certified Developer - Associate (June 2024)

- AWS Certified Solutions Architect - Associate (May 2024)

- Chinese Proficiency Test (HSK) - Level 4 (2018).

NLP COMMUNITY SERVICE

- Reviewer for ACL Rolling Review.

- Consulted the virtual infrastructure teams for EACL and NAACL 2021.

- I was senior chair of the virtual infrastructure team. for EMNLP 2020. I managed the team, coordinated technical aspect, and built the virtual conference website. I hosted it on AWS using S3, Cognito, and CloudFront.

- Volunteer web developer to the virtual infrastructure team of ACL 2020.

PUBLICATIONS

1. **Jan-Christoph Klie**, Rahul Nair, Juan Haladjian, Marc Kirchner. 2024. On Efficient and Statistical Quality Estimation for Data Annotation. Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers). To Appear. **Outstanding Paper Award**

2. **Jan-Christoph Klie**, Richard Eckart de Castilho, Iryna Gurevych. 2024. Analyzing Dataset Annotation Quality Management in the Wild. In: *Computational Linguistics. 2024.*

3. **Jan-Christoph Klie**, Ji-Ung Lee, Kevin Stowe, Gözde Gül Sahin, Nafise Sadat Moosavi, Luke Bates, Dominic Petrak, Richard Eckart de Castilho, Iryna Gurevych. 2023. Lessons Learned from a Citizen Science Project for Natural Language Processing. In: *Proceedings of the 17th Conference of the European Chapter of the Association for Computational Linguistics: Main Volume*, pages 6982–6993.

4. **Jan-Christoph Klie**, Bonnie Webber, Iryna Gurevych. 2023. Annotation Error Detection: Analyzing the Past and Present for a More Coherent Future. In: *Computational Linguistics*, 49 (1): 157–198.

5. Ji-Ung Lee*, **Jan-Christoph Klie***, Iryna Gurevych. 2022. Annotation Curricula to Implicitly Train Non-Expert Annotators. In: *Computational Linguistics*, 48 (2): 343–373.
   (*: equal contribution)

6. **Jan-Christoph Klie**, Richard Eckart de Castilho, Iryna Gurevych. 2020. From Zero to Hero: Human-In-The-Loop Entity Linking in Low Resource Domains. In: *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, pages 6982–6993.

7. Richard Eckart de Castilho, Nancy Ide, Jin-Dong Kim, **Jan-Christoph Klie**, Keith Suderman. 2019. A Multi-Platform Annotation Ecosystem for Domain Adaptation. In: *Proceedings of the 13th Linguistic Annotation Workshop*, pages 189-194.

8. Richard Eckart de Castilho, Nancy Ide, Jin-Dong Kim, **Jan-Christoph Klie**, Keith Suderman. 2019. Towards cross-platform interoperability for machine-assisted text annotation. In: *Genomics & Informatics*, 17(2):e19.

9. Beto Boullosa, Richard Eckart de Castilho, Naveen Kumar, **Jan-Christoph Klie**, Iryna Gurevych. 2018. Integrating Knowledge-Supported Search into the INCEpTION Annotation Platform. In: *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing: System Demonstrations*, pages 127–132.

10. **Jan-Christoph Klie**, Michael Bugert, Beto Boullosa, Richard Eckart de Castilho, Iryna Gurevych. 2018. The INCEpTION Platform: Machine-Assisted and Knowledge-Oriented Interactive Annotation. In: *Proceedings of the 27th International Conference on Computational Linguistics: System Demonstrations*, pages 5–9.

11. Teresa Botschen, Iryna Gurevych, **Jan-Christoph Klie**, Hatem Mousselly-Sergieh, Stefan Roth. 2018. Multimodal Frame Identification with Multilingual Evaluation. In: *Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long Papers)*, pages 1481–1491.