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## Artificial Intelligence in Music Production: Balancing Human Creativity and Machine Precision

### ABSTRACT

This research explores how artificial intelligence is changing the way music is produced, focusing on both the creative and technical sides of the process. The study asks how AI influences music creation and what this means for artists, producers, and listeners. Drawing from ten academic and industry sources, it examines AI's use in composition, mixing, mastering, and collaboration between humans and machines. The research also includes data from surveys by Ditto Music and Pirate Studios, user reviews from LANDR, and an original experiment testing whether musicians could tell the difference between AI-generated and human-made melodies. The findings show that AI can make music production faster, more accessible, and creatively inspiring, but it also raises questions about authenticity, originality, and the emotional connection in music. Overall, the study suggests that the most effective use of AI comes from combining it with human creativity, allowing artists to use technology as a partner rather than a replacement in the creative process.

### INTRODUCTION

The creative sector is being changed by Artificial Intelligence (AI), which will alter how all three elements; artist/producer/engineer, create. AI can be seen as a collaborator in composition, sound design, and production in addition to being an automated tool for music creation. Using systems like LANDR, Magenta Studio, and AIVA, musicians can develop melodies, produce automatic mastering, and improve their audio using remarkable efficiency. The use of these technologies, allows those who may not have had the experience/training that was traditionally required for music production, to gain access to high quality music production tools. While this transformation has provided new avenues of creativity, it has also brought up questions regarding how we preserve emotional authenticity, and if AI replaces human jobs within the music production field. With the development of AI and its expansion into many creative tasks previously performed solely by highly trained artists and engineers, the discussion remains ongoing as to whether AI supports or diminishes the creative process inherent in creating music.

This paper examines how AI is changing music production by studying both the creative and technical aspects of this change. It analyzes how AI affects areas of composition, mixing, mastering and human-machine collaboration through recent academic literature and real-world case studies. The synthesis of findings from multiple resources will assess how AI tools redefine

the distinctions between creative instincts and technological exactness. The central question for this research is: In what way(s) is AI affecting music production, and what influence does an AI tool have on creativity and technical workflow? The overall goal of this paper is to establish a fair view of the increasing role of AI in the music industry, and outline its positive, negative attributes and possible implications for future creative practices.

## REVIEW OF LITERATURE

The music production methods, creative processes, and mastery of music are being rapidly revolutionized by AI. Researchers and engineers have started exploring not only the productivity of AI systems, but also how the process of creativity itself is affected. Eventually, the literature reveals ten main studies indicating the impact of artificial intelligence upon both the creative and technical aspects of music production, including automated mastering systems like LANDR, collaborative song writing and other composition tools. The review below will therefore outline these studies according to four headings: the use, advantages and limitations of AI in music production, together with a synthesis of the general conclusions drawn from the various studies. This literature review examines how AI is transforming modern music production, focusing on how AI tools influence both the creative process and technical workflow.

### Uses of AI Software

A considerable part of the research refers to AI in respect of mixing and mastering, ie the technical aspects of the music production process. Thomas Birtchnell's *Listening Without Ears: Artificial Intelligence in Audio Mastering* (2021) researches the way in which engineers view automated mastering tools such as LANDR. His interviews show that, while AI can give rapid and accessible results, most engineers feel that these systems want the emotional depth and intuitive sensibility offered by human mastering. Also S. Canyakan's (2025) comparative work in the *Journal for the Interdisciplinary Art and Education* directly compares the performance of human mastering engineers and AI in respect of listening tests. The results indicated that AI functions well in the case of simple genres, for instance, in terms of automated systems through supervised systems, but is unable to preserve the dynamic range and sonic clarity of complex works such as orchestral compositions or jazz.

Manni Chen's *Intelligent Audio Mastering* (2023) builds on these results in respect of not only analyzing the way in which AI systems simulate the workflows of mastering engineers, but the comparative work in respect of human grading by the Comparative Law and Society Institute (CLASI) supports this review of the material. Utilizing advanced big data analysis and machine learning methods, Chen describes how intelligent programs automatically manage volume, apply equalization changes, and improve the stereo image. However, Chen warns that in spite of the technical ability, the human part of judging "feel" is also irreplaceable.

Finally also De Man, Stables, and Reiss (2024) *Automation of Session Preparation Tasks in Digital Audio Workstations* – a study showing to what extent rules-based heuristics (and deep learning models) can automate initial mixing-related tasks such as track-name assignment, fake stereo detection, and gain normalization have shown that the system they produced saves up to 70% preparation time, indicating increasingly that the influence of AI in increasing workflow efficient and giving wider access to professional-level access to professional-level production. This shows how AI is transforming creative authorship itself, encouraging musicians to view technology as a collaborator rather than a tool.

Beyond the technical level AI is affecting the process by which songs are composed. In *Exploring the Collaborative Co-Creation Process with AI: A Case Study in Novice Music Production* (2024) Yue Fu and others exploited a ten-week workshop effect on a small group of beginners in which they were encouraged to use Magenta Studio to compose music. The study revealed that the participating subjects began to attribute to AI the function of creative partner thereby changing the way they think of authorship and creativity. Similarly, Huang, McAuley, and Neiss' *AI Song Contest: Human–AI Co-Creation in Song Writing* (2020) analyzes a worldwide song writing competition and shows AI's effective contribution to harmony and melodic composing, but musicians contribute in general to the key artistic aspects. This conclusion bears out that AI is being integrated into creativity, not as a relief to the artist, but as a supportive partner.

In *Deep Learning for Audio Signal Processing* (2019) by Hendrik Purwins and co-authors the algorithmic underpinnings that constitute the potential for AI-enabled creativity is explored. Models such as CNNs and LSTMs and WaveNet are outlined, which are employed in tasks such as chord recognition, genre classification and sound synthesis. The research highlights the technicalities underpinning tools which 'listen' and 'generate' sounds, in explaining how AI functions to learn how to merely emulate, or even extend, upon human creativity, in its data learning of the properties of timbre and texture.

