Yong Ma

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Hilights

10+ years' industry R&D experiences in developing and delivering data-driven and AI/ML solutions with deep roots in signal processing, numerical optimization, HPC, and physics.

Experience

Microsoft, Applied Sciences Group **Houston, TX**
Sr. Researcher *01/2024 –*
Efficient AI for Edge and Cloud.

- Led developments of deep learning models for CV-related applications in oil/gas production:
  - Detect GHG emissions & associated sources (Yolo/RCNN-based) from hyperspectral images/videos,
  - Land cover classification and segmentation (UNet, GAN, Transformer) from aerial images,
  - Led a team of 5 to win the 1st place in Google Cloud Emission Hackathon in 2022.

Aramco Americas, Houston Research Center **Houston, TX**
Staff Machine Learning Scientist *11/2021 – 12/2023*
R&D of ML solutions for various hydrocarbon exploration, production, and upstream sustainability projects.

- Led developments of deep learning models for CV-related applications in oil/gas production:
  - Detect GHG emissions & associated sources (Yolo/RCNN-based) from hyperspectral images/videos,
  - Land cover classification and segmentation (UNet, GAN, Transformer) from aerial images,
  - Led a team of 5 to win the 1st place in Google Cloud Emission Hackathon in 2022.
- Led developments of deep learning with physics (PDE-based wave simulation) to reconstruct earth models.
  - Utilized generative models (VAE, normalizing flow) to regularize the inversion for faster convergence,
  - Built a CNN + LSTM model to infer subsurface structures and physical properties (e.g., sound speed),
  - Detected changes in subsurface from multichannel time series data via optimization.

Sinopec Tech Houston **Houston, TX**
Research Advisor *04/2021 – 10/2021*
Led R&D of model building and optimization for production projects in GPU cluster.

ConocoPhillips **Houston, TX**
Staff/Sr. Research Scientist *11/2012 – 03/2021*
Developed algorithms for machine learning and inverse problems via numerical optimization and HPC.

- Led R&D of multiple regression models with optimization methods (e.g., GD, NLCG, BFGS, L-BFGS, etc.) for solving PDE-based least-squares imaging/inversion problems with more than 10^9 parameters.
  - Designed sparse-model regression to speed up convergence by >3X; enabled production-size sensitivity analysis.
  - Developed advanced regularization and loss functions to reduce local minima and improve convergence landscape.
  - Optimized algorithms via MPI/OpenMP/Vectorization/CUDA for production in HPC platforms.
- Developed ML solutions and signal processing algorithms for: e.g., temporal/spatial waveform alignments via dynamic warping; frequency band expansion; acoustic signal onset time detection; denoising, etc.
- Led a team of 3-4 analysts to commercialize developed technologies & deployed models to 10+ projects.

Education

Colorado School of Mines **Golden, CO**
Ph.D. in Computational Geophysics *2007 – 2012*

Nanjing University **Nanjing, China**
M.Sc. in Acoustics & B.Sc. in EE, *2000 – 2007*