30th October 2019

Languages English

PhD Research Fellow in Sensor fusion for perception, collision avoidance and navigation towards autonomous systems

Apply for this job

(https://www.jobbnorge.no/jobseeker/#/application/apply/176225)

See advertisement

About the position

A 100 % position is available at the University of Agder, Faculty of Engineering and Science (https://www.uia.no/en/about-uia/faculties/faculty-of-engineering-and-science) as a PhD Research Fellow, for a period of 3 years (January 2020 – December 2022), with possibility of one-year extension, with additional teaching assistance duties. The position is affiliated to the Department of Engineering Sciences (https://www.uia.no/en/about-uia/faculties/faculty-of-engineering-and-science/institutter2/department-of-engineering-sciences) and the Mechatronics group (https://www.uia.no/en/research/teknologi-og-realfag/ingenioervitenskap/robotics-and-automation), in collaboration with Department of Information and Communication Technology (ICT) (https://www.uia.no/en/about-uia/faculties/faculty-of-engineering-and-science/institutter2/department-of-information-and-communication-technology) and WISENET center (https://wisenet.uia.no/). The position is located at Campus Grimstad.

Responsibilities

A 3-year PhD position has occurred with 3D Sensors and Autonomous systems, within Faculty of Engineering and Science (Mechatronics group and ICT) at University of Agder; Senter for forskningsdrevet innovasjon (SFI Offshore Mechatronics (https://sfi.mechatronics.no/)) and industrial partners starting January 2020 and ending December 2022 (with possibility of one-year extension, with additional teaching

assistance duties). This PhD is strongly tied to academic, research centers and industries where the student, on one hand, will benefit intellectually from strong interaction between academic, and well-equipped research centers while gaining exposure to the industries at the same time, thus making a balance between academic and industry. Some of partners and collaborators with SFI project are – NORCE, NOV, ABB, UiA, NTNU and the list goes on. Please refer to for the complete list of partners (https://sfi.mechatronics.no/?page_id=2).

The objective of this PhD thesis is to design, implement and validate sensor fusion algorithms at perception layer for scene perception, object detection, collision avoidance and navigation towards autonomous systems, especially focused on autonomous waterborne applications and maritime sectors such as autonomous ship.

The PhD candidate will work on the perception layer to process the signal from Lidar and camera for scene perception that include the object recognition (using the information from camera) and its distance from the vehicle (using the information from Lidar) in different adverse climatic and environmental conditions. Then based on the information, the necessary action is triggered for path planning and control to guide the autonomous system in pre-defined path for collision avoidance. To achieve the task various Machine learning (ML) algorithms (e.g. Yolo R-CNN, 3D-CNN, voxnet, GCN/GNN and related other algorithms) and libraries for point cloud processing for object detection shall be fused, trained, implemented and/or optimized. For detail please refer here (https://drive.google.com/file/d/1niqS0sCIjb4_VL4yXkSRE1pYRJ1Hf9WS/view).

More specifically the scope of this PhD is

- Use the existing infrastructure (integrated Lidar and camera) to develop solutions for perception, object recognition, collision avoidance and navigation
- Simultaneous Localization and Mapping (SLAM)
- Extrinsic and Intrinsic callibration
- Machine Learning algorithms to perform different

inferences (information extraction, object recognition, tracking) and autonomous control algorithms for navigation and collision avoidance.

Key words: Lidar, camera, sensor fusion, object recognition, ML algorithms and frameworks (CNN, RNN, GNN…), collision avoidance, point cloud libraries

Required qualifications

- Masters in related field such as computer science, electronic, mechatronics, robotics or background in sensors and algorithm development. Candidates/candidates who are in the closing stages of their master's degree can also apply.
- Recent graduates with industrial experience are encouraged to apply.
- Familiarity with sensors (Lidar, camera), integration and data acquisition; ROS
- Sound knowledge with computer vision, sensors (and sensor fusion), related ML algorithms and frameworks.
- Knowledge on Geometric convolution neural network and Deep Learning
- Programming languages - Python, C/C++, MATLAB.
- Multi- disciplinary knowledge; make use of existing infrastructure to think out of box to provide solutions to given / arisen problems.
- Good knowledge of English, both written and oral, is also required.

A prerequisite for employment is that the candidate is to be admitted to UiA's PhD programme at the Faculty of Engineering and Science, specialization in Mechatronics (https://www.uia.no/en/studies2/phd-programmes/specialisation-in-mechatronics).

Further provisions relating to the positions as PhD Research

Fellows can be found in the Regulations Concerning Terms and Conditions of Employment for the post of Post-Doctoral Research Fellow, Research Fellow, Research Assistant and Resident (https://www.uhr.no/_f/p1/i83a1e613-4f72-4e3a-9852-5289d556871b/regulations_post_doctoral_and_research_fellow.pdf).

