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Dr. Steffen Remus

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Skillset

Core Skills

Communications,
Analysis & Algorithmic Thinking,
Team Work,
Creativity,
Problem Solving,
Research,
Critical Thinking,
Organizations,
Leadership,
Project management,
Self-management,
Presentations / Aesthetics

Knowledgeable Concepts

Machine Learning, Deep Learning, Containerization, Generative AI, Information Extraction, Information Retrieval, Data Modeling, Data Structures, Large Language Models (LLMs), SQL, MapReduce, Artificial Intelligence (AI), (Computational) Linguistics, Data Science, Data Management, Software Architecture, Data Visualization, Software Development, Big Data, NLP (Natural Language Processing), NLU (Natural Language Understanding), Computational Linguistics, Knowledge Discovery, Knowledge Representation, Information Dis-

Professional Profile / Summary

A highly dedicated research engineer with over 10 years of professional hands-on experience in:

- ▶ Developing machine learning algorithms and managing large-scale data engineering projects, with a primary focus on natural language processing.
- ▶ Software engineering, utilizing industry-standard tools and processes.
- ▶ Leading and managing individuals and teams, fostering individual growth and collaboration.
- ▶ Administering and maintaining server infrastructure.

I actively share my expertise through my current role as a (co-) lecturer and advisor, and as a freelance consultant for industry partners. As a researcher, I thrive in fast-paced environments and I am committed to staying at the forefront of advancements in machine learning and AI. I approach challenges with patience and a strong attention to detail, and I excel in bridging technical expertise with effective communication, ensuring strong teamwork and maintaining high levels of motivation. My leadership style is collaborative and adaptive, focusing on fostering a positive team environment, encouraging open communication, and empowering individuals to reach their full potential.

Professional Experience

Language Technology Group & HITeC e.V., University of Hamburg, Germany

since 07/2023 **Postdoctoral Research Scientist**

10/2016 to 06/2023 .. **Pre-doctoral Research Scientist**

Outline: Conducted original research under the guidance of Prof. Dr. Chris Biemann, participated in project-related events, offered consultancy services for industry partners, developed and delivered courses in machine learning, NLP, and software engineering, supervised theses, studies, student helpers and interns, maintained technical infrastructure and ensured its uptime.

Key Responsibilities:

- ▶ §Teaching & Supervision
- ▶ §Research Projects
- ▶ Server infrastructure maintenance: Responsible for maintaining key components of the group's server infrastructure, including the management of a Hadoop cluster that supports a distributed Elasticsearch cluster, two GPU servers, and several web servers. One of these web servers hosts demo applications as Docker containers.

Key Achievements:

- ▶ Successfully defended Ph.D. in June, 2023
- ▶ Organized four research workshops and served 50+ times as a reviewer
- ▶ Gained leadership qualifications during 19 teaching activities, supervision of over 30 theses, interns, and student helpers, providing academic guidance and mentorship at various levels in well organized regular SCRUM-style meetings.
- ▶ Contributed to over 30 small to medium sized software projects.
- ▶ (Co-)authored over 30 peer-reviewed §publications.

Freelance Consulting Services (Occasional & Part-Time)

occasional since 2016 . **Research Consultant (Ad hoc engagements)**

Outline: Provided project-based freelance consultancy services, specializing in NLP research and offering expert guidance on various related topics.

Key Responsibilities: Worked with various clients, including:

- ▶ Glanos GmbH (Munich, Germany)
- ▶ T-Systems (Darmstadt, Germany)
- ▶ Merck KGaA (Darmstadt, Germany)

International Business Machines (IBM)

05/2015 to 11/2015 .. **Research Intern at the Zurich Research Lab, Rüschlikon, Switzerland**

Supervisor: Dr. Abdel Labbi & Dr. Alfio Gliozzo

Outline: Collaborated closely with Angela Fahrni on supervised relation extraction and event detection, utilizing distributional features.

Key Responsibilities:

- ▶ Implemented a system for named entity recognition, cross-sentence relation extraction, and event detection using distributional features
- ▶ (Small) internal crowdsourcing task for relation annotation.

