Xin Lin

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Profile

I am a current graduate student (2002-02 | man) at China University of Geosciences (Wuhan), currently working on the direction of coupling human-earth systems and deep reinforcement learning, trying to use deep reinforcement learning for the adjustment of policy trajectories in the operation of complex systems. Before entering China University of Geosciences (Wuhan) in 2023, I was an undergraduate student of Geographic Information Science in the School of Surveying and Mapping of Xi'an University of Science and Technology. I was ranked 1/259 in the overall assessment of the whole college during my college years, and won several national awards in GIS. In 2022, under my undergraduate graduation advisor, I carried out the research work of unsupervised unmixing network in deep learning for hyperspectral super-resolution reconstruction, and contributed to the International Conference on Image Processing in 2023, and based on the work above, I completed my graduation thesis and was awarded the title of Outstanding Graduate.

My research interests lie in deep learning for hyperspectral image reconstruction, spatio-temporal big data analytics for social perception, and data assimilation in earth system modeling, and I am currently studying in a joint training program at the Tibetan Plateau Graduate School of the Chinese Academy of Sciences (Tertiary Observation and Big Data Center).

Education

China University of Geosciences (Wuhan)

Wuhan, Hubei Studying for a master's degree，Hydrology 2023-present

- **Recommendation for admission without examination** (ranked 1/259 in the assessment)

Xi'an University of Science and Technology

Shaanxi, Xi'an Geographic Information Science Program (National First Class Program) 2019.06 - 2023.06

- **GPA**：4.00 / 5.00 **Overall ranking:** 1/59 **Outstanding Graduate/Outstanding Thesis**
- **Relevant awards:** National Inspiration Scholarship Sun Echizaki Scholarship Two Second Class Scholarships at School Level Two Third Class Students at School Level Two Outstanding Youth League Members at School Level Two times

Project Experience

- **Undergraduate level**

  In the 2021 National University Students Mathematical Modeling Competition, completed the experimental research and analysis of ethanol coupling based on multiple regression analysis model using MATLAB software, and conducted multiple regression and gray correlation analysis of C_4 olefin, and won the first prize at the provincial level;

  In the 2021 Undergraduate School GIS Software Application and Development Competition, completed the construction of "WebGIS Map Visualization System" as a team leader, built a WebGIS visualization system based on the open source map JS library, understood the development process of WebGIS, and also practiced the ability of geographic data processing and library building.

  In the 2022 National College Students' Surveying and Mapping Discipline Competition, completed the writing of the thesis "Spatio-temporal Characterization of Precipitation and Forecasting Modeling in Henan Province from 1990 to 2020", mainly responsible for the spatio-temporal and temporal analysis of precipitation data, and mastered the application of the MK test, Morlet analysis, and Kriging interpolation in analyzing the factors of precipitation, and practiced the thesis writing ability and ENVI, Arcgis software processing data ability;

- **Graduate level**

  In the 12th International Conference on Image Graphics (ICIG), 2023, we will present as Poster the undergraduate work on Deep Learning for Hyper-resolution Reconstruction of Hyperspectral Images, in which we propose a super-resolution method based on a densely coupled self-encoder network (CoDenNet), introduce a dense network technique for spectral unmixing extraction, and introduce a joint loss function to simplify the training strategy. A dense network technique is introduced for spectral unmixing extraction, and a joint loss function is introduced to simplify the training strategy. https://github.com/peter-kinger/CoResNet

In the 12th China Graduate Student Mathematical Modeling Competition "Huawei Cup" in 2023, as a team leader, we led the members to complete the "Research on Strong Convective Precipitation Forecasting Model Based on Deep Residual Networks", which was mainly responsible for the RAIN-CONet model, Hi-RAIN-CONet model to predict the radar echo and the Z-R relationship to predict the precipitation. precipitation by utilizing the Z-R relationship quantitative prediction, and finally evaluated the contribution of dual-polarized radar data in proximity forecasting. As a key member of the programming team, he familiarized himself with the use of Pytorch framework in building deep learning for meteorological precipitation prediction.

During his graduate studies, he is currently working on the coupling of human-earth systems and deep reinforcement learning in the direction of deep reinforcement learning for the adjustment of strategy trajectories of complex system operation, as a joint study in the Qinghai-Tibetan Plateau Graduate School (Tertiary Observation and Big Data Center) of the Chinese Academy of Sciences (CAS). At present, the specific research is still in the experimental design stage, using Gym and Stable-line3 open source libraries to preliminarily build their own deep reinforcement learning based on the earth system warming management problems in the research framework.

Publications

CONFERENCE PROCEEDINGS

[C1] Coupled dense convolutional neural networks with autoencoder for unsupervised hyperspectral super-resolution.
Xin Lin, Yuanchao Su, Sheng Li, Mengying Jiang, Bin Pan, Pengfei Li, Jinying Bai, and Feng Liu
ICIG, 2023. [Paper] (CCF-C)

Skills

Programming Languages: Python > Matlab > Java > Latex

Platform Framework: Pytorch, numpy,

Main honors and awards

- **National Awards**

2022.11 The 10th National University Students' GIS Skills Application First Prize (data processing and analysis)
2021.06 China Computer WeChat Small Program Application Development Competition Third Prize (Captain)
2021.12 Thirteenth National University Student Mathematics Competition Third Prize
2020.04 Obtained two national utility model patents

Professional Experience

- **Digital Topographic Surveying Internship** 2020.05 – 2020.06

The internship consolidated the theoretical knowledge of digital mapping principles, mastered the basic operation of level meter and total station, the observation and calculation methods of wireline survey and triangular elevation survey, and learned how to carry out field topographic survey and topographic map drawing and stitching, and cultivated the ability of teamwork in the process.

- **Practical training in digital mapping software applications** 2020.12-2021.01

Mastered the basic process of transforming paper map data into computerized digital topographic map data, based on the measured 1:1000 Jodai topographic map, modified and produced large-scale topographic maps and thematic maps with Southern CASS software, as well as the conversion of data format of cartographic software and GIS software, this internship mastered the whole process of raw topographic data acquisition, vector graphics editing, and output of mapping vector results.

- **AE Component Development** 2022.05-2022.06

Proficiency in GIS basic functions of integrated application system development, able to apply common database operation and analysis, combined with SpatialReference and other controls to develop projection transformation, overlay analysis component function, able to call eris class library for component development, and according to the customer's requirements of the function maintenance.

- **4D Product Creation Internship** 2022.08-

Mastered the quality control measures of 4D productions, and skillfully utilized MapGIS, ENVI, ERDAS, Virtuo-Zo and other software for DRG, DLG, DOM, DEM productions.

Services

- Participate in the GISphere Institute (a non-profit organization that provides an online educational platform for GISers at https://gisphere.info/) GIS-info-LLM (Large Language Model) information collection on global

institutions (github link), a comprehensive resource for GIS professionals and students, including details on 500+ GIS graduate programs and 2000+ instructors. This information-gathering guide is a comprehensive resource for GIS professionals and students, including details on 500+ GIS graduate programs and 2000+ faculty members.

Responsibilities: Participate in the gis-info-llm open source project, collect information through web crawler technology using gpt and other large language models, analyze professor enrollment information from North American GIS institutions through gpt structural information transformation, coordinate with the person in charge of uploading issues, and troubleshoot bugs. 2024.04 - Now

Certification of key skills

CET-4: 520

CET-6: 512

IELTS 6.0

NCRE-C language: excellent