Jaivardhan Kapoor

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EDUCATION

UNIVERSITY OF TÜBINGEN
September 2021 - Ongoing
PhD candidate
Scholar - IMPRS-IS

INDIAN INSTITUTE OF TECHNOLOGY (IIT) KANPUR
July 2015 - March 2021
M.Tech. in Electrical Engg.
CPI: 10/10
B.Tech. in Electrical Engg.
CPI: 8.4/10

SKILLS

MACHINE LEARNING
• Diffusion Models • VAEs
• Neural Time Series • Medical Imaging
• Transformers • Deep SSMs
• Multi-GPU & Multi-stage Training

SOFTWARES/LIBRARIES
• PyTorch • Tensorflow
• Numba • Triton
• Freesurfer & FSL • git

LANGUAGES
• Hindi (Native)
• English (Fluent)
• German (Elementary)

COURSEWORK
• Bayesian Machine Learning
• Mathematics of Signal Processing
• Learning Theory
• Convex Optimization
• Computational Cognitive Science

ACHIEVEMENTS
• All India Rank **1026** in JEE Mains 2015 (99.92%ile) and **496** in JEE Advanced 2015 (99.7%ile)
• All India Rank **485** in Kishore Vaigyanik Protsahan Yojana 2014-15 (99.1%ile)

VOLUNTARY SERVICE
• Student Guide at Counselling Service, IIT Kanpur
• Design Executive at Antaragni, IIT Kanpur

RESEARCH

PHD THESIS | University of Tübingen
September 2021 - Present
Research Group: Machine Learning for Science
Developing generative models for clinical neuroimaging and neural data, focusing on:
- Realistic neural spike generation & neural decoding of stimuli
- Brain age progression modeling with hi-res 3D MRIs
- Unsupervised anomaly detection & uncertainty quantification for medical imaging data

Specializing in **diffusion models** , **multi-stage training** , and domain-specific architectures using **deep state space models**

MASTERS THESIS | Indian Institute of Technology Kanpur
November 2019 - January 2021
Title - Accelerated Simulation of the XY Model using Conditional Normalizing Flows
- Developed conditional normalizing flows with circular splines to generate XY model lattice configurations at any given temperature
- Compared performance to MCMC and relevant ML methods, speeding up simulation by orders of magnitude while outperforming ML baselines

WORK EXPERIENCE

TEACHING & SUPERVISION | University of Tübingen
Tübingen, Germany | September 2021 - Present
- Taught graduate-level courses as a Teaching Assistant, including Probabilistic Machine Learning, LLMs for Scientific Discovery, and Data Literacy
- Supervised and mentored Masters students and PhD candidate

RESEARCH INTERNSHIP | Aalto University
Espoo, Finland | May – July 2019
- Performed MCMC inference in ODEs modeled with Gaussian Process
- Benchmarked popular optimizers and MCMC schemes on ODE models

RESEARCH INTERNSHIP | Max Planck Institute for Intelligent Systems
Tübingen, Germany | June 2018 – December 2018
- Developed a methodology to combine count-based Bayesian nonparametrics with Hawkes processes and Sequential Monte Carlo
- Evaluated the framework with datasets on online user activity, citation networks, and corporate mail servers

SELECTED PAPERS
- **Kapoor** et al. Latent Diffusion for Neural Spiking Data. **Spotlight** NeurIPS, 2024
- **Kapoor** et al. MRExtrap: Linear Prediction of Brain Aging in Autoencoder Latent Space of MRI Scans. Medical Imaging with Deep Learning, 2024
- **Kapoor** *, Frotscher* et al. Unsupervised Anomaly Detection using Aggregated Normative Diffusion. In review, 2024
- **Kapoor** et al. Bayesian Nonparametric Hawkes Processes. NeurIPS Workshop on Bayesian Nonparametrics, 2018