Yu Wang

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About Me

I am a Ph.D. student at the Visualization and Graphics Group, Utrecht University, with research interests in high-dimensional data visualization, adversarial training (GAN), and machine learning classifier visualization. Proficient in managing high-dimensional data, I apply machine learning techniques to extract insights, reduce dimensionality, and address complex challenges. Additionally, I am also passionate about Generative AI in art, and hold a gemology diploma from Gem-A, with proficiency in gem identification.

Education

I am pursuing two Ph.D. degrees in Visual Data Analytics and Geology, respectively.

Department of Information and Computing Sciences, Faculty of Science, Utrecht University *Mar. 2023 – Summer2025 (expected)*

- *Ph.D. Candidate in Visual Data Analytics*
- Supervisor: Prof. Alexandru C. Telea

School of Earth Sciences and Resources, China University of Geosciences, Beijing *Sep. 2019 – Jun. 2025 (expected)*

- *Ph.D. Candidate in Geology*
- Supervisor: Prof. Kunfeng Qiu; Prof. Richard Goldfarb

School of Gemmology, China University of Geosciences, Beijing *Sep. 2015 – Jun. 2019*

- *B.A. in Product Design*
- GPA: 3.55/4.0

Research Experience

Ph.D. Researcher *Mar. 2023 – Present*

Department of Information and Computing Sciences, Utrecht University

- Working on Decision Maps for machine learning classifiers, a method for interpretable machine learning.
- Currently focusing on using adversarial training to achieve better inverse projections.

Ph.D. Researcher *Mar. 2019 – Present*

School of Earth Sciences and Resources, China University of Geosciences, Beijing

- Machine learning for mineral genetic type classification.
- Built decision boundary maps for mineral genetic types.

Work Experience

AI Engineer Intern *Feb. 2022 – Sep. 2022*

Schlumberger Technologies (Beijing) Ltd.

- Contributed to the project: *Digital Geo-mechanics Algorithms and Implications for Real-time Drilling.* The project integrates various formats of legacy data and focuses on innovating AI learning algorithms and workflows to train a digital geostructure model. This model is designed to label formation rocks, describe geostructures in well-drilling engineering, and self-improve based on real-time drilling data. The prototype has demonstrated significant potential in driving the digital transformation of the oil and gas industry.
  - Worked with a team of ∼10 members.
  - Developed a GAN-based solution for lithology reconstruction.
  - Implemented a 3D formation labeling algorithm, reducing complexity from $O(n^3)$ to $O(n^2)$, and cutting runtime from hours to minutes.
  - Created 3D interactive visualizations to showcase the above algorithms.
- Achieved 2nd place in the PUTC Data Science Hackathon 2022 (out of ∼100 participants).

Technical Skills

Generative Adversarial Networks (GANs), Convolutional Neural Networks (CNNs), Decision Maps for Classifier Engineering, Visual Analytics for High-Dimensional Data, Analysis of Multivariate Data, Hyperparameter Optimization, User Interface Design.

Skill Category	Technologies	Years	Proficiency	Usage
Programming Languages	Python	6+ years	Advanced	60k+ lines of code
	JavaScript	1+ years	Intermediate	5k+ lines of code
Data Science & Machine Learning	pandas, NumPy, scikit-learn	5+ years	Advanced	20+ projects
	PyTorch, TensorFlow	4+ years	Intermediate	∼10 projects
Web Development	Flask	3+ years	Intermediate	2 projects
	HTML,CSS	2+ years	Intermediate	5+ project
	TensorFlow.js	1+ years	Introductory	1 project
Visualization	Matplotlib, seaborn	5+ years	Advanced	20+ projects
	vispy, pyqtgraph	3+ years	Intermediate	2 projects
	D3.js	1+ years	Intermediate	2 projects
GUI Development	PySide, PyQt	3+ years	Intermediate	2 projects
Version Control	Git, GitHub	5+ years	Advanced	∼50 repositories

Awards

Best Student Paper Award *2024*
15th International Conference on Information Visualization Theory and Applications (IVAPP/VISIGRAPP)
(out of 431 submissions)

First-class Doctoral Student Scholarship *2020, 2021*
China University of Geosciences, Beijing (CUGB)
(top 20% of 150+ students)

3rd Prize *2018*
'Tianmu Cup' National Jewelry Identification Professional Skills Competition
(out of 1000+ participants)

2nd Prize *2017*
'Tianmu Cup' National Jewelry Identification Professional Skills Competition
(out of 1000+ participants)

