POSTDOCTORAL RESEARCH FELLOW - SCH00213

Full time, Fixed Term Contract (expected dates 01/08/2016 - 30/09/2018)
Salary: Grade 7 (£31,656 - £40,082)
Closing date: Until the post is filled (Only short-listed candidates will be contacted)

The Post

The UK Engineering and Physical Sciences Research Council (EPSRC) funded project "Towards visually-driven speech enhancement for cognitively-inspired multi-modal hearing-aid devices (AV-COGHEAR)", aims to develop a new generation of hearing aid technology that extracts speech from noise by using a camera to see what the talker is saying. Our proposed approach is consistent with normal hearing. Listeners naturally combine information from both their ears and eyes: we use our eyes to help us hear. When listening to speech, eyes follow the movements of the face and mouth and a sophisticated, multi-stage process uses this information to separate speech from the noise and fill in any gaps. Our proposed cognitively-inspired multi-modal approach will act much the same way by exploiting visual information from a camera, and develop novel causal algorithms, for intelligently combining audio and visual Big Data information, in order to improve speech quality and intelligibility in real-world noisy environments. The postdoctoral research fellow will be part of a multi-institute team, led by Stirling, comprising speech researchers, psychologists, and industry partners, and will focus heavily on cognitively-inspired signal and image processing.

The University

Stirling was the first new university to be established in Scotland for nearly 400 years, created by Royal Charter in 1967. Since its foundation, the University has embraced its role as an innovative, intellectual and cultural institution with an established reputation for blending arts and science.

Stirling is a University of distinction, home to leading researchers and scholars attracted by the unique learning environment, exceptional facilities and student-centred approach, where ability, not background, is recognised and valued.

The essence of the University of Stirling is its people: graduates, staff and students are helping to shape the world by making a direct and positive contribution to the development of prosperous, healthy and sustainable communities around the globe.

The University population has grown from 164 undergraduate students and 31 postgraduates in 1967 to 8,800 undergraduates and 3,500 postgraduates in 2012. With over 100 nationalities represented at Stirling, around one in five students come from overseas.

A truly Scottish university, Stirling's reach extends to campuses in the Highland capital of Inverness and to Stornoway, gateway to the Western Isles.

Stirling's main campus is located at the historic heart of Scotland, with convenient links to the rest of the UK and beyond. The University is within easy reach of Scotland's capital city, Edinburgh, and its largest city, Glasgow. Scotland's two main international airports are less than an hour away, with direct flights to Europe and beyond.

About Us

School of Natural Sciences

The School of Natural Sciences was formed in January 2011, bringing together the Institute of Aquaculture, biological and environmental sciences, psychology and computing science & mathematics.

The School offers a unique academic environment where new ideas on the complex and challenging relationships between human behaviours and social, biological and environmental systems are explored. Our students are curious about the world and the relationships that exist in it.

Our approach is explicitly inter-disciplinary, rigorous and developed through the power of mathematics, modelling and computing science technologies. Research is problem focused and internationally recognised for its quality and relevance in the most recent UK Research Assessment Exercise (RAE 2008).

We work with business and public service organisations, both at home and overseas, to develop research with direct and positive outcomes for society across a range of critical problems. These include improving fish farm production in developing countries, conserving endangered species and working out how best to live with rapid environmental and social change.

Our teaching programmes focus on real life issues and offer strong theoretical frameworks with rigorous training in field, laboratory and numerical skills. With opportunities to study abroad and flexible programme options, graduates from our BSc programmes are highly valued by employers in all parts of the world.

We have active and developing research and teaching partnerships with the Schools of Arts and Humanities, Management, Health, Sports, and Applied Social Sciences. We are actively involved in four major Scottish Funding Council research pooling initiatives and have formal international research and teaching collaborations in the EU, USA, Canada, sub-Saharan Africa, the Middle East, Latin America, South Asia and China.

Description of Duties

The main focus of the research fellow at Stirling will be to develop an improved audiovisual speech filtering system. This will merge relevant elements of image processing and audio speech processing. This will be developed in close collaboration with joint project partners at the University of Sheffield, clinical researchers at the Institute of Hearing Research (Scottish Section), and the industrial partner: Phonak. The project has currently focused on initial image processing work, and the role of the research fellow will be to further develop and apply the image processing results to the auditory domain. Specific tasks will be to:

- Apply current image processing results to the auditory domain to filter speech using lip region information.
- Development of novel audiovisual speech enhancement systems, inspired by audio-only approaches, to remove noise from speech
- Work closely with project partners on developing, and integrating other complementary speech processing (speech resynthesis) approaches developed at Sheffield
- Integration of approaches from project partners, and development of joint codebases

- Write up research for regular journal and conference publications.

Essential Criteria

- PhD in a relevant area (or close to completion of PhD, i.e. PhD submitted).
- Candidates must have excellent signal and image processing skills, with expertise in machine learning in MATLAB, Python and/or similar languages.
- Candidates must have knowledge of speech signal and image processing, with prior experience in relevant aspects of working with speech and natural language processing, preferably in recognition or enhancement systems.
- They should be able to demonstrate the ability to work both independently and as part of a team.
- Candidates should have some cross-modality research experience. An example of this would include applying machine learning techniques to new problem domains, integrating audio and visual aspects of signal processing, implementing psychological principles in computational systems, or other relevant proven examples.
- They must be able to demonstrate a track record in this field (e.g. through peer-reviewed publications of international quality), and an ability to present their work to a specialist audience.
- Candidates must be willing to travel to other project sites for collaboration (including regular short visits lasting up to two weeks to Sheffield University).

Desirable Criteria

- proven ability to work in an inter-disciplinary team;
- real-time (multi-modal) signal image processing, Big Data analytics, visualization, and hardware implementation expertise would be helpful;
- a knowledge of the cognitive aspects of speech and listening;
- interest in integrating psychological and image aspects of signal processing to auditory domain.

For informal enquires, or to discuss how you might fit into our project, please contact the project principal investigator, Prof Amir Hussain (01786 467437, ahu@cs.stir.ac.uk).

An applicant guide can be found at the following address we recommend you read this before making your application http://www.stir.ac.uk/media/pdf/applicant-guide_v2.pdf.