CANDIDATE BRIEF

Research Fellow in Collective Artificial Intelligence for Digital Voting Systems, Faculty of Engineering and Physical Sciences

Salary: Grade 7 (£33,797 - £40,322 p.a.) Due to funding restrictions, an appointment will not be made higher than £36,914 p.a.

Reference: EPSCP1053

Closing date: Sunday 23rd May 2021

Fixed-term for 2 years

We will consider job share and flexible working arrangements

Research Fellow in Collective Artificial Intelligence for Digital Voting Systems, School of Computing.

Are you excited to practice direct digital democracy in real-world using AI-based decision-support systems? Would you join an international project with a team of world-leading partners such as ETH Zurich? Do you aspire to drive research on collective decision-making and digital voting into real-world pilot tests in the city of Aarau in Switzerland?

The Distributed Systems and Services group at University of Leeds has an opening for a Research Fellow in the lab of Distributed and Intelligent Social Computing Systems. The scientific activities of the lab are inter-disciplinary, international and linked to government and industry.

You will have a PhD (or be close to completion) in Computer Science, Electrical Engineering, Economics or other relevant area, with solid programming skills applied to learning and optimization problems. You will have an experimental research profile in the area of intelligent multi-agent systems and decision-support systems (reinforcement learning, distributed optimization, recommender systems) and an interest on computational social science and mechanism design (computational social choice, game theory). You will develop AI models for digitally assisted collective decision-making and digital voting solutions applied to participatory budgeting processes as well as Smart City applications such as energy/traffic management and sharing economies.

As a Research Fellow in this project, you are expected to develop and study multi-agent decision-support systems for digital voting using distributed AI and optimization techniques, while exploring relevant insights from social science and mechanism design.

Together with the project team, you will apply novel decision-support systems solutions to mobile crowd-sensing platforms and digital voting solutions to empower trustworthy collective decisions in Smart Cities. You will apply data science skills to data collected from citizens to understand collective crowd behaviour and decision-making processes. You will have a unique opportunity to apply this research in real-world by running field tests in the city of Aarau in Switzerland with a strong tradition on

direct democracy initiatives. The pilot tests will assess novel participatory budgeting processes. This project will run in collaboration with ETH Zurich and University of Fribourg in Switzerland as well as the city authorities of Aarau.

What does the role entail?

As a Postdoctoral Researcher, your main duties will include:

- Developing AI-based decision-support systems for digital voting;
- Applying learning and optimization techniques such as (active) reinforcement learning, evolutionary optimization, collective learning (EPOS project), recommender algorithms, among other;
- Prototype and simulate multi-agent systems that integrate the developed solutions;
- Improving existing voting systems (voting rules) and design new ones to create fairer voting outcomes with a social capital;
- To collect, store, manage, structure, process, analyse and plot/visualize data;
- Designing social experiments and field tests in indoor and outdoor (living) lab environments (with smart phones) as well as online platforms such as Amazon Mechanical Turk;
- Integrating developed solutions to web and smart phone platforms (e.g. Smart Agora) for experimental evaluation and piloting;
- Publishing high profile scientific papers in journals and conference proceedings;
- Writing and documenting open-source code;
- Attending project meetings, conferences and other related meetings with partners, virtually or physically when necessary;
- Actively collaborating with other team members and in particular work closely with PhD students from University of Leeds.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

What will you bring to the role?

As a Postdoctoral Researcher you will have:
- A PhD (or close to completion) in Computer Science, Electrical Engineering, Economics or other relevant area;
- Expertise on learning and optimization for multi-agent systems, for instance, (active) reinforcement learning, swarm/evolutionary or other combinatorial optimization techniques, (bioinspired) collective intelligence algorithms, recommender algorithms, etc.;
- Expertise in simulating/experimenting with interactive multi-agent systems;
- Data science and machine learning skills for collecting, storing, managing, structuring, processing, analyzing, mining and ploting/visualizing data;
- Solid technical and programming skills, e.g. Java, Python, UNIX command line skills and scripting, database systems, latex, Git, etc.;
- Interest in collective decision-making processes, voting methods and digital democracy;
- Interest and affinity in working together with inter-disciplinary teams, for instance, in the intersection of computer and social science;
- The ability to travel (in line with government guidelines) to Switzerland for research;
- Good time management and planning skills, with the ability to meet tight deadlines, manage competing demands and work effectively under pressure without close support;
- Experience in publishing high-profile journal and conference peer-reviewed papers;
- Excellent written and verbal communication skills including presentation skills.

You may also have:
- Interest or experience on Smart City applications with socio-spatio-temporal data;
- Experience in designing lab experiments, field tests and pilots, including the application of causal inference to experimental data;
- Experience with mobile app development (Android, iOS);
- Background and understanding of distributed systems and security;
- Experience with blockchain and smart contract development;
- Knowledge and interest on computational social science, mechanism design, social choice and game theory.

How to apply

You can apply for this role online; more guidance can be found on our How to Apply information page. Applications should be submitted by 23.59 (UK time) on the advertised closing date.

Contact information

To explore the post further or for any queries you may have, please contact:

Dr Evangelos Pournaras, **Associate Professor**
Tel: + 44 (0) 113 343 5447
Email: E.Pournaras@leeds.ac.uk

Additional information

Faculty and School Information
Further information is available on the research and teaching activities of the Faculty of Engineering and the School of Computing.

A diverse workforce
The Schools in the Faculty of Engineering & Physical Sciences are proud to have been awarded the Athena SWAN Bronze or Silver Award from the Equality Challenge Unit, the national body that promotes equality in the higher education sector. Our equality and inclusion webpage provides more information.

Working at Leeds
Find out more about the benefits of working at the University and what it is like to live and work in the Leeds area on our Working at Leeds information page.

Candidates with disabilities
Information for candidates with disabilities, impairments or health conditions, including requesting alternative formats, can be found on our Accessibility information page or by getting in touch with us at disclosure@leeds.ac.uk.

Please note: If you are not a British or Irish citizen, from 1 January 2021 you will require permission to work in the UK. This will normally be in the form of a visa but, if

you are an EEA/Swiss citizen and resident in the UK before 31 December 2020, this may be your passport or status under the EU Settlement Scheme.

Criminal record information

Rehabilitation of Offenders Act 1974
A criminal record check is not required for this position. However, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our Criminal Records information page.