Levon Melkonyan

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Education

California Polytechnic State University, San Luis Obispo — Sept 2020 - Sept 2024
Bachelor of Science in Computer Science — *San Luis Obispo, CA*

Chalmers University of Technology (Exchange Program) — Aug 2023 - Jan 2024
Graduate Coursework in Computer Science — *Gothenburg, Sweden*

Work Experience

CK Technologies, Inc. — Mar 2025 - Present
Software Engineer, *Full-time* — *Camarillo, CA*

- Architected an **STM32**-based overheat protection tool for 24/7 field operation, designing state machines, budgeting flash/RAM, defining safety and fail-safe behavior, and collaborating with electrical engineers on the BOM, schematics, HAL interfaces, and a thorough test plan
- Implemented a hardware watchdog and interrupt-driven **C++** drivers for SD-card logging, RTC timestamps, and a TFT display with a custom library over SPI/I^{2}C, verifying ISR latency and memory usage with tight resource budgets
- Ported legacy **C++** device services to embedded **Linux** (Yocto), performing board bring-up and replacing Win32 APIs with POSIX threads/timers/serial interfaces, with containerized builds in **Docker** for remote testing and debugging
- Built an automated **Python** test suite with HTML/CSV report generation that simulates user I/O and verifies timing paths, helping eliminate manual UI testing efforts

VOICE (Visual Outputs for Inclusive Change and Environments) — Jun 2024 - Present
Multimedia Software Engineer, *Part-time* — *Remote*

- Designed an **ESP32**-based installation for the 2025 *Time Space Existence* exhibition in Venice, integrating PIR motion sensors, a motor, and audio playback hardware, ensuring 24/7 gallery operation
- Implemented a non-blocking **C++** event loop and state-machine logic that polls sensors, debounces inputs, triggers motor and audio cues, and services a hardware watchdog for reliability
- Developed an automated speech privacy pipeline using **PyTorch**, OpenAI Whisper, and FFmpeg that denoises, diarizes, anonymizes, transcribes, captions, and extracts metadata from video files
- Engineered an automated face-blurring pipeline with **OpenCV** and YOLOv8 that applies batched frame decoding, temporal box smoothing, selective Gaussian blur, and video re-encoding

Personal Projects — github.com/levon-m

MicroLoop: MIDI-Synced Live Looper & Sampler

- Built on **ARM Cortex-M7** using CMake and **C++17**, adding *choke*, *stutter*, and *freeze* effects to live line-in audio quantized to external MIDI clock, with parameter presets and an OLED menu system
- Wrote an SGTL5000 register-layer driver (I^{2}C codec configuration), custom audio I/O with click-free crossfades, and a deterministic DSP engine using lock-free queues and a zero-allocation design
- Architected a preemptive multitasking system with an audio ISR and five control tasks communicating via non-blocking SPSC queues for minimal latency

BassMINT: Multimodal Interface for Note Transcription

- Built a bass guitar bridge mount around an **ARM Cortex-M7** that streams real-time string and fret positions as serial MIDI CC messages, enabling live playing visualization inside DAW plugins
- Differentiates active string via per-string IR photodiodes with an envelope follower, while YIN pitch-detection is applied to a piezoelectric sensor signal with low and high-pass filtering
- Integrating firmware on a desktop **C++**/JUCE application with a dynamic fretboard UI and playing statistics, emphasizing cross-compatible architecture for a variety of bass guitar models, operating systems, and DAWs

Skills

Languages: C++, C, Python, Bash
Tools: CMake, GCC/Clang, GDB, Valgrind, JTAG, Logic analyzer, Oscilloscope, Docker, Yocto Project, Git, KiCad
Concepts: Real-time systems, Multithreading, ISRs, RTOS, Embedded Linux, Serial protocols (UART, SPI, I^{2}C, I^{2}S)