

# YASHAV BHATNAGAR

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LinkedIn Profile

Github Profile

## Education

### International Institute of Information Technology (IIIT)

B.Tech in Computer Science and Engineering; CGPA: 8.19

Hyderabad, India

2024 – 2028

## Experience

### Smart City Living Lab, IIIT Hyderabad

Student Researcher

Feb 2024 – Present

Hyderabad, India

- **Hardware Test Jig:** Developed a comprehensive testing platform on Raspberry Pi 3 using Python to validate hardware communication protocols including **I2C, SPI, UART, PWM, ADC, GPIO, and RS485**.
- Implemented a unified multi-interface architecture supporting a **CLI** for local testing, a **Tkinter GUI** for desktop usage, and a **FastAPI** web interface for remote network accessibility.
- Engineered real-time data visualization using **Server-Sent Events (SSE)** and utilized threading/asyncio to ensure non-blocking hardware interaction and reliable fault logging.
- Worked extensively on RS485 Modbus RTU communication for industrial sensor integration. [\[GitHub\]](#)
- Presented about OneM2M framework and a basic sensor-actuator project at Institute Research Fest (Spring 2025).

## Projects

### Network File System | C, POSIX Threads, Socket Programming, Concurrency

- Architected and implemented a modular distributed document collaboration system with sentence-level locking, real-time file streaming, and structured fault logging; designed to scale horizontally by adding additional name servers / storage servers without downtime.
- Designed the system for scalability and reliability using Git-inspired checkpointing, revert functionality, and asynchronous data replication across storage servers to enable granular recovery from failures. [\[GitHub\]](#)

### Audio-Guided Microbot | ESP32-S3, Embedded C/C++, TinyML, CNNs, BLE/LoRa

- Built a fully offline, voice-controlled microbot by deploying an on-device CNN-based Keyword Spotting (KWS) pipeline on ESP32-S3 under tight memory and power consumption constraints. Highly skeletal and robust for modular implementation for lot more scenarios, along with robust online communication methods using BLE/LoRa.
- Implemented a multi-metric speech gate (SNR, RMS energy, ZCR) to skip pre-processing stages during silence/noise, reducing average compute and extending battery life.
- Deployed an 8-bit quantized CNN with ~81 kB model size and ~50 kB tensor arena; achieved an average of >93.87% validation accuracy under a variety of scenarios and ~102 ms command-to-actuation latency even with the MCU underclocked for extended power savings. [\[GitHub\]](#)

### C-Shell | C, Unix Systems Programming

- Built a custom Unix shell from scratch supporting advanced features including I/O redirection, pipes, signal handling, background/foreground process management, and job control, demonstrating deep understanding of system calls and process management. [\[GitHub\]](#)

## Technical Skills

Languages: Python, C, C++, Assembly

Technologies & Tools: Linux, Postman, REST APIs, Git, MySQL, NumPy, PyTorch

## Relevant Coursework

Data Structures and Algorithms, Computer Systems Organization, Algorithm Analysis and Design, Linear Algebra, Discrete Structures, Probability & Statistics, Intro to System Software, Database and Applications, Operating Systems and Networks, Embedded Systems Workshop

## Achievements

JEE Advanced 2024: Secured All India Rank **3949** among 1.8 lakh qualified candidates.

JEE Main 2024: Secured All India Rank **1189** (top 0.1%) among 14 lakh candidates.