

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++, Rust, JavaScript, TypeScript, Java, SQL
Frameworks Libraries: PyTorch, NextJS, React, NodeJS, Vue.js, Three.js, JUCE
AI/ML Data: Machine Learning, **Transformer Architecture**, CUDA, **GPU Acceleration**, Computer Vision, 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 **CO₂ 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