07/2014 to 10/2014 .. **Research Intern at the Thomas J. Watson Research Center, Yorktown Heights, NY, USA**

Supervisor: Dr. Alfio Gliozzo

Outline: Implemented, tested, and evaluated distributional semantic methods to enhance

covery, Text Mining, Data Mining, Web Technologies, Prompt Engineering, Feature Engineering, Retrieval Augmented Generation (RAG), Vector Databases, NoSQL Databases, ...

Tech Stack

PyTorch, Docker, Elasticsearch, Lucene, Solr, Hadoop (Administration & Applications), MySQL, PostgreSQL, PgVector, Paradedb, MongoDB, Apache Spark, REST, Websockets, Webservices, Microservices, Swagger, Redis, Large Language Models (LLMs), AWS (Amazon Web Services), L^AT_EX, ...

Programming Languages

Python
Java
JavaScript
R
Scala
C#

Other

Research and Development (R&D),
Qualitative & Quantitative Research Methodologies

Languages

German (native)
Englisch (fluent)
Spanish (basic)
French (basic)

Hobbies & Interests

🏃 Running
🏄 Kitesurfing
🚴 Biking (road)
📺 Tech Stuff
🏆 Any kind of sports activity
🧩 Solving Riddles
💡 Keenly interested to try new things



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knowledge graphs for both open and closed domains.

Technical University of Darmstadt, Germany & Deutsches Institut für Pädagogische Forschung (DIPF), Frankfurt (Main), Germany

04/2013 to 06/2016 . . Researcher in the §KDSL Graduate School Program

Outline: Conducted original research under the supervision of Prof. Dr. Chris Biemann in a team of 5 core research members and 5 research principles in the framework of the Knowledge Discovery in Scientific Literature (§KDSL) graduate school.

Key Responsibilities:

▸ Project Crawling & Semantic Structuring.

Key Achievements:

▸ (Co-)authored & published 6 peer-reviewed papers.

▸ Organized a one-day research workshop on IBM Watson.

ConWeaver GmbH, Darmstadt, Germany

10/2012 to 05/2013 . . Software Engineer (full time)

2009 to 09/2012 Software Engineer (part-time student assistant position)

Technical University of Darmstadt, Darmstadt, Germany

2009 to 2012 Tutoring: Software Engineering 1+2

JDS-Sommer GmbH, Frankfurt (Main), Germany

2007 to 2008 Systems Administrator

Greater Union Filmpalast (Cinestar Metropolis), Frankfurt (Main), Germany

2002 to 2006 Part-time job

Siemens AG, Frankfurt (Main), Germany

2000 to 2003 Systems Specialist, Field Service Technician for EWSD telephone exchange systems

1997 to 2000 Apprenticeship for Information and Telecommunications Systems Electronics Technician (Ausbildung als Informations- und Telekommunikationssystem Elektroniker)

Education

Dr.rer.nat. (Ph.D.) in Computer Science – University of Hamburg, Germany – 2023

Thesis: “Domain Defining Context: On Domain-Dependent Corpus Expansion and Contextualized Semantic Structuring”, Advisor: Prof. Dr. Chris Biemann

M.Sc. in Computer Science (Linguistics minor) – Technical University of Darmstadt, Germany – 2012

Thesis: “Automatically Identifying Lexical Chains by Means of Statistical Methods – A Knowledge-Free Approach” – Nominated for best thesis award at the German conference for computational linguists (GSCL), Advisor: Prof. Dr. Chris Biemann

B.Sc. in Computer Science – Technical University of Darmstadt, Germany – 2009

Thesis: “Next-Gen IDE – Evaluation Of Statistical Approaches For Intelligent Code Completion”, Advisor: Dr. Marcel Bruch

State Certified Engineer (Techniker) in Computer Systems & Networking – Werner von Siemens Professional School, Frankfurt (Main), Germany – 2005

State Certified Apprenticeship (Ausbildung) in Information and Telecommunications Systems Electronics Technician (Informations- und Telekommunikationssystem Elektroniker) – Siemens AG, Frankfurt (Main), Germany – 2000

High School – Brüder Grimm Realschule, Frankfurt (Main), Germany – 1997

Scientific Experience

Volunteering

Member of the appointments committee (Berufungskommission) for the Machine Learning professorship, University of Hamburg, 2020/21

Certifications

Attended 28th European Summer School in Logic, Language and Information (ESSLI), Bolzano-Bozen, Aug 2016

