ICASSP 2025 Travel Report – Dor Patel

I had the privilege of presenting my paper, “Adaptive Waveform Design for Cognitive MIMO ISAC”, at the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2025, held in Hyderabad, India, from April 6 to April 12. ICASSP is the flagship conference of the IEEE Signal Processing Society and attracts leading researchers and professionals from around the world.

My paper focuses on the topic of waveform design for Integrated Sensing and Communication (ISAC) system. ISAC is an emerging technology that allows radar sensing and wireless communications to share the same hardware and spectrum. This integration is particularly significant for automotive applications, offering key advantages such as improved spectrum efficiency, reduced hardware costs, and lower energy consumption. The paper proposes a new technique for transmit beamforming for joint ISAC waveform. Designing a joint waveform for ISAC is particularly challenging because it requires addressing different optimization criteria for sensing and communication. The key difficulty lies in achieving an effective balance between sensing accuracy and communication performance. In this work, we incorporate a cognitive approach into ISAC waveform design in a Bayesian framework, leveraging 'a-prior' knowledge obtained from previous radar observations and use it for sequential optimization of the transmit waveform.

I presented my paper in the HiPeCASP Workshop (High-Performance and Low-Cost Array Signal Processing), which included a short lightning talk followed by a dedicated poster session. Presenting at ICASSP was particularly important for advancing this line of research, as it allowed me to receive valuable feedback from experts in the field and to increase the visibility of our approach within the signal processing society. In addition to my own presentation, the workshop also featured an insightful lecture by Perry Wang, a senior researcher from Mitsubishi, on the topic of automotive radar, which provided valuable insights into this field.

In addition to my workshop, I attended several technical sessions in the conference related to radar signal processing, wireless communications, and specifically ISAC. These sessions were highly relevant to my work and allowed me to stay updated with the latest research trends in this fields. The large number of presented works related to ISAC throughout the conference highlighted the growing global interest in this technology and reinforced its status as a rapidly emerging focus in the field of automotive radar. Participating in these sessions provided valuable perspective on the techniques and challenges currently being explored across academia and industry.

My travel and participation were made possible thanks to the generous financial support of the Israel Smart Transportation Research Center (ISTRC). The travel expenses from Israel to India—including flights, accommodation, and conference registration—are substantial, and this grant was essential in enabling my attendance. The support allowed me to fully focus on preparing and presenting my research in the best possible way. Therefore, I would like to thank ISTRC for making this opportunity possible. Attending ICASSP 2025 and presenting my work at this prestigious international forum was a valuable experience that contributed significantly to my academic development and professional growth.

Dor Patel