Jinju Lee

Software Engineer (Agentic AI), Samsung Electronics
Independent Music-AI Researcher, PearlLeeStudio
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Research Interests

Symbolic music generation and music information retrieval, centered on genre-adaptive and controllable generative models: chord and harmony modeling, LoRA-based adaptation, and listening-based evaluation of generative music systems. In parallel: retrieval-augmented and agentic LLM systems, and creative tools that connect these models with music theory and human composition workflows.

Education

Hongik University, Seoul, South Korea ***Mar 2012 - Feb 2016***
B.S. in Computer Engineering, GPA 3.72/4.5 (92.2%)

Research Experience

Independent Researcher, PearlLeeStudio, Seoul, South Korea ***Jan 2026 - Present***
TheArtist

- Built an AI-assisted chord-composition application integrating a custom-trained 25.7M-parameter Music Transformer and 11 genre-specific LoRA adapters with a React/FastAPI interface, music-theory retrieval, and acoustic-roughness ranking
- Implemented editable staff and MIDI input, selected-measure generation, candidate comparison, voice-leading visualization, and immediate playback, letting users choose and revise model suggestions
- Evaluated five adaptation methods across 11 genres and three random seeds (165 runs), using held-out evaluation, wrong-genre controls, and multiple-comparison correction to assess adaptation gains and genre specificity
- Identified a checkpoint-selection failure by verifying that the released F1 checkpoint was weight-identical to its initialization; corrected selection to use target-domain validation and released a retrained checkpoint
- Extended TheArtist to a score-to-DAW workflow, PDF score import, Meta Muse Spark reharmonization scored by the Music Transformer, song-form planning, MIDI/Logic Pro export; entered in the Meta Global AI Developer Hackathon

TheVoyager

- Built a multimodal pipeline connecting travel diaries and photos to interpretable music controls, TheArtist chord generation, and audio rendering; published a browsable collection of 105 visit-specific soundtracks at thevoyager.pages.dev

Applied Research (selected), Samsung Electronics, Suwon, South Korea ***Mar 2025 - Present***

- Designed ontology-driven knowledge-graph retrieval that models software-change data as machine-verified axioms; deployed in the enterprise agent system described under Professional Experience
- Mined a confidence-scored evaluation case set from fix-commit history (SZZ) to benchmark runtime-risk triage
- Fine-tuned and quantized Google TimesFM 2.0 for on-device forecasting and context detection with end-to-end MLOps

Publications & Preprints

Accepted

[1] Jinju Lee, "Where Does Genre Stop Following the Chords? A Fixed-Frame Listening Probe of Bounded Chord-Symbol Genre Identity (TheArtist)," I*SMIR 2026 Late-Breaking/Demo*, Abu Dhabi, Nov 2026.

Preprints

[2] Jinju Lee, "How Far Can Chord-Symbol Time-Series Adaptation Carry Genre Identity? Capabilities and Boundaries in Multi-Genre Chord-Symbol Modeling," *arXiv:2606.07334*, 2026.

[3] Jinju Lee, "Empirical Study of Pop and Jazz Mix Ratios for Genre-Adaptive Chord Generation," *arXiv:2605.04998*, 2026.

Submitted

[4] Jinju Lee, "When the 'Best' Checkpoint Is the Initialization: Mismatched Model Selection in Fine-Tuned Music Transformers," submitted to IEEE ICASSP 2027.

Software & Model Releases

- **TheArtist Model Suite**: 18 checkpoints (7 base and fine-tuned Music Transformers and 11 genre-specific LoRA adapters, CC BY-NC 4.0) at huggingface.co/PearlLeeStudio
- **TheArtist**: live app at artist.pearlleestudio.co; source-available app snapshot (React, FastAPI, PyTorch) with API spec and citation metadata at github.com/PearlLeeStudio/TheArtist
- Meta Global AI Developer Hackathon 2026 entry (TheArtist score-to-DAW build): live at artist-daw.pearlleestudio.co
- **TheVoyager**: live map-based memory-music platform at voyager.pearlleestudio.co
- Demo and research videos: youtube.com/@StudioPearlLee

Professional Experience

Samsung Electronics, Mobile eXperience (MX) Business, Suwon, South Korea ***Feb 2016 - Present***