Research Projects

03/2019 to 02/2022 . . JOIN-T2: Joining Ontologies with Text

06/2017 to 01/2019 . . WebAnno meets EXMARaLDA

01/2017 to 03/2019 . . BIMDanube: Network of Excellence on Biomedical Information Management in the Danube Region

2016 to 2017 Associate Researcher at JOIN-T: Joining Ontologies and Semantics Induced from Text

04/2013 to 06/2016 . . Knowledge Discovery in Scientific Literature (§KDSL)

2015 to 2017 Associate Researcher at AIPHES: Adaptive Preparation of Information from Heterogeneous Sources

Visiting Researcher

04/2014 to 06/2014 . . Bar Ilan University, Ramat Gan, Tel Aviv, Israel

Outline: Worked closely with Omer Levy under the guidance of Prof. Ido Dagan, Ph.D. on lexical entailment using distributional semantics.

02/2019 to 04/2019 . . Indian Institute of Technology (IIT) Kharagpur, Kharagpur, West Bengal, India

Outline: Worked under the guidance of Animesh Mukherjee and Pawan Goyal on an expert ranking system with summarization.

Organizing Committee

Organizer Shared Task on Classification and Regression of Cognitive and Motivational Style from Text (GermEval Task 1) held in conjunction with the SwissText & Konvens Joint Conference, 2020 ([link](#))

Responsibilities: Advised and supported organizational initiatives and efforts.

Main Organizer Shared Task on Hierarchical Classification of Blurbs (GermEval Task 1) held in conjunction with the GSCL Conference, 2019 ([link](#))

Responsibilities: In collaboration with Rami Aly under my supervision, I managed the call for participation, developed and maintained the shared tasks website, coordinated paper submissions, authored the overview paper, and organized and hosted the workshop session at the GSCL Conference.

Main Organizer 2nd Workshop on Biomedical Information Management: Data-Driven Innovations held in Hamburg, Aug. 2018 ([link](#))

Responsibilities: I led the full organization of the workshop, including securing the venue, inviting speakers, designing the program, issuing the call for participation, and overseeing logistics such as catering, hotel accommodations, and website management.

Main Organizer 1st Workshop on Biomedical Information Management: Challenges and Open Problems held in Hamburg, Feb. 2018 ([link](#))

Responsibilities: In collaboration with Prof. Chris Biemann, I managed the organization of the workshop, including securing the venue, inviting speakers, designing the program, issuing the call for participation, and overseeing logistics such as catering, dinner arrangements, and website management.

Co-Organizer One Day Workshop on IBM Watson held in Darmstadt, Apr. 2014

Responsibilities: Under the guidance of Prof. Chris Biemann, I managed the event schedule and ensured the smooth operation of the technical infrastructure.

Programm Committee

I regularly serve as a voluntary reviewer for the venues listed below and I contributed to numerous other venues (not listed), with a total of over 50 reviewing activities to date.

Conferences EMNLP, ACL, AACL, CONLL, *SEM, NAACL, EACL, AACL-IJCNLP, Coling, LREC, GSCL/KONVENS, COLM

Journals TPAMI, TACL, NLE

Workshops TextGraphs, SemEval, WAC

Teaching Experience

Curricula

University of Hamburg, Hamburg, Germany

- ▶ 1× Co-Lecturer, Research Software Engineering (Lecture+Exercise)
- ▶ 1× Teaching Assistant, Python for Computational Science (Exercise)
- ▶ 2× Lecturer, Deep Learning for Natural Language Processing (Seminar)
- ▶ 3× Lecturer, Web Interfaces for Language Processing Systems (Practical Course)
- ▶ 3× Lecturer, Applications with Aspects of Language Technology (Practical Course)
- ▶ 5× Teaching Assistant, Software Engineering I (Exercise)
- ▶ 1× Lecturer, Deep Learning for Unstructured Data (Seminar)
- ▶ 1× Teaching Assistant, Statistical Methods of Language Technology (Lecture+Exercise)
- ▶ 1× Teaching Assistant, Machine Learning I (Exercise)
- ▶ 1× Lecturer, Practical Applications in NLP (Practical Course)

Technical University of Darmstadt, Darmstadt, Germany

- ▶ 2× Lecturer, Q & A Technologies behind IBM Watson (Seminar Workshop)
- ▶ 3× Teaching Assistant, Algorithms of Language Technology (Lecture + Exercises)
- ▶ 5× Tutor, General Computer Science (Exercises)



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Thesis Supervision

Provided dedicated supervision for 2 student helpers, 3 inters and 24 academic theses, including 10 Bachelor's theses, 11 Master's theses and 3 independent studies. Led regular one-on-one progress meetings on a weekly or bi-weekly basis, ensuring consistent academic development, timely completion, and overall project success.

