



ESR Project title: Distributed ML for radar localization with multiple nodes [ESR15]

Contact names:

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Application deadline: May 31, 2021

ESR Project Description:

An emerging technique to replace privacy-invasive video cameras is the use of radar-based techniques that acquire minimal information for the underlying task. This project uses multiple nodes to sense radio reflections from targets for localization and tracking purposes. The nodes will use radio signals reflected off humans to determine their location and posture. Each sensor node will apply some local learning and send the output to a master node for fusion. As sensors usually have limited computational capability, we will look at ways to reduce the computational complexity at the edge nodes. Objectives are: (1) Combine techniques from ML and RF propagation and waveform design to develop distributed radar localization technologies; (2) Combine signal processing and communication theory with modern ML to reduce computational complexity and to improve energy efficiency, while providing privacy to the end users.

Expected Results:

(1) To design and develop energy-efficient and privacy-sensitive distributed ML and communication algorithms for radar localization and tracking. (2) To carry out a theoretical convergence analysis of these distributed ML mechanisms. (3) Implement and test the developed techniques on real systems.

Supervision and Mobility Program:

Once hired, the candidate:

- will work at Toshiba Europe Limited, performing full-time research under the supervision of Dr Usman Raza (industrial supervisor).
- will be enrolled in the PhD program at Imperial College London, under the supervision of Prof Deniz Gündüz (university supervisor).

Required, Preferred and Desired Prerequisites/Skills:¹

- **Required:** At the time of recruitment, the applicant must not have lived in the UK for more than 12 months in the previous 36 months (3 years).
- **Required:** No more than 4 years spent in research/work activities after the achievement of the MS degree.

¹ **Required**, means mandatory to pass the eligibility check. **Preferred**, means highly welcome and recommended. **Desired**, means additional, not strictly needed, but still very much appreciated.



- **Preferred:** A Master's degree in Telecommunications, Electrical Engineering, Computer Science, Data Science, or equivalent.
- **Preferred:** Very good communication skills in oral and written English.
- **Preferred:** Open-mindedness, strong integration skills, self-motivation, and team spirit.
- **Desired:** Good command of Python and/or C programming languages.
- **Desired:** Master's level training in machine learning techniques.
- **Desired:** Prior experience of successfully conducting and publishing research results in top scientific journals and/or conferences.

Additional requirements for this position

The candidate must satisfy the PhD level entry requirements (country specific academic requirements as well as English requirements) of Imperial College London, as specified at: <https://www.imperial.ac.uk/study/pg/apply/requirements/>