School of Science
Department of Computer Science

Loughborough University

Research Associate in AI and Machine Vision for Defect Detection on Textiles

Project Title: AI and machine vision for defect detection on patterned textiles

Job Ref: REQ180850

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

Project Description

We are looking for a talented, motivated and experienced Postdoctoral Research Associate (PDRA) to work on the Innovate UK project "Novel real-time algorithms and system architecture for defect detection on patterned textiles".

The specific role of the PDRA is to improve the performance of existing in-house algorithms and explore novel robust algorithms to detect defects in patterned textile rolls, and record all the information of the defects (i.e. position, type, grade etc.). It will apply state of the art computer vision, image processing, machine learning (deep learning) and pattern recognition methods to deal with the challenges in this application. The developed intelligent system will become a powerful tool that may be used to optimise the textile manufacturing, reducing waste and maximising production yield.

This is an exciting opportunity for the PDRA to work within the Department of Computer Science at Loughborough University under the supervision of Dr Qinggang Meng. The PDRA will also work in parallel with industry partner Shelton Machines Ltd (SML) which has solid R&D track record in providing market leading machine vision solutions for defect detection in textile industry.

You will have substantial opportunities for learning and development, working closely with other researchers, PDRAs, PhD students and engineers from both academia and industry.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To develop algorithms for for defect detection on patterned textiles. The PDRA also needs to conduct theoretical analysis of the algorithms.

Job Duties

- To develop and implement defect detection algorithms based on image processing, AI and deep learning.
- To conduct theoretical analyse of the developed algorithms to understand its complexity and the key parameter selection.
- To implement the algorithms on deep learning embedded board from NVIDIA.
- To collaborate with the engineers from the company to conduct trials.
- 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 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 (IP) 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 Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Academic Principle Investigator : Dr Qinggang Meng

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. 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 Computer Science, or other related Engineering areas	1
	Experience in image processing and AI	1
	Experience in carrying on theoretic study using mathematically sound approaches	1
	Experience working in an academic or industrial research environment	1
	Authoring original work for academic journal papers, conference papers or technical reports	1
Skills and abilities	An appreciation and understanding of real world requirements in machine vision applications	3
	Ability to design and develop AI, deep learning and machine vision algorithms	1,3
	Ability of theoretical algorithm analysis	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
	Ability to take part in collaborative activities	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	3
Qualifications	PhD (or near completion)	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Experience in embedded systems programming	1,3
	Experience in C/C++, Matlab	1,3
	Experience in image processing and machine vision	1,3
	Developing proposals for funding from external agencies	1,3
	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
	A strong publication track record	1
	Strong real-world problem solving skills in machine vision and deep learning area	1,3
Qualifications	PhD (or near completion) in AI, or computer vision.	1
Other	Able to travel Independently	3

Conditions of Service

The position is full time, and fixed term for 17 months. Salary will be on Specialist and Supporting Academic Grade 6, (£30,395 -£39,609) per annum, at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment Grade 6 and above staff, 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 are available at http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html.

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 equality 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/