- 1 Günzler R. (in progress). *Exploring large language models in argument retrieval for content- and demographic-relevance* [BA]. Universität Hamburg.
- 2 Heider P. (in progress). *The EU AI Acts Risk Management in Practice* [BA]. Universität Hamburg & Bucerius Law School.
- 3 Hinrichs N. (2024). *Combined generation of images and texts for MEMEs* [BA]. Universität Hamburg.
- 4 Roth L. (2024). *A comparison of selective state space models and transformers for single-step retrosynthetic reaction prediction* [BA]. Universität Hamburg.
- 5 Li M. (2022). *Knowledge-infused approaches to abstractive text summarization* [MA]. Universität Hamburg.
- 6 Lübeck T. (2022). *Clustering of bert-based subject-verb-object embeddings* [BA]. Universität Hamburg.
- 7 Rausch F. (2022). *Transformer-encoder-based financial entity and value extraction with distant supervision* [MA]. Universität Hamburg.
- 8 Stenzel J. (2022). *Zero-shot entity disambiguation by clustering unambiguous contextualized mentions* [MA]. Universität Hamburg.
- 9 Wille F. (2022). *Unsupervised entity disambiguation using pretrained contextualized word embeddings* [MA]. Universität Hamburg.
- 10 Fischer M. (2021). *Matching bottom-up sense inventories to top-down ontology concepts* [BA]. Universität Hamburg.
- 11 Fischer T. (2021). *Finding factual inconsistencies in abstractive summaries* [MA]. Universität Hamburg.
- 12 Venkatesh G. (2021). *Enriching word representations using distributional thesaurus* [MA]. Universität Hamburg & IIIT, Bangalore.
- 13 Hatz HO. (2020). *Using neural language models to detect spoilers* [MA]. Universität Hamburg.
- 14 Au CN. (2019). *Question answering for machine comprehension: A unified approach* [Independent Study]. Technische Universität Hamburg.
- 15 Dobert T. (2019). *Sentiment analysis of informal online texts with neural networks* [MA]. Universität Hamburg.
- 16 Feng J. (2019). *Pun detection and location* [Independent Study]. Technische Universität Hamburg.
- 17 Aly R. (2018). *Hierarchical writing genre classification with neural networks* [BA]. Universität Hamburg.
- 18 Brusch K. (2018). *Variational inference for scalable probabilistic topic modelling* [MA]. Universität Hamburg & AirBnb.
- 19 Fazrie AR. (2018). *Visual information management with compound graphs* [MA]. Universität Hamburg.
- 20 Fischer T. (2018). *Expert retrieval using weighted query-based expertise graphs on citation networks* [BA]. Universität Hamburg.
- 21 Harms J. (2018). *Evaluation of argumentation schemas for the identification of software-architecture knowledge in developer communities* [BA]. Universität Hamburg.
- 22 *Relation extraction using sense embeddings* [Independent Study]. Universität Hamburg. (2018).
- 23 Sobania D. (2015). *Focused crawling with self-learning features* [MA]. Technische Universität Darmstadt.
- 24 Werner D. (2015). *Focused crawling for parallel corpora* [BA]. Technische Universität Darmstadt.

Awards & Grants

2022 Mentor for a student research project (Förderung studentischer Forschungsgruppen), supervising a team of 4 students awarded with €10,000 to support a novel language learner application with eye-tracking on consumer hardware (iPads).



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2019 Awarded over €3,000 by the German DAAD office to work in a top international research program in India.

2015 Best mentoring award for “Algorithms of Language Technology” exercise lab.

2013, 2014, 2016 Association of Computational Linguists (ACL) Travel Grants.

2013 – 2016 Knowledge Discovery in Scientific Literature (KDSL) Graduate School Fellowship from the Technical University of Darmstadt & German Institute for International Educational Research (DIPF) ([link](#))

2013 Awarded a travel grant of €1,000 from Freunde der TU-Darmstadt e.V.

Publications



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