

PhD Position - Reducing the energy footprint of AI systems

You want to apply your data science knowledge to the basic research questions and societal challenges of our modern world? Our scientists in HDS-LEE address some of the most pressing issues of our time, such as energy transition, climate change and resource scarcity, brain function, drug design, identification of diseases at very early stages.

As Helmholtz School for Data Science in Life, Earth and Energy (HDS-LEE), we aim to educate and train the next generation of data scientists during their doctoral thesis in close contact to domain-specific knowledge and research in three application domains: Life and medical science, earth science, energy systems and material science. Visit HDS-LEE at: <https://www.hds-lee.de/>

The *Chair of Artificial Intelligence Methodology* (Informatik 14, RWTH Aachen University), headed by Prof. Dr. Holger Hoos, is concerned with the research and development of methods in human-centred artificial intelligence (AI) and their broad use for the benefit of society and humanity ("*AI for All*" and "*AI for Good*"). In addition to the research into the fundamentals of AI, particularly on topics in machine learning, automated reasoning and optimisation, our work focuses on AI applications in the fields of medicine and health, climate, and art. More information can be found on our website.: www.aim.rwth-aachen.de

Project overview

AI systems, and notably machine learning techniques, have advanced considerably over the past decade. As a result, they are now being used increasingly broadly across many application domains and are seen widely as drivers not only of future economic prosperity, but also of scientific progress. At the same time, these systems and the algorithms they are based on have a considerable and fast-growing energy footprint. Principled ways of reducing this footprint are therefore a topic of active research and high societal relevance.

The final goal of this project is to provide data scientists and AI researchers across a broad spectrum of application domains with tools and techniques for understanding and minimising the energy footprint of their work, especially when using automated machine learning (AutoML) techniques, which are especially compute-intensive.

Towards this end, we will be studying techniques for assessing and reducing the energy footprint of AI systems, with a focus on AutoML techniques, including hyperparameter optimisation and neural architecture search, and the ML systems optimised or produced by them. New, automated techniques will be developed, leveraging insights and algorithms from single- and multi-objective optimisation, as well as the paradigm of Programming by Optimisation (PbO), which underlies all AutoML systems.

Your Profile

- Excellent degree in computer science or a closely related discipline
- Strong background in artificial intelligence, machine learning or data science
- First-author scientific publications are highly desirable
- Profound programming knowledge in at least one scripting language and one high-level language
- Experience with running large-scale experiments on compute clusters is highly desirable
- Excellent organisational skills and ability to work independently
- Strong communication skills and capacity to strengthen a highly international and interdisciplinary team
- High level of scholarship as indicated by bachelor and master study transcripts and two reference letters
- Very good command of the English language (TOEFL or equivalent evidence)

What we offer

The HDS-LEE PhD position will be located at RWTH Aachen University, Chair of AI Methodology (AIM).

- Outstanding scientific and technical infrastructure – ideal conditions for successfully completing a doctoral degree
- A highly motivated group as well as an international and interdisciplinary working environment
- Continuous scientific mentoring by your scientific advisors
- Chance of participating in (international) conferences and other networking activities
- Unique HDS-LEE graduate school program

- Qualification that is highly welcome in industry
- Further development of your personal strengths, e.g. via a comprehensive further training program

We offer you an exciting and varied role in an international and interdisciplinary working environment. The position is for a fixed term of 3 years. Your salary is in line with 100 % of pay group 13 of the Collective Agreement for the Public Service (TVöD/TVL). Equal career prospects for women and men. We especially foster women in data science and offer individual career planning. We welcome applications from disabled persons.

Become a part of HDS-LEE and apply.

Applicants should submit applications (a one-page letter of motivation why they are interested in the respective project and how they can contribute to the project's success, a current CV, and contact data of three references) by email to secret@aim.rwth-aachen.de. Please provide all documents as one PDF file.

Apply until: 15 June 2022

Starting date: 1 August 2022