

# SAPTARSHI MUKHERJEE

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## EDUCATION

**Swami Vivekananda Institute of Science and Technology**

Kolkata, India

Bachelor of Technology (B. Tech) in Computer Science and Engineering

*Expected July 2027*

GPA: 7.5/10.0

Relevant Coursework: Machine Learning, Deep Learning, Computer Vision, Artificial Intelligence, Probability

## RESEARCH INTERESTS

Robust & Trustworthy AI, RAG Systems, Multimodal Learning, Human-AI Interaction

## RESEARCH EXPERIENCE

**Undergraduate Researcher – Machine Learning & Computer Vision**

Jun 2024 – Present

- Studied robustness of deep vision models; observed ~85% accuracy drop under severe noise
- Built controlled evaluation pipeline for noise, blur, and low-light conditions
- Developed denoising autoencoder, reducing reconstruction error (MSE: 0.12 → 0.032)
- Explored multimodal systems and deepfake detection with robustness analysis

## RESEARCH PROJECTS

**Personalized Memory-Aware RAG System with Context Evolution** | [GitHub](#) | [Link](#)

Mar 2026

- Designed memory-augmented RAG with short-term + persistent user context
- Improved response relevance via context-aware retrieval and adaptive ranking
- Evaluated system across multi-turn interactions to study context evolution and personalization

**Noise-Resilient Multimodal RAG for Low-Quality Inputs** | [GitHub](#) | [Link](#)

Mar 2026

- Built multimodal RAG robust to noisy text and degraded images
- Implemented noise-aware retrieval and adaptive fusion under input corruption
- Evaluated robustness under synthetic noise injection (blur, distortion, missing data)

**RAG-Driven Digital Twin for Intelligent Environments (XR + AI)** | [GitHub](#) | [Link](#)

Mar 2026

- Designed RAG-integrated digital twin with spatial context-aware query processing
- Combined environment state + retrieval for grounded, context-aware responses
- Simulated interactive scenarios for context-aware assistance and decision support

## TECHNICAL SKILLS

- Programming:** Python
- ML/DL:** PyTorch, TensorFlow, Scikit-learn
- LLM & RAG:** Retrieval-Augmented Generation (RAG), Prompt Engineering, Multimodal AI
- Computer Vision:** OpenCV, Noise Modeling
- Data:** NumPy, Pandas, SciPy
- Tools:** Git, Jupyter, LaTeX

## ACHIEVEMENTS / CERTIFICATIONS

- Best Class Representative Award
- Trained in Generative AI with focus on LLMs and prompt engineering

## ACTIVITIES

- Participate in ML/CV research discussions and open-source contributions
- Implement and analyze research papers in robust and multimodal AI systems