School of AACME

Research Associate in *Agri-Robotics*
Project Title: Information theoretic based collaborative environment sensing for agriculture applications
Job Ref: REQ250154

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

The Loughborough University Centre for Autonomous Systems (LUCAS) in the Department of Aeronautical and Automotive Engineering (AAE), is one of few in the UK which bring together the fundamental research and practical deployment of autonomous systems with state-of-the-art facilities. Housed in purpose-built facilities that include an autonomous systems laboratory, indoor flight test area, workshops, and the access to various robots and agricultural fields, the research group has conducted high-profile research programmes ranging from fundamental theories on autonomous systems to various applicational projects.

Project Description

This project is part of the Horizon MSCA-DN project AIGreenBots (https://aigreenbots.eu/) to develop the next generation of intelligent AI-based agricultural robotics. At Loughborough University Centre for Autonomous Systems, we are recruiting one Doctoral Candidate (DC) at the Research Associate level to work on information theoretic based collaborative environment sensing. The recruited research associate will need to register as a PhD student or DC with Loughborough University.

The project aims to develop a novel online learning and planning framework to coordinate heterogeneous sensing platforms for more effective information gathering in agriculture settings. The DC will design and verify adaptive environment sampling strategies to enable collaborative sensing of key agri-environmental attributes (e.g., crop stress and soil properties) by using both aerial platforms and ground robotics. It is envisaged that the methodologies and tools developed in this project will generate a highly accurate map of crop status and environment factors to support the decision-making process for farming.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose
To conduct research in the areas of robotic information gathering and to develop robotic systems to support algorithm evaluation and demonstration.
To be responsible for development of the collaborative environment sensing capability for agriculture applications and to test and evaluate the performance of the developed algorithms in field trials.

Qualifications
You must hold or close to complete a MEng/BSc degree in Control Engineering, Computer Science, Robotics, Signal processing or a related technical field, or a MSc/MRes degree in relevant fields. Demonstrated ability to program in C/C++, Python and/or MATLAB to a high standard, experience with Bayesian estimation and path

planning algorithms and working experience with the Robotic Operating System (ROS) are required. A track record of publications preferably in robotics or control engineering themed journals/conferences and experience of field trials of mobile robotic systems would be desirable.

Eligibility Criteria
Due to the mobility requirement of the European Commission for MSCA DN projects, we can only accept candidates that have not been working/living in the country of host institution for more than a total of 12 months within the 3 years prior to recruitment date.

The applicants must at the time of recruitment have not been awarded a doctoral degree. Researchers who have successfully defended their doctoral thesis but have not yet formally been awarded the doctoral degree are not eligible. Exceptions include compulsory national service, short stays such as holidays, or time spent undergoing procedures to obtain refugee status under the Geneva Convention.

Job Duties
The work entails, primarily, the following aspects under the direction and supervision of Prof Cunjia Liu.

- To conduct scientific and technological research into robotic information gathering in the context of agriculture applications.
- To implement and translate the developed algorithms into software tools and deploy them on real robotic systems.
- To conduct experimental trails of the developed systems in real-world environments.
- To conduct the research in all the engineering related activity.
- To collaborate with other project partners within AIGreenBots consortium and beyond.
- To undertake primary data collection and analysis, and report writing.
- Be responsible for conducting the day to day running of the project.
- To formulate detailed plans for the project based on broad guidance from the project team.
- To feed back to the project team on progress, to make recommendations for next steps.
- Write up regular progress reports and present outcomes to all Investigators and Collaborators.
- Travel to attend meetings and conduct secondments and make presentations both within the project partners working group and to external stakeholders.
- To support the project team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
- To write research papers suitable for publication in high quality academic journals.
- To attend and contribute to conferences.
- To contribute to project promotion and public engagement events.
- Contribute ideas for new research and enterprise directions.
- Maintain confidentiality at all times and ensure that intellectual property (IPR) agreements are not violated.
- To assist the academic staff in the project team with the supervision of undergraduate MSc and PhD project work and day-today supervision and support of other researchers.
- Where appropriate, to deliver teaching, tutorial and laboratory sessions to students.
- Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.
- Undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equity, Diversity & Inclusion policy and procedures at all times. Duties must be carried out in accordance with relevant Equity, Diversity & Inclusion legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Belonging and Inclusion, Health & Safety, etc.

Organisational Responsibility

Reports to Prof Cunjia Liu

Person Specification

Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

1 – Application
2 – Test/Assessment Centre/Presentation
3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Background in robotics and autonomous systems, control engineering, Byesian estimation, or machine learning.	1, 3
	Experience with popular programming language, e.g., Python, MATLAB/Simulink and ROS	1, 3
	Experience with the experimental procedure of testing algorithms on robotic systems, including UAVs and ground robots	1, 3
	Authoring original work for academic journal papers, conference papers or technical reports	1, 3
Skills and abilities	Experience on operation mobile robotics	1, 3
	Analysis skills on algorithm derivation	1, 3
	Excellent written and oral communication skills	1, 3
	Self-motivated with ability to meet deadlines	1, 3
	Excellent interpersonal, and organisational skills	3
	Working knowledge of software packages, e.g., ROS Gazebo	1, 3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1, 3
	Knowledge of relevant Health & Safety issues	1, 3
Training	Demonstrate evidence of having undertaken further training	1, 3
Qualifications	MEng, MSc (or near completion)	1, 3
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1, 3

Desirable Criteria

Area	Criteria	Stage
Experience	Familiar with common informative path planning algorithms	1, 3
	Familiar with common ROS packages and robotic operation in field environments	1, 3
	Developing proposals for funding from external agencies	3
	Working in a high quality academic research environment	1, 3
	Experience of teaching and / or supervision of students in relevant areas	1, 3
Skills and abilities	Authoring original work, in the highest quality refereed academic journals	1, 3
	A strong publication track record	1

	Working knowledge of specific analytical, numerical methods, such as Kalman filters, Particle filter, Gaussian process, MCTS, RL, etc.	1, 3
Qualifications	MSc (or near completion) in robotics	1, 3
Other	Travel / Able to travel Independently / Working patterns	1, 3

Conditions of Service

The position is FULL TIME and FIXED TERM for 36 months with position not extending beyond the project end date of 31/03/2029. Salary will be on Specialist and Supporting Grade 6, £35,116 - 44,128 per annum, at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's Terms and Conditions of Employment for STAFFGRADES 6 AND ABOVE, details of which can be found here.

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which can be found here.

The University offers a wide range of employee benefits which can be found here.

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html

In addition, the University is supportive, wherever possible, of flexible working arrangements.
We also strive to create a culture that supports equity and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see http://www.lboro.ac.uk/services/hr/athena-swan/