



AI SONG CONTEST 2025 PROCESS DOCUMENT

Auditory Nerve

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SoundCloud link: <https://soundcloud.com/mike-468799321/mix-3-cm>

Generated variations:

https://tomcollinsresearch.net/audio/aisc2025/process/vargen_bounces/

Early MIDI-based draft:

https://tomcollinsresearch.net/audio/aisc2025/process/midi_draft_20250804.m4a

Motivation

"Silent N[AI]ght" explores current tyrannies in the world, and the peace and calm that hopefully will ensue. We see lots of tyrannical situations in the world right now – in political and military spheres, as well as in the environment (with our current inability to stem global warming), and in the rise of artificial general intelligence, which it has been claimed will "benefit all of humanity" (Sutskever, OpenAI, 2023), but which has been shown to widen inequality gaps (Hao, 2025).

We had an open-source theme-and-variation generator called VarGen at our disposal, due to recent basic research in AI at our Music Computing and Psychology Lab (Gao, Reuben, & Collins, 2024, <https://zenodo.org/records/14877299>), and a love of the progressive metal genre, so we thought we would try to break the VarGen tool by training it on metal guitar parts and then asking for variations on "Silent night." Historically, breaking tools has been a great way to find creative uses of new technology. This carol, with its calming and peaceful qualities, also felt like a challenge for a model trained on metal, as well as an affective antidote to the global tyranny we mention above.

We were motivated to use words from "Silent night" to seed or scaffold our lyric generation, devising an acrostic for "Silent night" in the process: Strength Inspires Liberty Ending Night;



Truth Nurtures Independence Giving Hope To all.

Pushing boundaries of creative expression

Drawing inspiration from listening consecutively to variations of a theme, we were inspired to depart from typical song structure (verse, chorus, verse, chorus, etc.) and instead devise a through-composed song. While progressive metal music often explores alternative song structures, through-composed music is perhaps more often associated with opera and certain eras of classical music. This presented a unique opportunity to enhance storytelling with unique expression in the metal genre. By layering and transitioning between variations, which become more decipherable as the song proceeds, leading up to the main theme being revealed at the end, the listener is encouraged to consider the music in a larger context, and use their imagination to hear the relationships between parts.

Additionally, using the VarGen model provided a new opportunity to explore the songwriting process through frameworks of additive and subtractive composition/synthesis. Since VarGen outputs an arbitrarily large number of variations at a time (we chose 20, https://tomcollinsresearch.net/audio/aisc2025/process/vargen_bounces/), it made sense to develop musical ideas by layering different sections of the output together. This pushes boundaries in musical expression as it provides an alternative method to songwriting that could prove useful in the event of writer's block. At times, it is hard for inspiration to strike or to feel inspired to write riffs that sound different from a player's standard vocabulary. Using MIDI variations inspired riffs and sections that we would never have written before.

Workflow, collaboration, and songwriting process

As mentioned under Motivation, the making of our song began with using VarGen to generate theme-and-variation material. After training VarGen on 185 metal guitar parts, Mike, Jacey and Tom input the melody of "Silent Night" to infer 20 AI-generated variations. These variations became a foundation for melodic and rhythmic ideas across the song's structure.

During early sketching and review, we decided to build the song up from singular highlighted variations into chaos and layering. During the songwriting process, each section of the through-composed song was built around selected MIDI outputs, which were later adapted for live instruments. Our first complete MIDI demo featured the direct AI content more heavily (https://tomcollinsresearch.net/audio/aisc2025/process/midi_draft_20250804.m4a), but through studio recording sessions, we altered these parts to be more playable and musically cohesive. Mike and Jacey recorded guitars and bass, while Asher recorded drums. Raina, Mike, Brayton, and Jacey wrote lyrics with help from ChatGPT, including acrostic and



restructured poems based off of “Silent Night” lyrics, and centered around resistance and peace.

The process of tracking the vocal melody followed the instrumental’s emotional outline. Brayton’s improvised screams in the first half of the song evoke conflict and the anguish of victims, while Raina’s clean vocals emphasize resolution and peace. Final production in Pro Tools involved rhythm-tightening and synth-layering. In the songwriting process, our group collaborated with AI to transform a well-known carol beyond its religious origins, into a song that speaks to timeless struggles for peace.

Evaluative steps in song development

Our initial idea for “Silent N[AI]ght,” was a kind of “subtractive synthesis” song that begins with chaos and converges towards the main theme as it progresses. We transitioned, however, to an additive approach when we began to place our output MIDI into Logic, in order to highlight each individual variation before the chaos. The process began with a verse which inspired the decision for a through-composed style so that we could highlight unconventionality.

Early demos were built with MIDI and introduced practical difficulties that were soon revealed in studio sessions. Many of the model’s MIDI outputs were either too busy or unplayable in their chord structures, rhythms, and melodies. Real-time fixes were necessary during recording in order to maximize flow and time efficiency. For example, our drummer had to re-learn and simplify his part during our studio session due to the complexity of the original MIDI rhythm. Many of the bass and guitar parts were also rewritten as more playable while maintaining their musical intention.

Additionally, we came across technical hurdles such as Mike working in Pro Tools and Jacey working in Logic. This affected our workflow and consistency in production, along with the fact that our entire team was geographically distant for the summer. We worked remote for the first three months of our project, unable to record anything live in the studio until the middle of August. Nonetheless, the evaluative steps that came from these adversities aided in shaping our song into its final form.

Diversity, ethical, and cultural considerations

As in previous years, we adopted the Originality Report method developed in our Music Computing and Psychology Lab (Yin et al., 2021), to check that the generated variations were no less original than the self-originality of items in the metal guitar collection. Self-originality can be measured by taking short passages of a hold-out dataset item, comparing them using a similarity measure like cardinality score to all passages in the



dataset, and storing the value of the maximum match. In terms of our chosen theme, “Silent Night”, an ethical advantage of this is that it is in the public domain.

Artificial intelligence, as it relates to the topic of music, has become widespread in recent years. Although AI applications may aid in creativity for projects, it is important to understand its limitations too. Depending on the use, AI often struggles to take into account the diversity between cultures due to its lack of historical knowledge. Knowing the origin of the sound attempting to be altered or created provides for an increased accuracy through more specific parameters.

Additionally, AI has contributed to new issues and debates in relation to copyright, which is, and always has been, an enormous subject in the music industry. Many existing tools are trained using data from non-consenting artists and further provide little-to-no compensation. While the copyright laws of AI are still in the process of being determined, considerations towards the content of musicians and the musicians themselves should be made, as being an artist is, beyond doubt, an occupation.