EPSRC CDT in Distributed Algorithms

PhD Project: Scheduling of Distributed Information Processing

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Project Description

Mature techniques exist to schedule the use of a disparate mix of sensors (e.g., cameras on drones or sensor arrays distributed across a large geographic area) to maximise the utility of the information that can be derived from the sensed data. However, only a modest quantity of research has investigated how to schedule what subset of a disparate mix of distributed processing is applied. For example, given a network of sensors receiving data, future middleware needs to reason about the long-term impact of communicating data to a central server to perform an accurate, but time consuming, analysis, rather than using processing in close proximity to the sensor to provide a timely, but less accurate, output.

The key challenge in this context is ensuring we can reason about what we might calculate elsewhere and in the future without actually performing the calculation itself: we need statistical models for the future distributed processing tasks just as sensor management uses models for future sensing tasks.

The focus of the PhD will therefore centre on developing statistical emulators that can predict how computation will process data and generate information. Once those emulators exist, the focus will be on using the emulators to schedule distributed computational resources. Use cases and metrics for utility will be co-defined with the non-academic partner, Dstl.

Go to the EPSRC CDT In Distributed Algorithms website.