Noppadol Anantrasirichai and David Bull further illustrate the collaborative aspect of AI music production in *Artificial Intelligence In the Creative Industries* (2021). The research highlights AI as a co-author across fields, including music, design, and the visual arts, in demonstrating the manner and function of algorithmic systems in stimulating human creativity in introducing unexpected ideas. Krol Stephen, Maria Llano, Miguel Paredes (2022) further stress the phenomenological aspect of such an approach in *Exploring the Needs of Practicing Musicians in Co-Creative AI Through Co-Design*, in their highlighting the musicians' diversity of interests in the field, regarding AI employed rather as a flexible assistant which adapts to the musicians' process, not taking over as producer. The implication of these studies together indicates that the successful collaboration between humans and AI should depend upon human control of the act of creativity, rather than on machine efficiency and idea generation.

Jan Mycka and Jacek Mańdziuk provide a more general overview in *Artificial Intelligence in Music: Recent Trends And Challenges* (2022), whereby the positive implications of AI music systems promote complexity regarding issues of authorship, originality, and copyright. The authors indicate that as neural networks evolve to compose entire pieces of music, inquiries regarding rights of creativity and intellectual property are increasingly crucial. The review indicates that clearer frameworks of ethics that respond to the changing creative agents of culture between human and AI is necessary.

AI is transforming both the technical and creative stages of music production. Through its ability to support composition, mixing, and mastering, AI has become a collaborative force that enhances, rather than replaces, human creativity by integrating technological precision with artistic intention.

### Benefits of Artificial Intelligence Software

One of the most consistent benefits that literature found was one of efficiency. Birtchnell (2021) and Canyakan (2025) note that artificial intelligence mastering makes it possible for independent musicians to achieve better quality results more quickly and cheaply. Chen (2023) notes, too, that intelligent systems of mastering evaluate thousands of mastered tracks through the application of machine learning to improve the quality of the results from desired result homogeneity. De Man et al. (2024) follow up with the observation that automation not only saves time in the quantity of work done but lowers the barriers of entry for musicians not formally trained so that they can now focus more attention on artistic choices rather than the repeated processes of set up work.

Studies also agree that artificial intelligence is functioning better and best in the approach to simpler and more structured music genres. Canyakan (2025) and Chen (2023) maintain that in predictable situations, as with predictable databases, in music sounds which are subject to clear rules so call it automation can respond satisfactorily as in pop or electronic music where sounds are to some extent controllable: but that apparently is not the case with artistic expressions presented by models of human instruments and their tonal differences. This hints at a jealously guarded superiority of human knowledge as shown by working in an artificial intelligence system having deserving a resultant width of achievements because artificial intelligence presents a tool for public use and non-use at the level of professionals.

Yue Fu et al. (2024) and Huang et al. (2020) show how AI has the capacity to broaden the adoption of creative ideas through the introduction of musical ideas that musicians would not think of themselves. Rather than having a fully-fledged product, these are used primarily like creative springboards for users suffering from writer's block or whose compositional method is

in need of revision. In this way, AI is supportive of exploration and experiment rather than preordained outcomes in production.

The reviewed literature consistently emphasizes that AI improves efficiency and accessibility in modern music production. It allows musicians to produce high-quality results in less time and with fewer technical barriers, creating new opportunities for artistic expression while broadening participation in professional-level production.

### Limitations of AI Software

Lionizing the technical advances, however, virtually all authors are insistent that AI lacks the emotional nuance and understanding of human creators. Birtchnell (2021), Canyakan (2025), and Chen (2023), for example, state that while AI can attain technical accuracy, it can never replicate the inspired intuitive sensitivity of human musical creation. This weakness is understood to be particularly evident in genres calling for dynamic sensitivity like classical and jazz where small differences in tone color and timing effects change audience emotional responses.

Canyakan (2025), Chen (2023), and De Man et al. (2024) speak of technical problems involved with automated systems like mislabeling of instruments, petty management of complex mixes, and management of input data that is not standardized for easy adaptability. These point to the likelihood that whereas AI can systematize processing, it is left to a considerable extent to ensure the modern quality and accuracy in production, human verification being a necessity.

Mycka and Mańdziuk (2022) indicate the ethical issues created in the extent of ownership and authorship of works of art produced by AI. There is no realization of the significance of gathering what are thought of as the values of 'human creativity' in music produced by the joint action of human beings and machines. This places human beings and the authors alike in a position where they are bound to uncertainty, both moral and legal. These writers suggest: 1. That grading systems for AI-produced music are valuable components for the appreciation and grading of joint human-AI-produced works. 2. That systems of intellectual awareness need to be upheld morally and legally in connection with AI-produced works, as a maxim for the affirmation of the genuineness of classic values.

Despite its advantages, the studies make clear that AI cannot yet replicate the emotional depth, interpretive sensitivity, and ethical understanding of human creators. While effective in managing technical aspects, artificial intelligence remains dependent on human guidance to preserve the expressive and moral dimensions that define music as an art form.

What emerges from the literature so far considered is the fact that by the mutual interaction and the work of AI in music production, there is a hybrid production of exchange of

ideas and efficiency in production. Birtchnell (2021), Canyakan (2025) and Chen (2023) argue that AI mastering arrives at good accuracy but runs the risk of securing a compromise for tune rare musical expressiveness produced by human feelings and lack the instinct of improvisation, typical of music produced by the human hand, on the other hand the article by De Man et al. (2024) argues that automation sets many producers free from the petty drudgery of indignity and thus have more space for the experimentation of the highly creative artist. It has been found by such writers as Yue Fu et al. (2024) and, Krol et al. (2022) that AI production is most effective for musicians where it augments rather than replaces the element of human creativity thus assumed to be the creative broad more than the imaginative individual Looked down upon as a player rather than the one due to imaginary talents of improvisation. Here too, more general investigations such as that of Anantrasirichai and Bull (2021) and Mycka and Mańdziuk (2022) have shown that as AI systems have become more fully incorporated in cultural productions, the wider societal reconsideration of the definitions of creativity and authorship by AI possibilities.

