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|--------------------------|---|---|--|--|--|--|
| Current | | | | | | |
| RESEARCH INTERESTS | ☐ Machine Learning☐ Matrix/Tensor Computations☐ Low-Rank Models | Spatiotemporal Data ModelingMissing Data ImputationTime Series Analysis | Intelligent TransportationSmart CitiesHuman Mobility | | | |
| Contact | □ chenxy346@gmail.com | | | | | |
| INFORMATIO | NA https://xinychen.github xinychen chenxy346 Google Scholar | .io (homepage) ons (h-index: 10 & i10-index: 10) | | | | |
| Biography | In Summer 2023, I will finish my PhD at University of Montreal (UdeM), with support from the IVADO PhD Excellence Scholarship and the CIRRELT PhD Excellence Scholarship. My PhD research focuses on machine learning, spatiotemporal data modeling, and intelligent transportation systems | | | | | |
| Education | ▶ PhD in Civil Engineering (Transportation) ♠ Polytechnique Montreal, University of Montreal | | 2020.08 - 2023.08 (expected) Montreal, Canada | | | |
| | ♀ IVADO PhD Excellence Scholarship & CIRRELT PhD Excellence Scholarship | | | | | |
| | Thesis: Spatiotemporal Traffic Data Imputation and Forecasting with Low-Rank Models Advisor: Nicolas Saunier (full professor at Polytechnique Montreal) Co-advisor: Lijun Sun (assistant professor at McGill University) | | | | | |
| | Master's degree in Traffic I Sun Yat-Sen University | nformation Engineering & Contro | ol 2016.08 - 2019.06 Guangzhou, China | | | |
| | ♀ Outstanding Thesis Award (top 2% in total) | | | | | |
| | Thesis: Imputing Spatiotemporal Missing Traffic Data by Bayesian Tensor Factorization Models Advisor: Zhaocheng He (full professor) | | | | | |
| | Bachelor's degree in Traffic Guangzhou University | c Engineering | 2012.09 - 2016.06 Guangzhou, China | | | |
| | Thesis: Modeling Vehicles' 7Advisor: Xiaodong Zang (| Time Headway with Log-Normal and I full professor) | Power-Law Distribution | | | |
| Honours and Awards | CIRRELT PhD Excellence Schola IVADO PhD Excellence Schola Outstanding Thesis Award (by National Scholarship (by Ministra) | rship (\$100,000, by Institute for Dat Sun Yat-Sen University) | 2021.12 2020.04 2019.06 2018.11 | | | |
| Refereed | Google Scholar: https://scholar.google.com/citations?user=mCrW04wAAAAJ&hl | | | | | |
| Journal Papers | ♦ First-author papers | | | | | |
| TALEAG | 7. Xinyu Chen, Lijun Sun (2022). Bayesian temporal factorization for multidimensional time series prediction. <i>IEEE Transactions on Pattern Analysis and Machine Intelligence</i> . 44 (9): 4659-4673. | | | | | |
| | https://doi.org/10.1109/TPAMI.2021.3066551 JCR-Q1 IF: 24.314 top-tier 100+ citations ESI hot paper (top 0.1%) ESI highly cited paper (top 1%) | | | | | |
| | 6. Xinyu Chen, Mengying Lei, Nicolas Saunier, Lijun Sun (2022). Low-rank autoregressive tensor completion for spatiotemporal traffic data imputation. <i>IEEE Transactions on Intelligent Transportation Systems</i> . 23 (8): 12301-12310. | | | | | |
| | https://doi.org/10.1109/ | TITS.2021.3113608 | ECI bet maner (tor 0.19/) | | | |

5. Xinyu Chen, Yixian Chen, Nicolas Saunier, Lijun Sun (2021). Scalable low-rank tensor learning for spatiotemporal traffic data imputation. *Transportation Research Part C: Emerging Technologies*. 129: 103226.

4. Xinyu Chen, Jinming Yang, Lijun Sun (2020). A nonconvex low-rank tensor completion model for spatiotemporal traffic data imputation. *Transportation Research Part C: Emerging Technologies*. 117: 102673.

3. Xinyu Chen, Zhaocheng He, Yixian Chen, Yuhuan Lu, Jiawei Wang (2019). Missing traffic data imputation and pattern discovery with a Bayesian augmented tensor factorization model. *Transportation Research Part C: Emerging Technologies*. 104: 66-77.

