

# Anant

## Software Engineer | Systems & Web

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## Summary

Software engineer working across web and embedded systems, with experience building production websites, backend services, and hardware-integrated software. I work mainly with JavaScript, TypeScript, React, and Next.js, and I also enjoy low-level engineering, embedded development, and deploying AI models on constrained devices.

## Education

IIT Madras | *BS in Electronics (Hybrid, 3rd year)*

- **Focus:** Electronics fundamentals with an interest in automotive, consumer electronics, space, mobile, medical, and defense systems.

## Experience

**Hardware & Software Developer** | IIT Madras, Electrical Engineering Department February 2025 – July 2025

- Built communication protocols between a Pi 5 and smart meters to control the integrated system.
- Developed custom software for hardware control and device integration.
- Deployed and optimized AI models on embedded systems for on-device inference.

## Skills

- **Programming Languages:** JavaScript, TypeScript, Python, C, Embedded C, C++, Dart, Assembly, Verilog.
- **Web & Mobile Frameworks:** Next.js, React, Express, Node.js, Flutter, FastAPI, Astro.
- **Databases & Backend:** MongoDB, PostgreSQL, Firebase, Supabase, Prisma.
- **Tools & Infrastructure:** AWS EC2, Nginx, Docker, Socket.IO, Zod, Axios, React Hook Form, Tailwind CSS, Shadcn UI.

## Projects Portfolio

### Full-Stack & Web Development

- **HeyProData (Professional Networking Platform):** Built the crew-side platform for the MENA film and media industry using Next.js 15, Supabase, and PostgreSQL. Added role-based profiles, a jobs hub, and Row Level Security. [Live](#) | [Repo](#)
- **Swasyn & Eazika Web Platforms:** Developed secure web platforms with authentication, route redirection, and shared backend services using Next.js and PostgreSQL. [Swasyn Live](#) | [Eazika Live](#)
- **Restaurant Management App:** Built a full-stack Next.js app for restaurant operations with Firebase authentication and real-time order and inventory sync. [Live](#) | [Repo](#)
- **Developer Portfolio & Tech Hub:** Built a personal portfolio with Next.js and Tailwind CSS, including sections for writing and hardware/software projects. [Live](#)
- **High-Performance Astro Blog:** Built a zero-JS static blog with Astro, Tailwind CSS, and Markdown/MDX. [Live](#) | [Repo](#)

## Cloud Infrastructure & Data Science

- **AWS Nginx Reverse Proxy Infrastructure:** Set up an AWS EC2 deployment with Nginx on Ubuntu as a reverse proxy for backend Node.js services.

## AI, Computer Vision & Hardware

- **Deep Learning Resistor Decoder (AI Hardware Scanner):** Designed and engineered a real-time Computer Vision pipeline to detect and decode 3 to 6-band resistors using PyTorch, Ultralytics YOLOv8, OpenCV, Flask, and Apple MPS. Built a two-stage architecture for localization and band classification, automated BS 1852-style data labeling with a reverse-math parser, and deployed a responsive Tailwind CSS and JavaScript web interface with WebRTC camera streaming and image upload support.

## Hardware, DSP & Low-Level Engineering

- **A Voice-Watermarking System for Copyright Protection:** Built a real-time audio watermarking system in Python with NumPy and SciPy, and tested it against common audio processing changes.
- **16-Bit Custom CPU Architecture:** Designed and built a 16-bit CPU from scratch, including the ALU, register files, and control logic in Verilog. Wrote Assembly programs to run on it.
- **VLSI Circuit Testing & ATPG Analyzer:** Built a C++/Python verification tool that runs ATPG algorithms to simulate stuck-at faults and measure testability.
- **DSP & Control Systems Toolkit:** Created a Python toolkit for DFS and DTFT visualization, system response simulation, and PID tuning.
- **SP24 Signal Generator & Analyzer:** Built a DSP suite for real-time signal generation and for testing digital filters and control-system responses.
- **High-Performance C++ Proxy Server:** Built a lightweight multithreaded proxy server in C++ using POSIX sockets and manual memory management.

## Mobile & Cross-Platform Development

- **Omnichannel E-Commerce Platform:** Built a unified e-commerce platform with a responsive Next.js frontend and a Flutter mobile app, keeping cart and user state in sync across platforms.
- **Healthcare Appointment Scheduling App:** Built a scheduling platform with a patient booking portal and a doctor dashboard, with real-time calendar availability.

## Additional Contributions

- Contributed to live production applications including [linkstockapp.vercel.app](#), [feathery.in](#), and [devvoy.com](#).