ENNIS CAO

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Senior Full Stack, Product and Design Engineer with 5+ years of experience building complex, interactive, and optimized web applications. Industry experience within AI, education, e-commerce, and music technology. Specializing in Typescript, React, Python, and AI integration. Values performance optimized and clean code, scalable frontend architecture, and intuitive UI/UX design. Additionally, I have 5+ years of experience in music technology and production.

EXPERIENCE_

Senior Full Stack Software Engineer (Contract)	<u>MyMCAT.ai</u>	Remote	01/2025 - Present	
• Single handedly refactored entire codebase migrating global state from 12 React ContextAPIs into Zustand which				
resulted in 25x less re-renders and boosting fronte	end performance			

- Created a DebugPanel invaluable for the development team tracking global state across all navigation pages.
- Consolidated all interactive audio (SFX, looping) and music playback into a single WebAudio API instance with buffer caching, clean up, smooth volume transitions, and managed by Zustand.
- Mentored two interns tasked in implementing a full-stack social gaming feature (friend system with group management and coin sharing) from user story to implementation. Oversaw Figma designs, UI/UX wireframes, architecture refactor in Prisma and final code review across frontend and backend systems.

Lead Software Engineer NDA (Events Website) Los Angeles/Remote 10/2024 - 1/2025 OpenAl Web Scraper - Engineered a robust backend microservice (Python FastAPI, Zyte, Beautiful Soup, OpenAl, Docker, Lightsail), within a containerized environment for an Al-driven web scraping system, achieving 100% elimination of manual data entry and streamlining event data integration from over ten sources.

Lead Software Engineer

- Amazon Los Angeles/Remote 08/2024 - 10/2024 • Developed a sophisticated six-state interactive touchscreen application utilizing TypeScript, React, and Python from Figma designs; this project highlighted Amazon's 30 years of technical innovations while allowing users to explore global impacts through an intuitive world map interface.
- Established an advanced monitoring and debugging framework featuring real-time event logging, state tracking, and a hidden debug console; enhanced troubleshooting efficiency while delivering usage analytics for stakeholders.

Software Engineer

The Concord Consortium Massachusetts/Remote 07/2022 - 04/2024

- CLUE: real time open-source STEM learning platform and data science playground • Increased commenting system speed by 50%, enabling teachers to comment and tag student documents for AI
- analysis using asynchronous parallel promises and compound queries.
- Implemented custom Typescript React hooks and designed a multi-state system for a 'Data Flow' tile to record 10,000+ data points from real-world sensor data (e.g., Arduino, Micro:bit) at varying baud rates.
- Built a logging system for investigating speed bottlenecks on LCP, logging loading and performance measurements to a metrics dashboard, identifying issues and increasing LCP speeds by 30%.
- Architected a new interactive "Number Line" tile with custom data point management (save, sync, delete) with an algorithm to automatically adjust bounds for new values, enhancing visualization flexibility.
- Led redesign of backend Firestore schema to ensure persistent UI states and improving the user experience.
- Developed the UI layout and sorting algorithms (by group, name, tag, bookmarks, tile type) to enable teachers to review student documents by group.
- Collaborated with engineers to redesign the system model architecture, enabling multiple datasets to link to tiles and developed a bidirectional UI for synchronized "Graph" and "Table" tiles with scalable and flexible axes. DESE / FOSS: 2D and 3D natural science browser simulations
- Independently coded five advanced frontend simulation/animations utilizing various animation methods (CSS transitions, class swapping, requestAnimationFrame, sprites, SVG manipulation, Three.js).
- Electronic Musician / Sound Designer Pasadena, CA 05/2021 - 11/2021 Chad Cannon • Penglai 蓬莱(Animated Short Film) | Illumination Entertainment: Processed and remixed Chad's Eastern traditional stems—including Tibetan monk chanting, erhu, guzheng, and pipa— to create psychedelic sonic atmospheres. Explored non-Western tuning systems, utilizing Scala tuning files, microtonal scales and non-equal temperament tunings, enhancing the film's sonic universe. Penglai was Oscar Shortlisted for Best Animated Short at the 2022 Academy Awards.

Audio Software Engineer Dave & Dave Recording Los Angeles, CA 01/2019 - 12/2019 • Automated Audiobook Recording App: created an iPad app in Swift, Python, and Max/MSP to create a user interface for narrators, automating 100% of the recording process by enabling control over a Max patch on a computer.

- Innovated a 2-channel audio file format with markers for 'mess-up moments' to assist in the audio editing process.
- Integrated real-time feedback and monitoring features, enabling narrators to catch recordings mistakes.

Electronic Musician

One Child Policy Los Angeles, CA • Released music on label Dian Nao (电脑 - translation "electronic mind" or "computer" in Mandarin) along labels: Arca's Mutant Mixtapes, Black Lodge, Guangzhou Underground. Featured on publications such as Resident Advisor, Mixmag, XLR8R, Pitchfork, Magnetic Mag, Apple Music. Featured on NTS (LA, Shanghai), Rinse FM, The Lot Radio, Dublab, Currents.FM, Lower Grand Radio, Hong Kong Community Radio, and more.

