Robot Learning of Mobile Manipulation Ph.D. Student Position @ TU Darmstadt

The newly founded Intelligent Robotics Systems and Assistants (iROSA) group, led by Georgia Chalvatzaki, Ph.D., in cooperation with the Intelligent Autonomous Systems Lab (IAS) at the Technical University of Darmstadt (TU Darmstadt) is seeking a Ph.D. student with a strong interest in one or more of the following research topics:

* Learning of Mobile Manipulation and Grasping;
* Human-robot interaction and learning for Human-robot object handovers;
* Learning in Task and Motion Planning of Long-horizon assistive tasks.

The Ph.D. student will work on a highly interdisciplinary topic at the intersection of machine learning and classical robotics. Following the increasing demand for embodied AI agents that will serve as assistants in houses, workplaces, etc., we will research how intelligent behavior may be acquired by the continual purposeful interaction of an agent with an environment and the induced sensorimotor experience.

Our central research question is "How can embodied AI systems, specifically mobile manipulator robots, acquire skills for performing long-horizon assistive tasks in human-inhabited environments?". As planning for assistive tasks requires impractical computational time, coupling planning with learning methods is key to advancing the state-of-the-art in the field of mobile manipulation. Before the introduction of deep Reinforcement Learning, learning methods were not able to scale well to high-dimensional problems, thus prohibiting their use in real-world problems. iROSA group aims to create mobile manipulation robot assistants with the ability to intelligently acquire their skills, fluently interact with humans through handover tasks, and dynamically adapt their behavior for accomplishing long-horizon household tasks, like the fetch-carry-handover paradigm, in human-inhabited environments.

Outstanding students and researchers from the areas of robotics and robotics-related areas including machine learning, control engineering, or computer vision are welcome to apply. The candidates are expected to conduct independent research and at the same time contribute to the research topics listed above.

Women and people of underrepresented minority groups are strongly encouraged to apply.

ABOUT THE APPLICANT
Ph.D. position applicants need to have a Master's degree (high grade required) in a relevant field (e.g., Robotics, Computer Science, Engineering, Statistics & Optimization, Math and Physics). Expertise in working with real robot systems (including e.g. programming in ROS and sensor data processing) and strong interest or past experience in working with an interdisciplinary team is a big plus.

THE POSITION
The position is for a 36-month contract. Payment will be according to the German TVL payment scheme.

HOW TO APPLY?
All complete applications submitted through our online application system found at https://www.ias.informatik.tu-darmstadt.de/Jobs/Application will be considered.
The deadline for applications is 18.01.2021.
The position is planned to start between March 2021 and September 2021
Depending on the candidate's availability.
Ph.D. applicants should provide at least a research statement, a PDF with their CV, degrees, and
grade-sheets, and two references who are willing to write a recommendation letter.
Please state clearly how your past experience in robotics and machine learning relates to the offered
topics in your Research Statement.
Note that we favor heavily candidates with real robot experience.
Please ensure to include your date of availability for starting the Ph.D. position.
Please, after submitting the application, send a quick notification with the subject line
"Ph.D. student applicant <your name>" to Dr. Georgia Chalvatzaki
(georgia.chalvatzaki@tu-darmstadt.de) and include your application number in the e-mail.

ABOUT iROSA and IAS
The iROSA group is a newly founded group on intelligent robotics systems for assistance led by Dr. Georgia Chalvatzaki (https://www.ias.informatik.tu-darmstadt.de/Team/GorgiaChalvatzaki). Georgia Chalvatzaki, a postdoctoral researcher at the Intelligent Autonomous Systems group (IAS) in the Department of Computer Science at TU Darmstadt, has been accepted into the renowned Emmy Noether Programme (ENP) of the German Research Foundation (DFG). This project was awarded within the ENP Artificial Intelligence call of the DFG – only 9 proposals out of 91 proposals were selected for funding. It enables outstanding young scientists to qualify for a university professorship by independently leading a junior research group over six years.
In her research group iROSA, Dr. Chalvatzaki and her new team will research the topic of "Robot Learning of Mobile Manipulation for Assistive Robotics". Dr. Chalvatzaki proposes new methods at the intersection of machine learning and classical robotics, taking one step further the research for embodied AI robotic assistants. The research in iROSA proposes novel methods for combined planning and learning for enabling mobile manipulator robots to solve complex tasks in house-like environments, with the human-in-the-loop of the interaction process. The iROSA group has access to two bi-manual manipulator robots TIAGo++ by PAL robotics, a dedicated OptiTrack Motion Capture System, Kinect Azure, and RealSense cameras, a cluster for accelerated computing, etc.
Dr. Chalvatzaki completed her Ph.D. studies in 2019 at the Intelligent Robotics and Automation Lab at the Electrical and Computer Engineering School of the National Technical University of Athens, Greece, with her thesis "Human-Centered Modeling for Assistive Robotics: Stochastic Estimation and Robot Learning in Decision Making." During her career, she has worked on eight research projects, and she has published more than 30 papers (Google scholar), most of which in top-tier robotics and machine learning venues, e.g., ICRA, IROS, RA-L.
Her research at the Computer Science department of TU Darmstadt has been about human-robot collaboration and joint action. In her recent work, she focused on robotic grasping, manipulation, and motion prediction, introducing novel methods for orientation attentive grasp synthesis, accelerated skill learning, and human intention prediction.

The Intelligent Autonomous Systems (IAS) institute of TUDa (https://www.ias.informatik.tu-darmstadt.de/) is considered one of the strongest robot learning groups in Europe with expertise ranging from the development of novel machine learning methods (e.g., novel reinforcement learning approaches, policy search, imitation learning, regression approaches, etc.) over semi-autonomy of intelligent systems (e.g., shared control, interaction primitives, human-collaboration during manufacturing) to fully autonomous robotics (e.g., robot learning
ABOUT TU DARMSTADT
TU Darmstadt is one of Germany's top technical universities and is well known for its research and teaching. It was one of the first universities in the world to introduce electrical engineering programs, and it is Germany's first fully autonomous university.
More information can be found on
https://en.wikipedia.org/wiki/Technische_Universit%C3%A4t_Darmstadt

ABOUT DARMSTADT
Darmstadt is a well-known high-tech center with essential activities in spacecraft operations (e.g., through the European Space Operations Centre, the European Organization for the Exploitation of Meteorological Satellites), chemistry, pharmacy, information technology, biotechnology, telecommunications, and mechatronics, and consistently ranked among the Top high-tech regions in Germany. Darmstadt's important centers for arts, music, and theatre allow for versatile cultural activities, while the proximity of the Odenwald forest and the Rhine valley allows for many outdoor sports. The 33,547 students of Darmstadt's three universities constitute a significant part of Darmstadt's 140,000 inhabitants. Darmstadt is located close to the center of Europe. With just 17 minutes driving distance to the Frankfurt airport (closer than Frankfurt itself), it is one of Europe's best-connected cities. Most major European cities can be reached within less than 2.5h from Darmstadt.