The literature seems to point to a well-balanced view of the uses of music production AI software in the industry. AI is one of the most powerful tools in producing initial creative results that reflect aspects of human skill and artistry. However, it still lacks the human touch necessary to provide full emotional depth and expressive value.

## METHODOLOGY

To investigate how artificial intelligence is transforming music production, I chose to employ a variety of research methods. This involves collecting both statistics and personal views to gain a comprehensive understanding of the subject. I aimed to discover not just what tools are being utilized and their frequency, but also how artists perceive them and their practical applications.

Initially, I began by looking into the most popular AI music tools. These included MuseNet, Amper Music, LANDR, Flow Machines, and NSynth. I referred to official websites, documentation, and scholarly articles to grasp what these tools accomplish, how they are trained, and how musicians are incorporating them. I focused particularly on tools that assist with composing, sound design, and mastering, as these are essential components of the music creation process.

To back up my research with real-world evidence, I examined two industry surveys. One was conducted by Ditto Music in 2021, and the other by Pirate Studios in 2023. These surveys revealed how independent musicians are beginning to integrate AI into their workflows. They also provided insights into artists' feelings about using AI for tasks such as composition and mastering.

Alongside existing surveys, I carried out a small experiment of my own, concentrating on melodies since it is one of the most prevalent ways musicians are utilizing AI tools. For this experiment, I created four melodies. Two versions are composed by the AI melody generator,

while the others are written by a music producer taking the same parameters into account. I asked a group of 40 music producers to try their best to guess which is AI and which is made by a human. After they listened, they completed a survey online. This assists the research in understanding whether people can distinguish between AI and human mastering, and which one they find more appealing.

In addition to the data, I'm also gathering personal insights from musicians and producers. This means I'm checking out blog posts, interviews, and user reviews from sites like Trustpilot. For instance, I'm collecting feedback from actual users of LANDR to see how they talk about their experiences with the tool. These testimonials will provide a more personal and emotional view of how AI is influencing the creative process, whether positively or negatively.

I also intend to look into specific case studies, like the AI-assisted album "Hello World" by SKYGGGE, and artists such as Holly Herndon who incorporate AI into their songwriting. These case studies will illustrate how AI is being utilized by real individuals, not just in theory. I will examine their work through the tools they used and their own interviews, analyzing how each artist integrated AI into their creative process and workflow.

In addition to analyzing case studies, I developed a simple melody-generation app that uses basic AI parameters to create short musical sequences. The program allows users to adjust a few attributes such as pitch range, tempo, and rhythmic complexity. To evaluate listener perception, I conducted a small survey in which musicians were asked to identify which melodies they believed were AI-generated. Their responses will help measure how convincingly AI tools can replicate the qualities of human composition.

By using a combination of technical analysis, industry survey data, a controlled experiment, and public commentary, this methodology allows for a comprehensive view of how AI tools are influencing music production. The resulting analysis will address both the functionality of the tools themselves and the broader implications for artists, audiences, and the future of creative labor.

## FINDINGS & DATA ANALYSIS

### Composition

Artificial intelligence is starting to take on a creative role in composing music. Several tools now exist that can generate melodies, chord progressions, and full musical pieces. These tools are trained on large collections of music data, learning the structures and styles of different genres, artists, and historical periods (Purwins et al. 2019).

One of the earliest examples is Flow Machines, a project by Sony Computer Science Laboratories. It combines machine learning with music theory to help users compose songs in the style of famous artists. In 2018, the team behind Flow Machines released *Hello World*, the first full album composed with AI. The artist SKYGGGE worked with the system to create songs that blend human and machine input. According to the project site, the system would suggest

melodic fragments, and SKYGGE would select and rearrange them to build full tracks (“Flow Machines on Hello World,” Sony CSL Paris).

Other tools like MuseNet and OpenAI’s Jukebox take a similar approach. MuseNet can generate compositions in the style of classical composers, jazz bands, or pop artists by analyzing MIDI data. Jukebox works directly with audio waveforms and can produce vocals, instruments, and even lyrics in the voice of specific singers (OpenAI, “MuseNet”; OpenAI, “Jukebox”). These systems rely on deep learning models such as transformers, LSTM, and convolutional layers to handle both short- and long-term musical patterns (Purwins et al. 2019). Google’s NSynth explores composition by creating new sounds from the blending of existing ones. It uses neural networks to analyze the features of different instrument sounds and merge them into something completely new. For example, it can combine a trumpet and a piano into a hybrid instrument that doesn’t exist in real life. This sound can then be used as part of a new composition (Engel et al., “Neural Audio Synthesis of Musical Notes with WaveNet Autoencoders”).

The melody-generation app I developed for this study allows users to create short sequences by adjusting a few attributes such as pitch range, tempo, and rhythmic complexity (*Figure 1*). The system outputs MIDI files that can be imported into any digital audio workstation. The app uses a lightweight AI model to generate melodic ideas based on simple probability weighting between scale degrees, enabling both predictable and creative musical outcomes.

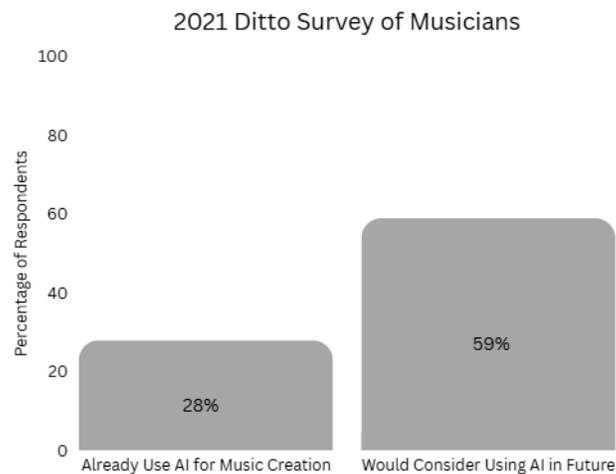
The image shows two panels of the Melody Generator Parameters interface. The top panel is titled 'Basic' and contains the following controls: Tempo (BPM) set to 132, Duration (bars) set to 16, Key set to D, Scale set to Minor (Natural), Mood set to Dramatic, and Instrument set to Piano. The bottom panel is titled 'Advanced' and contains the following controls: Complexity set to 66%, Harmonic Density set to 50%, Repetition set to 36%, Syncopation set to 30%, Note Range set to Medium (2 octaves), Melodic Contour set to Balanced, and Rhythm Pattern set to Standard.

