



Aditya Raj

B.Tech

Electronics and Communication Engineering
National Institute of Technology, Patna

+91- 8797073498
adityar.ug22.ec@nitp.ac.in
hexronus@gmail.com
linkedin.com/in/hexronus
github.com/hexronuspi
codeforces/profile/hexronus
portfolio/aditya/academics

EDUCATION

Degree/Certificate	Institute/Board	CGPA/Percentage	Year
B.Tech ECE	National Institute of Technology, Patna	7.77 (5th Sem)	2022-2026
Senior Secondary	CBSE	93.20%	2020-2022
Secondary	ICSE	90.20%	2010-2020

PERSONAL STATEMENT

I am passionate about understanding neural network mathematics and memory mechanisms in large language models. I possess good skills in model development and performance evaluation, and am proficient in Python and deep learning frameworks. I've won deep learning competitions and built successful real-world projects.

COURSES (** A+ * A + ONGOING)

Artificial Intelligence and Machine Learning**	Electromagnetic Field Theory*
Introduction to Deep Learning(MOOC)	Network, Signal and Systems*
Applied Linear Algebra(EE07-NPTEL) ⁺	Introduction to Large Language Models(CS45-NPTEL) ⁺

TECHNICAL SKILLS(+ PROFICIENT)

Languages: C/C++(+), Python(+), JavaScript	AI/ML: PyTorch, OpenCV, SciPy, numpy, scipy, scikit-learn, Hugging Face, Langgraph, Crew AI, LangChain, LLamaIndex
DataBase: PostgreSQL	Other: Git, GitHub, Linux(Ubuntu) WSL
Tools: MATLAB, Supabase	libraries: Nodemailer, Streamlit
Framework: Nextjs 13, 14	

CONFERENCE PAPER

- **EEG Functional Connectivity Feature-Based Diagnosis of ADHD Using Deep Learning on Raspberry Pi(Rejected)**
submitted to International Conference on Signal Processing and Communications (SPCOM 2024) PaperID - 204.
Authors: Rakesh Ranjan, Shiva Singh Bagri, **Aditya Raj**, Dr. Bikash Chandra Sahana^{PI}
Affiliation: National Institute of Technology, Patna

EXPERIENCE

- **IIIT-H**
Research Intern
Supervisor: Dr. Kuldeep Kurte | Project Title: Disaster Situational Awareness
– Constructed a web parser using Google Search API agent to **systematically extract disaster-related data** from online sources, and currently building a **hybrid architecture** integrating real-time data streams for the continuous enhancement and **update of Knowledge Graph** integrated with a **RAG system for LLM question answering**.
April 2025 - Present
Hyderabad, India - Remote
- **21Spheres**
GenAI Development Intern
– Developed a **multimodal AI search engine** using **Ollama** and **CLIP**, wrapped around a custom algorithm for **personalized recommendations and search**, achieving **near-perfect human-aligned results** and enhancing product discovery.
Dec 2024 - Apr 2025
Gujrat, India - Remote
- **Freelance**
Web Developer | <https://gynecologistinchembur.com/>
– Built a **website** replacing a \$150/month service, supporting **10,000+ users** and **300 MAU**, with all operations (CRUD, RBAC) executing in **under 0.1s**. Built appointment scheduling, OTP logic on Vercel serverless, and optimized using **lazy loading**, **debounce**, and **memoization**, achieving **LCP under 1s on slow 4G** and **0.35s on no-throttling**.
Nov 2024 - Feb 2024
Mumbai, India - Remote
- **IIT Jodhpur**
Research Intern: SIP@SAIDE 2024
Supervisors: Dr. Bikash Santra and Dr. Dipanjan Roy
– Implemented image classification algorithms utilizing various architectural models (AlexNet, MobileNet, EffNet, Custom Attention and CNN) on **FER 2013 Facial Image Dataset**, achieving a maximum accuracy of **53%** on the test dataset.
– Applied signal processing techniques and **extracted features using CNN sliding window technique** to build a **multimodal model** by fusing EEG and video data on the SEED V dataset.
May 2024 - July 2024
Jodhpur, India - Remote
- **IIT Guwahati**
Intern: Dept. of CSE 2024
Supervisor: Dr. Arijit Sur
– Developed a **GAN-based shape completion system** in Python, used **UNet-based Generator** to reconstruct overlapping geometric shapes. **Generated a diverse synthetic dataset** to train the model effectively.
June 2024 - July 2024
Guwahati, India - Remote