Software Engineer

Agentic AI (AX), current

- Architect AI-native engineering for RTOS productization with autonomous planning and closed-loop execution. Orchestrate knowledge-grounded agents over secure enterprise context, driving software changes from implementation through validation and self correction
- Design and operate Kubernetes-hosted enterprise LLM agents and MCP (Model Context Protocol) servers that automate internal engineering workflows and package them as reusable agent skills
- Extend the Android platform feature-flag toolchain with internal customizations
- Engineered model-agnostic context serving so the same agents and toolchain work across Gemini, Claude, and GPT clients: server-enforced response shaping, aggregate-first answers sized to each client's context budget, and per-client capability fallbacks
- Built a software-provenance knowledge graph that traces AOSP commits across internal branches, feature flags, and product builds; multi-store RAG retrieval over Neo4j, Milvus, and PostgreSQL (deployed on-prem and in the cloud) resolves reach and lineage questions in seconds
- Curated a runtime-risk dataset (severity and category taxonomy, provenance-tracked detection rules, evidence-commit links, inter-risk relations) that seeds graph and vector retrieval and drives daily commit triage with scored, rule-traceable matches
- Re-architected graph ingestion from recurring full-refresh upserts to cursor-based, idempotent incremental loading in a shared multi-tenant production Neo4j; automated invariant checks enforce namespace isolation (zero cross-namespace edges), backed by an incident-response runbook
- Built a continuous evaluation harness for the MCP layer combining deterministic checkers, auditor agents, and calibrated LLM-as-judge verdicts on answer correctness and latency; a verification console attaches semantic-match judgments to served answers

Android System Apps (Gallery, Digital Wellbeing)

- Led One UI specifications and feature development for Gallery and Digital Wellbeing, serving 100M+ daily users across the global Galaxy device base

Software Engineer, Samsung C-Lab Inside (in-house venture program) ***Sep 2022 - Aug 2023***

- Built a tool-agnostic web platform for collaborative 3D model creation in AR and metaverse scenarios (React, Three.js) with visual diffs, in-context editing, shared viewers, and 3D comments, hosted at Seoul National University

Technical Product Manager, Device Care ***Feb 2019 - Dec 2020***

- Managed APK operations, CI/CD pipelines (AWS), staged rollouts, and hot-fix coordination for 200M+ Galaxy devices annually

Honors & Awards

- Excellence Award, Samsung DX Culture Awards 2026: work-efficiency improvement with Digital Workers
- Samsung MX S/W Award for Individual Programming, Q4 2025
- Excellence Awards at the Creative Engineering Design Contest (art x engineering) and Graduation Exhibition, Hongik University, 2016
- Samsung Software Track (SST) Scholarship and Merit Scholarship, Hongik University, 2012-2016

Certifications

- Samsung GenAI Certification (top tier), 2026: built datasets and shipped an end-to-end multi-agent system
- Samsung AI Application Specialist Certification, 2025: on-device forecasting with TimesFM 2.0 and end-to-end MLOps

Technical Skills

- ML & Music: PyTorch, Music Transformer, LoRA and full fine-tuning, quantization, on-device ML, TimesFM, MIR (Music Information Retrieval)
- Agentic AI & LLM Systems: LLM agents, MCP server and agent-skill design, multi-store RAG (Retrieval-Augmented Generation), ontology and knowledge-graph design, prompt and context engineering, multi-LLM serving (Gemini, Claude, GPT, Meta Muse Spark), tool orchestration and function calling, multi-agent workflows, evaluation design (LLM-as-judge, curated datasets, risk triage)
- Systems & Full-Stack: Python, Neo4j, Milvus, PostgreSQL, Kubernetes, FastAPI, REST APIs, React, Three.js, Tone.js, Android (One UI), CI/CD on AWS

Languages

Korean (native), English (professional working proficiency)

Community & Leadership

- Google AI Study Jam Leader, 3rd cohort, Seoul Women IT's (women-in-tech community), 2025
- Organizing Committee, 23rd Hongik Street Art Exhibition: interdisciplinary coordination across Fine Arts, Engineering, Architecture, and Humanities, 2015

Creative Background

- Keyboardist, Gosrock (rock band), Hongik University, 2012-2016
- Composing original works with TheArtist-derived tooling and releasing them on YouTube, 2026-Present