School of Computer Science
TrainFX

Job Ref: REQ250487

Job title: Computer Vision and Machine Learning Specialist (KTP Associate)

Period: 13.5 months
Salary: £34,000 to £38,000 per annum (Starting salary to be confirmed on offer of appointment), plus £4500 training budget
Application deadline: 25 June 2025

Key words: Computer vision, machine learning, deep learning, embedded system, AI, artificial intelligence, data analytics, computer science, software.

Project Title: AI-empowered Vision System for Passenger Counting and Smart Passenger Information System (PIS)

This is a Knowledge Transfer Partnerships (KTP) project between Loughborough University and TrainFX, funded by UKRI Innovate UK.

This is an exciting opportunity for a forward-thinking and ambitious specialist in computer vision and machine learning to join a company that specialises in providing SAAS services to the Rail Industry. Working with some of the biggest Train Operators in the UK, you will be joining a company that finds ways to help make services to Rail passengers better, faster and more accessible for everyone.

About the project

The project aims to develop computer vision technology for automated counting of passenger numbers and monitoring occupancy in train carriages and integrate the real-time passenger loading information into TrainFX Smart-PIS (Passenger Information System).

The AI-empowered Smart-PIS will provide dynamic data acquisition and real-time, personalised information supporting travellers, railway operators and service providers. The system will improve current service efficiency, promote passenger satisfaction, and provide the potential for new services through affordable technologies. It is the first of this kind of innovative system in railway which enables bespoke customisation towards rail industry objectives.

The whole KTP project will be delivered through dual Associate workplans by **Two KTP Associates.** The Associates will work closely with and be supported by the company technical team and AI experts at Loughborough University throughout the project. KTPs aim to help businesses improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK Knowledge Base.

KTP Associate Role:

Unlike some existing passenger-counting systems, which are expensive and only count numbers of people getting on/off the train, the system developed through this project utilises low-cost cameras (e.g. ToF depth) and state-of-the-art computer vision technology to provide accurate passenger loading information in each carriage, enabling the analysis of occupancy time and collecting variables such as main vacation points, occupancy rates, and variation with seasonality.

The framework of automated passenger counting has been developed using state-of-the-art computer vision and deep learning technology. You will primarily refine the people-counting AI models using data collected from trains and enhance the software interface, focusing on system settings and data communication within the current framework. The vision software and AI model have been primarily tested on embedded devices (e.g., NVIDIA Jetson, Linux system), you will continue to implement and test the system, supporting multi-camera image analytics. Your role will also involve testing and deploying the prototype system on trains, integrating camera control with on-train operational signalling and data communication methods.

The KTP Associate will be based primarily at the company TrainFX premises in Derbyshire and will also spend some time at Loughborough University with the academic team. The Associate will be supervised by an academic team led by Prof. Baihua Li and Prof. Qinggang Meng who are experts in AI and computer vision at Department of Computer Science, Loughborough. The Associate will form an integral part of the TrainFX research and development team, working closely with the TrainFX supervisory team and company partners. As a KTP Associate the successful applicant will have access to a wide range of R&D and commercial training programmes as well as technical training resources and facilities at Loughborough University.

Contact: Prof. Baihua Li (b.li@lboro.ac.uk)

Introduction to TrainFX

TrainFX is a UK-based rail technology company specialising in bespoke, turn-key and fully integrated on-train solutions, incorporating seat sensors, CCTV, passenger counting, passenger information system, crew comms, call for assistance, etc. Based in the rail city of Derby, TrainFX are proud to supply and maintain Passenger Information Systems to train operators and ROSCO's right across the UK.

Our Vision - a better journey through innovation: we empower train operators to provide the best possible passenger experience, through smart, reliable and affordable technologies. To give operators the ability to analyse and monitor passenger and fleet activity, creating valuable insights which translate to dramatic improvements in service efficiency and passenger satisfaction.

The developed Smart-PIS will step-change existing TrainFX technology, creating fully integrated, bespoke operations management and passenger-facing mobile App services. State-of-the-art computer vision and machine learning technology will be applied to power novel, intelligent services. This project will help achieve TrainFX strategic aims through the development of novel AI technology, and further promote TrainFX profile with AI innovation.

Loughborough University/Department Summary

Loughborough University is ranked in the Top-10 in the most recent Complete University Guide Guardian League Table and the Times Good University Guide. Its position is confirmed through its outstanding research & innovation in science and engineering, and its world-class research facilities. It has been awarded a record of seven Queen's Anniversary prizes for its research impact to society and UK industry.

Founded in 1974, the Department of Computer Science is one of the first university computing departments established in Great Britain. It is a part of the Loughborough University School of Science. The department has an excellent research record in AI, machine learning, robotics, computer vision, deep learning, data science, HCI, IoT, digital technologies, and wireless sensor systems. with projects funded by UKRI EPSRC, Innovate UK, Newton, EU, NHS, KTP and a wide range of industry. In addition to our strong track record in fundamental research, a particular focus of our research is applied research to support industry and create significant economic and social impact. A recent £1m upgrade of high-end GPU computing facilities and £5.8M DigLabs now complement a £9m investment in our purpose-built research and teaching space.

