Ritika Mishra

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Professional Summary

Building data-driven health products: biosignal viz, processing, and ML training.

Core Competencies

- **Full-Stack:** Next.js, React, Node.js, Express, TypeScript, REST/WS, IndexedDB
- **Machine Learning:** End-to-end ML product (data pipelines, feature engineering, 1D CNNs), model optimization & quantization, live in-browser & edge inference, online retraining & feedback loops, model monitoring and telemetry, deployment for low-latency production systems
- **Real-Time Systems:** Low-latency data pipelines, BLE/serial integrations, WebGl plot
- **Signal Processing:** Filtering, normalization, windowing, PQRST detection, HRV, clinical interval extraction
- **Tools:** Git, Docker (basic), VS Code, CI fundamentals

Professional Experience

Software Developer — Full Stack & AI/IoT Engineer, Upside Down Lab, Delhi — July 2024 – Present

- **Rpeak — Real-Time ECG AI Analysis**
  - Designed and implemented a full-stack web application for **real-time ECG signal acquisition, visualization, and AI-driven heartbeat classification** using **React, Next.js, and TensorFlow.js**.
  - Developed and trained a **1D Convolutional Neural Network (CNN)** for multi-class ECG beat classification (AAMI EC57 standard) on the MIT-BIH Arrhythmia Database, achieving high accuracy and robust generalization.
  - Built interactive frontend for real-time ECG visualization, in-browser model inference/retraining, and session recording with user-friendly UI/UX.
- **Gyroscop — Rotation-Invariant Motion Detection (Edge AI)**
  - Built an offline motion classifier on BLE sensors using TensorFlow.js for edge inference; achieved **<10 ms** classification latency and **95%+** accuracy across device orientations.
  - Implemented an end-to-end pipeline: data collection, orientation-proof feature engineering (23+ features), model training, and deployment.
- **CortEx — Real-Time Neurofeedback (Frontend)**
  - Built a fast Next.js frontend for BLE EEG/ECG: Web Workers for off-thread signal processing & inference, IndexedDB session storage, Canvas/WebGL plotting, jsPDF exports, and PWA/offline support.

Full Stack Intern — MERN Developer, ReadyCoder (Remote) — Sep 2023 – Nov 2023

- Built a production-ready laundry services platform using the MERN stack; implemented secure authentication, payment gateway (Razorpay), and real-time chat integration.
- Focused on performance, responsive UI components, and accessibility to improve user engagement.

Education & Certifications

B.Tech. in Computer Science and Engineering — Dr. APJ Abdul Kalam Technical University, Lucknow
July 2020 – June 2024

- Microsoft Tech Saksham Program — Full Stack Development

Selected Projects

- **Chords-Web** — Open-source bio-potential streaming platform (EMG/ECG/EEG/EOG) with low-latency bidirectional comms and IndexedDB-backed session storage for ML dataset capture.
- **Property Listing App (MERN)** — Auth (email/Google), listing CRUD, and search/filter UX improvements that increased search efficiency by 40%.