Pratham Vadhulas

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PROFESSIONAL SUMMARY

Technology innovator with expertise in **AI**, **full-stack development**, and music technology.
Specialized in **data engineering** for large audio datasets, **machine learning** models, and audio processing solutions with demonstrated success in research and client-facing environments.

TECHNICAL EXPERTISE

Programming Languages: Python, C/C++, **Rust**, JavaScript, **TypeScript**, Java, SQL
Frameworks Libraries: PyTorch, **NextJS**, **React**, NodeJS, Vue.js, Three.js, JUCE
AI/ML & Data: Machine Learning, **LLM**, **Fine-tuning**, **CUDA**, Audio AI/ML, Digital Signal Processing
Cloud Infrastructure: AWS, **GCP**, **Terraform**, **Supabase**, **Firebase**, Git, CI/CD pipelining, Docker
Tools Hardware: Arduino, Raspberry Pi, Sensor Integration, Plugin Development

PROFESSIONAL EXPERIENCE

Music Informatics Lab, Georgia Tech
Atlanta, GA | Jan 2025 – Present

- Contributed to AI-driven research on music analysis and generation, focusing on Music Information Retrieval.
- Establish research methodologies including literature reviews and baseline model development.

Freelance Full Stack Developer
Atlanta, GA | October 2023 – Present

- **Reduced** application latency and load times to achieve near-instantaneous user interaction.
- Developed highly secure applications with permission-based and role-based access control, implementing secure authentication systems (Auth0, Supabase/Firebase) to protect user data and assets.

Center for Research and Learning(CRL)
Indianapolis, IN | May - Aug 2023

- **Engineered** neural network using PyTorch implementing **Transformer Architecture** for music generation.
- **Optimized** model to generate chord progressions with 60% more diverse velocity, enhancing human-like sound quality.
- Presented research findings at CRL Symposium 2023, receiving academic scholarship for outstanding performance.

PROJECTS

MIDI Gen AI | Generative AI

Designed and **implemented** a **Large Language Model (LLM)** that predicts musical chords, trained on 20.9M MIDI tokens. Applied advanced music theory principles to enhance generation quality and musical coherence.

Eco-charge | Hackathon 3rd Place Winner

Developed a tool optimizing EV charging schedules to minimize CO_2 **emissions** during the vehicle use phase. Applied data analytics to predict optimal charging windows based on grid carbon intensity

Employee/Project Management Platform | Freelance project

Architected and engineered a comprehensive, cloud-native platform to automate complex workflows and streamline core operational processes for an enterprise client.

Home Security System | IoT Solution

Engineered **Arduino and ESP32 Wi-Fi** system for real-time security monitoring with sensor integration. Implemented custom **firmware** for reliable data streaming and alert mechanisms.

Vision Synth: Hand Gesture Music Interface | Music Interface

Created gesture-based music generation system using YOLO hand detection and neural network processing.
Implemented real-time tracking via webcam with low-latency audio response for intuitive musical expression.

Teeth Drummer MIDI Controller | Music Technology

Engineered a MIDI controller to translate teeth drumming gestures into musical data using FSRs.
Developed Arduino hardware, a cross-platform app for serial-to-MIDI conversion, and a DAW audio plugin.

EDUCATION

Georgia Institute of Technology
Atlanta, GA | May 2026

Master of Science, Music Technology

Purdue University
Indianapolis, IN | May 2024

Bachelor of Science, Computer Science