Conference Summary Report: 64th IEEE Conference on Decision and Control (CDC 2025)

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Institute: Technion – Israel Institute of Technology **Conference:** CDC 2025

Dates: December 9 – December 12, 2025 **Location:** Rio de Janeiro, Brazil

Acknowledgment I would like to express my sincere gratitude to the Israeli Smart Transportation Research Center (ISTRC) for awarding me the ISTRC conference grant. This generous support significantly alleviated the financial burden of international travel, allowing me to fully dedicate myself to academic exchange and professional development at the prestigious IEEE Conference on Decision and Control (CDC).

Conference Impression and Academic Insights The IEEE CDC is widely recognized as a premier international conference for systems and control, gathering top scholars and researchers from around the world. My participation in CDC 2025 was an incredibly enriching experience. The conference atmosphere was intellectually stimulating, highlighting not only the latest theoretical advancements but also the critical role of control theory in addressing real-world engineering challenges.

It is evident that research on smart transportation is receiving growing attention at the IEEE CDC. This year's technical program featured four invited sessions specifically dedicated to transportation topics. Additionally, a highlight of the conference was a comprehensive two-hour tutorial session titled *"Control, Learning, and Optimization Methods for Autonomous Multi-Agent Systems in Transportation."* This tutorial provided a rich framework for managing emerging cyber-physical mobility systems. It offered deep insights into integrating learning-based methods with optimal control to ensure safety and efficiency in mixed-traffic environments, while also addressing critical societal metrics such as fairness and accessibility.

As a researcher interested in multi-agent networks and intelligent transportation, I further focused my attention on sessions concerning network flows, multi-agent systems, and traffic optimization. I was pleased to find numerous high-quality presentations that aligned closely with the ISTRC's vision of **"Zero Transportation Externalities"**. Specifically, I gained valuable insights from the following studies:

- **Traffic Network Stability:** I attended a presentation on *On the Stability of Dynamical Multi-Commodity Flow Networks*. This research provided a deep dive into stability issues within complex traffic networks, offering a solid theoretical foundation for developing strategies to mitigate traffic congestion.
- **Optimization and Planning:** The session on *Distributed Combined Space Partitioning and Network Flow Optimization: an Optimal Transport Approach* was particularly inspiring. The authors utilized optimal transport theory to solve coupled problems of resource allocation and path planning, presenting a novel perspective that is highly relevant to my own research.
- **Multi-Agent Systems:** I was also impressed by the work on *Task Allocation for Multi-agent Systems via Unequal-dimensional Optimal Transport*. This study proposed innovative strategies for task allocation among UAVs and agents, which holds significant potential for applications in smart logistics and last-mile delivery.

These cutting-edge presentations reinforced my belief that advanced control algorithms and mathematical tools are key drivers in realizing smart, efficient, and green transportation systems.

Recommendations for Future Participants I strongly recommend that Master's students, PhD candidates, and young researchers in the fields of smart transportation and automatic control apply for ISTRC grants and actively participate in the IEEE CDC.

1. **World-Class Standards:** CDC represents the pinnacle of the control field, offering a unique opportunity to engage with the frontier of theory and methodology.
2. **Interdisciplinary Exchange:** Beyond pure theory, the conference increasingly features research on Intelligent Transportation Systems (ITS), connected vehicles, and smart cities, making it an excellent venue for cross-disciplinary inspiration.
3. **Professional Networking:** It is an exceptional platform for expanding one's international academic network, meeting leading experts, and finding potential collaborators.

Thank you again to the ISTRC for this invaluable opportunity, which has played a vital role in advancing my academic career.

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