

PhD Project Proposal

School of Electronics, Electrical Engineering and Computer Science

Proposed Project Title : Flexible automation and cobotics

Principal Supervisor: Prof Seán McLoone

Second Supervisor: i-ams

Project Description: Manufacturing is entering a new era, the so called the 4th industrial revolution (Industry 4.0), where advances in the Internet of Things technologies and the exponential rise in the number of connected devices and sensors are enabling huge volumes of data to be collected on manufacturing processes and systems. Exploiting this data to gain business insights, enhance decision making, optimise performance, and ultimately improve competitiveness is at the heart of Industry 4.0. Cooperative multi-robot and autonomous systems will also play a central role in delivering the underpinning flexible manufacturing systems. Here the vision is of robots as co-workers, with robots and humans working cooperatively and interactively to achieve common tasks, and of autonomous systems that are resilient and can adapt seamlessly as tasks and operating conditions change.

Flexible automation systems and autonomous robotics have seen major advances in the last decade but many challenges remain with regard to achieving cost-effective and safe solutions in unstructured environments, particularly where there is direct interaction with human operators.

The Centre for Intelligent Autonomous Manufacturing Systems (*i-AMS*) in the Faculty of Engineering and Physical Sciences at Queen's (www.qub.ac.uk/iams) is an interdisciplinary team of researchers spanning the disciplines of Engineering, Computer Science, Applied Mathematics and Psychology working together to develop innovative technologies and solutions to address the challenges of Industry 4.0. The Centre has a range of PhD opportunities available addressing different aspects of flexible automation and human-robot collaboration (a.k.a. cobotics). These include: (1) developing adaptive multi-robot/machine control, self-reconfiguration and self-calibration systems; (2) capturing, modelling, predicting and anticipating human-robot interactions; and (3) designing distributed control and path planning algorithms to deliver flexible and safe multi-robot and human-robot collaborative working environments.

To learn more please contact, the centre Director, Prof. Seán McLoone.

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