

EDUCATION

Program	Institution	CGPA/Marks	Year
Dual Degree (B.Tech. + M.Tech.)	Indian Institute of Technology Kharagpur	8.03/10	2027
All India Senior School Certification Examination	South Point High School, Kolkata	95.8%	2021
All India Secondary School Examination	South Point High School, Kolkata	97%	2019

COMPETITION/CONFERENCE

IEEE GLOBECOM 2026

DEC 2026

- Accepted paper at **IEEE GLOBECOM 2026 (SAC E-Health)**: *OmniMed-FL: A Robust Multimodal Federated Learning Framework for Clinical Diagnosis*.
- Developed a **multimodal federated learning** framework combining medical imaging and clinical text while preserving decentralized patient-data privacy.
- Achieved **0.956 Macro-F1**, retaining **99.1%** of centralized-model performance under non-IID settings, with explainability and evidence retrieval for clinical decision support.

INTERNATIONAL CONFERENCE ON APPLIED AI AND SCIENTIFIC MACHINE LEARNING

DEC 2024

- Presented a research poster on **Physics-Informed Neural Networks (PINNs)** at CASML 2024, IISc Bangalore.
- Explored the integration of neural networks with governing physical equations for scientific and engineering problem solving.
- Participated in a pre-conference workshop on Applied AI and Scientific Machine Learning, gaining exposure to recent physics-informed and data-driven methods.

OPEN IIT OPENSOFT 2025 - AI-POWERED HR CHATBOT, IIT KHARAGPUR

MAR 2025 - MAY 2025

- Won **Silver** in Open IIT OpenSoft 2025 by developing an AI-powered HR chatbot for employee engagement, well-being monitoring, and personalized conversations.
- Integrated **GPT-4**, **DistilBERT** sentiment analysis, and **SHAP**-based explainability to identify at-risk employees and generate context-aware HR interactions.
- Built a full-stack platform using **Next.js**, **FastAPI**, and **PostgreSQL**, with HR analytics dashboards, employee reports, and automated workflows.

INTERNSHIPS

RESEARCH INTERN - CARNEGIE MELLON UNIVERSITY

JULY 2026 - PRESENT

(Advised by Mosam Dabhi, PhD, Robotics Institute, Carnegie Mellon University; Prof. Simon Lucey; and Prof. Laszlo Jeni)

- Conducting reproducible evaluations of video world models across **WorldBench**, **WorldArena**, and **Omni-WorldBench**, identifying gaps in physical-state estimation, causal consistency, and downstream-task performance.
- Building Python pipelines to validate benchmark data, compare model results, generate publication-ready figures and tables, and ensure deterministic analysis through automated tests.
- Designing evaluation protocols for state-aware robotic policies, benchmarking world models, vision-language-action models, and diffusion policies across physical reasoning and control tasks.

RESEARCH INTERN - PURDUE UNIVERSITY

NOV 2025 - AUG 2026

(Advised by Professor Sayeed Shafayet Chowdhury, Department of Computer Science, Purdue University)

- Developed **Adaptive Spiking PointNet (ASP)** for energy-efficient 3D point-cloud recognition on **ModelNet40**, using LIF neurons and temporal spiking computation.
- Designed an **active slice-selection mechanism** for anytime inference, processing only **2.4 of 16 temporal slices** on average while maintaining strong classification performance.
- Achieved **89.10%** ModelNet40 and **93.28%** ModelNet10 accuracy, outperforming fixed-order baselines at a **24.5% mean firing rate**.
- Implemented surrogate-gradient training, cross-attention-based slice selection, and firing-rate regularization to optimize the accuracy-latency-energy trade-off.

RESEARCH INTERN - CARNEGIE MELLON UNIVERSITY

OCT 2025 - PRESENT

(Advised by Professor Zico Kolter, School of Computer Science, Carnegie Mellon University)

- Developed a training-free SVG generation and editing pipeline using pretrained diffusion models and frozen vision-language models to convert raster concepts into editable vector graphics.
- Designed a **DiffuSVG** workflow where diffusion handled image-space generation and a VLM extracted shapes, colors, positions, and z-order to produce compact SVG markup.
- Integrated **CairoSVG**, **DiffVG**, **CLIP**, and **DINO**-based evaluation and refinement, enabling render-compare-refine iterations.
- Achieved **92% valid SVG generation** with about **3.5 elements per SVG**; documented complex-shape limitations.

