Research Role Profile	

Job Title:	Research Fellow A

Responsible to:	Principal investigator

Responsible for:	Not applicable

Job Summary and Purpose:
To undertake research in accordance with the specified research project(s) under the supervision of the principal investigator.

Main Responsibilities/Activities
To undertake a range of research activities within a specified research area, assuming responsibility for specific areas of projects and making use of new research techniques and methods, in consultation with the research award holder or supervisor. This may include fieldwork, interviews, laboratory experimentation, critical evaluation and interpretation, computer-based data analysis and evaluation or library research.
Using initiative and creativity to identify areas for research develop new research methods and extend the research portfolio. Analysing and interpreting results of own research. Write up results and prepare papers for submission to appropriate journals and conferences, and other outputs as required and/or appropriate. Attend appropriate conferences for the purpose of disseminating research results of personal development. The post holder may also contribute to writing bids for research grants and will contribute to collaborative decision making with colleagues in areas of research.
Continually to update knowledge and develop skills, and translate knowledge of advances in the area into research activity.
To plan and manage own research activity in collaboration with others. To carry out administrative tasks associated with specified research funding, for example risk assessment of research activities, organisation of project meetings and documentation. Implementation of procedures required to ensure accurate and timely formal reporting and financial control.
To contribute to teaching in the Faculty by carrying out student supervision and/or demonstrating within the post holder's area of expertise and under the direct guidance of a member of departmental academic staff, as appropriate.
The post holder may occasionally be required to supervise more junior research staff.

Research Role Profile

Person Specification
The post holder must have:
A doctoral degree in a relevant discipline (although individuals who have almost completed a doctoral degree may be appointed). Consideration may also be given to individuals who do not hold a doctoral degree but have required skills based on a number of years experience in specified / relevant fields
The post holder will have authority over some aspects of project work and must be capable of providing academic judgement, offering original and creative thoughts and be able to interpret and analyse results.

Relationships and Contacts
Direct responsibility to the principal investigator or academic supervisor. The post holder may be asked to serve on a relevant Faculty committee. There may be additional reporting and liaison responsibilities to external funding bodies or sponsors. The post holder may work on original research tasks with colleagues in other institutions.

Special Requirements
To be available to participate in fieldwork as required by the specified research project

All staff are expected to:

- Positively support equality of opportunity and equity of treatment to colleagues and students in accordance with the University of Surrey Equal Opportunities policy.

- Help maintain a safe working environment by:

  - Attending training in Health and Safety requirements as necessary, both on appointment and as changes in duties and techniques demand

  - Following local codes of safe working practices and the University of Surrey Health and Safety Policy

- Undertake such other duties within the scope of the post as may be requested by your Manager.

Research Role Profile

Addendum to Role Profile

Job Title: Postdoctoral Research Fellow in Explainable AI and Machine Learning (1 year)	Research Fellow (1A)

Job Summary and Purpose:

We are looking for a Postdoctoral Research Fellow to join our EPSRC-funded project "Human-machine learning of ambiguities to support safe, effective, and legal decision making". The overall aim of this project is to improve the trustworthiness of the next-generation autonomous systems using the latest advances in AI and machine learning.

Autonomous robotic systems offer huge potential to help humans in a wide range of real-world applications. However, there is an acute lack of trust in robot autonomy in the real world - in terms of operational performance, adherence to the rules of law and safety, and human values. Furthermore, poor transparency and lack of explainability (particularly with popular deep learning methods) add to the mistrust when autonomous decisions do not align with human "common sense".

We will be achieving this through the logical and probabilistic machine learning approach of Bayesian meta-interpretive learning (BMIL). This approach uses a set of logical statements (i.e., propositions, connectives, etc.) that are akin to human language. In contrast, the popular approach of deep learning uses complex multi-layered neural networks with millions of numerical connections. It is through the logical representation and human-like reasoning of BMIL that it will be possible to encode expert human knowledge into the perceptive world model and deliberative planner of the robot's artificial intelligence.

The human-like decision-making will be encoded in a variety of ways:

a. By design from operational and legal experts in the form of initial logical rules;

b. Through passive learning of new logical representations and rules during intervention by human overrides when the robot is not behaving as expected

c. Through recognising ambiguities before they arise and active learning of rules to resolve them with human assistance.

Main Responsibilities/Activities

This postdoc will contribute to the WPs related to 1) logical representation of safety and legal rules and 2) algorithms for passive and active learning of ambiguities, with a focus on the safety and legal considerations. Relevant rules and regulations will be surveyed, and a selection of relevant laws will be identified together with our immediate stakeholders (i.e., underwater search and ColRegs collision regulations) and these will be translated into logical rules (compatible with our logic-based machine learning approach) and mapped into the robot's autonomy world model and planner.

Research Role Profile

Person Specification

Criteria	Essential/ Desirable
Qualifications	
A PhD degree, near completion of a PhD degree, or equivalent research experience in a subject area of direct relevance for the project: Computer Science (inc. Artificial Intelligence, Machine Learning) or Law	E
Experience/Knowledge	
Demonstrated specialist knowledge of a subject area of direct relevance for the project: Artificial Intelligence, Machine Learning or Law	E
Experience and knowledge of Inductive Logic Programming (ILP), relational learning or Bayesian/statistical relational learning	D
Post-doctoral experience	D
Demonstrated potential to publish in high quality, peer reviewed conferences or journals	E
Skills	
Ability to organise and prioritise own workload to meet required deadlines	E
Ability to conduct individual research work, write research reports and to disseminate results	E
Excellent oral, interpersonal and written communication skills	D
Proficiency in at least one programming language (preferably Python or C/C++)	D
Proficiency in logic programming and Prolog	D
Attributes	
Commitment to working within professional and ethical codes of conduct and safe working practices	E
Innovation and developing creative solutions	D
Commitment to excellence in research	E
Enthusiasm and self-motivation	E
Ability to be an effective team worker	E

Relationships and Contacts

This role is part of a larger collaborative project on trustworthy autonomous robotic systems where the case study is an autonomous "robot boat" for underwater search and crime scene investigation (police and emergency services). You will be working with Dr Alireza Tamaddoni-Nezhad and his research team at the University of Surrey in the area of explainable AI and human-machine learning and reasoning. You will also be collaborating with Dr Alan Hunter and his research team at the University of Bath in the area of marine remote-sensing and autonomy.

About the University of Surrey, Dept. of Computer Science and the AI Institute
 The University of Surrey is located on a beautiful campus in Guildford, just 30 miles from London and benefitting from excellent road and rail connections (35 minutes train journey). We are an ambitious, research-led organisation, committed to research excellence and to the application of our research for the benefit of society. Dept. of Computer Science was ranked 7th in the country for our research outputs in computer science and informatics according to the latest UK Research Excellence Framework (REF 2021). We are ranked 6th in the UK and top 100 globally for computer science and engineering in the *Shanghai Global Ranking of Academic Subjects 2022*. The successful candidate will also join our new multi-disciplinary Institute for People-Centred Artificial Intelligence which builds on the 35-year history of world-leading foundational AI research through the Centre for Vision, Speech and Signal Processing (CVSSP) which is the UK's largest research centre in Audio-Visual AI, with over 200 researchers. CVSSP has a track-record of pioneering ground-breaking AI technologies leading to successful commercialisation and is ranked 1st in the UK for Computer Vision research, 4th for AI and 5th for Robotics (csrankings.org).