

Bibhav Adhikari

+1 601 658 1890 | adhikaribibhav@gmail.com | linkedin.com/in/bibhavadhikari | github.com/Bibhav48

Education

University of Southern Mississippi

B.S. Computer Science (GPA: 3.86/4.00, President's List (x3))

- **Coursework:** Algorithms, Data Structures, Operating Systems, Database Systems, AI & Machine Learning, Networking
- **Activities:** Google Developer Club (GDC) Member

Hattiesburg, MS

Expected Dec 2027

Experience

Audia & audia-tap – [audia.vercel.app](#) | [github/audia-tap](#)

Feb 2025 – Present

Creator & Software Engineer | Swift, Core Audio, HAL, C++, SIMD, Shell, GitHub Actions

- Built **Audia**, a production macOS menu bar app for real-time per-app audio routing, alongside **audia-tap**, an OSS CLI for piping raw PCM audio directly into local AI models (Whisper, MLX).
- Engineered a **driver-free Core Audio HAL** capture pipeline achieving **<10ms end-to-end latency** via PID-level stream hookup and a custom **lock-free SPSC ring buffer**.
- Reduced streaming CPU overhead by **30–40%** utilizing **SIMD-accelerated DSP** (Apple Accelerate) for real-time equalization across concurrent high-fidelity audio pipelines.
- Automated the end-to-end CI/CD release pipeline via **GitHub Actions**, managing signed DMG releases, Homebrew updates, and **Sparkle** framework integration for seamless over-the-air auto-updates.

Notes-Ninja

Aug 2023 – Oct 2023

Backend Engineer | Python, Flask, PostgreSQL, Redis

- Architected a SaaS backend using **Flask** microservices, integrating a **Redis** caching layer that reduced query latency by **40%** under load.
- Secured role-based session management by integrating **OAuth 2.0** with a highly normalized **PostgreSQL** schema.

Budhanilkantha School (Nepal)

Jul 2023

Software Developer & Volunteer Instructor | VBA, Excel

- Developed a school-wide timetable management tool using **Excel/VBA** for a **1,200+** student institution, solving complex constraint-satisfaction scheduling workflows.
- Synchronized bidirectional teacher and grade-wise schedules, featuring real-time collision detection for both classroom and instructor conflicts.

Projects

Melody Retrieval System | Python, MERT-v1-95M, FAISS, PyTorch, HuggingFace

Mar 2026 – Present

- Architecting a gamified semantic music search engine functioning as a "sing-to-search" application, outputting precise **percentage-based similarity scores** for user vocal inputs against the POP909 MIDI dataset.
- Leveraged a **MERT-v1-95M** transformer backbone for robust audio embeddings, integrated with **FAISS** for approximate nearest-neighbor retrieval at scale.
- Fine-tuned a custom `MelodyEmbeddingModel` on an **H100 GPU** using **triplet loss** and hard negative mining to significantly improve embedding separation and retrieval precision.

Unbeatable AI Tic-Tac-Toe & Analysis Engine | [github/tic-tac-toe](#) | [github/TicTacToeCPP](#)

Aug 2023 – Sep 2023

- Engineered a full **Minimax** engine in **Python**, optimized with **Alpha-Beta pruning** to compress state-tree evaluation times and guarantee optimal execution.
- Integrated **OpenCV** to stream and record video gameplay (**MP4**), designing a recursive real-time review mode that catches user blunders, updates the UI dynamically, and exports localized **JPEG** fault logs.
- Ported the core algorithmic engine to **C++** as a compiled static library, achieving **sub-1ms move generation** across **5,478** unique terminal states.
- Bridged the C++ backend to a native **SwiftUI** macOS desktop application utilizing a **C FFI** layer, packaged into a standalone executable for seamless user deployment.

Technical Skills

Languages: C++, Python, TypeScript, Swift, Java, Go, Rust, SQL, Bash

Frameworks & Tools: React, Next.js, Flask, Node.js, Git, Docker, GitHub Actions, PostgreSQL, Redis, PyTorch, FAISS, OpenCV

Platforms & Concepts: AWS, Linux/Unix, macOS (Core Audio, HAL, SwiftUI, Sparkle), REST APIs, WebSockets, CI/CD, C FFI

Honors

CS50's Introduction to Artificial Intelligence with Python | Harvard Online

Aug 2023

Uber Global Hackathon | Regional Finalist, South/Central Asia

Oct 2023