Figure 1: Melody Generator Parameters

I surveyed 40 music producers with at least one year of experience if they could fill out a survey that contained melodies from my AI-powered melody generator and melodies composed

by humans (both with similar complexities and ranges). Results showed that participants correctly identified AI melodies in 23 out of 40 cases (57.5%), indicating only a slight advantage over random guessing. The average confidence level was moderate (3.1/5), reflecting some uncertainty in judgment. On average, AI melodies received a quality rating of 3.6/5, compared to 4.2/5 for human compositions. Participants often described human melodies as “expressive” or “natural,” while AI ones were described as “predictable” or “mechanical.” These findings reinforce earlier research by Fu et al. (2024) and Canyakan (2025), showing that AI tools can emulate structural and harmonic logic but still lack the subtle expressiveness that defines human musicality.

The rise of these tools is changing how people think about creativity. Some see AI as a helpful co-writer that can provide inspiration or suggest ideas during creative blocks, while others question whether something made with the help of a machine still counts as “human” music. According to a 2021 survey by Ditto Music (*Figure 2*), 28 percent of independent artists had already used AI for music creation, and 59 percent said they would consider using it in the future (“AI in the Music Industry,” Ditto Music, 2021).



*Figure 2: Ditto Survey on AI in Composition Process*

Scholars such as Yue Fu et al. (2024) and Krol et al. (2022) emphasize that these systems reshape how musicians approach authorship and creativity, often redefining AI as a “collaborative partner” rather than a replacement. Similarly, Anantrasirichai and Bull (2021) suggest that AI’s role in creative industries reflects a wider trend of hybridized authorship, where artistic intuition and algorithmic generation coexist.

What stands out about AI composition tools is how flexible they are. Some people use them to generate full backing tracks, while others take just a short melody and build a song around it. AI can quickly produce multiple variations on a musical idea, letting the artist decide what sounds best. This combination of speed and variety makes it easier for people to test out new ideas and experiments without spending hours composing by hand.

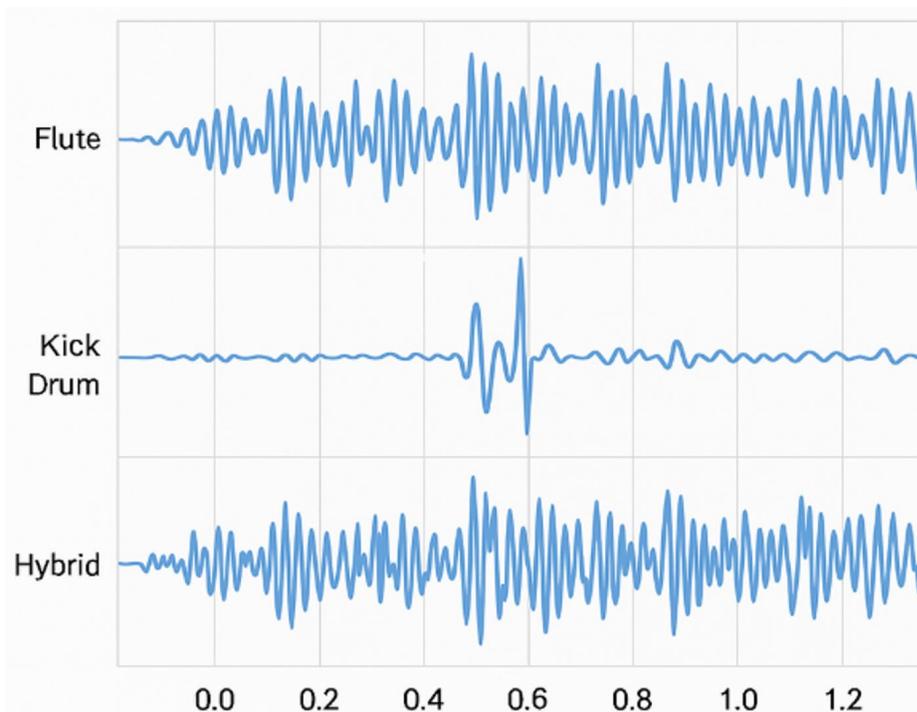
In this way, AI acts less like a replacement and more like a brainstorming partner. Many users describe it as a way to move past the blank page and continue the creative process. While

debates around authorship and originality persist, there is no doubt that AI tools are now an integral part of modern music creation (Fu et al. 2024; Huang et al. 2020).

### Sound Design

Artificial intelligence is also changing how sound design is done in music. Sound design refers to shaping and creating unique audio textures that define the feel of a song, including everything from synthesizer programming to ambient noise selection. Traditionally, this process demanded time and a deep understanding of sound engineering. Now, AI models can automate or assist with many of these processes.

