Title: Multi Agent Based Anarchic Production Systems: Smarter manufacturing through context awareness

Type of award  PhD Research Studentship

Department  Mechanical Engineering

Scholarship  A minimum £14,296 p.a. for 2016/17 (subject to confirmation of scholarship)

Duration  3.5 years

Eligibility  Home/EU applicants only

Deadline  Open until filled

The Graduate Education Team within the Faculty Of Engineering invite applications from outstanding candidates for one of their competitive PhD scholarship opportunities

PhD Topic Background/Description

Production planning is usually a centralised activity where manufacturing enterprises gather data from a hierarchic structure and take production decisions based on aggregated and simplified information; decisions are therefore based on limited information. To improve decision making, heterarchical manufacturing systems have been proposed that allow decision making processes to be conducted in a distributed manner as a result of collaboration between products and the resources such as workers, machines and auxiliary devices.

In such systems, a major challenge is to ensure that the locally optimised decisions that are taken by products and machines result in a production plan that is optimised globally for the enterprise. The most common method for achieving this control is combining the distributed decision taking with centralised monitoring and control.

Further Particulars

In this project, an alternative approach based on context awareness of actors involved in the decision making process is explored using multi agent systems. Here, production is planned as the result of interaction and collaboration between software agents representing the products, the machines and other auxiliary resources. However, in contrast to current heterarchical methods, there is no centralised control. Instead, the agents are given awareness of the implications of their decisions for the global enterprise (through methods such as system dynamics) and programmed to adhere to a set of “ethics” that ensure that the decisions that they take are for the good of the entire company. Compared to existing methods, this could reduce communication costs, reliance on a central monitoring system to assess the viability of production goals and better flexibility when the availability of resources is variable.
The project would thus aim to specify, design, realise and evaluate an “anarchic” platform for manufacturing systems that could supersede existing methods of realising smart manufacturing systems at a lower cost with better performance.

**Candidate Requirements**
We are looking for an enthusiastic student with a high 2:1 honours degree in Mechanical, Manufacturing, Software, Industrial engineering degree or equivalent. Basic skills and knowledge required include scheduling or production planning. A knowledge of agent based systems is desirable.

**Scholarship Details**
Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to application) PhD tuition fees and a tax-free stipend at the current RCUK rate (£14,296 in 2016/17). EU nationals resident in the EU may also apply but will only qualify for PhD tuition fees.

**Informal enquiries**
For informal enquiries, please email Dr Aydin Nassehi, Aydin.nassehi@bristol.ac.uk

For general enquiries, please email gsen-pgrs@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 Dr Aydin Nassehi.

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