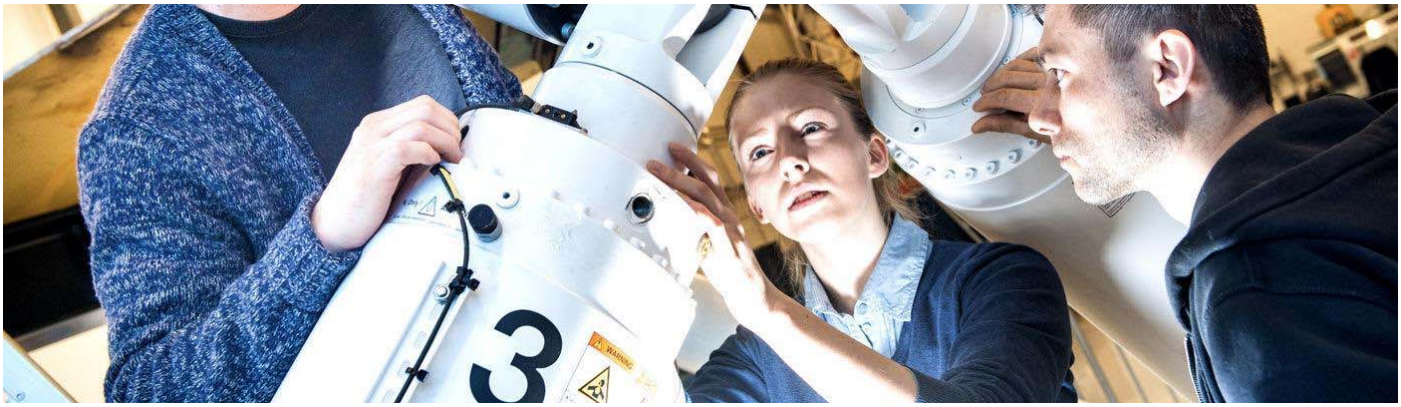
Desired qualifications

- Extensive theoretical and practical knowledge with cameras / Lidars, drivers and installation.
- Experience in localization and navigation techniques for autonomous systems

Personal qualities

- Quick learner, motivated and dedicated to research
- Strong analytical, and experimental skills
- Team player, and be able to work independently depending upon the situations
- Good communication and documentation skills

Personal qualities and suitability for the position will be emphasised.



We offer

- Professional development in a large, exciting and socially influential organisation
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- Membership of the Norwegian Public Service Pension Fund (https://www.spk.no/en/the-value-of-the-membership/)

More about working at UiA (https://www.uia.no/en/about-uia/working-at-uia).

The position is remunerated according to the State Salary Scale, salary plan 17.515, code 1017 PhD Research Fellow, NOK 479 600 gross salary per year. A compulsory pension contribution to the Norwegian Public Service Pension Fund is deducted from the pay according to current statutory provisions.

General information

A good working environment is characterised by its diversity. We therefore encourage all qualified candidates to apply for the position, irrespective of gender, age, disability or cultural background. The University of Agder is an IW (Inclusive Workplace).

Women are strongly encouraged to apply for the position.

The successful applicant will have rights and obligations in accordance with the current regulations for the position, and organisational changes and changes in the duties and responsibilities of the position must be expected. Appointment is made by the University of Agder's Appointments Committee for Teaching and Research Positions.

Short-listed applicants will be invited for interviews. With the applicant's permission, UiA will also conduct a reference check before appointment. More about the employment process (https://www.uia.no/en/about-uia/working-at-uia/hiring-process).

In accordance with the Freedom of Information Act § 25 (2), applicants may request that they are not identified in the open list of applicants. The University, however, reserves the right to publish the names of applicants. Applicants will be advised of the University's intention to exercise this right.

Application

The application and any necessary information about education and experience (including diplomas and certificates) are to be sent electronically. Use the link "**Apply for this job**".

The following documentation must be uploaded electronically:

- Certificates and Diploma
- Updated CV
- List of publications (if any or link to Google Scholar)
- Additional programming skills or experience in other relevant tools (e.g. github, bitbucket if any)
- A description of the applicant's research interests, the background for the research questions that the applicant wishes to work on including project plan (preliminary, not

very descriptive)
- References – 2 (details with Name, designation, email and contact number)
- Summary of Master's thesis (abstract, 1 or 2 pages)
- Any other relevant documentation

The applicant is fully responsible for submitting complete digital documentation before the closing date. All documentation must be available in a Scandinavian language or English.

Application deadline: 30.10.19

Contact

For questions about the position:

- Associate Professor Ajit Jha, tel. +47 37 23 37 29, e-mail ajit.jha@uia.no (mailto:ajit.jha@uia.no)
- Professor Baltasar Beferull-Lozano, tel.: +47 37 23 31 59, email: baltasar.beferull@uia.no (mailto:baltasar.beferull@uia.no)
- Assistant Head of Department, Tom Viggo Nilsen, tel. +47 37 23 32 55, e-mail tom.v.nilsen@uia.no (mailto:tom.v.nilsen@uia.no)

For questions about the application process:

- HR Advisor Nina Rønningen, tel. +47 38 14 20 16, e-mail nina.ronningen@uia.no (mailto:nina.ronningen@uia.no)
- Higher Executive Officer Lise Askbo Fylkesnes, tel. +47 37 23 31 25, e-mail: lise.a.fylkesnes@uia.no (mailto:lise.a.fylkesnes@uia.no)

University of Agder

The University of Agder has more than 1400 employees and 13 000 students. This makes us one of the largest workplaces in Southern Norway. Our staff research, teach and disseminate knowledge from a variety of academic fields. Co-creation of knowledge is our common vision. We offer a broad range of study programmes in many fields. We are situated at two modern campuses in Kristiansand and Grimstad respectively.

We are an open and inclusive university marked by a culture of cooperation. The aim of the university is to further develop education and research at a high international level.

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