Three-Good Student Award *2017*
China University of Geosciences, Beijing
(out of ∼100 students)

Professional Scholarship (4 times) *2015–2019*
China University of Geosciences, Beijing
(top 20% of ∼100 students)

Conference Presentations

- The 15th International EuroVis Workshop on Visual Analytics (EuroVA) *May 2024*
  Odense, Denmark (Non-Speaker)
- The 15th International Conference on Information Visualization Theory and Applications (IVAPP/VISIGRAPP) *Feb 2024*
  Rome, Italy (Speaker)
- EGU General Assembly *Apr 2023*
  Vienna, Austria (Speaker)
- The 15th National Conference on Mineral Deposits *Nov 2020*
  Hangzhou, China (Speaker)

Selected Publications

1. Wang, Y., Dennig, F., Telea, A. How to make dogs smile: Controlling inverse projections by maneuvering the lost information. *In submission to IEEE TVCG.* **(1^{st} journal worldwide in VA/Visualization)**
2. Wang, Y., Telea, A. Investigating Desirable Properties of Inverse Projections and Decision Maps. *Communications in Computer and Information Science.* (to appear).
3. Grosu, C., Wang, Y., Telea, A. (2024). Computing fast and accurate decision boundary maps. In *Proc. EuroVA.* **(1^{st} venue in Europe on visual analytics)**
4. Blumberg, D., Wang, Y., Telea, A., Keim, D., Dennig, F. (2024). Inverting Multidimensional Scaling Projections Using Data Point Multilateration. In *Proc. EuroVA.* **(1^{st} venue in Europe on visual analytics)**
5. Wang, Y., Qiu, K., Telea, A., Hou Z., Zhou T., Cai Y., Ding Z., Yu H., Deng J. (2024). Interpreting mineral deposit genesis classification with decision maps: A case study using pyrite trace elements. *American Mineralogist.*
6. Telea, A., Machado, A., Wang, Y. (2024). Seeing is Learning in High Dimensions: The Synergy Between Dimensionality Reduction and Machine Learning. *SN Computer Science*, 5(3), 279.
7. Wang, Y., Telea, A. (2024). Fundamental Limitations of Inverse Projections and Decision Maps. In *Proc. IVAPP*, 1, 571–582.
8. Wang Y., Machado, A., Telea, A. (2023). Quantitative and Qualitative Comparison of Decision-Map Techniques for Explaining Classification Models. *Algorithms*, 16(9), 438.
9. Zhu, Z., Zhou, F., Wang, Y., Zhou, T., Hou, Z., Qiu, K. (2022). Machine learning-based approach for zircon classification and genesis determination. *Earth Science Frontiers*, 29(5), 464.
10. Sun, Y., Qiu, K., An, M., Li, S., Shang, Z., Wang, Y. (2022). Geochronological and Geochemical Constraints on the Petrogenesis of Lamprophyre from the Giant Weishan REE Deposit in China. *Minerals*, 12(6), 706.
11. Wang Y., Qiu K. Hou Z., and Yu H. (2022). Quartz Ti/Ge-P discrimination diagram: A machine learning based approach for deposit classification. *Acta Petrologica Sinica*, 38(1): 281-290.
12. Zhou T., Qiu K., Wang Y., Yu H. and Hou Z. (2022). Apatite Eu/Y-Ce discrimination diagram: A big data based approach for provenance classification. *Acta Petrologica Sinica*, 38(1): 291-299.
13. Wang Y., Qiu K., Müller A., Hou Z., Zhu Z., Yu H. (2021). Machine Learning Prediction of Quartz Forming-Environments. *Journal of Geophysical Research: Solid Earth.* 126(8): e2021JB021925. **(Nature Index Journal)**
14. Qiu, K., Deng, J., Yu, H., Wu, M., Wang, Y., Zhang, L., Goldfarb, R. (2021). Identifying hydrothermal quartz vein generations in the Taiyangshan porphyry Cu-Mo deposit (West Qinling, China) using cathodoluminescence, trace element geochemistry, and fluid inclusions. *Ore Geology Reviews*, 128, 103882.

Languages

Mandarin (native); **English** (working proficiency); **Dutch** (A1 level)

Certificates

Deep Learning Non-Credit Specialization
Coursera

Gemology with Diploma Distinction (FGA)
Gemological Association of Great Britain

Diploma in Gem Diamond Grading
Gemmological Institute, China University of Geosciences