Hemanthsai Katuri

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Education

Vignana Bharathi Institute of Technology Hyderabad, Telangana
Bachelor of Technology in Electronics and Communication Engineering *2022 – 2026*

Professional Summary

Electronics and Communication Engineering undergraduate with experience in full-stack development, embedded systems, FPGA-based acceleration and scalable web platforms. Skilled in React.js, Next.js, Firebase, PostgreSQL and hardware-software co-design. Experienced in developing production-ready platforms, embedded architectures and research-oriented engineering solutions with strong problem-solving and performance optimization capabilities.

Technical Skills

Languages: JavaScript, TypeScript, Python, C/C++, Verilog, HTML5, CSS3
Frontend: React.js, Next.js, Tailwind CSS, Framer Motion
Backend & Databases: Firebase, Supabase, PostgreSQL, PHP, MySQL, REST APIs, Node.js
Embedded: MCUs, MPUs, Arduino, ATmega328P, Communication Interfaces, FPGA Acceleration
UI/UX & Design: Figma, Responsive Design Principles, User Interface Design
Tools & Platforms: Git, GitHub, Vercel, VS Code, Arduino IDE, Google Apps Script, Xilinx Vitis HLS, GCC, Linux Server Administration, cPanel, phpMyAdmin
Concepts: Full Stack Development, Authentication, Technical SEO, Performance Optimization, Hardware-Software Co-Design
Professional Skills: Problem Solving, Analytical Thinking, Team Collaboration, Technical Documentation, System Design Thinking

Experience

IEEE – VBIT Student Branch | Web Master July 2025 – Present
Hyderabad, Telangana

- Re-engineered and deployed the official IEEE - VBIT Student Branch website using Next.js, TypeScript, and Tailwind CSS to improve scalability, responsiveness, and overall website performance.
- Engineered a secure PHP/MySQL admin dashboard for handling website feedback and query management with authentication and automated email routing.
- Improved Core Web Vitals and mobile responsiveness through optimized rendering strategies, lazy loading, and performance-focused frontend enhancements, achieving a Lighthouse performance score of 92.
- Implemented Technical SEO enhancements including structured metadata, sitemap optimization and dynamic OpenGraph integration for improved search visibility.

IEEE – VBIT Student Branch | Web Designer July 2024 – July 2025
Hyderabad, Telangana

- Developed and maintained dynamic event registration platforms using JavaScript and Firebase, automating event management workflows for the student branch.
- Built secure admin dashboards enabling non-technical members to create and manage events, registrations and payment workflows in real-time.
- Integrated Razorpay payment gateway and automated registration data exports to Google Sheets using Google Apps Script.
- Designed and deployed interactive competition websites with multi-level progression systems and real-time validation using Cloud Firestore.

IEEE Robotics and Automation Society March 2025 – April 2025
Virtual Internship — Research Methodology, Embedded Systems & IoT

- Completed a 5-week virtual internship focused on Research Methodology, 3D Modelling, Embedded Systems and IoT under IEEE Robotics and Automation Society (RAS) Hyderabad Section.

Projects

Hybrid Genetic Algorithm Framework for FPGA CNN Accelerators | *Xilinx Vitis HLS, CNN, GA*

- Developed a memory-aware optimization framework for FPGA-based CNN accelerators using Hybrid Genetic Algorithms and HLS directives.
- Implemented parameterized MAC-array and Conv2D accelerator models to analyze compute-memory trade-offs.
- Automated synthesis evaluation workflows for latency, DSP, LUT, BRAM and timing analysis in FPGA accelerator configurations.

Learnable Universal Remote Architecture | *ATmega328P, Arduino, EEPROM, IRremote*

- Designed and implemented a programmable universal IR remote supporting both standard and unknown IR protocols using ATmega328P.
- Implemented EEPROM-based persistent storage for learned IR commands with support for NEC and raw signal decoding.
- Developed a standalone hardware interface with runtime mode switching and dynamic IR learning capabilities.

Dynamic Event Registration Portal | *JavaScript, Firebase, Razorpay, Google Apps Script* | Live

- Developed a full-stack event registration system with real-time event management and payment integration for IEEE SB activities.
- Built secure Firebase-based admin panels supporting custom registration forms and automated attendee management.
- Integrated Razorpay payment gateway and automated Firestore-to-Google Sheets data synchronization workflows.

Svadhyay LMS | *Next.js, React, Tailwind CSS, Supabase, PostgreSQL* | Live

- Architected and developed a custom Learning Management System serving 390+ students with role-based dashboards for administrators and learners.
- Implemented secure authentication and database management using Supabase with PostgreSQL-backed access control.
- Engineered automated PDF certificate generation and scalable email notification systems for course workflows.

Publications & Achievements

"A Low-Cost, Learnable Universal Remote Architecture with Persistent Storage for Unknown IR Protocols" 2025

- Published in IEEE Xplore. Proposed a cost-effective embedded system using ATmega328P with on-device learning and persistent storage for handling standard and unknown IR protocols.
- IEEE Xplore Publication Link

Achievements

- Secured **Global Rank 1848**, **Region 10 Rank 1048** and **University Rank 3** in **IEEEXtreme 18.0** as part of team **IEEEVBITSB9** in the international 24-hour competitive programming challenge organized by IEEE.
- Awarded **First Prize** in **AAKAR–2026** organized by the Research and Development Cell, Vignana Bharathi Institute of Technology, for technical project innovation and presentation excellence.