Wenbo Lv

B.Sc. Graduate

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Curriculum Vitae
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Some stuff about me

- My research interests lie in **advancing methodologies in spatial causal inference** and **developing high-performance computational tools**, with a primary focus on *R packages*.
- Currently, my work centers on **Empirical Dynamic Modeling (EDM)** framework for modeling *dynamic system* and **Difference-in-Differences (DID)** methods for *event studies*. I am particularly interested in leveraging these approaches to address critical challenges in *urban sustainability*, *climate change mitigation*, and broader global issues.
- I specialize in *data analysis*, *statistical modeling*, and developing open-source analytical tools, including *R packages*, using **R**, **C++**, and **Python**, with a strong focus on *spatial analysis*. I actively contribute to the R geospatial community and am dedicated to advancing open-source geospatial software.

Education

2021.8-2025.6 **B.Sc. In Geographic Information Science** — Shaanxi Normal University
Xi'an, Shaanxi

Research Experience

2024.8-2025.12 **Visiting Student** — HKUST(GZ)
Guangzhou, Guangdong

2025.2-2025.8 **Research Assistant** — PolyU
Shenzhen, Guangdong

Publications

1. Lv, W., Lei, Y., Liu, F., Yan, J., Song, Y., & Zhao, W. (2025). gdverse: An R package for spatial stratified heterogeneity family. *Transactions in GIS*, *29*(2), 29:e70032. https://doi.org/10.1111/tgis.70032
2. Lv, W., Liu, F., Cai, K., Cao, Y., Deng, M., Liang, W., Yan, J., & Wang, G. (2024). Distinguishing the impacts and gradient effects of climate change and human activities on vegetation cover in the weihe river basin, china. *Journal of Geophysical Research: Biogeosciences*, *129*(10). https://doi.org/10.1029/2024jg008297
3. Chen, C., Song, Y., Lv, W., Shemery, A., Hampson, K., Yi, W., Zhong, Y., & Wu, P. (2025). Predicting pavement cracking performance using laser scanning and geocomplexity-enhanced machine learning. *Computer-Aided Civil and Infrastructure Engineering*. https://doi.org/10.1111/mice.13489
4. Song, Z., Liu, F., Lv, W., & Yan, J. (2023). Classification of urban agricultural functional regions and their carbon effects at the county level in the pearl river delta, china. *Agriculture*, *13*(9). https://doi.org/10.3390/agriculture13091734
5. Song, Z., Liu, F., & Lv, W. (2023). *Spatiotemporal characteristics and optimization strategies of urban-rural development disparities in china's urban agglomerations(in chinese)* (pp. 1418–1429). People's Cities, Empowered by Planning - Proceedings of the 2023 China Urban Planning Annual Conference (14 Regional Planning; Urban Economy). https://link.cnki.net/doi/10.26914/c.cnkihy.2023.061565

Honor

2024.12 **Longi Non-Education Major Scholarship**

2024.11 **First Prize in the 13th National University Student GIS Application Skills Competition**

2024.06 **National University Student Innovation and Entrepreneurship Training Program Qualified Completion**

2023.12 **Grand Prize in the 12th National University Student GIS Application Skills Competition**

2023.11 **First Prize in the Second National University Student Ecological Environment Management Research Innovation Competition**

2023.12 **Second Prize of the 5th 'Guodi Cup' National College Student Natural Resource Science and Technology Competition, China Society of Natural Resources**

2021.10 **Outstanding Individual in Military Training Publicity for College Students, Shaanxi Normal University**

Unpublished

First Author	**Measuring causal strengths by geographical cross mapping cardinality**	Submitted to IJGIS, currently second-round revision
First Author	**Causal discovery in urban data with temporal empirical dynamic modeling: The R package tEDM**	Submitted to CEUS
Third Author	**Agricultural policies reshape cropland patterns with varying impacts - a case of soybeans from Heilongjiang Province**	Submitted to Land Use Policy, currently under review
First Author	**Decomposing spatial causality through mutual information**	Plan

Developed Spatial Analysis Toolkit

Package	Description	Source Code	Language
spEDM	Spatial Empirical Dynamic Modeling	https://github.com/stscl/spEDM	C++, R
tEDM	Temporal Empirical Dynamic Modeling	https://github.com/stscl/tEDM	C++, R
gdverse	Analysis of Spatial Stratified Heterogeneity	https://github.com/stscl/gdverse	R, C++, Python
itmsa	Information-Theoretic Measures for Spatial Association	https://github.com/stscl/itmsa	C++, R
sdsfun	Spatial Data Science Complementary Features	https://github.com/stscl/sdsfun	R, C++
geocomplexity	Mitigate Spatial Bias Through Geographical Complexity	https://github.com/ausgis/geocomplexity	C++, R, C
HSAR	Hierarchical Spatial Autoregressive Model	https://github.com/spatlyu/hsar	C++, R
GD	Geographical Detectors for Assessing Spatial Factors	https://github.com/ausgis/GD	R
sesp	Spatially Explicit Stratified Power	https://github.com/stscl/sesp	R, C++
cisp	A Correlation Indicator Based On Spatial Patterns	https://github.com/stscl/cisp	R
geosimilarity	Geographically Optimal Similarity	https://github.com/ausgis/geosimilarity	R
geocn	Loads Spatial Data Sets of China	https://github.com/stscl/geocn	R
figpatch	Easily Arrange External Figures with Patchwork Alongside 'ggplot2' Figures	https://github.com/spatlyu/figpatch	R
qgisprocess	R package to use QGIS processing algorithms	https://github.com/r-spatial/qgisprocess	R
spEcula	Spatial Prediction Methods In R	https://github.com/SpatLyu/spEcula	R
tidyrgeoda	A tidy interface for rgeoda	https://github.com/SpatLyu/tidyrgeoda	R