PROJECTS | (ALL PROJECTS ARE ON PERSONAL PORTFOLIO)

- Image Caption Generation** Link | June, 2024 - Aug, 2024
Tools: Python, OpenCV, OpenAI CLIP, Hugging Face GPT-2M
Reference Paper: ClipClap
– Implemented an image captioning system using **CLIP** and a **PyTorch-based GPT** variant, increasing the number of contextually similar generated words by **30% through edge enhancement**.
- OCR Model - LLM Re-correction | Ranked 1st on Kaggle, Won Annual ML Competition of IIT ISM** Link | October, 2024
Tools: Python, OpenCV, LLMs, OCR
– Developed an OCR - LM for **medieval age handwritten Spanish text recognition**, used **TrOCR with T5 re-correction** model finetuned using linguistic similarities and text augmentation using custom algorithm, **achieved a WER of 0.116**
- ML4SCI - DeepLens | GSOC 2025 Proposal** Link | March, 2025
Tools: Python, PyTorch, DeepLearning
– Developed a GravitationalLensClassifier using ConvNeXt with MoESelfAttention2d (4 experts, 0.2 dropout), achieving 97.23% accuracy on nonLens (19,455 samples) and 94.36% on lenses (195 samples), with 0.9942 ROC AUC and 0.98 F1-score, for imbalanced astronomical imagery.

ACHIEVEMENTS

Software		
AI of GOD 3.0: IIT ISM	Ranked 1st on Kaggle, finetuned OCR-LMs using custom algorithm, achieved WER of 0.116 on old spanish manuscript (Link).	2024
Amazon ML Challenge	Ranked 184th among 75,000 registrations, achieved an F1 score of 0.4667 on the test set using moondream VLM after finetuning it on the train set.	2024
Adobe GenSolve	Ranked among the top 5%ile , worked with shape regularisation, completion and symmetry detection (Link).	2024
Academics		
IOQA	Qualified National Standard Examination in Astronomy (HBCSE, Mumbai).	2022
NTSE	Qualified National Talent Search Exam Stage I .	2020
RMO	Among top 1% of students from classes 8th-12th in India and scored 44/102 .	2019
PRMO	Qualified Pre-Regional Mathematical Olympiad (2018, 2019, and 2021).	
METER	Achieved State Rank 7th from Bihar Region among 50K+ students .	2017

POSITIONS OF RESPONSIBILITY

Team Lead, AI/ML Web and Coding Club, NITP		September 2024 - Present
<ul style="list-style-type: none">Guiding the team on the project titled, "OCR model MNIST", a number detection model trained on the MNIST dataset, utilizing a custom algorithm to detect numbers.Guiding the team on the project titled, "RNN-S-OCR", a text detection model trained on an alphabet character dataset, utilizing a custom algorithm to detect text sentences.		
Team Coordinator, AI/ML Google Developer Students Club, NITP		August 2023 - June 2024
<ul style="list-style-type: none">Conducted an open-book pure mathematics test for the selection of first-year trainees.Designed AI/ML questions for the TCF Technical Contest.		

OPENSOURCE

Supabase | ([supabase/supabase/pull/30555](#))
Worked on an alert in Supabase to prevent silent failures when saving a column without selecting a data type - Conflict Issues

ONGOING

- [Sirly](#) | AI-powered search engine that thinks, verifies, and delivers Knowledge Graph-based RAG-LLM system that searches both your documents and the web, delivering in-depth, context-aware results.
- [GoPod](#) | AI-powered personal collaborative assistance