Position: **Doctoral Candidate #09 (DC 09)**
Project: **Sensor fusion and robotic perception for agricultural robots**
Host Institution: University of Extremadura - Spain
PhD programme: PhD in Information Technology

Research project description

The PhD candidate will design and develop an advanced perception framework tailored to agricultural robotics, focusing on the integration and temporal coordination of diverse sensor technologies. This framework will incorporate probabilistic models for enhanced environmental recognition and real-time decision-making. Using state-of-the-art methodologies for multi-sensor data fusion, including temporal alignment and stochastic modeling, the candidate will integrate sensors such as cameras, LiDAR, and inertial measurement units (IMUs) into a cognitive architecture that supports real-time decision-making in agricultural tasks.

Objectives:

1. Specify and integrate sensor technologies for agricultural robots, focusing on temporal dimension.
2. Develop a probabilistic perception model that enhances environmental recognition under various conditions.
3. Integration into a cognitive architecture for real-time multi-sensor data fusion, facilitating complex decision-making in agricultural robots.

Expected Results:

- An integrated sensor suite with optimised features for data collection and effective communication protocols.
- Developed a time-based multi-sensor data fusion system.
- A probabilistic model for environmental perception adaptable to different scenarios.
- Disseminate the results in world-class international conferences and journals.

Keywords: ***multi-sensor fusion; probabilistic models; cognitive architecture***.

Secondments

The secondments planned for this research project are at:

- OnePlanet Research Center - IMEC (in Netherlands): further developments, fine-tunning, and testing sensor-fusion for robotic perception.
- Wageningen University & Research - WU (in Netherlands): to validate the selected technologies/systems in a real (farm Lab) agricultural environment.

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 preferably a valid MEng/MSc degree, or equivalent, in electrical engineering, computer science, mathematics, physics, or related fields.
- C++ and Python programming skills
- Some experience on robotics, machine learning, AI, coding. Motivation, sense of responsibility, autonomy and problem-solving skills are highly desirable.

Benefits

- Very attractive salary - living allowance (gross): 3.104,20 €/month
- Excellent conditions including - social security tax, food allowance, PhD tuition fee, mobility allowance, family allowance (if eligible)
    - Mobility allowance (if applicable): 600€/month

Funded by the European Union

AIGreenBots has received funding from the European Union's Horizon Europe research and innovation programme under the Marie Skłodowska-Curie Actions (MSCA) Grant agreement ID 101169330.

- Family allowance (if applicable): 495€/month
- Research, training and networking costs covered: Registration and attendance at international conferences, as well as the costs associated with publications in international peer-reviewed journals.

How to apply

You should submit your application through this channel: https://aigreenbots.eu/recruitment/apply-now

Deadline: 02 of March 2025, 23:59.

Additional information

Supervisors of this PhD project: Prof. Luis V. Calderita, Prof. Pedro Nuñez Trujillo

Host institution and living conditions: The University of Extremadura (Universidad de Extremadura) is a dynamic and growing institution in southwestern Spain, renowned for its commitment to academic excellence and regional development. Established in 1973, it serves as a key educational and research hub in the autonomous community of Extremadura. The university offers a wide range of undergraduate, postgraduate, and doctoral programs across diverse fields, fostering innovation and interdisciplinary collaboration. Your PhD work will be carried out in RoboLab, the Robotics and Artificial Vision Laboratory of the University of Extremadura, a research group specializing in robotics, computer vision, and intelligent systems.

Cáceres is a captivating city where history and culture come alive. As a UNESCO World Heritage Site, it offers a unique blend of medieval charm and vibrant modernity. As a student, you will find yourself surrounded by stunning architecture, cobblestone streets, and an inspiring atmosphere steeped in centuries of tradition. Cáceres is a peaceful and welcoming city, perfect for fostering personal. Its rich cultural heritage, coupled with a warm and inclusive community, makes Cáceres an exceptional place to live, learn, and thrive.

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