Position: **Doctoral Candidate #1 (DC 1)**
Project: **Probabilistic robotic perception for agriculture**
Host Institution: University of Coimbra - Portugal
PhD programme: Electrical and Intelligent Systems Engineering

Research project description

The PhD candidate will develop a sensor fusion framework, including calibration, spatio-time alignment, and stochastic fusion-models, to be embedded in the robots and automated-machinery. She/he will use state-of-the-art methods (early, intermediate - with attention mechanisms - and late-fusion) to combine Deep Learning models based on data collected by cameras, LiDARs, GPS and IMU sensors onboard the field robotics platforms, while the output of such a pipeline will support decision-making.

Objectives:

1. Analyse and benchmark existing artificial perception probabilistic architectures within the context of agriculture.
2. Develop a spatio-temporal multimodal framework for the improvement of perception capabilities of agricultural robots, based on DeepNNs and Dynamic Bayesian Nets.
3. Identify the most relevant sensing abilities according to the task and the amount of information to be exchanged for field-robots (Agri-bots/UAV systems).
4. Validate results in real platforms (secondments).

Expected Results:

- Identify the requirements for robotic perception in agricultural applications and translate them into technical specifications for probabilistic imagery fusion approaches.
- Design and implement an efficient framework for the robot perception considering the case of agricultural robotics.
- Determine criteria to evaluate the proposed architecture both for single-robot and multirobot applications.
- Integrate the approach in different robotic platforms endowed with multimodal sensing and validate the developments.
- Disseminate the results in world-class international conferences and journals.

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

Secondments

The secondments planned for this research project are at:

- Harper Adams University (in UK)
- AntoBot company (in UK)

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 (preferably) electrical engineering, computer science, mathematics, physics, or related fields.
- Python programming skills
- Some experience on robotics, machine learning, AI, coding. Motivation, sense of responsibility, autonomy and problem-solving skills are highly desirable.

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.

Benefits

- Very attractive salary - living allowance (gross): 2 285,06 €/month (x14)
- Excellent conditions including - social security tax, food allowance, PhD tuition fee, mobility allowance, family allowance (if eligible)
- Mobility allowance (if applicable): 600€/month
- Family allowance (if applicable): 495€/month
- Research, training and networking costs covered: Registration and attendance at international conferences.

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. Cristiano Premebida, Prof. Urbano J.C. Nunes

Host institution and living conditions: University of Coimbra stands as one of the oldest and most prestigious universities in Europe, offering a unique blend of tradition, innovation, and vibrant student life. Founded in 1290, it has been a beacon of academic excellence for centuries, with its historic campus, including the stunning Joanina Library and the Royal Palace, offering a mesmerizing glimpse into Portugal's rich past. Your PhD work will be carried out in the DEEC department (Polo 2) and in the Institute of Systems and Robotics.

Coimbra is a dynamic city with a mix of youthful energy and historical charm. As a student, you will be immersed in a city that thrives on creativity, cultural expression, and a warm, and a very welcoming atmosphere. Coimbra is small enough to foster a close-knit community, yet lively enough to offer a myriad of opportunities for social interaction and personal growth.

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