2. Xinyu Chen, Zhaocheng He, Lijun Sun (2019). A Bayesian tensor decomposition approach for spatiotemporal traffic data imputation. *Transportation Research Part C: Emerging Technologies*. 98: 73-84.

```
    https://doi.org/10.1016/j.trc.2018.11.003
    JCR-Q1
    IF: 9.022
    top-tier
    190+ citations
    ESI highly cited paper (top 1%)
```

1. Xinyu Chen, Zhaocheng He, Jiawei Wang (2018). Spatial-temporal traffic speed patterns discovery and incomplete data recovery via SVD-combined tensor decomposition. *Transportation Research Part C: Emerging Technologies*. 86: 59-77.

- ◆ Co-author papers
- 3. Lijun Sun, Xinyu Chen, Zhaocheng He, Luis F. Miranda-Moreno (2021). Routine pattern discovery and anomaly detection in individual travel behavior. *Networks and Spatial Economics*. 35.

```
http://dx.doi.org/10.1007/s11067-021-09542-9
```

2. Pu Ren, Xinyu Chen, Lijun Sun, Hao Sun (2021). Incremental Bayesian matrix/tensor learning for structural monitoring data imputation and response forecasting. *Mechanical System and Signal Processing*. 158: 107734.

```
https://doi.org/10.1016/j.ymssp.2021.107734

IF: 8.934

10+ citations
```

1. Zhaocheng He, Kaiying Chen, Xinyu Chen (2018). A collaborative method for route discovery using taxi drivers' experience and preferences. *IEEE Transactions on Intelligent Transportation Systems*. 19 (8): 2505-2514.

```
http://doi.org/10.1109/TITS.2017.2753468
$ JCR-Q1
IF: 9.551
Q top-tier
$ 20+ citations
```

Conference TRB 2023: Xinyu Chen, Chengyuan Zhang, Lijun Sun, Nicolas Saunier (2023). Nonstationary temporal matrix factorization for sparse traffic time series forecasting. The 102nd Annual Meeting of Transportation Research Board.

KDD Time Series Workshop: Xinyu Chen, Mengying Lei, Nicolas Saunier, Lijun Sun (2021). Lowrank autoregressive tensor completion for spatiotemporal traffic data imputation. *The 7th SIGKDD Workshop on Mining and Learning from Time Series* (*MiLeTS*).



- 4. Xinyu Chen, Zhanhong Cheng, Nicolas Saunier, Lijun Sun (2022). Laplacian convolutional representation for traffic time series imputation. arXiv: 2212.01529.
 - in IEEE Transactions on Signal Processing IEEE Transactions on Signal Processing
- 3. Xinyu Chen, Chengyuan Zhang, Xiaoxu Chen, Nicolas Saunier, Lijun Sun (2022). Discovering dynamic patterns from spatiotemporal data with time-varying low-rank autoregression. arXiv: 2211.15482.
 - iii IEEE Transactions on Knowledge and Data Engineering under review (1st round)
- 2. Xinyu Chen, Chengyuan Zhang, Xi-Le Zhao, Nicolas Saunier, Lijun Sun (2022). Nonstationary temporal matrix factorization for multivariate time series forecasting. arXiv: 2203.10651.
- 1. Xinyu Chen, Lijun Sun (2020). Low-rank autoregressive tensor completion for multivariate time series forecasting. arXiv: 2006.10436.
 - ₹ 10+ citations

ACADEMIC FUNDING

- 1. City-Scale Traffic Data Imputation and Forecasting with Tensor Learning
 - Authors: Xinyu Chen, Nicolas Saunier (advisor)
 - Link: https://ivado.ca/en/scholarships-and-grants/phd-excellence-scholarships/

Reviewing Activities

I am serving as a reviewer for **10+** scientific journals.