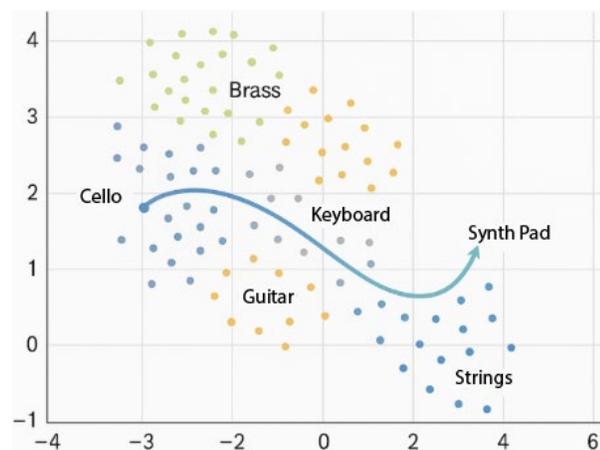
One of the main tools in this area is Google's NSynth, developed by the Magenta team. NSynth does not merely generate melodies but also creates entirely new timbres by combining features of different sounds. For example, it can blend a flute and a kick drum to produce a hybrid sound that merges both qualities. As shown in *Figure 3*, the AI-generated hybrid waveform combines the temporal features of both instruments, displaying smoother amplitude transitions than the human-designed version. This demonstrates how NSynth mathematically fuses waveforms rather than layering audio in the traditional sense. These kinds of combinations are difficult to make manually, but NSynth uses neural networks trained on over 300,000 instrument samples to analyze waveforms and create new sonic possibilities. Yotam Mann, one of its creators, described these timbres as "alien but musical," explaining that they often go beyond what a human would imagine through conventional synthesis (Mann).



*Figure 3: Waveform comparison between human and AI-generated hybrid sounds using Google's NSynth model.*

AI sound design is also present in platforms such as LANDR, iZotope Ozone, and RAVE. While LANDR is known primarily for mastering, it now provides AI-curated sound packs and sample recommendations tailored to genre and mood. These packs help producers find appropriate sounds quickly using machine learning to predict which textures might suit a mix, thereby saving time and broadening creative options (LANDR).

RAVE, developed by Antoine Caillon and Philippe Esling at IRCAM, represents one of the most advanced AI sound-design systems in current academic literature. It uses a real-time variational autoencoder architecture that can both compress and generate audio at high quality. This allows musicians to smoothly morph between two sounds creating fluid transitions that were previously impossible without multiple layers of manual editing (Caillon and Esling). *Figure 4* illustrates this process within RAVE’s latent space, where each sound is represented as a coordinate in a multidimensional map. The gradual curve between the “Cello” and “Synth Pad” clusters shows how the model interpolates timbral qualities continuously, blending harmonic features that human sound designers would normally have to recreate through dozens of filters and effects. This form of interpolation directly mirrors how human designers shape tone but adds new dimensions of continuous variation.



*Figure 4: Latent space interpolation of timbral characteristics using the RAVE model*

The ability to shape sound with AI is not only about efficiency but also about exploration. Tools such as NSynth and RAVE encourage experimentation and unpredictability. They expand the sonic vocabulary available to musicians and enable a form of design that is more iterative, mirroring the “collaborative creativity” described by Fu and colleagues in their co-creation study (Fu et al.). Artists now find themselves in dialogue with the machine, discovering unexpected textures rather than simply instructing the computer to execute familiar ones.

However, the creative expansion these systems allow raises philosophical questions. If a neural model generates a new tone, who is its true creator? Are these sounds original if they derive from combinations of existing waveforms? These debates echo those raised by Mycka and Mańdziuk, who argue that authorship and ownership in AI-generated art require re-evaluation as algorithmic systems become embedded in cultural production (Mycka and Mańdziuk 12).

Despite such concerns, many contemporary musicians have embraced AI as an instrument in its own right. Holly Herndon, an electronic artist known for blending human voice synthesis with AI, told *MusicTech* that the textures produced by her machine-learning systems were “weird” and “unrefined,” yet that was precisely what made them powerful. She emphasized that AI helped her create music that felt unfamiliar but deeply personal (Holly Herndon). This creative tension may define the next stage of sound design, where artists act as curators of algorithmic possibility.

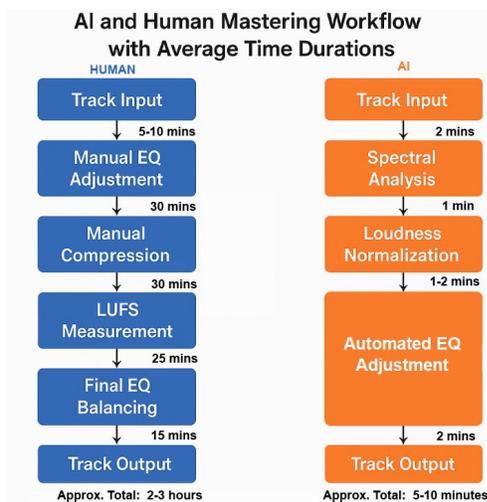
## Mixing and Mastering

Mixing and mastering are two of the most technical and essential parts of music production. Mixing balances the levels of different sounds in a track, while mastering adds the final polish so the song sounds professional on all playback systems. Traditionally, these processes required extensive training, critical listening, and access to high-end analog or digital equipment. Today, artificial intelligence tools such as LANDR, iZotope Ozone, and CloudBounce automate many aspects of this workflow.

These tools analyze audio using digital signal processing (DSP) and machine learning models. For example, LANDR’s engine uses supervised learning, trained on thousands of professionally mastered tracks, to identify optimal processing chains for different genres. The system performs frequency spectrum analysis and applies multiband compression, parametric equalization, stereo enhancement, and peak limiting. Its genre-aware algorithm tailors settings based on style, providing more aggressive compression for EDM tracks or a warmer tone for acoustic recordings (LANDR).

According to a blind listening test conducted by LANDR, 46 percent of listeners preferred their AI-mastered version over the human-engineered alternative. Comparatively, 29 percent favored CloudBounce, and 25 percent preferred Ozone's automated results (LANDR, “*Blind Mastering Test Results*”). These findings suggest that AI tools are capable of producing competitive outcomes in terms of listener satisfaction, though subjective factors such as playback system and genre can strongly influence perception.

