

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032, India

Seminar Notice

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School of Mathematical & Computational Sciences

Title: SpecSense: Towards Low-cost Distributed Spectrum Patrolling

Speaker: Arani Bhattacharya, KTH Royal Institute of Technology, Stockholm

Time: 4 P. M. - 5 P. M.

Venue: S. N. Bose Hall.

Date: January 10, 2020 (Friday)

Abstract: With the increase in the number of wireless devices, spectrum has become increasingly expensive over the last few years. This increase in the cost of spectrum has made it essential for regulatory authorities to detect and/or localize illegal transmitters. Such patrolling of spectrum needs to be done with low-cost sensors and using minimal amount of energy to keep its overhead low. We propose using cheap, crowdsourced sensors to perform low-cost spectrum patrolling. However, using crowdsourcing faces a number of challenges. One key challenge is that low-cost sensors give noisy outputs. In the first part of this talk, I will explain how using multiple low-cost sensors can outperform more expensive sensors while also incurring much lower cost. We use a data-driven technique to model individual sensors and their hardware imperfections. We then use a sensor fusion algorithm to combine the results from the individual sensors to improve the accuracy of individual sensors. We validate both our data-driven technique and our sensor fusion algorithm on data collected from actual sensors. In the second part of this talk, I discuss improving the energy-efficiency of crowdsourced spectrum system by selecting the most relevant sensors. However, selecting the optimal subset is NP-Hard. We, therefore, propose an approximation algorithm that guarantees a constant performance bound with the optimal. We show that our algorithm performs much better in practice than some baseline techniques while also scaling across thousands of sensors.

Bio: Arani Bhattacharya is a postdoctoral researcher at KTH Royal Institute of Technology, Stockholm, currently working on edge computing and physical layer of wireless networks. He received his PhD from Stony Brook University in 2019 and Masters from Indian Statistical Institute in 2013, all in Computer Science. His research broadly focuses on applications of algorithms and machine learning techniques to improve the reliability and scalability of emerging wireless network applications.

All are cordially invited to attend the seminar.