

# HARINI MANDALAM

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## SUMMARY

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Proficient in embedded systems, wireless communication, and sensor integration. Skilled in IoT solutions, including designing smart, connected devices, real-time data transmission, and wireless automation. Experienced in web development, building responsive and functional websites for various applications. Strong background in robotic motion control and hardware development.

## SKILLS

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**Frontend:** React.js, HTML/CSS, JavaScript, React, TypeScript

**Backend:** Node.js, Express.js, SQL, Python

**Embedded Systems & IoT:** ESP32, Flex Sensors, MPU6050, Wi-Fi Communication, Wireless Automation

**Robotics & Motion Control:** Motor Control with Encoders, PID Tuning, Position & Velocity Control, Brachiation Mechanics, Sensor-Based Control, Real-Time Data Processing

**Hardware Development:** Circuit Design, Microcontrollers, Wireless Indicators & Brake Systems

**Software & Simulation:** MATLAB, Basic Fusion 360

**Problem-Solving & Teamwork:** Strong analytical thinking, collaborative mindset, effective communication

## PROJECTS

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### Mechanical Cooker whistle counter:

Aug 2024 - Dec 2024

Developed a mechanical whistle counter for pressure cookers that tracks and alerts users after a preset number of whistles. Designed a spring-loaded indexing mechanism that operates without electronics. Created a detailed 3D model to visualize and refine the design. Integrated an acoustic alert system for easy recognition. Focused on user-friendly, low-cost, and accessible design.

### Smart Bicycle Indicator and Brake Light System:

Jan 2025 - Mar 2025

Designed a wireless bicycle signaling system using flex sensors and ESP32 to detect hand movements for turn indicators. Integrated an MPU6050-based braking system that activates brake lights based on deceleration. Implemented WiFi communication for real-time signal transmission. Focused on enhancing cyclist safety.

- Embedded Systems: ESP32, WiFi communication
- Sensor Integration: Flex sensors, MPU6050 accelerometer
- Wireless Communication: Real-time data transfer using ESP32
- Hardware Prototyping: Circuit design and implementation
- IoT Development: Smart signaling and automation

### Selective Noise Cancellation Headphones:

Jan 2025 - Mar 2025

Developed a real-time frequency-tuning headphone system to help autistic individuals manage sensory overload. Used an STM32 microcontroller to process audio signals and filter out specific frequencies dynamically. Integrated real-time digital signal processing (DSP) for adaptive noise suppression. Designed a custom 3D model for the headphone casing. Generally made for people with sensory and auditory overload.

### Brachiation Robot – Motor Control and PID Implementation

Nov 2025 - Present

Developing a brachiation robot that mimics swinging motion using high-precision motor control. Implementing PID control for accurate position and velocity regulation using RK-370SD motors with encoders. Utilizing MATLAB for system modeling and control tuning. Working with microcontrollers and motor drivers for real-time execution. Focused on robotic locomotion, stability, and energy efficiency.

## EDUCATION

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Indian Institute of Information Technology, Design and Manufacturing , Chennai  
*Bachelor of Technology in Electronics and Communication, VLSI*

Aug 2023 - Mar 2028