- Applied Intelligence
- Big Data Research
- Expert Systems with Applications
- IEEE Intelligent Transportation Systems Magazines
- IEEE Open Journal of Signal Processing
- IEEE Sensors Journal
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Knowledge and Data Engineering
- INFORMS Journal on Computing

xinychen/transdim

- Scientific Reports
- Transportmetrica B: Transport Dynamics
- Transportation Research Part B: Methodological
- Transportation Research Part C: Emerging Technologies

| Profes- sional Member- | Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT) Institute of Electrical and Electronics Engineers (IEEE) | Student Member Student Member | 1 |
|------------------------------|--|-------------------------------|-------------------|
| SHIPS | | | _ |
| Open- Source Projects | I am leading some innovative projects on GitHub (3k+ stars & 450+ followers) ◆ Selected repositories ☐ transdim: Python codes for spatiotemporal data imputation and prediction using a variety of state-of-the-art machine learning and deep learning models. | | 2018.09 - present |

☆ 950+ stars

| | ■ awesome-LaTeX-drawing: Drawing Bayesian networks, grap tensor structures, and technical frameworks in LaTeX. (Most from our research papers.) | | 2019.06 - present | | | |
|--|--|---------------|-------------------|--|--|--|
| | 🕥 xinychen/awesome-latex-drawing 🕏 1k+ stars | | | | | |
| | ☑ LaTeX-cookbook: Academic writing with LaTeX: A tutorial (| in Chinese). | 2021.05 - present | | | |
| | 🕥 xinychen/latex-cookbook 🌣 650+ stars | | | | | |
| | awesome-beamer: Creating presentation slides by using Beam (Most examples are from our research.) | ner in LaTeX. | 2020.11 - present | | | |
| | \bigcirc xinychen/awesome-beamer \Leftrightarrow 60+ stars | | | | | |
| | tracebase: Multivariate time series forecasting on high-dimensional and 2020.11 - present sparse Uber movement speed data. | | | | | |
| | 🗘 xinychen/tracebase 🌣 30+ stars | | | | | |
| Presenta- tion & Talk | □ Low-rank matrix and tensor factorization for speed field reconstruction. 2023.03 • Research Group of Transport, Polytechnique Montreal • Slides: https://xinychen.github.io/slides/MF_TF_SFR.pdf | | | | | |
| | ☐ Spatiotemporal traffic data imputation and forecasting with tensor learning. 2022.05 • IVADO Project Workshop • Slides: https://xinychen.github.io/slides/phd_project_22summer.pdf | | | | | |
| | ☐ Nonstationary temporal matrix factorization for multivariate time series forecasting. 2022.05 | | | | | |
| | Hong Kong Machine Learning Meetup (virtual) Slides: https://xinychen.github.io/slides/notmf.pdf | | | | | |
| | ☐ Bayesian temporal factorization for multidimensional time series prediction. 2021.03 | | | | | |
| | IFT 6760A Course (Matrix and tensor factorization techniques for machine learning) Slides: https://doi.org/10.5281/zenodo.4693404 | | | | | |
| BLOG POSTS I enjoy writing some blog posts about my research (30+ posts & 65k+ views & 300+ followers on Medium). M https://medium.com/@xinyu.chen ◆ Selected posts | | | | | | |
| | Temporal matrix factorization for multivariate time series forecasting. | 4k+ views | 2022.03.20 | | | |
| | Reduced-rank vector autoregressive model for high-dimensional time series forecasting. | 4k+ views | 2021.10.16 | | | |
| | 3 . Dynamic mode decomposition for multivariate time series forecasting. | 14k+ views | 2021.10.10 | | | |
| | 2. Matrix autoregressive model for multidimensional time series forecasting. | 8k+ views | 2021.10.03 | | | |
| | Intuitive understanding of randomized singular value decomposition. | 8k+ views | 2020.07.01 | | | |
| Skills | ☐ Language: Chinese (native) & English (fluent) | | | | | |
| | ☐ Expertise : Python/Matlab/Julia/R/Java; NumPy/PyTorch/CSS/HTML. | Cupy; Jupyter | Notebook; LaTeX; | | | |

References Please reach out to request a reference letter.

Prof. Nicolas Saunier (advisor)

- Full Professor
- Département des génies civil, géologique et des mines (CGM)
- Polytechnique Montréal
- CIRRELT, RRSR, CIRODD & IVADO
- Homepage: http://n.saunier.free.fr/saunier/
- Email: nicolas.saunier@polymtl.ca

Prof. Lijun Sun (co-advisor)

- Assistant Professor
- Department of Civil Engineering
- McGill University
- Homepage: https://lijunsun.github.io
- Email: lijun.sun@mcgill.ca

Prof. Xi-Le Zhao (collaborator)

- Full Professor
- School of Mathematical Science
- University of Electronic Science and Technology of China
- Homepage: https://zhaoxile.github.io
- Email: xlzhao122003@163.com