Unterfeldstrasse 4
Zurich 8050, Switzerland
+41 78 255 90 00
pakshalbohra@gmail.com
linkedin.com/in/pakshalbohra23
Google Scholar Profile
github.com/pakshal23

Pakshal Bohra

Summary

ML researcher and engineer with 7+ years of experience developing ML systems across multiple domains. I bring a strong theoretical foundation in ML, signal processing, and statistics along with solid software engineering skills, and I work across the full ML development cycle—from research to deployment.

Experience

Aug 2024 – Present **Computational Software Engineer**, Distran AG, Zurich, Switzerland
Focus: Machine Learning, Scientific Computing, Software Development

- Designed and implemented end-to-end ML workflows for developing trustworthy models for quantitative acoustic-image analysis
- Built production-grade internal tools, including a semantic search engine based on multimodal foundation models
- Developed and contributed advanced, high-performance ultrasonic imaging pipelines to the company's JAX-based scientific computing toolkit
- Acting as Scrum Master for the team, facilitating sprint planning and review meetings, backlog refinement, workload estimation, and progress tracking

Sep 2018 – June 2024 **Research Assistant**, Biomedical Imaging Group, EPFL, Lausanne, Switzerland
Focus: Machine Learning, Statistics, Computational Imaging

- Developed state-of-the-art image and video reconstruction pipelines based on deep generative models for quantitative phase imaging
- Designed and implemented a novel learnable activation function for building robust and stable deep neural networks
- Introduced an ultra-fast and interpretable deep-learning-based image-reconstruction algorithm and applied it to MRI and CT imaging
- Supervised 13 student projects (master's theses, internships, and semester projects)
- Published 11 papers (7 as first author), and presented tutorials at the SIAM Conference on Imaging Science and the IEEE International Symposium on Biomedical Imaging

June 2017 – June 2018 **Graduate Student Researcher**, IIT Bombay, Mumbai, India
Focus: Signal Processing, Optimization, Statistics, Communication Systems

Master's Thesis: *Poisson Inverse Problems with Performance Bounds*

- Proposed sparsity-driven estimators based on variance-stabilizing transforms for recovering signals and images under Poisson or Poisson-Gaussian noise
- Derived upper bounds on reconstruction error and validated the estimators through extensive numerical simulations
- Published 2 first-author papers based on this work

R&D Semester Project: *Cooperative Viewing in Immersive Videos* (Fall 2017)

- Proposed a system where multiple users are viewing an immersive video and the server detects popular events via user-generated auxiliary data and informs them about those events
- Built an Android application with a 360-degree video player, two-way server communication, and a server-side data-analysis routine for event detection

May 2016 – July 2016 **Research Intern**, Siemens Healthineers, Bengaluru, India
Focus: Computer Vision, Image Segmentation, Machine Learning

- Developed an algorithm based on supervoxel features, random forest classifiers and the graph cuts method for the automated segmentation of the spleen in CT images

Education

Sep 2018 – June 2024 **PhD in Electrical Engineering**, École Polytechnique Fédérale de Lausanne (EPFL)
Research areas: Machine Learning, Deep Learning, Statistics, Computational Imaging
Thesis Advisor: Prof. Michael Unser

July 2013 – June 2018 **B.Tech + M.Tech in Electrical Engineering**, Indian Institute of Technology (IIT) Bombay
Minor in Computer Science and Engineering
Major GPA: 9.55/10 (ranking: top 10%)

Technical Skills

Languages: Python, MATLAB, Java, C++

Frameworks and Libraries:
- Machine Learning: PyTorch, JAX, Equinox, scikit-learn, XGBoost, Transformers (Hugging Face), SentenceTransformers, OpenCLIP
- Computer Vision and Image Processing: OpenCV, scikit-image, FFmpeg, ImageJ
- Data Processing and Analysis: NumPy, SciPy, pandas, polars, SQLite
- Data Visualization and UI: matplotlib, seaborn, plotly, Streamlit

Dev/ML Ops: Git, Docker, Jenkins, Data Version Control (DVC)

Others: Linux, LaTeX, Android Studio, Unity 3D

Selected Publications (* denotes equal contribution)

- **P. Bohra***, J. Campos*, H. Gupta, S. Aziznejad, and M. Unser, "Learning Activation Functions in Deep (Spline) Neural Networks", *IEEE Open Journal of Signal Processing*, 2020
- **P. Bohra**, T. -a. Pham, J. Dong, and M. Unser, "Bayesian Inversion for Nonlinear Imaging Models Using Deep Generative Priors", *IEEE Transactions on Computational Imaging*, 2022
- **P. Bohra***, T. -a. Pham*, Y. Long, J. Yoo, and M. Unser, "Dynamic Fourier Ptychography With Deep Spatiotemporal Priors", *Inverse Problems*, 2023
- S. Ducotterd, A. Goujon, **P. Bohra**, D. Perdios, S. Neumayer, and M. Unser, "Improving Lipschitz-Constrained Neural Networks by Learning Activation Functions", *Journal of Machine Learning Research*, 2024
- A. Goujon, S. Neumayer, **P. Bohra**, S. Ducotterd, and M. Unser, "A Neural-Network-Based Convex Regularizer for Inverse Problems", *IEEE Transactions on Computational Imaging*, 2023
- **P. Bohra**, P. del Aguila Pla, J. -F. Giovannelli, and M. Unser, "A Statistical Framework To Investigate the Optimality of Signal-Reconstruction Methods", *IEEE Transactions on Signal Processing*, 2023

Teaching and Mentoring

Sep 2018 – June 2022 **Teaching Assistant**, *EPFL*
- TA for Image Processing I (∼200 students) and Image Processing II (∼60 students)
- Responsible for conducting weekly exercise sessions and organizing and grading exams
- Served as Head TA for Image Processing I in Fall 2021, managing a team of 14 TAs

July 2016 – June 2018 **Student Mentor**, *IIT Bombay*
- Selected twice for the 80-member senior mentor team supporting incoming freshmen