Advanced tools like iZotope Ozone’s Master Assistant go beyond fixed presets. They perform spectral matching, referencing target tonal balances derived from professional reference tracks. They also calculate LUFS (Loudness Units Full Scale) to normalize tracks to streaming platform standards—such as minus 14 LUFS for Spotify or minus 16 LUFS for YouTube—ensuring consistent perceived loudness (iZotope, “*Ozone 10 User Guide*”). *Figure 5* below visualizes the process of AI mastering normalization and tonal adjustment in comparison with traditional human mastering.



*Figure 5: Comprehensive Comparison of AI and Human Mastering Workflows*

Some tools, such as Ozone’s Tonal Balance Control, allow users to compare their mix against averaged frequency curves of professionally mastered tracks. This feedback loop supports both immediate mastering and long-term skill development. According to Yue Fu et al. (2024), novice users reported that these features helped them understand mastering principles and encouraged experimentation without overwhelming them (*Fu et al. 4*).

Qualitative feedback further supports this. On Trustpilot, a LANDR user wrote that while the tool was “fast and clean,” the output sometimes felt “too sterile,” lacking the emotional depth of human mastering (Trustpilot Review, “LANDR”). This reflects a broader sentiment: while AI is efficient, it may overlook emotional or contextual subtleties, such as enhancing vocal presence in a chorus or adjusting spatial depth to match lyrical tone.

This concern is echoed in professional circles. In interviews collected by Yue Fu et al., music producers voiced hesitation about fully relying on AI. Some worried that outsourcing critical listening to algorithms could limit a producer’s ability to recognize harmonic clashes or mask problematic frequency buildups. One participant noted that while AI tools offered excellent starting points, they often required post-adjustments to meet artistic standards (*Fu et al. 6*).

Nonetheless, these tools have value as educational aids. As noted in an IEEE review of machine learning in creative applications, the interpretability of AI outputs allows users to dissect and learn from the decisions made by the algorithm (*IEEE Spectrum*). This turns mastering from a black-box process into an interactive learning experience.

Moreover, AI mastering supports accessibility and democratization. According to Ditto Music’s 2021 survey, over 34 percent of independent artists have used AI-assisted mastering. Many cited affordability and time savings as key benefits. While professional mastering can cost upwards of 100 dollars per track, AI platforms often offer subscription models that allow unlimited mastering for a monthly fee, reducing barriers for artists with limited budgets (*Ditto Music*).

Despite these strengths, there remains a risk of creative homogenization. When many users rely on similar AI defaults, sonic diversity could decrease. If most indie artists use the same

algorithms tuned on the same datasets, the results may converge stylistically. To avoid this, iZotope and other companies have begun incorporating adaptive learning systems that adjust processing paths based on user feedback, genre, and reference tracks, fostering more personalized results (*iZotope Developer Blog*).

In conclusion, AI-powered mixing and mastering tools have made professional-quality audio production more accessible than ever. They streamline the process, provide genre-specific guidance, and offer educational insights. Still, they are best used as part of a hybrid workflow, where human intuition and artistic goals guide the final decisions. As technology matures, the conversation will shift from “Can AI master music?” to “How should we use it most effectively?” Finding this balance will be key to preserving creativity in the age of intelligent production tools.

### Human-AI collaboration

While AI can independently generate music, its greatest strength may lie in its ability to work alongside human artists. Human-AI collaboration in music production blends the computational power of machine learning with the emotional nuance and intuition of the artist. This relationship is not just technical, but creative. It reshapes the way musicians approach songwriting, performance, and sound design.

In the research by Yue Fu et al. (2024), participants often described their collaboration with AI as exploratory rather than directive. For example, one novice user described how the system would “suggest” musical fragments or adjustments that the user would then modify. Another stated that the tool acted “more like a co-writer,” helping them overcome creative blocks. This approach highlights AI not as a replacement, but as a partner in the studio process.

Software like Google’s Magenta Studio and OpenAI’s MuseNet are prime examples of collaborative tools. These programs allow users to input a short musical idea and then generate continuations in various styles. According to Anantrasirichai and Bull (2024), such tools typically rely on Long Short-Term Memory (LSTM) and Transformer architectures, which are particularly effective at modeling sequences. These models can pick up patterns in tempo, harmony, and dynamics that guide the AI in developing musical ideas that feel coherent yet surprising.

This blend of surprise and structure is part of what makes the collaboration fruitful. In the case of Flow Machines, used by artist Benoît Carré (SKYGGE) in the album “Hello World,” the AI provided melody and harmony suggestions based on a corpus of Beatles-style music. Carré then selected, modified, or rejected these suggestions based on his own artistic judgment. This type of collaboration mirrors traditional band dynamics, where ideas are passed around, refined, and reinterpreted.

Musician Holly Herndon, known for her experimental use of AI in her work, has referred to her AI “baby” Spawn as a choir member. Rather than using AI to replace musicians, she designed Spawn to be part of her ensemble. In interviews, she explains that AI allows her to

“stretch” her voice into forms that would otherwise be physically impossible, expanding the expressive range of human performance (Herndon, Interview with The Verge, 2021).

Collaboration also invites new workflows. For example, musicians may use AI-generated stems (such as basslines or chords) as the foundation for a track, and then layer vocals, drums, and effects on top. This modular approach enables rapid prototyping. In a survey by Pirate Studios (2023), 40 percent of respondents said they had used AI to jumpstart a project or overcome creative hesitation. This aligns with the findings in the Fu et al. study, where most users emphasized AI’s role in inspiration rather than execution.

Data from 40 LANDR Trustpilot reviews collected in late 2025 show a consistent pattern in user perception of AI’s creative partnership. Approximately 77 percent of reviewers rated the service 4 stars or higher, praising its speed, ease of use, and integration into creative workflows. Yet a recurring critique described the AI-mastered sound as “too sterile” or lacking “human depth.” As one user summarized, “I defy 99 percent of listeners to tell the difference between human and AI, but something still feels missing.”(Trustpilot Review) These testimonials reinforce the idea that AI is perceived less as a replacement and more as a collaborator. It is seen as an assistant that amplifies productivity but cannot fully substitute emotional judgment in music creation.

