PhD Position on Safe Learning-based Model Predictive Control

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Job description

Model predictive control (MPC) is an established control methodology for handling multi-variable control problems and is capable of explicitly dealing with constraints on inputs and outputs. Recently, the abundance of measured data rises the interest in deriving MPC approaches that can learn from data and adapt to time-varying or uncertain dynamics. However, driving an adaptive control while respecting the system constraints is a challenging task. This project aims to integrate the methods from model-based and learning-based control to develop control methods that are adaptive and guarantee constraint satisfaction or provide bounds on closed-loop constraint violation. More specifically, the aim is to develop innovative approaches to combine robust model predictive control (MPC) and reinforcement learning (RL) to develop safe adaptive control strategies.

Requirements

Candidates for this project should have an MSc degree and background in e.g., systems and control, applied mathematics, electrical/mechanical engineering, or related field. The candidate should demonstrate a strong theoretical background in terms of mathematical and systems-and-control knowledge. Expertise in robust and model predictive control, stochastic systems and/or reinforcement learning is a plus. Excellent written and oral communication skills in English are important for this position.

The department Delft Center for Systems and Control (DCSC) of the faculty Mechanical, Maritime and Materials Engineering, coordinates the education and research activities in systems and control at Delft University of Technology. The Centers' research mission is to conduct fundamental research in systems dynamics and control, involving dynamic modelling, advanced control theory, optimisation and signal analysis. The research is motivated by advanced technology development in physical imaging systems, renewable energy, robotics and transportation systems.

http://www.dcsc.tudelft.nl

Conditions of employment

TU Delft offers PhD-candidates a 4-year contract, with an official go/no go progress assessment after one year. Salary and benefits are in accordance with the Collective

Labour Agreement for Dutch Universities, increasing from € 2395 per month in the first year to € 3061 in the fourth year. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment with an excellent team of supervisors, academic staff and a mentor. The Doctoral Education Programme is aimed at developing your transferable, discipline-related and research skills.

The TU Delft offers a customisable compensation package, discounts on health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. For international applicants we offer the Coming to Delft Service and Partner Career Advice to assist you with your relocation.

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 and aim to be as inclusive as possible (see our Code of Conduct). Together, we imagine, invent and create solutions using technology to have a positive impact on a global scale.

Challenge. Change. Impact!

Faculty Mechanical, Maritime and Materials Engineering

The Faculty of 3mE carries out pioneering research, leading to new fundamental insights and challenging applications in the field of mechanical engineering. From large-scale energy storage, medical instruments, control technology and robotics to smart materials, nanoscale structures and autonomous ships. The foundations and results of this research are reflected in outstanding, contemporary education, inspiring students and PhD candidates to become socially engaged and responsible engineers and scientists. The faculty of 3mE is a dynamic and innovative faculty with an international scope and high-tech lab facilities. Research and education focus on the design, manufacture, application and modification of products, materials, processes and mechanical devices, contributing to the development and growth of a sustainable society, as well as prosperity and welfare.

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? This video will introduce you to some of our researchers and their work.

Additional information

For more information about this vacancy, please contact Assistant Professor Azita Dabiri, email: a.dabiri@tudelft.nl

For more information about the application procedure, please contact Irina Bruckner, HR Advisor, email: application-3me@tudelft.nl

Application procedure

Are you interested in this vacancy? Please apply by July 31, 2021 via the application button and upload:

- a detailed curriculum vitae;
- a cover letter stating your motivation;
- the names of up to three professional referees;
- a list of courses taken with grades obtained in your BSc and MSc program (in English);
- a list of publications (if any);
- a summary of your MSc thesis.

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

You can apply online. We will not process applications sent by email and/or post.

Acquisition in response to this vacancy is not appreciated.

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