ROHAN ASTHANA

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Summary

PhD researcher at FAU working on the topic **"Structural and Geometric Signals for Designing, Evaluating, and Diagnosing Neural Models"**, with 3 first-author publications at **ICLR** and **TMLR**. Research spans Diffusion Models, VLMs and VLAs; Neural Architecture Search (NAS) and Model Compression; and Predictive Maintenance with Nokia and Astrum IT. Industry experience at **BMW Group** and **Fraunhofer IKS**; official reviewer at TMLR; sub-reviewer for NeurIPS, ICLR, ICML, ICCV/ECCV and CVPR.

Experience

Friedrich-Alexander-Universität Erlangen-Nürnberg *Mar 2023 – Present*
Research Assistant

- Proposed an anisotropy-based metric for detecting and mitigating **memorization in diffusion models** (Stable Diffusion), $\sim$**5–8**$\times$ **faster** than prior methods and requiring only 2 forward passes (ICLR 2026); also researching generalization in Vision Language Models (VLMs) and Vision Language Action (VLA) models.
- Developed DiNAS, a conditional graph diffusion model **generating neural architectures in** $<$**0.2s** across 6 benchmarks (TMLR 2024), and Dextr, a zero-shot NAS proxy using SVD and extrinsic curvature requiring only one unlabeled sample (TMLR 2025).
- Collaborating with Nokia and Astrum IT on remaining useful life (RUL) prediction of hardware components using pretrained time series foundation models.
- Supervised $\sim$15 MSc theses and 2 seminars; co-wrote DFG research proposals.

BMW Group *Mar 2022 – Aug 2022*
Machine Learning Intern

- Predicted Quality of Service attributes (including ping and throughput) using large-scale real-world signal data with up to 7 million samples through CNNs, SVMs, and XGBoost, **achieving state-of-the-art accuracy on ping prediction.**

Fraunhofer Institute for Cognitive Systems IKS *Aug 2021 – Dec 2021*
Working Student

- Built a **reverse image search** system using transfer learning embeddings and t-SNE to retrieve visually similar products with metadata (price, condition, material) from the web.

First Author Publications

- **Detecting and Mitigating Memorization in Diffusion Models through Anisotropy of the Log-Probability**
  International Conference on Learning Representations (**ICLR**) 2026
  Project Page | OpenReview | Code
- **Dextr: Zero-Shot Neural Architecture Search with Singular Value Decomposition and Extrinsic Curvature**
  Transactions on Machine Learning Research (**TMLR**), 08/2025
  OpenReview | Code
- **Multi-conditioned Graph Diffusion for Neural Architecture Search**
  Transactions on Machine Learning Research (**TMLR**), 03/2024 **(25 citations)**
  OpenReview | Code

Other Publications

- Differentiable Cost Model for Neural-Network Accelerator Regarding Memory Hierarchy (Link)
- Too-Hot-to-Handle: Insights into Temperature and Noise Hyperparameters for Differentiable Neural-Architecture-Searches (Link)
- PSumSim: A Simulator for Partial-Sum Quantization in Analog Matrix-Vector Multipliers (Link)
- Confidence Estimation and Boosting for Dynamic-Comparator Transient-Noise Analysis (Link)
- Fake News Detection using Deep Learning Models: A Novel Approach (Link)

Education

Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany *Mar 2023 – Present*
PhD in Machine Learning (Chair of Multimedia Communications and Signal Processing)

Ulm University, Ulm, Germany *Nov 2020 – Feb 2023*
M.Sc. Cognitive Systems | Final Grade: 1.6 (≈90%)

Dr. APJ Abdul Kalam Technical University, India *Aug 2016 – Sep 2020*
B.Tech. Computer Science & Engineering | First Division Hons – 7.5/10 | Led Google Developer Student Club

Skills

ML Frameworks & Systems: PyTorch, PyTorch DDP/FSDP, HuggingFace, TensorFlow, Python

Mathematical Methods: Differential geometry, spectral analysis (SVD), graph theory, information geometry

Research Areas: Diffusion Models, Multimodal Learning (VLMs/VLAs), Neural Architecture Search, Model Compression (Pruning & Quantization), Representation Learning

Languages: German (B1) | English (C1) | Hindi (Native)

Other Projects

Autonomous Driving in Bad Weather

- Used conditional GANs (pix2pix) and CNNs to build an autonomous driving agent in OpenAI Gym capable of driving in unseen conditions (snow, rain).

Gender and Subject Identification using IMU Human Pose Data

- Developed and trained 7 deep learning models to identify gender and subjects on different configurations of real human pose IMU and graph data.

Abstractive Reasoning using Meta-Learning

- Applied Model-Agnostic Meta-Learning (MAML) to solve abstract reasoning tasks on the ARC Corpus.