RESEARCH INTERN - STANFORD UNIVERSITY

DEC 2025 - PRESENT

(Advised by Professor Tapan Mukherji, Department of Energy Resources Engineering, Stanford University)

- Developed **Physics-Informed Neural Networks (PINNs)** and **Fourier Neural Operators (FNOs)** for elastic wave-propagation PDEs with governing physical constraints.
- Benchmarked learning-based PDE solvers against finite-difference and finite-element methods, evaluating accuracy, stability, and physical consistency.
- Implemented physics-informed loss functions combining governing-equation residuals with initial and boundary conditions to improve physically valid predictions.
- Investigated FNO-based operator learning for fast surrogate modeling of wave dynamics across varying initial and boundary conditions.

COMPUTER VISION INTERN - IISC BANGALORE

DEC 2024 - APR 2025

(Advised by Professor S.N. Omkar, Aerospace Engineering Department, IISc Bangalore)

- Implemented optical flow (**Lucas-Kanade**), **YOLO v11**, and **MediaPipe** for motion tracking and analysis.
- Designed and implemented a novel motion-capture model from scratch using **PyTorch**, **ResNet50**, and CNNs.
- Analyzed over **20,000 images** to extract keypoints in 3D human poses with six degrees of freedom.
- Used GANs to generate synthetic images for enhanced training, achieving an accuracy of **0.80**.

PROJECTS

BACHELOR THESIS PROJECT

APR 2025 - JUN 2026

(Advised by Professor Sudip Misra, Department of Computer Science and Engineering, IIT Kharagpur)

- Developed a multimodal crop-diagnosis framework combining **VLMs**, **LLMs**, and agronomic metadata for automated crop-stress and disease assessment.
- Designed a vision-language pipeline to extract semantic indicators such as leaf discoloration, lesions, texture variations, and other disease-related visual patterns.
- Integrated an LLM reasoning module to fuse visual evidence with contextual and sensor information, enabling interpretable diagnoses and actionable recommendations.
- Built an end-to-end **Flutter** application with a **Firestore** backend for real-time image capture, inference, and natural-language feedback.

FULL STACK WEB DEVELOPMENT INTERN - IIT ROORKEE

MAY 2024 - JUL 2024

(Advised by Professor Sudip Roy, Department of Computer Science and Engineering, IIT Roorkee)

- Created a dynamic website using **HTML**, **CSS**, **JavaScript**, **React.js**, and **Material-UI**.
- Implemented backend services with **Node.js**, **Express.js**, and **MongoDB** for data management.
- Added role-based login and file storage, and used **AWS** and **Docker** for deployment.

MACHINE LEARNING INTERN - IIT DELHI

JAN 2024 - APR 2024

(Advised by Professor Shaurya Shriyam, Department of Mechanical Engineering, IIT Delhi)

- Developed an ANN-based model using displacement and direction changes for **pedestrian trajectory prediction**.
- Improved trajectory accuracy through parameter tuning on **14,861 unidirectional** and **9,673 bidirectional** samples.
- Analyzed Social-LSTM, Social GAN, and SR-LSTM to improve spatiotemporal accuracy.

AWARDS AND ACHIEVEMENTS

- Secured **AIR 4708** in **JEE Advanced 2022** among over 250,000 JEE Main-qualified candidates.
- Achieved **99.1 percentile** in **JEE Main 2022**, placing in the top 1% among over 1,000,000 candidates.
- Ranked **318** in **WBEE 2022** among approximately 100,000 candidates.

COURSEWORK INFORMATION

- **Computer Science:** Programming and Data Structures, Algorithms, COA, Computer Networks, OOP, DBMS, OS
- **Machine Learning:** Artificial Intelligence Foundations and Applications, Linear Algebra, Soft Computing
- **Mathematics:** Advanced Calculus, Partial Differential Equations, Transform Calculus, Automata Theory
- **MOOCs:** Neural Networks and Deep Learning, Computer Vision, PINNs, Structuring ML Projects, Building LLMs

SKILLS AND EXPERTISE

- **Programming Languages:** C++, C, SQL, Python, JavaScript, HTML, CSS, Dart
- **Libraries and Frameworks:** PostgreSQL, MySQL, ReactJS, NodeJS, NumPy, Pandas, PyTorch
- **Software and Tools:** Git, GitHub, Google Colab, Jupyter, MATLAB, COMSOL, SolidWorks

POSITION OF RESPONSIBILITY

SECRETARY, SPORTS AND GAMES

NOV 2023 - JUN 2024

- Collaborated with hall council members to organize and manage sports events within the hostel.
- Managed a budget of 10,000 for training sessions, enhancing sports activities in the hall.