PhD Project Proposal

ECIT Interdisciplinary PhD Programme

Proposed Project Title: Evaluating the Impact of Autonomous Agents for Real Time Decision Making

Principal Supervisor(s): Dr Karen Rafferty, Dr Stuart Ferguson,

Project Description: The aim of this PhD is to determine if autonomous agents can be safely and effectively used to aid or take over some of the decision-making processes of humans during situations that cause high workload and sensory overload. These agents should integrate learning, communication, collaboration and knowledge management. The main question being: is there a way to bring together information from multiple low cost sensors to leverage a better, more reliable and accurate performance so that it is possible to recognise and react to what is happening within challenging environments? Research is required to define the limitations of current and forthcoming hardware technology and to mitigate these limitations through intelligent software. A review of literature will be required to determine suitability of agents for real time decision making. A sample situation based developed and tested within a virtual environment and that will incorporate interface interaction will be developed with and without autonomous agents to quantity benefit. Leading on from these findings, we will then evaluate the effectiveness of autonomous agents within an augmented reality environment. These agents should develop intelligence that will augment the real world with additional information when needed (e.g. when the human is experiencing stress or high workload).
This PhD project will combine the latest research in virtual and augmented reality with artificial intelligence to develop a system capable of enhancing a human's interaction with their environment.

Objectives:
Collaborate with other specialist disciplines to design suitable testing scenarios that encompass the applications targeted for study. Construct practical simulator environments, in terms of hardware (AR/VR) and software e.g. Game Engine platforms, CAD systems, custom application programs. Integrate autonomous agent algorithms into AR/VR platforms. Evaluate the performance of different classes of autonomous agent algorithms in terms of real-time operation. Evaluate quantitatively and qualitatively the effect of autonomous agents in assisting decision making.

Academic Requirements:

Students entering the programme will normally be required to have a 2.1 BSc/BEng in Computer Science, Electrical and Electronic Engineering, or a maths based engineering or physical science degree, or equivalent qualification recognised by the University. Students holding an appropriate MEng or MSc (Software conversion) will normally be required to have a 2.1 or commendation (distinction) respectively. Furthermore, additional criteria may be applied. All applicants must have significant mathematical and programming experience.

GENERAL INFORMATION:
This 4 year PhD studentship, potentially funded by the Department for Employment and Learning (DEL), commences on 1 October 2019.

Eligibility for both fees and maintenance depends on the applicants being either an ordinary UK resident or those EU residents who have lived permanently in the UK for the 3 years immediately preceding the start of the studentship. Non UK residents who hold EU residency may also apply but if successful may receive fees only.

Applicants should apply electronically through the Queen's online application portal at: https://dap.qub.ac.uk/portal/

Deadline for applications: Friday 1 March 2019

Contact details:

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