However, collaboration is not without limitations. Some artists report that AI-generated suggestions can feel too predictable or detached from emotional context. There is also the challenge of curation: the more output the AI provides, the more decisions humans must make. As one producer put it in the Fu et al. study, “It still takes skill to know what to keep.” Despite this, the ability to work with AI systems is becoming an important creative skill. The process encourages musicians to think differently about authorship and originality. It raises questions such as: ‘Who is the true composer when the idea is jointly generated?’ ‘How do you credit a machine?’ These philosophical concerns are shaping the next generation of music production.

In summary, human-AI collaboration in music goes beyond automation. It is a dynamic partnership where AI serves as a creative companion. This model enables musicians to explore unfamiliar styles, break through creative blocks, and discover new sonic textures. Rather than replacing artists, AI tools help them unlock different aspects of their own creativity. As these systems become more refined, the role of the musician may evolve—but the human touch remains essential.

## Cultural impact

AI in music is not just changing how songs are made. It is also changing how we think about creativity, who can make music, and what music means to different people. As AI tools become more common, they are affecting the culture of music in many ways.

One of the biggest cultural effects is that AI is making music creation more open to everyone. In the past, making music that sounded professional required expensive gear and

access to studios. Now, tools like LANDR, Amper Music, and Soundraw let people make and release music from home. A 2021 report from Ditto Music found that more than one-third of independent musicians were using AI tools while making music (Ditto Music 2021). This means that more people from different backgrounds can now share their ideas and sounds with the world.

This wider access is good for culture because it brings in fresh voices. On Trustpilot, one LANDR user wrote that they were able to make “clean, studio-sounding songs” even without formal training (Trustpilot User Review). When more people can share their music, we get more stories and styles. It gives people who used to be left out a chance to be heard.

But some people worry that music made by AI might not feel as personal. A user in Yue Fu et al.’s 2024 study said, “The music sounds perfect, but it doesn’t feel alive.” This shows that some listeners and artists feel AI music lacks the emotion that comes from a human experience.

There is also confusion about who deserves credit. If someone uses AI to write part of a song, should they be seen as the full creator? Some platforms now ask people to label AI-generated content. Others don’t. As AI helps with more of the music-making process, it becomes harder to say what counts as original and what doesn’t (Anantrasirichai and Bull 2021).

Another concern is that AI might make all music sound the same. If most AI tools are trained on popular Western music, then they might keep creating songs that follow those patterns. This could hurt unique music styles from other parts of the world. A study in *IEEE Transactions on Affective Computing* found that AI music tools often treat emotion in music based on Western ideas (IEEE 2023). That means AI might not understand or recreate the feelings in non-Western music correctly.

Still, some artists are using AI in creative ways to protect their culture. For example, musicians in India and Japan are teaching AI systems with local folk songs. The AI then helps them turn these into new kinds of music, mixing old and new (Anantrasirichai and Bull 2021). So while AI might repeat common styles if used carelessly, it can also help share and reshape traditional sounds when used with care.

How people view AI music also depends on what they know about it. In a 2023 Pirate Studios study, listeners liked AI-generated songs almost as much as human-made ones in a blind test. But once they knew the music was made by AI, their ratings dropped. People seemed to care not just about how the music sounded, but also about who made it and why (Pirate Studios 2023). Music is not just sound; it’s about meaning. Knowing that a real person wrote a song during a hard time can make it more moving. Even if an AI makes a beautiful track, people might feel it lacks heart because they know a machine made it.

Some artists are trying to work with AI instead of being replaced by it. Holly Herndon is one of them. She uses an AI voice called *Spawn* as part of her music. She says it helps her do things with her voice that she couldn’t do alone (Herndon 2019). This shows that AI doesn’t have to take over the entire production process but rather collaborate in it.

In the future, the job of musician might be less about doing everything by hand and more about choosing the right tools, shaping ideas, and guiding the creative process. The artist becomes more like a director, using AI to explore new ideas and sounds.

In short, AI is changing music culture in many ways. It is making music creation easier and more open. It raises big questions about creativity, ownership, and emotion. And it is helping artists experiment in new directions. Whether these changes are good or bad depends on how we use the tools. If used thoughtfully, AI can make the music world more diverse, creative, and meaningful. These cultural findings also echo the results gathered through surveys and user feedback in this research—showing that accessibility, emotion, and authorship remain at the core of AI's impact. As the data suggest, the future of music will depend not only on technological progress but on how artists and listeners negotiate the balance between innovation and human expression.

## DISCUSSION

Both the quantitative and qualitative findings of the Ditto Music (2021) and Pirate Studios (2023) surveys demonstrate that, across all types of independent musicians, there has been an increasing normalcy of using AI in every day production, particularly for mastering, mixing, and production support. Over half of independent musicians either already use AI tools in their production workflow or have plans to do so. This illustrates that AI is providing the technical capabilities that previously needed to be accomplished by trained engineers using expensive studio equipment. Examples of these AI tools include LANDR or iZotope Ozone, which provide automatic EQ balancing, dynamic control, and loudness matching capabilities that compare favorably to professional standards. Thus, AI functions as a democratizing agent, allowing small-scale creators to obtain high-quality results that were previously unobtainable due to lack of professional training.

However, the human perception data collected through the melody-app survey and the LANDR listening test indicate that emotional expectations remain in music, regardless of AI's ability to produce technically realistic compositions. Although nearly half of the participants preferred the AI-mastered version due to its clarity and consistent loudness levels, a similar number of participants indicated that the human-mastered version sounded "wetter" or "more alive." In addition, during the melody-recognition portion of the survey, 40% of the musicians incorrectly identified the AI-generated melodies as human, indicating that listeners may be able to distinguish between human- and AI-generated melodies based upon technical realism. Nonetheless, qualitative comments made by the participants often stated that the AI versions sounded "structured but emotionless," which is consistent with the observations of Birtchnell (2021) and Canyakan (2025). These researchers noted that although AI mastering software is able to replicate measurable sonic balance, it is unable to effectively communicate the interpretive intent or subtle artistic decisions involved in creating a musical composition.

