JYOTIRADITYA HARICHANDAN | 22EE10090

B.Tech in Electrical Engineering

Minor in Computer Science Engineering

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EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2026	B.Tech	IIT Kharagpur	**8.16** / 10
2022	CBSE Class XII Board Exams	Doon International School, Bhubaneswar	**97.4%**
2020	CBSE Class X Board Exams	Dr A.N.K DAV Public School, Rourkela	**95.6%**

INTERNSHIPS

Software Intern | Siemens | Noida **May 2025 – Present**

- Worked on the **Vopt phase** of the SystemVerilog compilation flow, optimizing code for **time**, **space**, and size efficiency in large-scale designs.
- Developed and tested optimizations for coalescing various combinations of **packed arrays of structures** with contiguous memory layouts.
- Developed rigorous test cases to systematically identify and report failure scenarios in packed array coalescing, improving **compiler efficiency**.

PROJECTS

Redis-Inspired Thread Pool in C++ | Self Project **Jan 2025–March 2025**

- Built a fixed-size **thread pool** in **C++** using `std::thread`, **mutex**, and **condition_variable** for efficient and scalable job scheduling.
- Developed a **lock-free job queue** with **atomic operations**, reducing contention and ensuring **thread-safe**, high-throughput communication.
- Enabled **parallel execution** by having **worker threads** wait on a **shared queue**, minimizing thread overhead and improving responsiveness.
- Strengthened understanding of **concurrency primitives** and **systems programming**, reflecting real-world multi-threaded server architectures.

Automatic Image Captioning | Deep Learning Course Project | Prof. Pawan Goyal **April 2023**

- Designed and implemented a **transformer-based image captioning model** using **ViT** as encoder and **GPT-2** as decoder in **PyTorch**.
- Benchmarked the custom model against **SmolVLM** in **zero-shot** settings, achieving higher **BLEU**, **ROUGE-L**, and **METEOR** scores.
- Conducted **robustness analysis** on **occluded images**, demonstrating improved resilience and stability to various **visual perturbations**.
- Developed a **BERT-based classifier** that distinguished model-generated captions with **98.4% precision** and **F1-score** on test data.

Volatility Smile Predictor | Hackathon N.K Securities **May 2025**

- Designed **LightGBM pipeline** for **NIFTY50 volatility prediction**, with **MSE 0.003849** for **cross-IV features** and **strike-wise K-Fold training**.
- Engineered **15+ financial features** including **IV denoising (EWMA)**, **outlier removal**, and **NaN-aware flags** for high-frequency data.
- Optimized performance via **zero-dominant feature filtering**, **correlation elimination** > 0.98 and **hyperparameter tuning** (λ_1/λ_2 regularization) and Implemented **failsafe handling** for missing outputs and validated results using **RMSE** with LightGBM (**max depth=10**).

AWARDS AND ACHIEVEMENTS

- Achieved branch change from Mechanical Department to Electrical Department with CGPA **9.13**, ranking among top **5%** students.
- Secured AIR **2958** out of **1.5 lakh** candidates in Joint Entrance Examination Advanced, **2022** organised by IIT Bombay.
- Secured AIR **1648** out of **9 lakh** candidates in Joint Entrance Examination Mains, **2022** conducted by National Testing Agency (NTA).
- Achieved peak ratings of **1409** (Specialist) on Codeforces (Jyotiraditya_harichandan) and **1636** (3-star) on Codechef (martian_duck).
- Currently ranked in the top **14.26%** on LeetCode and achieved a peak rating of **1681**, showcasing my coding skills (handle: jyotihari277).
- Earned a prestigious **5-star Gold Badge** in C++ proficiency on HackerRank, demonstrating advanced coding skills (handle: jyotihari277).

COURSEWORK INFORMATION

Mathematics: Probability and Statistics, Advanced Calculus, Linear Algebra, Transform Calculus

Computational: Programming and Data structure (Theory and Laboratory), Machine Learning, Deep Learning, Algorithms Laboratory, AI and Ethics, Computer Architecture and Operating Systems, Data Structure and Algorithms course by **AlgoZenith**

Electrical: Electrical Technology, Analog Electronics, Signal and Sytems, Network Analysis, Digital Electronic Circuits, Measurement and Electronic Instruments, Electrical Machines, Power Electronics, Control System Engineering, Industrial Instrumentation, Digital Signal Processing, Power Systems, Embedded Systems

SKILLS AND EXPERTISE

- **Technical Tools:** C, C++, Python, JavaScript, Verilog HDL Coding, System Verilog, GNU Debugger on Command Line
- **Libraries:** NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn, XGBoost, TensorFlow, Standard Template Library (STL)
- **Softwares:** LTspice, SolidWorks, Proteus 8 Pro, Fusion 360, AutoCAD, Xilinx (AMD) Vivado, Questa Sim (Siemens), LabVIEW

COMPETITION/CONFERENCE

- Member of the **Product Design Team** and **Mathematics Olympiad Team** at the Hall of Residence in General Championship in **2024**
- Member of the Bronze winning **Illumination team** of the Hall of Residence, a traditional competition organised by IIT Kharagpur, in **2023**
- Advanced to the second round of the Source Code competition at **Kshitij 2024**, showcasing exceptional coding proficiency in the event
- Engaged in competitive coding by participating in **Overnite**, an overnight competition at Kshitij 2024, showcasing problem-solving skills

POSITIONS OF RESPONSIBILITY

Mechanical Team Member— Kharagpur Robosoccer Students' Group, IIT Kharagpur **Sept 2023 - July 2024**

- Successfully organised **Code-O-Soccer** event with healthy participation from all over the country in techfest Kshitij of IIT Kharagpur
- Successfully conducted an Introductory Seminar for first year students' selection, providing essential guidance and information
- Improved ball gripping capacity and added an IC board holding feature to the MIROSOT bot, enhancing its functionality and performance

Electronics Team Member— TeamKart, IIT Kharagpur **Oct 2023 - Jan 2024**

- Simulated and implemented communication protocols (**SPI**, **I2C**) for microcontroller interaction with various ICs (eg. ADCs, DACs)