Qi Pang

pangjiutian@stu.xjtu.edu.cn | (+86)18782704488 | Homepage

Education

Xi'an Jiaotong University, China *Sep. 2023 – Jul. 2026 (Expected)*

- *Master in Information and Communication Engineering*
- Current score: **90.05/100** | Supervisor: Jinghuai Gao
- Relevant Courses: Modern Inverse Problem Theory and Its Application, Linear Space and Matrix Analysis

Shenyang Aerospace University, China *Sep. 2019 – Jul. 2023*

- *Bachelor of Information and Communication Engineering*
- Average score: **87.05/100**
- Relevant Courses: Signals and Systems, Digital Signal Processing

Research Interests

Physics-informed Machine Learning, Inverse Problems, Generative Models.

Publication

[1] **Pang Q**, Chen H, Gao J, et al. Iterative Gradient Corrected Semi-Supervised Seismic Impedance Inversion via Swin Transformer, in IEEE Transactions on Geoscience and Remote Sensing, 2025.

Research Experience

Petrophysical Inversion with Multi-source Information-guided Diffusion Model *Jan. 2025 – Present*

- Simulated non-stationary geological deformations (such as folds and faults) to generate structurally realistic synthetic datasets and utilized diffusion models to enhance flexibility and diversity.
- Currently exploring forward modeling and multiple priors for guiding denoising in diffusion inversion frameworks.

Iterative Gradient Corrected Semi-Supervised Seismic Impedance Inversion via Swin Transformer

Jun. 2024 – Nov. 2024

- Developed an iterative gradient-updating seismic inversion framework that performs optimization in the model space rather than transitioning from the observation space, employing a more flexible training strategy. The inversion accuracy and network convergence are both notably enhanced after several iterations.
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- Integrated anisotropic structural regularization informed by seismic dip into the loss function, thereby improving inversion accuracy and ensuring geological consistency.

Research on DL-Based Time-Shift Estimation for Seismic-Well Tie *Mar. 2024 – May. 2024*

- Applied a piecewise block time shift to the time-depth relationship to align with physical conditions, generating training datasets with time-shifted seismic data and corresponding time-depth relationships.
- Utilized soft-DTW as a loss function and integrated KAN as a mapping layer to construct a time-shift estimation network, achieving improved prediction accuracy.

Research on Model-driven Seismic Inversion with Structural Constraints *Oct. 2023 – Jan. 2024*

- Estimated dip angles using structural tensors and validated results against estimates from plane-wave destruction.

- Developed a structural constraint operator based on seismic dip and incorporated it into the regularization term of the objective function to enhance inversion continuity and resolution.
- Employed FISTA and conjugate gradient algorithms for regularized least-squares inversion.

Awards

Second Prize in the 2021 National College Student Electronic Design Competition 2021

Second Prize in the 13th National College Student Mathematics Competition 2021

First Prize in the 12th National College Student Mathematics Competition 2020

Skills

Programming Languages: Python, MATLAB, C