Aryan Das

arya-domain | Aryan Das | aryan-das.netlify.app | Google Scholar
aryan.das.applied.mail@gmail.com | +91 87773 89113

Summary

My research investigates the capabilities and limitations of deep learning systems, spanning both discriminative and generative models. Current interests include multimodal language models, diffusion models, and foundation model architectures. Research contributions have been published or accepted at leading venues, including ECCV 2026, WACV 2026, IEEE GRSM, and IEEE Transactions, with additional papers currently under review. Research efforts at IIT Kanpur are presently focused on World Models and Recursive Model Learning.

Work Experience

Project Associate (IIT Kanpur) Apr 2026 - Ongoing

– Working on World Models and Recursive Model Learning.

Research Scientist I, SIR Lab (IISER Bhopal) Jan 2026 - Feb 2026

– Working on metacognition and theory of mind to develop an agentic, offline interface for human mental health.

Project Associate I, Moon Lab (IISER Bhopal) Oct 2025 - Dec 2025

– Developing a model of shortest path estimation for drones using satellite and aerial imagery.

Data Scientist, House of Couton Mar 2024 - Sept 2025

– Led a team of 5 in developing an automated hiring tool (AI Hire Studio) using micro and macro facial expression analysis (contract-based).

AI/ML Intern, CDAC Bengaluru Nov 2023 - May 2024

– Collaborated with Scientist Mr. Raghu HV to design an HPC power-saving prototype using machine learning, achieving at least a 20% reduction in power consumption.

Research Intern (IIT Roorkee) Sept 2023 - May 2024

– Worked under Prof. Pravendra Singh (IITR) on 6+ research projects focused on 2D and 3D image processing.

Education

2021 - 2025 B.Tech in Computer Science at **Vellore Institute of Technology, Bhopal** (GPA: 8.78/10)

Publications

Published & Accepted Papers

Conferences

UNITY: Attention Flow Networks for Adaptive Conditioning in Diffusion

Aryan Das, Koushik Biswas, Moloud Abdar, Vinay Kumar Verma, 2026

Accepted, ECCV 2026 [CORE A]*

– Introduces UNITY, a Universal-to-Specialized adapter for efficient and scalable composite conditioning in diffusion-based image generation, jointly learning shared cross-modal semantics before specializing without modifying the architecture.

Efficient Text-Guided Convolutional Adapter for the Diffusion Model

Aryan Das, Koushik Biswas, Swalpa Kumar Roy, Badri Narayana Patro, Vinay Kumar Verma, 2026

Published, WACV 2026 [CORE A]

– Introduces Nexus Adapters, efficient and prompt-guided adapters for diffusion models, enhancing structure-preserving conditional generation.

Uncertainty-Aware Vision-Language Segmentation for Medical Imaging

Aryan Das, Tanishq Rachamalla, Koushik Biswas, Swalpa Kumar Roy, Vinay Kumar Verma, 2026

Published, WACV 2026 [CORE A]

– Introduces a novel uncertainty-aware multimodal segmentation framework leveraging radiological images and clinical text for precise medical diagnosis.

Journals

HyperCap: A Hyperspectral Imaging Dataset with Pixel-Level Captions and Benchmarking

Aryan Das, Tanishq Rachamalla, Pravendra Singh, Koushik Biswas, Vinay Kumar Verma, S. Garcia, A. Plaza, et al., 2026

Published, IEEE GRSM 2026 [IF:16.4]

– Presents HyperCap, a hyperspectral captioning dataset enhancing interpretability and performance in remote sensing.

SM-HAD: Spectrum Mamba for Hyperspectral Anomaly Detection

Tanishq Rachamalla, **Aryan Das**, Swalpa Kumar Roy, S. Das, L. Bruzzone, 2026

Published, IEEE Transactions on Geoscience and Remote Sensing 2026 [IF:8.6]

– Proposed SM-HAD, a novel hybrid encoder-decoder framework integrating Fourier-based spectral modeling, masked spatial attention, and state-space Mamba blocks for hyperspectral anomaly detection.

A Generative Framework for Detection and Classification of Plant Leaf Disease Using Diffusion Network

Aryan Das, Rajul Mahto, Wentao Wang, Ali Jamali, Pravendra Singh, Swalpa Kumar Roy, 2026

Published, Elsevier Applied Soft Computing 2025 [IF:7.8]

– Presents LeafDisDiff, a diffusion-based model for classifying plant leaf diseases.

Submitted Papers

Conferences

RAD: Relative Advantage Diffusion

Aryan Das, Surjo Dey, Koushik Biswas, Swalpa Kumar Roy, Moloud Abdar, Vinay Kumar Verma, 2026

Under Review, 2026

– Introduces RAD, a unified adaptive diffusion training framework leveraging relative difficulty estimation across samples, timesteps, and spectral frequencies through AGD, TAM, and SAD modules for improved quality and learning efficiency.

Fuzzy Radial Sets for Operator Routing in Text-Guided Chest Infection Segmentation

Srishti Kaushik*, **Aryan Das***, Koushik Biswas, Swalpa Kumar Roy, Vinay Kumar Verma, Moloud Abdar,

2026

Under Review, 2026

– Introduces MemberNet, a multimodal text-guided segmentation framework leveraging fuzzy reasoning, deep state space token mixing, and fuzzy radial routing attention for uncertainty-aware infection segmentation.

SLAM: Sequential Linear Adapter Modules for Efficient Text-to-Image Finetuning of Diffusion Transformers

Aryan Das, Rini Smita Thakur, Vinod K. Kurmi, Vinay Kumar Verma, 2026

Under Review, 2026

– Introduces SLAM, a plug-and-play sequential adapter framework for diffusion transformers that leverages the gated delta rule for memory-aware, linear-complexity feature refinement, and proposes a progressive guidance loss to reduce inference steps by up to 40%.

U-RED: Uncertainty-Aware Reward-Driven Diffusion for Multimodal Medical Image Segmentation

Aryan Das, Koushik Biswas, Swalpa Kumar Roy, Vinay Kumar Verma, Sushmita Mitra, 2026

Under Review, 2026

– Introduces a novel reward-modeling-based vision-language framework for medical image segmentation, leveraging diffusion transformers with hierarchical visual-text conditioning.

Skills

Languages & Frameworks	PyTorch, TensorFlow, Keras, NLTK, Scikit-Learn, HF-Hub, NumPy, Pandas, Diffusers, OpenCV, Transformers
Cloud Platforms	AWS, GCP
Operating Systems	Linux, Windows, macOS

Miscellaneous

- Invited as a Guest Speaker by IIT Indore to deliver a talk on research in Drone Technology.
- Served as ACM MM Reviewer 2026

References

Dr. Arnab Bhattacharya Professor, IIT Kanpur arnabb@iitk.ac.in

Dr. Vinay Kumar Verma Senior Applied Scientist, Amazon vkvermaa@amazon.com