Delft Center for Systems and Control

TU Delft
Delft University of Technology

Postdoc Reinforcement Learning and Control: An Algorithmic Approach

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Job description

Recent developments in sensing and communication technology offer unprecedented opportunities by ubiquitously collecting data at high detail and at large scale. Utilization of data at these scales, however, poses a major challenge for control systems, particularly in view of the additional inherent uncertainty that data-driven control signals introduce to systems behavior. In fact, this effect has not been well understood to this date, primarily due to the missing link between data analytics techniques in machine learning and the underlying physics of dynamical systems.

The goal of this project is to address this issue by proposing a novel control design paradigm embracing ideas from the emerging field of distributionally robust optimization (DRO). DRO is a decision-making model whose solutions are optimized against all distributions consistent with given prior information. Recent breakthrough work, among others by the PI of this proposal, has shown that many DRO models can be solved in polynomial time even when the corresponding stochastic models are intractable. DRO models also offer a more realistic account of uncertainty and mitigate the infamous post-decision disappointment of stochastic models.

Requirements

Candidates for this challenging project should have a PhD degree and background in e.g., systems and control, computer science, applied mathematics, electrical engineering, mechanical engineering, or chemical engineering. The candidate must be enthusiastic and greatly interested in fundamental research in addition to having good programming skills for implementing state-of-the-art advanced algorithms. Familiarity or previous experience with the following topics is a plus: model predictive control, model-based and data-driven fault detection and identification, moving horizon estimation, convex optimization, randomized algorithms, stochastic programming, machine learning. In addition, excellent communication skills are important for this position and a good command of the English language is required. Previous experience in an industrial environment or serving as a liaison with industrial partners is a plus. We offer the opportunity to perform scientifically challenging research in a multi-disciplinary research group in collaboration with several key industrial partners in high-tech manufacturing.

Conditions of employment

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities (salary indication: € 4.036 - € 5.090 per month gross). The TU Delft offers a customisable compensation package, discounts on health insurance, and a monthly work costs contribution. Flexible work schedules can be arranged.

For international applicants, TU Delft has the Coming to Delft Service. This service provides information for new international employees to help you prepare the relocation and to settle in the Netherlands. The Coming to Delft Service offers a Dual Career Programme for partners and they organise events to expand your (social) network.

The appointment will be for 1 year, with the possibility for extension up to 3 years.

TU Delft (Delft University of Technology)

Delft University of Technology is built on strong foundations. As creators of the world-famous Dutch waterworks and pioneers in biotech, TU Delft is a top international university combining science, engineering and design. It delivers world class results in education, research and innovation to address challenges in the areas of energy, climate, mobility, health and digital society. For generations, our engineers have proven to be entrepreneurial problem-solvers, both in business and in a social context.

At TU Delft we embrace diversity as one of our core values and we actively engage to be a university where you feel at home and can flourish. We value different perspectives and qualities. We believe this makes our work more innovative, the TU Delft community more vibrant and the world more just. Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale. That is why we invite you to apply. Your application will receive fair consideration.

Challenge. Change. Impact!

Faculty Mechanical, Maritime and Materials Engineering

From chip to ship. From machine to human being. From idea to solution. Driven by a deep-rooted desire to understand our environment and discover its underlying mechanisms, research and education at the 3mE faculty focusses on fundamental understanding, design, production including application and product improvement, materials, processes and (mechanical) systems.

3mE is a dynamic and innovative faculty with high-tech lab facilities and international reach. It’s a large faculty but also versatile, so we can often make unique connections by combining different disciplines. This is reflected in 3mE’s outstanding, state-of-the-art education, which trains students to become responsible and socially engaged engineers and scientists. We translate our knowledge and insights into solutions to societal issues, contributing to a sustainable society and to the development of prosperity and well-

being. That is what unites us in pioneering research, inspiring education and (inter)national cooperation.

Click here to go to the website of the Faculty of Mechanical, Maritime and Materials Engineering. Do you want to experience working at our faculty? These videos will introduce you to some of our researchers and their work.

Additional information

For more information about this vacancy, please contact Peyman Mohajerin Esfahani, p.mohajerinesfahani@tudelft.nl.

Are you interested in this vacancy? Please apply by 31 March 2024 via the application button and upload:

- motivation letter
- detailed CV
- names and contact information of 3 references.

For information about the application procedure, please contact Linda Ruijters, HR Advisor, recruitment-me@tudelft.nl.

Notes:
- You can apply online. We will not process applications sent by email and/or post.
- Please do not contact us for unsolicited services.

Application procedure

A pre-employment screening can be part of the selection procedure.

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