

Zixiang Zhang

Machine Learning Engineer · Software Engineer

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Machine learning engineer with a mathematics and statistics background, working on models applied to audio and on the evaluation needed to judge them. Alongside that I design and ship production software end to end — nine applications released to the App Store as sole engineer, all of them running entirely on-device.

TECHNICAL SKILLS

Languages	Python, Swift, Java, R, JavaScript, SQL
Machine learning	PyTorch, NumPy, pandas, scikit-learn
Frameworks and tools	SwiftUI, SwiftData, React, Vite, SQLite, Git, LaTeX

SOFTWARE

On the App Store — 9

Rhym	Ambient soundscape generator with a watchOS companion for timed sessions.	iOS · macOS · watchOS
Inserable	Binds Hugo articles to their asset folders and flags integrity mismatches.	macOS
Backtrack	Recurring task manager built on a template, item, and subitem hierarchy.	iOS · macOS
Norkta	On-device PDF utility: colour inversion, compression, merging, page extraction.	iOS · macOS
Marktap	Menu-bar Markdown notepad with live rendering.	iOS · macOS
Texmorph	Rule-based cleanup for mixed Markdown and LaTeX, with a diff before copying.	iOS · macOS
Cognodex	Spatial file manager: files arranged as a mindmap, originals left in place.	macOS
Sonodex	Sample manager for large local audio libraries, with full-text search and async waveform indexing.	macOS
Lumyna	Local music player for owned libraries, with lossless playback and offline search.	iOS · macOS

In beta

Lyncemit	Countdown timeline, with today at the base and future dates rising above it.	iOS
Norktavisoin	Multi-pane reader for PDF, Quarto, R Markdown, and Jupyter exports.	macOS
Zenolyth	Voluntary website and application blocking with an append-only history.	macOS
Avarywhere	Reference catalog for files and folders, in a hierarchy independent of Finder.	macOS

In development

Mathpedition	Interactive mathematics exploration for live visual reasoning.	iOS
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PROJECTS

Synthorea	2026
Generates a valid, editable synthesizer preset from a natural-language description of a sound. Python, PyTorch: a domain transformer emits a typed intermediate representation, a mixture-of-experts predicts the 881 parameters, and a deterministic compiler guarantees every result loads in the target synthesizer.	
Harmonic Convergence	2026
Teaches Independent Component Analysis by having the listener separate mixed audio by hand while the underlying linear algebra updates alongside. Swift, SwiftUI.	
SpectralDecoder	2026
Extracts perceptual descriptors — brightness, dominance, tonality — from a raw waveform. JavaScript with no dependencies: DC removal, Hann windowing, and a radix-2 DFT implemented against a written specification.	
Structural Dependencies of Handwritten Digits	2025 — 2026
Locates reproducible linear structure in MNIST by decomposing digits into geometric fragments and tracing variance across them. Python, NumPy, scikit-learn, PCA and CCA.	
Toronto Housing Need Explorer	2026
Interactive dashboard mapping housing-need disparities across Toronto neighbourhoods. R, Shiny; reconciles census variables whose definitions changed between 2016 and 2021 so the two years can be compared at all.	
AGN Protocol	2025 — 2026
Open-source protocol for coordinating multiple coding agents through executor and reviewer roles, with hand-off contracts that keep each step auditable.	
Local Audio Sample and MIDI Manager	2025
Organises local sample libraries past the point a folder structure can handle. Python, SQLite, PyQt.	

EDUCATION

University of Toronto, St. George	2021 — 2026
Honours Bachelor of Science, Mathematics & Its Applications Specialist (Probability / Statistics). Coursework in probability, statistics, optimization, linear algebra, and algorithm design. Requirements completed August 2026.	

AWARDS

Apple Swift Student Challenge, Winner	2026
Awarded for an interactive Swift project on Independent Component Analysis.	

AUDIO

Producer and audio engineer, as Alexxon	2020 — 2026
50+ original tracks released and distributed globally, with support from Martin Garrix, Ferry Corsten, Anjunadeep Edition, and Monstercat Silk Showcase. Audio direction for four game titles, covering score, sound design, and implementation-ready assets. Cover art, logos, and application icons are also my own work.	