Swarnadeep Karmakar

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EDUCATION

Birla Institute of Technology and Science, Pilani *Hyderabad, India*

B.E. Electrical and Electronics & M.Sc. Chemistry | CGPA: 6.44/10 *Oct 2022 – Feb 2026*

Minor in Computing and Intelligence *Aug 2024 – Feb 2026*

Relevant Coursework: Data Structures & Algorithms, Operating Systems, Object Oriented Programming, Machine Learning, Artificial Intelligence, Cryptography, Optimization, Linear Algebra, Probability & Statistics, Differential Equations

TECHNICAL SKILLS

Languages: Java, C++, Python, C, SQL, Bash, LaTeX

Libraries: OpenCV, PyTorch, TensorFlow, LangChain, NumPy, Pandas, Matplotlib, Seaborn, W&B

Tools: K8s, Postman, Splunk, OpenObserve, Azure Cosmos, Azure Databricks, Git, Swagger, Keras API, Apache Kafka

WORK EXPERIENCE

CSIR – Central Electronics Engineering Research Institute *Chennai, India*

PCB Design Intern [Report] *May 2024 - Jul 2024*

- Designed a compact PCB module integrating laser and temperature drivers for accurate terahertz wave production
- Enabled high-resolution THz based robotic arm scanning for material characterization and defect detection.

PROJECTS

Transformer Winding Fault Analysis [Code] *Aug 2025 - Dec 2025*

- Benchmarked **LSTM**, **GRU**, **BiLSTM**, and **BiGRU** models on real laboratory transformer current and voltage data, showing consistent gains from bidirectional architectures over unidirectional ones
- Identified stability and generalization limits of pure time-domain sequence models for transformer fault prognosis.
- Designed a Spectrally-Aware Residual TCN with FFT-based feature injection and local attention to explicitly model harmonic components.
- Achieved 97.6% classification accuracy with improved robustness to frequency drift and load variation.

WolframBeta, *Advanced Graphing Calculator App* [Code] *May 2025 - Jul 2025*

Built a Java Swing graphing application with interactive plotting (pan, zoom, tooltips) and a modular engine for expression parsing, calculus operations, multi-function analysis, JSON persistence, and SVG export using Graphics2D

POSITIONS OF RESPONSIBILITY & VOLUNTEERING

Team Lead, *Under-grad CubeSat Team - Hyperion SEDS* *Aug 2024 - Dec 2024*

- Led 25 people, 6 divisions team - ADCS, Communication Systems, EPS, OBC, Mechanical & Payload
- Managed active team recruitment, formulated the budget of the team, and planning the future trajectory of the team.
- Conducted workshop in Atmos '24 on Arduino programming, working with sensors, and ADCS based on PID mechanism.
- Developed Reaction Wheel based ADCS prototype, testing it by self-balancing the CubeSat on a vertex.

Technical Team Member, *Artemis SEDS Rocketry Team, Aeolus Drone Club, PHoEnix association* *Sep 2023 - Feb 2024*

Actively participated in experimental rocketry, structural designing and drone making