09/2018 - Present

Electrical Software Engineer Preston Cinema Systems Los Angeles, CA 03/2013 - 12/2018 • Repair Tracking Automated Web App: Customer-facing web app (Django, PostgreSQL, jQuery, Bootstrap) that streamlined communication between the company and clients regarding motor control driver repairs, reducing customer inquiry resolution time by 40% and improving repair tracking efficiency.

- Built a facing backend system to update repair statuses, triggering an automated email notification system (Django, Celery, SendGrid) for real-time updates to customers, reducing inbound inquiries by 30% & increasing productivity.
- Diagnosed power, RF, digital, and analog PCB failures and created schematic modifications reducing issues by 20%.
- 01/2012 08/2012 Audio Software Engineer Beck LLC Los Angeles, CA • Custom Granular Multi-Sampler Instrument: Created a custom Max/MSP instrument used on the album Morning Phase which won a Grammy for Album of the Year by Beck and production team (Cole M.G.N & Cassidy Turbin).
- The software instrument featured 5 sample playback heads with variable playback speeds and pitch (linked or independent), random envelope generation, loop playback positions, granular synthesis, time stretching, formant shifting and randomized ADSR envelopes.

Cole M.G.N Los Angeles, CA Music Production Intern Summer 2011 • Ariel Pink's Haunted Graffiti | 4AD: Assisted in mixing and recording Pro Tools sessions for psychedelic lo-fi pop group Ariel Pink's Haunted Graffiti.

Keith McMillen Instruments Oakland, CA Summer 2012 Software Engineering Intern

- SoftStep Mk1 MIDI Foot Controller: Programmed a step function look up table algorithm that filtered noise from incoming voltage of an expression pedal port.
- Programmed the testing procedure application used following product burn-in at the QA process of each SoftStep.
- Developed a wireless saxophone gesture controller at CNMAT (Center for New Music and Audio Technologies)
- Contributed SoftStep documentation and gathered user tips, techniques and patches through artist outreach from musicians as Jordan Rudess, Matthew Dear, Thavius Beck.

Engineering Intern Santa Monica, CA Summer 2010 Apogee Electronics • Symphony I/O audio interface: Quality assurance testing using Audio Precision calculating frequency response plots, along with PCB failure analysis, and BOM calculations.

SKILLS

Languages Frameworks: JavaScript (ES6+), TypeScript, React (Hooks and Classes, Zustand, Redux, MobX, MobX State Tree, Context API), Next.js, Python, HTML, Node.js, Express.js, jQuery.

Frontend and Visualization: Tailwind CSS, SCSS/SASS, Styled Components, D3.js, Three.js, Framer Motion, P5.js, Material UI, UI/UX, Interactivity, Animations, UI/UX, Responsive Design, Cross-Browser Compatibility, ComfyUI. API | Backend | Databases: OpenAI Integration, RESTful APIs, GraphQL, MySQL, PostgreSQL, NoSQL (Firebase, Firestore, MongoDB), AWS (EC2, S3 RDS), Docker, Nest.js, Scalability, Server-Side Rendering (SSR), SSG. Testing & DevOps: Git, Jest, Cypress, Selenium, K6, CI/CD, GitHub Actions, Webpack, Babel, YAML, Linux (Bash, Cron). Tools & Design: Figma (Extensively used for prototyping, UI/UX workflows and even personal life), Adobe Creative Suite, Photoshop, Vercel, Raspberry Pi, Arduino, physical computing.

Audio & Music Programming: Web Audio API, HTML Audio, Max/MSP/Jitter, Max for Live, Tone.js, PyAudio, Librosa Music Software Tech / Sound Design: Ableton Live, Cubase, Reaktor, Kontakt, Arturia V Collection, Eventide, Infiltrator, iZotope(Ozone, RX, Nectar, Trash), z-Plane, IRCAM, NeuralNote, Fabfilter, Soundtoys, Synplant 2. Synthesis techniques: Subtractive, Additive, FM synthesis, Wavetable, Granular, Physical Modeling, Wavefolding, Karplus-Strong.

Music Hardware: Eurorack modular synthesizers, West Coast & East Coast synthesis,, MIDI/Audio routing, ADAT, Dante, Music: Classically trained in piano for 10 years.

EDUCATION

B.S. Electrical Engineering - Digital Signal Process	sing UCLA L	os Angeles, CA	
CLASSES/WORKSHOPS			
(Taught) Ableton Workshop: Generative Techniques	Coaxial Arts Foundation	Los Angeles, CA	01/2023
(Taught) Intro 101: Circuit Bending	Machine Project	Los Angeles, CA	06/2015
(Taught) Build Custom MIDI Controllers (Arduino/Ma	ax) Machine Project	Los Angeles, CA	08/2015
(Attended) Max/MSP/Jitter Day+Night School	UC Berkeley, CNMAT	Berkeley,, CA	Summer 2012
(Attended) Physical Interaction Design for Music	Stanford, CCRMA	Palo Alto, CA	Summer 2010
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PROJECTS_

- See website: https://www.denniscao.net