Call for Papers

IEEE ITSC 2025 Invited Session

Innovative Applications of Large Language Models (LLMs) in Multimodal Transportation Systems

Theme and Topics

Code: p25rt

The rapid evolution of **Large Language Models (LLMs)**, with their emergent capabilities in multimodal understanding, in-context learning, and human-like reasoning, is revolutionizing transportation systems by evolving from mere text generators into versatile, knowledge-driven task solvers. By integrating LLMs, novel solutions can bridge fragmented data pipelines, enhance predictive analytics, simulate human-like reasoning, and enable closed-loop interactions across sensing, learning, modeling, and managing tasks in **multimodal transportation systems**. To explore cutting-edge applications—from traffic prediction and signal control to safety analytics and urban transport management—this session will showcase **innovative applications** of LLMs in multimodal transportation systems, including language-based interactions, improved predictive analytics, automated decision-making, multimodal data fusion, and human-centric system design and optimization. By grounding LLMs in multimodal transportation systems, our session seeks to highlight how LLMs can unlock new capabilities through roles such as information processors, knowledge encoders, module generators, and decision facilitators. We welcome state-of-the-art research, emerging use cases, and forward-looking perspectives on LLM-enabled solutions.

Topics of interest, but are not limited to:

LLM-enhanced sensing:
Integrating LLMs or VLMs for multimodal traffic data acquisition, fusion, translation, and analysis.

Knowledge-driven learning:
Prompt engineering, domain-specific LLM fine-tuning, few-shot learning, retrieval-augmented generation (RAG), and knowledge representation in predictive learning tasks such as traffic prediction, demand estimation, travel forecasting, and behavior modeling.

Generative modeling in ITS:
Use LLMs to generate synthetic traffic scenarios, assist in the development of digital twins and simulation systems, design heuristic algorithms and functions, and provide feedback and evaluation.

Intelligent decision making:
LLM-based traffic control, network optimization, mixed traffic flows, intelligent vehicles, human-in-the-loop interfaces, agent frameworks for complex tasks, and multi-agent coordination.

LLMs in transport operation and management:
Applying LLMs in real-time traffic management, safety analytics, public transit, shared mobility, mult-modal integration, Mobility as a Service (MaaS) platform.

Innovative case studies and demonstrations:
Presentation of pioneering deployment where LLMs have been successfully integrated into real-world multimodal transportation systems.

Ethical and operational considerations:
Discussions on the challenges and implications of deploying LLMs, including data privacy, interpretability, bias mitigation, scalability, and computational efficiency.

Important Dates:

Submission Deadline	Notification of Acceptance	Final Papers Submission
May 1st, 2025	**July 1st, 2025**	**July 1st, 2025**

*The exact time will coincide with the main conference program

More details →

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Submission Notes

- Please follow the guidelines in: https://ieee-itsc.org/2025/contributions/information-for-authors/
- Submit your manuscript through the portal link: https://its.papercept.net/conferences/scripts/start.pl
- Submit as an "**Invited Session Paper**" with our session code **"p25rt"**