

SURJO DEY

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EDUCATION

Rajiv Gandhi Institute of Petroleum Technology, Raebareli, India

2022 – 2026

B.Tech in Computer Science and Engineering

Recipient of the Government of India's Study in India (SII) Scholarship Program

RESEARCH EXPERIENCE

Tezpur University, Assam, India

Mar'26 – Present

Research Fellow — Supervisor: Dr. Swalpa Kumar Roy

Remote

Working on Vision-Language Models (VLMs), building better ways to align image and text representations for stronger visual grounding and understanding across multimodal tasks.

Jashore University of Science and Technology, Jashore, Bangladesh

Jun'25 – Sep'25

Research Intern — Supervisor: Dr. A F M Shahab Uddin

On-site

Developed segmentation-guided diffusion models for medical image augmentation using the Duke-Breast-Cancer-MRI dataset to improve robustness and variability in diagnostic model training data.

PUBLICATIONS

S. Dey, P. Saikia. “**Explainability in Generative Medical Diffusion Models: A Faithfulness-Based Analysis on MRI Synthesis**”. *3rd World Conference on Smart Computing Systems (WCSC)*, 2026 [Paper]

Proposes a faithfulness-based explainability framework using prototype methods to make generative diffusion models transparent for breast MRI synthesis.

S. Dey, A. Sharma, H. Raj, S. Biswas. “**Automated Detection and Analysis of Minor Deformations in Flat Walls Due to Railway Vibrations Using LiDAR and Machine Learning**”. *International Conference on Computing, Communication and Networking Technologies (ICCCNT)*, 2024 [Paper]

Proposes an automated LiDAR and machine learning pipeline to detect and quantify minor structural wall deformations induced by railway vibrations in urban infrastructure.

S. Dey, A. Sharma, H. Raj, S. Biswas. “**Comprehensive Analysis of Structural Defects in Various Structures Using TLS Data and Machine Learning**”. *IEEE International Conference on Future Machine Learning and Data Science (FMLDS)*, 2024 [Paper]

Develops an automated ML-based system using TLS point cloud data to detect and analyze structural deformations across various building geometries.

UNDER REVIEW

A. Das, S. Dey, K. Biswas, S. K. Roy, M. Abdar, V. K. Verma. “**RAD: Relative Advantage Diffusion**”. *NeurIPS*, 2026

S. Dey, A. Das, S. K. Roy, A. Pal, A. Bhattacharya, V. K. Verma. “**Should Latent Autoencoders Be Multi-modal? Rethinking Latent Autoencoders for Text-to-Image Generation**”. *WACV*, 2027

A. Das, S. Dey, K. Biswas, S. K. Nigam, A. Bhattacharya, V. K. Verma. “**Learning from Relative Difficulty: Reducing the Sample–Noise Confound in Diffusion Models**”. *WACV*, 2027

TECHNICAL SKILLS

Languages Python, MATLAB, C

ML / DL PyTorch, Diffusers, Transformers, Scikit-learn, Pandas, NumPy, Matplotlib

Research Diffusion Models, Vision-Language Models, Fine-tuning, Curriculum Learning

Tools LaTeX, Git, Jupyter, VS Code, Google Earth Engine

OS Linux (Ubuntu), Windows

REFERENCES

Dr. Pallabi Saikia

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Dr. Swalpa Kumar Roy

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Dr. Vinay Kumar Verma

Senior Applied Scientist

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Formerly Duke University, USA

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