NILAVRA GHOSH

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Education

International Institute of Information Technology Hyderabad — **Hyderabad, India**
B.Tech in Electronics and Communication Engineering — Expected: 2027

Jawahar Navodaya Vidyalaya — **Pondicherry, India**
Class XII CBSE; 86.4% — 2023

Jawahar Navodaya Vidyalaya — **Hassan, India**
Class X CBSE; 95% — 2021

Projects

4-Bit CLA Adder (Verilog/FPGA)
- Designed in Verilog HDL achieving **3.2ns propagation delay** (40% faster than ripple-carry)
- Synthesized in Xilinx Vivado; verified via 256-input testbench with timing constraints
- Optimized layout in Magic Spice achieving **15% area reduction** vs standard cells

RISC-V Pipelined Processor Implementation (Verilog)
- Designed **5-stage pipelined RISC-V core** (IF, ID, EX, MEM, WB) supporting RV32I ISA
- Implemented **hazard detection unit** with forwarding/bypassing for data hazards and **stall control** for load-use cases and control hazard

4-Stage Audio Amplifier (LTSpice)
- Implemented pre-amp, CE amplifier (**53dB gain**), active BPF (20Hz-20kHz), and Class AB power stage
- Achieved **-0.5% THD** at 2W output through careful biasing and feedback design

AI-Powered Code Review Assistant (MERN Stack)
- Built full-stack web platform with **React** frontend and **Node.js/Express** API serving **Python AI models**
- Integrated **OpenAI** for code analysis with custom prompt engineering for technical feedback-

E-Commerce Platform (MERN Stack)
- Built React frontend with product search/filter; Node/Express backend with MongoDB
- Integrated Razorpay payments with proper order validation and receipt generation

Campus Lost & Found System
- React/Firebase application with user auth and image uploads using Firebase Storage
- Enhanced UI with Three.js interactive elements for better item visualization

Terminal Strategy Game (Python)
- Implemented OOP architecture with Colorama for terminal rendering and Numpy for game logic
- Designed troop mechanics, resource management, and real-time battle system

Technical Skills

Digital Design: Verilog-HDL, Xilinx Vivado, Magic Spice, Ngspice, FPGA Prototyping
Programming: Python (Pandas, NumPy), C/C++, JavaScript (ES6+), SQL, Bash
Web Development: React.js, Node.js, Express.js, Three.js, Tailwind CSS, Vite
AI/ML: PyTorch, TensorFlow, OpenAI API, Prompt Engineering
Database: MongoDB, MySQL, Firebase (Firestore, Auth)
Tools: Git, Linux, VS Code, LTSpice, LaTeX, Jupyter

Relevant Courses

Digital Systems: VLSI Design.

Programming: Data Structures & Algorithms, OOP, Intro to Processor Architecture

Mathematics: Linear Algebra, Probability, Discrete Math, Real Analysis

Electronics: Analog Circuits, Signal Processing.

Experience

Scholar and Mentor-Avanti Foundation — **Dec 2021 – Present**

- Awarded the Avanti Foundation Scholarship for academic excellence and leadership potential.
- Mentor and guide students in preparing for competitive exams, enhancing problem-solving skills and strategic thinking.