Jobbnorge ID: 222112
Deadline: 4/11/2022
Website: http://www.uia.no
Scope: Fulltime
Duration: Temporary

PhD Research Fellow in AI and Machine learning tools for UAV communications - Focus on control and autonomous operations

About the position

A fixed-term 100% position is available at the University of Agder, Faculty of Engineering and Science as a PhD Research Fellow in Mechatronics, affiliated to the Department of Engineering and Sciences in collaboration with the Department of Information and Communication Technology, for a period of three years. The position is located, at the present, at Campus Grimstad. The starting date is as soon as possible or to be negotiated with the Faculty.

The successful applicant will become part of a team of 11 researchers working on artificial intelligence, machine learning, wireless communications, and control theory for autonomous unmanned aerial vehicles (UAVs). This team spans three departments and involves interdisciplinary and international collaboration.

Responsibilities

The successful applicant will conduct research in the project Ubiquitous Connectivity via Autonomous Airborne Networks (AirBonnet). This project comprises a set of key developments intended to develop the technology of unmanned aerial vehicles (UAVs) such as zeppelins, balloons, and multicopters that autonomously navigate through the airspace to provide data connectivity in those locations where it is absent or unsatisfactory.

While households in developed countries receive skyrocketing data rates through optical fibers and smartphones step into the 5G era, roughly one half of the world's population cannot connect to the internet. Even beyond developing economies, bringing data connectivity to areas where it cannot currently reach would drastically benefit applications such as the internet-of-things, smart agriculture/forestry, wildfire suppression, search-and-rescue missions, paramedical interventions, and emergency response handling to name a few.

To this end, the UAVs in the targeted technology are equipped with a communication module that connects to the ground users on one side and to the cellular terrestrial infrastructure on the other side. The user information may even be relayed through multiple UAVs before reaching its destination. For this technology to be viable, the UAVs must be able to navigate without human supervision to locations with favorable propagation conditions, that is, where the signals that they receive from and transmit to the ground users and cellular infrastructure are not significantly blocked by obstacles such as buildings or mountains.

The key approach in this project is to construct "radio maps" that describe the propagation conditions in a certain region. Using these maps, the UAVs rely on artificial intelligence algorithms to determine the appropriate locations and can even adapt to changes in the user positions and connectivity requirements as well as to coordinate with other UAVs. Our preliminary findings already showcase the ability of artificial deep neural networks to construct radio maps from a small number of measurements collected by the UAVs.

This position involves theoretical research, computer simulation, measurement collection, and testbed development.

A prerequisite for employment is that the candidate is to be admitted to UiA's PhD programme at the Faculty of Engineering and Science, Specialisation in Engineering Sciences. The goal of the PhD program is to train students to become autonomous researchers. This means that students need to complete a coursework component of 30 ECTS intended to provide the necessary background for conducting research. Additional self-study will also be required to fill possible background gaps or specialized knowledge requirements.

A close advising model is generally pursued at the beginning, whereas more independence is gradually granted to the student as she/he becomes more mature. Ideally, the student must be able to conduct research independently after graduation.

Part of the objectives of any PhD program is to develop the student's communication skills, both oral and written. The PhD program intensively and advising style will promote and assist in the development of these skills.

The research topic's links to the research environment at the Faculty

Top Research Centre Mechatronics: The project is in line with the activities of the newly established Top Research Center in Mechatronics (TRCM). In particular, important synergies will be created with the following Research Themes (RT): Human-Robot Interaction and Collaborative Robots.

Required qualifications

- Master's degree in a relevant subject area. Candidates who are in the closing stages of their master's degree can also apply. The relevant areas include:

    - Control theory/autonomous systems
    - Machine learning/artificial intelligence
    - Aeronautics/avionics
- English proficiency, both written and oral. International candidates that are not exempt from the English language requirements pursuant to the guidelines of the Norwegian Agency for Quality Assurance in Education (NOKUT) must document this through one of the following tests with the stated results or better:
    - TOEFL - Test of English as a Foreign Language with a minimum score of 600 for the Paperbased Test (PBT), or 92 for the Internet-based Test (iBT)
    - IELTS - International English Language Testing System, with the result of 6.5

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.

Desired qualifications

- Knowledge of control theory, machine learning, artificial intelligence, wireless communications, signal processing, autonomous systems, aeronautics, and/or avionics.
- Strong programming skills, especially in Python, MATLAB, and/or C/C++.
- Kowledge of the Robot Operating System (ROS).
- Experience with UAVs.
- Experience in measurement campaigns.
- Experience in emergency management.
- Working knowledge of Linux.
- Experience with the challenges of designing and rapid-prototyping robotic systems.
- Strong academic credentials and previous publications.

Personal qualities

- Enthusiasm for research
- Problem-solving skills
- Conscientiousness
- Team-working skills
- Critical and scientific thinking

We offer

- Professional development in a large, exciting and socially influential organisation
- A positive, inclusive and diverse working environment
- Modern facilities and a comprehensive set of welfare offers
- Membership of the Norwegian Public Service Pension Fund

More about working at UiA.

The position is remunerated according to the State Salary Scale, salary plan 17.515, code 1017 PhD Research Fellow, NOK 491 200 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

UiA is an open and inclusive university. We believe that diversity enriches the workplace and makes us better. We, therefore, encourage qualified candidates to apply for the position independent of gender, age, cultural background, disability or an incomplete CV.

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. The engagement is to be made in accordance with the regulations in force concerning the acts relating to Control of the Export of Strategic Goods, Services and Technology. Appointment is made by the University of Agder's Appointments Committee for Teaching and Research Positions.

Short-listed applicants will be invited for interview. With the applicant's permission, UiA will also conduct a reference check before appointment. Read more about the employment 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:

- Motivation letter.
- Complete post-secondary transcript of all academic degrees. When attaching a non-Norwegian academic transcript that does not include a description of the grading system (e.g. maximum grade and minimum passing grade) used by the issuing institution, a

(preferably official) description should also be attached. The description may simply contain a link to an official website where the grading system is explained.
- Updated CV with the list of publications.
- Master dissertation.
- Required English language certificates (see above). These can be emailed after the application deadline.

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

Application deadline: 11.04.22

Contact

For questions about the position:

- Professor Filippo Sanfilippo, tel. +47 37 23 30 76, e-mail filippo.sanfilippo@uia.no
- Associate Professor Daniel Romero, tel. +47 37 23 31 96, e-mail daniel.romero@uia.no

For questions about the application process:

- Higher Executive Officer Lise Askbo Fylkesnes, tel. +47 37 23 31 25, e-mail: lise.a.fylkesnes@uia.no

University of Agder

The University of Agder has more than 1500 employees and almost 14 000 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.

Additional information

Place of service:

Jon Lilletuns vei 9 4879 Grimstad (Grimstad Municipality)