

# Urban Morphology

in the Age of

# Artificial Intelligence

Book of Abstracts

ISUF | Torino | 2025

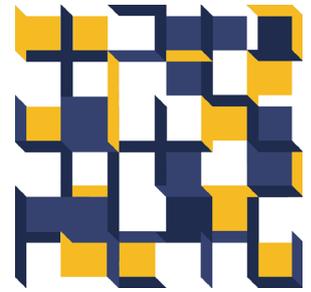
17th - 20th June

XXXII - International Seminar on Urban Form

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## Urban Morphology in the Age of Artificial Intelligence

### Book of Abstracts



Torino | 17th - 20th June 2025

#### Editors

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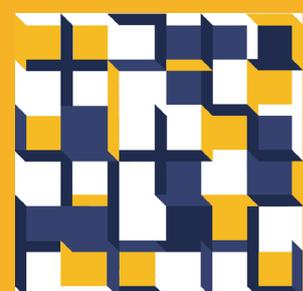


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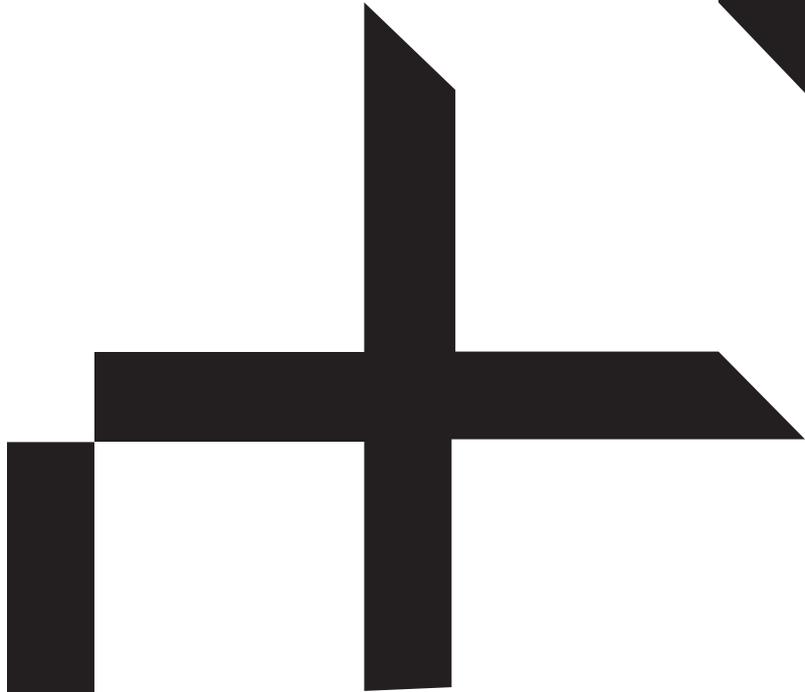
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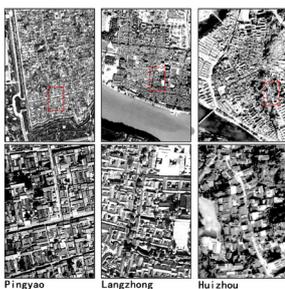
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# ***Typo-morphological studies of Chinese historical areas driven by artificial intelligence: Precision restoration and evolution analysis***

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## **Keywords**

*Convolutional neural networks, generative adversarial networks, multimodal data fusion, typomorphology, heritage conservation*

The study of typomorphology in Chinese historical areas faces challenges such as missing or low-information pre-1949 maps, low-resolution satellite imagery, and scarce historical documentation. These limitations have resulted in reliance on subjective speculation and manual reconstruction of pre-1949 typological maps and roof plans, which are inefficient and inaccurate. This paper introduces an AI-driven method using Shanxi Pingyao, Sichuan Langzhong, and Anhui Huizhou as case studies to integrate existing typological maps, roof plans, pre-1949 satellite imagery, and historical documentation and speculated pre-1949 typological maps and roof plans, constructing a universal framework for historical reconstruction. By training Generative Adversarial Networks (GANs), the framework enables efficient and accurate restoration of pre-1949 tomorphological data for other historical areas.

The methodology includes extracting features from existing and speculated typological maps and roof plans using Convolutional Neural Networks (CNNs), employing GANs to generate data for damaged or missing historic areas, and integrating multimodal data such

as remote sensing imagery, architectural plans, and archival records to address single-source data limitations. Results demonstrate the GAN model's high generalizability and accuracy, offering a broadly applicable automated tool for researchers. By combining AI with deep learning, the study establishes a universal typomorphological reconstruction model that significantly enhances precision, efficiency, and reproducibility while reducing subjective errors. This innovative approach advances typomorphological research and provides new solutions for cultural heritage preservation, urban renewal, and sustainable development.