

Applications Driven Automatic Differentiation

Project description:

The Department of Computer Science at the University of Hertfordshire invites applications for a PhD position in computer science (computational optimisation). The University of Hertfordshire is located in Hatfield, just 25 minutes by train from King's Cross station in London.

We are looking for a mathematically talented PhD student with excellent programming skills to continue long-term research in the area of automatic differentiation in our department.

Derivatives play an important role in many modern numerical methods in computational science and engineering. Automatic differentiation (AD) is a set of techniques for transforming a program that calculates numerical values of a function, into a program that calculates numerical values for derivatives of that function with about the same accuracy and efficiency as the function values themselves. AD allows to perform on coded models a what-if analysis, that is, analysing the sensitivity of parameters without expensive simulation.

As computational techniques for automatic differentiation improve, many new opportunities for advances emerge in areas for which optimisation is an important tool. The aim of this PhD research is to investigate how such opportunities can benefit broader optimisation problems, with a focus on improving the effectiveness of AD in concrete application areas and allowing for more resource-efficient calculations of the derivatives.

This research will be done in collaboration with RWTH Aachen University in Germany and NAG Ltd., a company based in Oxford that provides industry-leading numerical software and technical services to banking and finance, energy, engineering, and market research.

Further details:

The position is available for a 3-year period. The starting date is negotiable, but is ideally around August-October 2024.

Required qualifications:

- MSc degree (or equivalent, giving access to doctoral studies) in Computer Science, Mathematics, Electrical Engineering, or a related field. Students about to complete their MSc are also welcome to apply.
- Excellent academic record, showing a strong theoretical/mathematical background.
- Proficiency in at least one programming language, such as C++, Java or Python.
- Excellent communication skills in English, spoken and written.

More information:

Do you recognize yourself in this profile and would you like to know more? Please contact Dr Olga Tveretina (mailto: o.tveretina@herts.ac.uk) and/or Dr Raimund Kirner (mailto: r.kirner@herts.ac.uk).