Title: Versatile Dual-Arm Manipulation – Learning and Generalising from Human Operators

Type of award: PhD Research Studentship

Department: Mechanical Engineering

Scholarship Details: Scholarship covers full UK PhD tuition fees and a tax-free stipend of £14,777 p.a. (subject to contracts)

Duration: 3.5 years

Eligibility: Home/EU applicants only

Start Date: 24 September 2018

PhD Topic Background/Description

A PhD studentship is available at the University of Bristol under the theme of the Nonlinear Robotic Control Group (NRCG) of the Bristol Robotics Laboratory under supervision of Dr Guido Herrmann, University of Bristol, [http://eis.bris.ac.uk/~mexgh/gherrmann.htm](http://eis.bris.ac.uk/~mexgh/gherrmann.htm):

Humans provide dexterous, versatile and easily adapted two-arm manipulation of objects. This is enabled by two five fingered hands and two highly multi-degree of freedom arms, coupled with human intelligence, allowing for easily adapted tasks. For that reason, human operators are still essential to work in high-risk environments or on non-trivial, possibly strenuous tasks. Hazardous operations, such as in biological or chemical laboratories or at nuclear decommissioning sites, are best carried out by a human, often carefully protected by specially designed gloves within a glovebox arrangement.

Learning such tasks in a repeatable fashion has guaranteed to replace tedious operations and created exciting products such as automated dual-armed robotic cooks. Robustness of such products is required when the setting, e.g. environment, space, for the task changes. Thus, a purely learned, repetitive process may “be disrupted” by seemingly small modifications, which a human can easily deal with. At the same time, bimanual manipulation of an object can create an additional complexity which in such tasks requires a high level of robustness and failure tolerance.

This project looks at an important aspect of human-robot interaction, where the robot has to conduct a single complex dual-arm, bimanual task in a human-like fashion. The methods which will be explored on the lowest level are adaptive, learning-enabled, distributed control methods to guarantee dual-arm cooperation and object manipulation. This will have to be supported by high-level learning techniques to allow the robust succession of specific primitive movements/task components.
Further Particulars

Doing research at the University of Bristol

The quality of research at the University of Bristol places it within the top five Universities in the UK based on the Research Excellence Framework and Times higher Education rankings 2014-15. The PhD candidate will be a part of a friendly and diverse community. The University has a Doctoral College (BDC) which offers approximately 200 courses, interactive workshops and seminars as a part of the University’s Personal and Professional Development Programme for PGR students. The BDC organises University-wide events and provides a hub of information, guidance and resources to help researchers to get the most of their time at Bristol.

Candidate Requirements

The interested PhD-candidate should have a (prospective) excellent degree in engineering and a keen, well-founded interest in control, robotics and dynamics.

Scholarship Details

Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to 1st September 2018) PhD tuition fees and a tax-free stipend of £14,777 p.a. for the academic year 2018/19. EU nationals resident in the EU may also apply but will only qualify for PhD tuition fees.

Informal enquiries

Please email Dr Guido Herrmann g.herrmann@bristol.ac.uk
For general enquiries, please email came-pgr@bristol.ac.uk

Application Details

To apply for this studentship submit a PhD application using our online application system [www.bristol.ac.uk/pg-howtoapply]

Please ensure that in the Funding section you tick “I would like to be considered for a funding award from the Mechanical Engineering Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor.

Interested candidates should apply as soon as possible; applications will be evaluated as they are submitted and once a suitable candidate has been selected the studentship will close.

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