In joining the highly ranked and fast-developing Department of Computer Science, the successful candidate will have access to a wide range of high-spec computing facilities, including HPC, high-spec deep learning machines, workstations and servers. They will also have full access to robotics and AI laboratories equipped with cutting-edge camera/vision systems, sensors, robots and software platforms. You will work with a strong research team in AI composed of over 30 staff, PDRAs and PhDs, and be supported through an excellent research and innovation environment.

Job Description and Person Specification

Job Grade: Other

Job Purpose

The KTP Associate will:

- Work with stakeholders, including TrainFX senior leaders, technical multi-disciplinary scientists, commercial/sales/marketing teams, clients and academic experts, developing networks across the business and understanding of project needs, deliverables and highly regulated railway industry.
- Understand technical scope, objectives, specifications, and opportunities for technology advancement.
- Understand state-of-the-art technology in embedded real-time computer vision, smart CCTV functions and deep learning, to achieve passenger counting, loading and attention monitoring.
- Refine and improve the vison-system for passenger counting (including the deep learning model and interface software for system setting) and carry out experiments and evaluation.
- Deploy and test the vision system on an embedded device and carry out experiments and evaluation.
- Work with Associate 2 and integrate passenger counting information into Smart-PIS.
- Conduct experiments, testing, and evaluation for the developed system for commercial trials and measure its impact in rail industry.
- Document work regularly, ensuring knowledge and outcomes are transferred to other team members at TrainFX, embedding, recording, creating a repository throughout the project.
- Write reports and presentations, sharing these as project updates at supervision meetings, LMCs, advisory panel meetings, and other necessary forms of engagement and dissemination.

Job Duties

- Carry out the KTP project tasks and deliver the outcomes as outlined in the project workplan.
- Manage the project and disseminate key deliverables/findings to the project team and key stakeholders, to facilitate commercialization of the product.
- Undertake training and personal development training and courses as deemed necessary.
- Prepare research papers for publication in journals/conferences, in line with the expected scholarly activities of the University Research Staff, and in accordance with the commercial sensitivity of collaborating companies.
- Assist with the capture of intellectual property.
- Travel to Company business partners within the UK and possibly overseas, when necessary.
- To undertake such 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

Reports to the KTP Lead Academic: Professor Baihua Li (B.Li@lboro.ac.uk)

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 – Presentation
3 – Interview

Essential Criteria

Area	Criteria	Stage
Experience	Working experience in computer vision and image processing	1,2,3
	Algorithm development and software engineering	1,2,3
	Design and documentation of software architecture and application workflow	1,3
Skills	Solid programming skills in computer vision and image processing using e.g. Python, Linux, C/C++	
	Design, develop, code, test, debug and validate software system	1,3
	Analyse and enhance efficiency, stability and scalability of system resources	1,3
	Integrate and validate new product designs	1,3
	Authoring original work, technical reports and presentations	1,2,3
	Good project management and team-work skills	1,3
	Strong real-world problem-solving skills	1,3
Qualifications	PhD (or near completion) or MSc in Computer Science or closely allied disciplines	1,3

Desirable Criteria

Area	Criteria	Stage
Knowledge	Knowledge in deep learning, embedded devices	1,3
	knowledge of Linux kernel internals and device drivers	1,3
	Knowledge of railway transport operations	1,3
Experience	Experience in deep learning, deep learning platforms (e.g. PyTorch, TensorFlow) and Linux for computer vision tasks	1,3
	Experience of working in research and development projects.	1,3
Skills and abilities	Support software QA and optimise I/O performance.	1,3
	Interface with hardware design and development	1,3

	Ability to take part in collaborative activities and work with technical staff in other subject domains in a commercial environment.	1,3
Qualifications	Licenced to drive in the UK	1,3

Conditions of Service

The position is FULL TIME and FIXED TERM for 13.5 months. Salary will be between £34,000 - £38,000 per annum at a starting salary to be confirmed on offer of appointment. The successful applicants will also receive a £4500 training budget for personal development.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Academic and Related staff/Operational and Administrative staff, details of which can be found here.

We 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/.

Applications

The closing date for receipt of applications: 25 June 2025

The interviews will take place on or around 3 and 4 July 2025

The project requires the associate to start immediately, so the suitable candidate must have any applicable working visa already in place.

We actively encourage applicants from women, disabled and Black, Asian and Minority Ethnic candidates, who can bring their experiences and voices to the partnership.

Informal Enquiries

Informal enquiries should be made to the Lead Academic, Professor Baihua Li (b.li@lboro.ac.uk).