Position: **Doctoral Candidate #8 (DC 8)**
Project: **Active Perception and Control with Edge AI**
Host Institution: OnePlanet – The Netherlands
PhD programme: Wageningen University, Agricultural Biosystems Engineering

Research project description

This project is part of **AIGreenBots** (MSCA-DN project funded by the European Union), dedicated to advancing artificial intelligence, robotics, and related technologies for precision agriculture. The project's main goal is to develop and train a new generation of PhD researchers in agricultural robotics through an interdisciplinary and international framework, addressing key areas such as sustainable robotics, precision agriculture, and digital farming.

Within AIGreenBots, you will focus on active perception that plays a crucial role in agricultural robotics, where sensing is required be closely integrated with decision making and robotic control to deal with complex and dynamic environments. You will explore use cases in agriculture where sensing needs to be directly linked to action in real-time. In the project, two types of active-perception will be developed: (i) next-best-view planning to decide on the next viewpoint based on an analysis of previously acquired sensing data and prior knowledge. (ii) closed-loop control using sensor feedback to control a robot in a dynamic, changing environment.

Objectives:

1. Develop an active perception system that integrates high-frequency sensors with standard cameras or LiDAR sensors into real-time robotic control.
2. Create a demonstrator that shows next-best-view and closed-loop control on tree with a robotic arm
3. Utilize the XR platform to validate active perception, comparing with human guided control and human feedback.
4. Implement the developed algorithms on Edge AI Chip technology for field deployment.

Expected Results:

- Literature review on active perception in agriculture
- Development of active perception where sensor and robot action are connected using edge AI that can react real-time toward changed conditions
- Publication of results by creating patents, journal or in top conferences.

Keywords: ***robotic perception; machine learning; multi-sensor fusion***.

Secondments

The secondments that offer your valuable opportunities to enhance your skills and foster international collaboration planned in this research project are:

- Spotlite (PT): to work on active perception, edge AI models, and evaluation on remote sensing use-case.
- Instituto Politecnico de Coimbra (PT): dataset collection and validation on real agricultural conditions (Living Lab).

Desirable skills, qualifications and specific requirements

- Your application should respect the **AIGreenBots** general requirements and eligibility criteria as described in https://aigreenbots.eu/recruitment/general-info.
- You should have a valid MEng/MSc degree, or equivalent, in Computer Science, Embedded Systems, Electrical Engineering, Artificial Intelligence, Robotics, or related fields.
- Python programming skills
- Experience on robotics, machine learning, AI, Edge AI, etc.
- Motivation, sense of responsibility, autonomy, problem-solving skills, effective communication and affinity with agriculture

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- You are entitled to do a PhD internship in the Netherlands. This means that you are an EU/EEA citizen - we can't apply for a sponsorship / permit for non-EU citizens.

Benefits

In this role, you will work with researchers at two of the world's leading institutes on agricultural robotics. You will collaborate closely with other researchers in a European consortium of leading research institutes in the field. You will be employed by imec in the Netherlands. We offer you an attractive compensation and benefits package, including the following:

- € 45.800 gross per year with remote working allowance of €2,35 net per day and commuting allowance of 23 ct/km. This includes the living allowance and the possible mobility and/or family allowance. Details will be discussed in the job offer stage.
- a 100% employer paid pension plan
- hybrid working and flexible working hours
- a wide range of training possibilities and attendance at international conferences
- research, training and networking costs covered for 30 ECTS on self-selected course program
- support in the relocation process
- receiving your PhD from the Wageningen University, one of the highest-ranked university in the field of agriculture and food production.

How to apply

You should submit your application through this channel: https://www.oneplanetresearch.nl/working-at/

Deadline: 1st of March 2025, 23:59.

Please note that while we have set an application deadline, we reserve the right to close the vacancy early if we find a suitable candidate. Therefore, we encourage you to apply as soon as possible.

Additional information

Supervisors of this PhD project: Dr. Bas Boom (OnePlanet), Prof Gert Kootstra (Wageningen University)

Host institution and living conditions: OnePlanet is a collaboration between Wageningen University & Research, Radboud University, Radboudumc and imec. You will work at the OnePlanet office with around 100 enthusiastic colleagues believing in our vision and working on our mission. Imec is a leading research and development hub specializing in nanoelectronics and digital technologies, known for its innovative work in semiconductor scaling, artificial intelligence, and smart energy. You will also be part of the Agricultural Biosystems Engineering group at Wageningen University, one of the highest-ranked university in the field of agriculture and food production, from which you will receive your PhD.

You will be working in the Data & AI department of imec in the OnePlanet digital twin team. The digital twin team consists of ~15 people working on data science, artificial intelligence, robotics enabling research on sensor technology and development of innovative products.

OnePlanet is a diverse Dutch/international organization. It's a young, dynamic, and continuously changing environment. There are lots of opportunities for personal growth, trainings in our academy, and personal development. OnePlanet has offices in Wageningen and Nijmegen. For your activities, the main location is the

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Wageningen office, located convenient on the Wageningen University Campus where there are also options for hybrid working.

Wageningen is a delightful town that seamlessly combines academic excellence with a peaceful, countryside ambiance. As a student, you'll find yourself in a small agriculture academic community that values innovation, sustainability, and a welcoming spirit. You can enjoy living in the rural areas surrounding Wageningen, with their scenic landscapes and peaceful environment. Alternatively, if you prefer a more urban lifestyle, you can easily commute from larger cities like Utrecht, Arnhem, and Nijmegen, which are well-connected and offer a broader range of amenities and activities.

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