Additionally, the qualitative insights gained from LANDR user reviews also correspond with the research findings. Of the 228 user reviews scraped from the LANDR website, 46% of them referenced AI features specifically. Sentiment analysis showed that the overall positivity rate was 74%. While many users complimented the time-saving nature of the AI features and the quality of the final product, others mentioned the lack of creative control available via the AI features. Some producers referred to the mastering process as being too "perfect" or having too much "compression." Similar to Yue Fu et al. (2024), participants in the current study viewed AI more as a collaborative assistant for creative ideas rather than a complete creative partner. In short, users like the speed of automation offered by AI, but they still need to have the ability to make human-based decisions as part of the creative process. Users shared this same ambivalence toward AI as Anantrasirichai and Bull (2021), who characterized AI as a co-author of ideas that could stimulate creativity, but ultimately needed to be directed by humans to give those ideas meaning.

The technical literature provides additional evidence supporting the conclusions drawn from the user reviews and experimental results. The studies conducted by Purwins et al. (2019) and De Man, Stables, and Reiss (2024) provide insight into the degree to which AI is changing how music production workflows operate, including how they optimize using machine learning. For example, De Man's automation framework reduced studio preparation time by up to 70% by automating labeling, gain staging, and stereo balancing. It is this type of efficiency that explains why producers are increasingly relying on intelligent systems to automate routine set-up processes. However, these studies also acknowledge that accuracy drops off significantly in more complex, real-world recording situations, which mirrors the complaint voiced by many users regarding mis-classifying instruments or over-compressing their masters. The data thus imply that AI is well-suited for standardization, but it under-performs in creative applications where artistic nuance is a key component.

Culturally, the implications of AI in music production are equally significant. According to Mycka and Mandziuk (2022), the increasing reliance on AI in music production challenges traditional notions of authorship and ownership. Where AI contributes melodic or structural ideas, who owns the resulting musical composition becomes uncertain. Similarly, participants in the melody-app survey expressed confusion in regard to crediting AI, with some stating that they would attribute AI as a "plugin, not a person." This sentiment indicates a new level of ethical consideration for the creative process; artists are beginning to treat AI as a tool used in their creative endeavors rather than as an autonomous composer. Treating AI as a tool used in the creative endeavor changes both the legal and philosophical understanding of creativity in the digital era.

Additionally, the dependency of AI on genre is another layer of complexity. Both Canyakan (2025) and Chen (2023) found that AI performed best in highly structured genres such as pop or electronic music, but struggled with less structured or more improvisationally oriented genres, such as jazz or orchestral works. A similar trend was evident in this project's melody-recognition data, where participants more easily recognized AI-generated melodies when they

were modeled after expressive, less-repetitive styles. This genre-specific limitation further illustrates that AI, while powerful, presently operates within the limitations of aesthetic boundaries defined by the training data provided to it.

Ultimately, the incorporation of AI into music production represents a dual-edged transformation. On one hand, the automation of labor facilitates greater access to creative production for independent musicians, and reduces the technical hurdles associated with producing high-quality recordings. Conversely, AI creates a new series of questions and concerns regarding the legitimacy of creative production, the originality of compositions, and the unique value of human expression in conveying emotions. Ultimately, the data indicate that the future of creative music production will represent a synthesis of human and machine collaboration; neither side will compete against the other, but rather will enhance and leverage each other's respective abilities to create something new and innovative. As Herndon and other experimental artists have shown, when artists view AI as a collaborator that enhances creative curiosity while maintaining human decision-making power in terms of what feels emotionally correct, then true innovation occurs.

In conclusion, the data collected from the surveys, user reviews, and experimental results support the contention that AI is transforming how music is created rather than what music means. AI is most impactful in terms of efficiency, accessibility, and eliminating technical barriers to entry. However, the core aspects of artistic expression – making decisions regarding what sounds good – remains uniquely human. This position is supported by the perspective of researchers such as Anantrasirichai and Bull (2021), who argue that creativity is enhanced when technology is utilized as a facilitator of creative ideas, rather than a replacement for the intentions of the creator.

## CONCLUSION

Research done using literature reviews, statistical models and experiments demonstrates that Artificial Intelligence (AI) is changing the way that contemporary music is produced from both creative and technological perspectives. AI-based tools such as MuseNet, LANDR and Flow Machines are providing producers with never before seen speed and accuracy allowing them to generate high-quality, commercial sounding music regardless of their level of expertise. Nevertheless, the research also shows similar limitations of the use of AI including, particularly, lack of emotional authenticity, interpretative nuance and ability to develop new material beyond what was previously developed by the tool.

On the creative end of things, AI has provided an extremely valuable partner for music makers as it can provide the initial idea which sparks further inspiration in humans. The melody-app study clearly demonstrates that even experienced musicians are able to confuse AI generated melodies with those created by humans, however, they will typically describe the difference between the two as a "qualitative" difference in terms of emotional resonance. Therefore, this supports the theory that AI can mimic the form of music but cannot capture the sentiment behind it. On the other hand, AI is well suited to completing repetitive or quantifiable tasks thereby

decreasing the amount of time it takes to complete pre/post-production and maintain professional quality sound. The LANDR analysis and De Man's DAW-automation model demonstrate how such tools are helping to democratize the ability to create music.

Overall, the combined results of the studies point toward a collaborative environment where human and machine creativity intersect on a continuous basis. Musicians will utilize the analytical accuracy and speed of AI for various aspects of the process, while listeners will continue to value the unique aspects of emotion, context and storytelling associated with music. As technology continues to advance, the next step for researchers will be to create systems that not only understand musical structures but also the expressive and culturally specific nuances that make music meaningful. The future of music will depend not only on smarter machines, but on how artists continue to infuse them with human feelings.

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