

EPSRC CDT in Distributed Algorithms

PhD Project: High Performance Processing of Distributed Acoustic Sensing Data: Turning Optical Fibres into Massively Parallel Microphone Arrays

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Project Description

This project has been developed by the University of Liverpool in partnership with Sintela.

Distributed Acoustic Sensing (DAS) offers great potential to extract pertinent information from the environment close to optical fibres, turning each 50km long fibre into 5000 (or more!) acoustic microphones. This has significant commercial utility in contexts that include monitoring roads and railways as well as protecting critical infrastructure (e.g. gas pipelines and nuclear power stations).

A market-leading DAS company has a novel ability to use coherent processing to maximise the ability to extract such information. This provides an opportunity to develop a novel Bayesian signal processing chain that fully exploits the novel sensing capability.

This PhD will focus on developing a high performance variant of this processing chain using state-of-the-art techniques such as particle filters, Convolutional Neural Networks etc. The focus will be on a subset of: detection, localisation (e.g. using beamforming), tracking and classification of anomalies (e.g. the sounds of people walking, digging, driving, etc.) as well as long term condition monitoring and simulation (both for assessment of performance and generation of training data for machine learning algorithms).

Since the data-rates involved are high, it is anticipated that software will need to be developed with a view to implementation on a small cluster of GPUs or similar.

Go to the [EPSRC CDT in Distributed Algorithms](#) website.