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Special Issue on Urban Foundation Models

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Machine learning technologies have become pivotal in transforming urban landscapes, underpinning the development of various smart city services. These technologies enhance urban intelligence by enabling more efficient resource allocation, improved public services, and elevated quality of life for city dwellers. The recent advent of foundation models, including Large Language Models (LLMs) and Vision Foundation Models, has significantly reshaped the research landscape in machine learning and artificial intelligence. These models are characterized by their extensive pre-training on large-scale datasets, which imbues them with unparalleled emergent abilities, including contextual reasoning, complex problem solving, and zero-shot adaptability across diverse tasks. Such abilities make foundation models particularly suitable for interacting with dynamic and multifaceted urban environments, leading towards more integrated, intelligent, and responsive urban systems.

Urban Foundation Models (UFMs), refer to a novel family of models pre-trained on extensive and diverse urban data sources, encompassing multiple data granularity and modalities. These models exhibit a deep understanding of various urban data types and remarkable adaptability to a wide array of urban tasks, significantly contributing towards the ultimate realization of Urban General Intelligence (UGI). By integrating and interpreting diverse urban data types, UFMs can offer comprehensive insights, uncover intricate spatiotemporal patterns, and enhance decision-making across various urban tasks. Examples of Urban Foundation Models can be found on https://usail-hkust.github.io/Urban_Foundation_Model_Tutorial/.

This special issue aims to provide a forum for researchers and practitioners in academia and industry to present their latest research findings and engineering experiences in developing and applying urban foundation models for smart city construction. We invite submissions of papers that describe innovative algorithms, advanced systems, and practical case studies that demonstrate real-world applications of urban foundation models.

Topics
The articles in this issue will cover a wide range of topics, including but not limited to:
Topics of interest include, but not limited to:

- Theories, limitations, emergent capabilities and interpretability of urban foundation models
- Data preparation and engineering for training urban foundation models
- Architecture of urban foundation models
- Pre-training, fine-tuning, and prompt learning for urban foundation models
- Transfer learning and federated learning for urban foundation models
- Acceleration of urban foundation models
- Spatiotemporal reasoning and other high-level capabilities
- Urban agent framework and multi-agent collaborations
- Foundation models as urban simulators
- Evaluation of urban foundation models and urban agents

- Privacy and security issues of urban foundation models
- Model and data pricing
- Ethical and social implications of urban foundation models
- Urban foundation model applications

Important Dates
- Submissions Deadline: April 30, 2025
- First-round review decisions: June 30, 2025
- Deadline for revision submissions: August 31, 2025
- Notification of final decisions: October 30, 2025
- Tentative Publication: December 2025

Submission Information
Submissions to this special issue should follow the TIST author guidelines found at
https://dl.acm.org/journal/tist/author-guidelines Please submit your paper via Manuscript Central at
https://mc.manuscriptcentral.com/tist. Please select the paper type "Special Issue on Urban Foundation Models."

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