Intelligent Operation of Internet of Things Devices using Multiple Unmanned Aerial Vehicles (Ref CSEE/APR18/04)

The School of Computer Science and Electronic Engineering at the University of Essex is pleased to announce a PhD studentship available in "Intelligent Operation of Internet of Things Devices using Multiple Unmanned Aerial Vehicles".

This studentship will start from 23 April 2018 and once awarded, you'll receive the scholarship for three years of your PhD (subject to satisfactory progression).

The studentship includes:

- a fee waiver equal to the Home/EU fee (for 2017/18, £4,120). International students will need to pay the balance of their fees.
- a stipend equivalent to the Research Councils UK National Minimum Doctoral Stipend (£14,553 in 2017-18)

In many real-world internet of things (IoT) applications there is a requirement for timely data collection and reporting. Disaster management requires a coordinated effort involving remote capture and monitoring of data from the affected area in order to facilitate timely response for rescue, relocation, food and water provisioning through to the restoration of vital services such as telecommunications and transport. The growing use of Unmanned Aerial Vehicles (UAVs) equipped with antenna and sensors can be used as aerial mobile sinks to collect data from remotely deployed IoT devices. A collection of UAVs are able to act as ad-hoc mobile wireless network nodes that can approach IoT devices, gather required information and send it to other devices or base stations which are out of the transmission range of the IoT devices. The UAV collective can cover a wider area while collaborating with each other to carry out complex missions. However, there are several issues for effective employment of multiple UAVs for IoT applications including but not limited to: dynamic and intelligent management of the IoT sensors and devices on the ground, limited power of IoT devices and UAVs, communication between IoT devices and UAVs, communication between UAVs, connectivity of the UAVs and coverage of the region of interest. Due to the dynamic nature of the aforementioned issues, balancing these related factors becomes a challenging task. Hence, there is a need to develop novel computational techniques to manage and optimise real-time operation of these communication platforms in the face of dynamic and uncertain real-world deployment scenarios.

This PhD focuses on efficient and intelligent operation of IoT devices using UAVs by developing novel schemes for autonomous adaptive management of connectivity and coverage while maintaining the energy of the UAVs and IoT devices. Computational Intelligence techniques such as fuzzy systems, spatial-temporal reasoning and collective and cooperative intelligence approaches (multi agent and collective optimization techniques) will be investigated.

The successful applicant will be supervised by Dr Mohammad Hossein Anisi, Dr Faiyaz Doctor and Professor Hani Hagras.

Additional questions and queries about the studentship to be addressed to:

Dr Mohammad Hossein Anisi ma17546@essex.ac.uk , Dr Faiyaz Doctor fdocto@essex.ac.uk and Professor Hani Hagras hani@essex.ac.uk .

Entry requirements

At a minimum, the successful applicant will have a good honours BSc or BEng degree (1st class or high 2:1, or equivalent) in computer science, computer engineering, electronic engineering, or related subjects. An MSc with Merit or Distinction is desirable (but not essential for students with a first class degree). Strong analytical and mathematical skills with excellent programming skills are required. Knowledge of data communication, fuzzy logic, multi-agent optimisation and machine learning are highly desirable.

How to Apply

- To be considered for this Scholarship applicants are required to apply for their PHD course in the usual way via the University of Essex online admissions application process here: website, (including uploading all supporting documents required) by the deadline of
  Friday 23 February 2018.

- Please note on your PG Admissions application form in the 'Proposed research topic or area of research' field that you wish to apply for this scholarship, quoting Ref CSEE/APR18/04.

- In addition to your main online PHD application, you are also required to submit a separate application form, which can be accessed here and submit separately to: csee-schooloffice@essex.ac.uk by the deadline of **Friday 23 February 2018,** quoting Ref CSEE/APR18/04.

- Applicants will be informed of the outcome of their application for their PHD course and the scholarship award by the end of March 2018.

For further information on our current areas of research please refer to our research interests and staff profiles.

If you have a disability and would like information in a different format telephone (01206) 873521/874588.