

Thesis Project Portfolio

Decentralized Music Distribution: Enhancing Independent Musicians' Reach Through Blockchain and AI

(Technical Report)

Democratizing Music Distribution and Discovery with Blockchain Technology

(STS Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelors of Science, School of Engineering

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(Executive Summary)

Reimagining Music Distribution Through Technology and Social Understanding

The music industry stands at a crossroads, where technological innovation meets deeply entrenched social and economic structures. My technical project and STS research converge on a crucial question: how can emerging technologies democratize music distribution while resisting the industry's historical pattern of corporate consolidation? Through developing a decentralized music platform and analyzing the sociotechnical dynamics of blockchain adoption, I've gained unique insights into both the technical capabilities and social factors necessary for lasting change in the music industry. Together, these projects demonstrate how engineering solutions must be grounded in deep understanding of social contexts to create meaningful transformation.

The technical portion of my thesis proposes a decentralized music distribution platform that leverages blockchain technology and artificial intelligence to support independent musicians. Built on the Solana blockchain, the platform uses smart contracts to ensure transparent and automated revenue distribution, eliminating traditional intermediaries that often exploit artists. The platform's AI-driven recommendation engine deliberately deemphasizes mainstream metrics like follower counts, instead analyzing audio characteristics and user behavior to surface talented artists within niche subgenres. This technical architecture creates unprecedented resistance to centralized control – unlike previous platforms like SoundCloud, no single entity can unilaterally change the platform's rules or monetization systems. The integration of token economics also enables direct artist-fan relationships, allowing listeners to become stakeholders in musicians' success.

In my STS research, I examined how blockchain technology might succeed where previous attempts to democratize music distribution have failed. Using the Multi-Level Perspective framework, I analyzed the rise and fall of SoundCloud's "golden era" (2015-2017) alongside the emergence of blockchain platforms like Audius. This research revealed that technical capabilities alone cannot guarantee lasting change – successful democratization requires alignment of technical architecture, economic incentives, and cultural momentum. The case of Bitcoin provided an instructive example of how disruptive technologies can create resilient alternative ecosystems by forcing existing institutions to adapt rather than being absorbed by them. This understanding deeply informed the technical project's design choices,

particularly around governance structures and economic mechanisms.

The synthesis of these projects highlights how STS perspectives enhance engineering practice by revealing the complex interplay between technical and social factors in technological change. While my technical work demonstrated blockchain's potential to create transparent and automated systems, the STS research illuminated why such capabilities must be coupled with appropriate economic incentives and cultural resonance to achieve lasting impact. This sociotechnical lens helped identify potential pitfalls and guided design choices toward solutions that could resist corporate consolidation rather than simply creating new forms of centralized control. Moving forward, this integrated understanding will be crucial for engineers working to develop technologies that truly serve their intended social purposes rather than being co-opted by existing power structures.

The future of music distribution – and creative industries more broadly – depends on our ability to develop technologies that not only function technically but also align with and support positive social transformation. Through combining technical innovation with sociotechnical analysis, we can work toward systems that genuinely empower artists and enrich cultural expression rather than reinforcing existing inequities.