Delft Center for Systems and Control

TU Delft
Delft University of Technology

Apply Here

PhD Position Learning and Control for Probabilistic Multi-Agent Systems

Challenge: Ensure the safe navigation of automated vehicles in mixed traffic
Change: Use probabilistic machine learning models and multi-agent systems
Impact: Promote safe interaction in uncertain traffic environments

Job description

TU Delft is a top tier university and is exceedingly active in the field of Artificial intelligence. The HERALD lab is devoted to the development of novel computational frameworks to enable AI-based systems to safely and robustly interact with the humans and the uncertain environment around them. Our long-term ambition is to lay a foundation for the development of future automated driving systems which can reliably and beneficially interact with humans while maintaining human responsibility for their operation.

Your position will investigate the combination of probabilistic machine learning approaches and formal methods from computer science and control theory to devise solutions to problems in the context of multi-agent systems. In particular, your research will focus on developing probabilistic data-driven methods, for agents to safely interact in a multi-agent system and with expected level of performance. The theoretical results will be applied in the context of autonoumous driving to guarantee that automated vehicles can drive and interact safely in urban mixed traffic, i.e., where some of the vehicles are (fully) automated and others are driven by humans.

Requirements

- An MSc degree in systems and control, applied mathematics, electrical engineering, computer science, mechanical engineering, transportation engineering or related fields.
- Basic knowledge of control systems theory (waived if the candidate is particularly skilled on theoretical computer science or machine learning).
- Strong analytical skills and an ability to work at the intersection of several research domains, in particular control systems theory and computer science.
- Basic programming skills in Python, C/C++.
- Good command of spoken and written English and good communication skills.

Conditions of employment

TU Delft offers DAI-Lab PhD-candidates a 5-year contract with an official go/no go progress assessment after one year. The duration of your employment contract corresponds to the envisaged time of 5 years to complete your Doctoral programme as agreed with you. As a DAI lab PhD candidate you will be specifically deployed for AI-related education within the DAI labs programme. Therefore the duration of your employment contract is 5 years instead of a standard 4 year PhD contract. The extra year accommodates for the additional teaching load with regard to AI, Data and Digitalization education related activities.

Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities, increasing from € 2395 per month in the first year to € 3217 in the fifth 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.

HERALD lab
HERALD lab is a Delft Artificial Intelligence Lab. Artificial Intelligence, Data and Digitalisation are becoming increasingly important when looking for answers to major scientific and societal challenges. In a DAI-lab, experts in 'the fundamentals of AI technology' along with experts in 'AI challenges' run a shared lab. As a PhD, you will work with at least two academic members of staff and three other PhD candidates. In total TU Delft will establish 24 DAI-Labs, where 48 Tenure Trackers and 96 PhD candidates will have the opportunity to push the boundaries of science using AI. You will be a member of the thriving DAI-Lab community that fosters cross-fertilization between talents with different expertise and disciplines.

Each team is driven by research questions which arise from scientific and societal challenges and contribute to the development and execution of domain specific education. You will receive a 5-year contract and will be deployed for AI-related education for the usual teaching effort for PhD students in the faculty plus an additional 20%. The extra year compared to the usual 4-year contract accommodates the 20% additional AI, Data and Digitalisation education related activities. All team members have many opportunities for self-development..

The DAI HERALD lab is led by Luca Laurenti and Arkady Zgonnikov. You will work at the Delft Centre of Systems and Control (DCSC) and will be supervised by Luca Laurenti (System and Control Engineering) and Simeon Calvert (Transportation and traffic engineering).

Department
The Delft Centre for Systems and Control (DCSC) coordinates the education and research activities in systems and control at Delft University of Technology. The Centre's 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, robotics and transportation systems. The group actively participates in the Dutch Institute of Systems and Control (DISC).

Additional information

For information about this vacancy and the selection procedure, please contact Luca Laurenti, Assistant Professor, email: L.Laurenti@tudelft.nl.

Application procedure

Are you interested in this vacancy? Please apply before **5 April 2021** via the application button and upload the following pdf files:

- (pdf 1) 1-page Motivation letter, your CV;
- (pdf 2) a (part of your) M.Sc. thesis or a paper that you have written, in which you demonstrate your writing skills;
- (pdf 3) academic transcripts of both your BSc and MSc degrees.

Please highlight in your motivation letter and/or CV examples of projects and achievements that demonstrate your relevant competences

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.

Apply Here