Qibo Xu

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PROFESSIONAL PROFILE

Multidisciplinary and self-driven researcher applying machine learning to complex, data-intensive problems in physics, climate, and structural biology. Skilled at translating real-world challenges into machine learning solutions and delivering effective results.

SKILLS

- **Programming Languages:** Python, C
- **Frameworks & Libraries:** PyTorch, OpenCV, SciPy, Scikit-learn, NumPy, Pandas, Matplotlib
- **Technologies:** Deep Learning (CNN, U-Net), Computer Vision, Weights and Bias, Git, Linux, Notion
- **Communication:** Cross-functional collaboration with scientists/engineers; leadership/mentorship of junior researchers

PROJECTS

- **CryoID2: AI framework for protein/RNA identification in cryo-electron microscopy (cryoEM) maps**
  - Implemented multi-hierarchical U-Net from scratch using PyTorch to capture volumetric features
  - Integrated into an inference workflow with automated preprocessing for scalable deployment
  - Achieved high recall on key biological features (0.9788/0.9895/0.8266)
- **CryoDataBot: Scalable cryoEM dataset generation for supervised learning applications**
  - Orchestrated an end-to-end pipeline covering data acquisition, preprocessing, and fine-grained annotation at scale
  - Generated datasets used to retrain deep learning models, improving precision over 22% (0.556→0.679)
  - Supervised 4 team members; delegated tasks based on individual strengths and ensured timely progress
- **Stratospheric sudden warming (SSW) predictive modeling — post-event weather prediction**
  - Developed a novel spatiotemporal PCA method to extract dominant modes from multi climate datasets
  - Trained ML models on principal components to achieve >75% accuracy in post-event weather prediction

EXPERIENCE

- **California NanoSystems Institute, UCLA** — Los Angeles, CA
  Postdoc Scholar – Applied Machine Learning — *Sep. 2022 – Present*
  - **Data Engineering:** Design and implement modular pipelines to automatically construct large-scale cryoEM datasets, integrating data fetching, preprocessing, labeling using Python, Pandas and Numpy
  - **Neural Network Modeling:** Develop and optimize convolutional neural networks for protein structure identification, leveraging PyTorch for model design, training, and evaluation
  - **Applied Machine Learning:** Collaborated with data scientists, application developers, and domain experts to transition prototypes into production-ready ML tools
  - **Capstone Leadership:** Mentored and led a cross-functional team of undergraduates in applying ML to complex data problems

EDUCATION

- **Institute of Atmospheric Physics, Chinese Academy of Science** — Beijing, China
  Ph.D. in Meteorology — *Sep. 2016 – June. 2022*
- **Peking University** — Beijing, China
  B.S. in Physics — *Sep. 2012 – June. 2016*

SELECTED PUBLICATIONS

- Xu, Q. et al. **CryoDataBot: a pipeline to curate cryoEM datasets for AI-driven structural biology** (preprint). *Under review in GigaScience.*
- Xu, Q., Chen, W. Song, L. **Two leading modes in the evolution of major sudden stratospheric warmings and their distinctive surface influence**. Geophysical Research Letters 49, e2021GL095431 (2022).