The Alan Turing Institute

SENIOR RESEARCH ENGINEER, EDGE-AI, ARC-D

THE ALAN TURING INSTITUTE

There has never been a more significant time to work in data science and AI. There is recognition of the importance of these technologies to our economic and social future: the so-called fourth industrial revolution. The technical challenge of keeping our data secure and private has grown in its urgency and importance. At the same time, voices from academia, industry, and government are coming together to debate how these technologies should be governed and managed. The Alan Turing Institute, as the UK's national institute for data science and artificial intelligence, plays an important part in driving forward advances in these technologies in order to change the world for the better.

The Institute is named in honour of Alan Turing, whose pioneering work in theoretical and applied mathematics, engineering and computing is considered to have laid the foundations for modern-day data science and artificial intelligence. The Institute's purpose is to make great leaps in data science and AI research to change the world for the better. Its goals are to advance world-class research and apply it to national and global challenges, build skills for the future by contributing to training people across sectors and career stages, and drive an informed public conversation by providing balanced and evidence-based views on data science and AI.

After launching in 2015 with government funding from EPSRC and five founding universities, the Institute has grown an extensive network of university partners from across the UK and launched a number of major partnerships with industry, public and third sector. Today it is home to more than 500 researchers, a rapidly growing team of in-house research software engineers and data scientists and a business team.

BACKGROUND

The defence and security programme at the Turing is looking to build a newly funded research group the AI Research Centre for Defence (ARC-D) working on real world problems in AI. As a team, we aim to advance the state-of-the-art and publish cutting edge research in AI and data science. These are technical engineering posts to work in the defence and security programme at the Alan Turing Institute in London. Day to day we collaborate with technical and subject matter experts from our partner organisations as well as academics, software engineers, and data scientists from across the Turing's research community. Your role will be to work both independently and collaboratively with the PIs and other researchers in the centre working in domains as diverse as: future sensing, space systems, communications and networks, human-machine teaming, and the metaverse. The ideal candidate is inquisitive, enjoys solving complex, challenging problems, and thinks creatively to find non-obvious solutions. We provide a rewarding, fast-paced and innovative environment with the opportunity to get close to the application, and work embedded with defence and security partners with a wide range of expertise.

ROLE PURPOSE

The edge AI roles sit within the Artificial Intelligence Research Centre for Defence (ARC-D) which is aiming to become a world-class group focused on delivering the science needed to advance UK capabilities in AI and Data science in the defence and security domain. This involves both the application of existing AI algorithms and techniques, and building of hardware prototypes as well as fundamentally advancing the state of the art of AI.

Research engineers perform investigations based on tasking from D&S partners to derisk new technologies and create proof-of-concept work to inform future research. Investigations often involve understanding whether a new algorithm, or piece of hardware is suitable for a particular problem, how academic technology performs when applied in real- world situations, and what the potential drawbacks of adopting a new technology are.

ARC-D projects usually last 1-2 years, are exploratory, have a high risk of failure, and generally output Proof of Concept code, embedded hardware and software prototypes, and technical write-ups. Work is done in collaboration with other ARC-D members. Senior Engineers are expected to provide support and consultancy to more junior team members, as well as providing technical leadership on their team projects. The technical scope of the work involves:

- The application of modern AI techniques at the edge e.g. CNNs, transformers, autoencoders, GNNs, reinforcement learning
- Efficient implementation of complex AI algorithms for automated real time onboard collection, analysis and exploitation of data on low size, weight and power (SWAP) platforms e.g. pruning and quantisation of networks, and handling sparsity, and missing data.
- Embedded hardware and software for multi-purpose, multi-sensor autonomous systems
- Novel approaches to increasing the transfer and through-put of data and reducing latency e.g. in-network computing
- Distributed computing approaches to optimise resource allocation and computation for increased efficiency and improved resiliency.

- Novel approaches to 3D classifiers and reconstruction
- Perform technical edge AI assessments and trials.
- Managing of data scientists/research associates working on edge AI projects
- Ensure compliance with the secure handling of data and health and safety with all aspects of their work.

DUTIES AND AREAS OF RESPONSIBILITY

- Engage with data scientists from the ARC-D's Defence and Security partners to learn their aims and requirements, and understand and identify problems they face
- Apply state-of-the-art Machine Learning, Data Science, engineering, and embedded hardware and software techniques emerging from the Institute, broader academia and industry to problems faced by the ARC-D partners.
- Perform rigorous investigations into new algorithms and applications, providing consultancy to inform our Partners' decisions and developing high-quality proof-of-concept outputs which can be deployed in real-world situations
- Design and carry out rigorous experimentation and development with some guidance from Principal staff, both alone and in small teams, coaching junior team members and guiding collaborations to success
- Present, disseminate and explain our work via demonstrations, presentations, reports and workshops
- Provide technical project management and leadership for research projects, ensuring successful outcomes; Liaise with clients and colleagues to understand and prioritise project goals, and balancing client value with research outputs;
- Take ownership of a particular domain challenge area or methodology for the group.
- Develop new projects in conjunction with colleagues, authoring research proposals and agreeing involvement for the group in activities across the institute.
- Ensure compliance with the secure handling of data and health and safety with all aspects of their work

Please note that job descriptions cannot be exhaustive, and the postholder may be required to undertake other duties, which are broadly in line with the above key responsibilities. This job description is written at a specific time and is subject to changes as the demands of the Institute and the role develop.

If not already held, successful candidates will need to be willing to undertake the Security Check (SC) process once in-post. Eligibility criteria and further information on the process can be found on the UK Government security vetting [website].

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PERSON SPECIFICATION		
Skills and Requirements Post holders will be expected to demonstrate the following	**Essential (E)** **Desirable (D)**	**Tested at application(a)** **Tested at interview (i)**
Education/Qualification		
Experience in a field with significant use of both computer programming and advanced statistical or numerical methods, evidenced by • a PhD degree; **or** • equivalent professional experience	E	A/I
Knowledge and Experience		
Strong background in one or more of the following areas: autonomous systems, embedded hardware and software, edge computing, machine learning, reinforcement learning, adversarial AI, FPGAs, sensor systems, UAV technologies, neural network accelerators, neuromorphic computing	E	A/I
Fluency in one or more modern programming languages used in research in data science and artificial intelligence. We primarily work in Python, but demonstrable use of other programming languages for research, together with a facility for learning new languages, will be considered. Experience with Machine Learning frameworks such as PyTorch is beneficial	E	A/I
An understanding of the importance of good practices for producing reliable software and reproducible analyses, such as version control, issue tracking, automated testing, package management and literate analysis tools such as Jupyter and Rmarkdown	E	A/I
Experience working with customers to identify, understand and refine problems, scoping data science work to solve them	E	A/I
Experience leading a research project with a focus on edge AI, robotics, autonomous systems, or UAVs	E	A/I
Experience conducting and publishing research to the standard required by top-tier reviewed journals	E	A/I
Communication		
Excellent written and verbal communication skills, including experience in the authoring of research papers or technical reports, and giving presentations or classes on technical subjects	E	I
Ability to communicate complex, specialist or conceptual information clearly and persuasively, presenting compelling arguments to influence and/or negotiate satisfactory outcomes	E	A/I
Teamwork and Motivation		
Ability to lead one's own work independently, including planning and execution	E	A/I

Service Delivery		
Ability to work effectively as part of a remote team, when necessary, with collaborators and stakeholders	E	A/I
Adapts services and systems to meet stakeholders needs and identifies ways of improving standards	E	A/I
Decision Making		
Ability to confidently make low-risk decisions after assessing the wider impact	E	A/I
Able to contribute to discussions and make decisions as part of team	E	A/I
Analysis and Research		
Experience of managing, structuring, analysing and visualising research data and the results of computational experiments	E	A/I
Demonstrated enthusiasm and ability to rapidly assimilate new computational and algorithmic ideas and techniques on the job, at a more than superficial level, and apply them successfully	E	A/I
Other Requirements		
An understanding of the importance of equality and diversity within an organisation and a commitment to helping create an inclusive culture	E	I
A willingness to undergo the Security Check (SC) clearance process once in post, if not already held	E	A

OUR VALUES

The Alan Turing Institute is committed to equality diversity and inclusion and to eliminating discrimination. All employees are expected to embrace, follow and promote our EDI Principles and Our Values.

Our values

Trust
We create an environment where we have trust and can be trusted

Inclusivity
We expect our Turing community to contribute to a culture that is inclusive and free of barriers

Respect
We all have different roles, priorities and challenges but our shared purpose is the same

Leadership
Leadership is everyone's business; Turing leaders set the right tone and lead by example

Transparency
Everyone should understand the how and the why of our decisions and actions

Integrity
We are all ambassadors for the Turing's mission of changing the world for the better

APPLICATION PROCEDURE

If you are interested in this opportunity, please click the apply button below. You will need to register on the applicant portal and complete the application form including your CV and covering letter. If you have questions about the role or would like to apply using a different format, please contact us on 020 3862 3536 or email recruitment@turing.ac.uk.

CLOSING DATE FOR APPLICATIONS: 23 July 2023 at 23:59

TERMS AND CONDITIONS

This full time post is offered on a permanent basis. The annual salary is £53,577 - £55,215 plus excellent benefits, including flexible working and family friendly policies, https://www.turing.ac.uk/work-turing/why-work-turing/employee-benefits.

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Those that have a Security Check (SC) clearance will receive a security clearance allowance in recognition of this. If you do not have this clearance upon commencement of employment, you will receive this security clearance allowance from the date you successfully gain SC clearance. Please see National security vetting: clearance levels - GOV.UK (www.gov.uk) for more information.

EQUALITY, DIVERSITY, AND INCLUSION

The Alan Turing Institute is committed to creating an environment where diversity is valued, and everyone is treated fairly. In accordance with the Equality Act, we welcome applications from anyone who meets the specific criteria of the post regardless of age, disability, ethnicity, gender reassignment, marital or civil partnership status, pregnancy and maternity, religion or belief, sex, and sexual orientation.

We are committed to building a diverse community and would like our leadership team to reflect this. We therefore welcome applications from the broadest spectrum of backgrounds.

We are committed to making sure our recruitment process is accessible and inclusive. This includes making reasonable adjustments for candidates who have a disability or long-term condition. Please contact us at adjustments@turing.ac.uk to find out how we can assist you.

Please note all offers of employment are subject to obtaining and retaining the right to work in the UK and satisfactory pre-employment security screening which includes a DBS Check.