A Study on the Development Direction of Generative AI and Human Collaboration in Popular Music Creation: Focusing on Case Studies

Anonymous Author(s)
Affiliation
Address
email

Abstract

The advancement of artificial intelligence has led to a reevaluation of traditional definitions of creativity. While distinct from humans, generative AI possesses elements of creativity and assists human creative activities, functioning as co-creators. In the field of popular music, where efficiency and industrial aspects are crucial, collaboration has become a prominent creative method, and AI-human collaboration is actually being implemented in popular music. This study analyzed the achievements and challenges of generative AI-human collaboration in the field of popular music and proposed future directions. The study selected eight representative cases that demonstrated technological advancements and industrial impact in the field of popular music since 2019, when generative AI became commercially available and capable of actual creative work. The analysis revealed that AI has contributed significantly to human creative activities by supporting human creativity, performing impossible musical tasks that overcome disabilities or life-threatening situations, popularizing creative activities, overcoming cultural barriers, and creating new collaborative environments. However, it confirmed that humans still have the ability to identify problems, initiate planning, and make final decisions. These achievements will establish collaboration with AI as an inevitable trend and essential element in the creative landscape of popular music. However, collaboration with AI can raise ethical issues such as infringement on the rights of existing artists, cultural appropriation or distortion, and copyright issues. The legal and cultural frameworks to address these issues remain inadequate. A systematic approach to addressing copyright and ethical issues in the AI era is urgently needed. To address these issues, we propose the development of an AI verification program, an automated royalty distribution system, and improvements to the music distribution system through AI usage indicators. This will enhance the transparency of creative rights and foster healthy competition and collaboration.

1 Introduction

Technological innovation has always had a profound impact on music creation. In the 21st century, advances in artificial intelligence (AI) technology have brought about unprecedented changes in the music creation landscape. AI has gone beyond simply serving as a supporting tool and is now deeply ingrained in the creative process. This shift is shifting away from the paradigm of human-only creation to a new approach where AI and humans collaborate to create music. This shift is evident throughout the production process, from the core elements of music such as melody, harmony, and lyric generation. The AI music market is currently experiencing rapid growth and its importance is growing. The AI music market, which was valued at $6.2 billion in 2025, is projected to reach $38.7 billion by 2033, a compound annual growth rate of 25.8This study, within this context, deeply

analyzes musical examples born from AI-human collaboration in the process of creating popular music. Through this, our goal is to clearly understand the achievements and limitations of current collaborative models and propose future-oriented collaborative models and specific solutions that maximize creative synergy through the complementary interaction of AI and humans. This approach goes beyond simply listing the technological advancements of AI. It will be a crucial discussion that explores ethical, aesthetic, and practical approaches to maximize the potential of AI while preserving the essential value of music creation.

2   Theoretical background

2.1   The Evolution of AI Music

Artificial intelligence (AI) originated centuries ago from the human desire to create intelligent machines. Alan Turing's 1950 question, "Can machines think?" heralded the birth of the field. In 1956, John McCarthy officially coined the term "artificial intelligence," establishing it as an independent academic discipline. The goal of utilizing machine learning to compose creative music has been a key area of research since the 1950s. Early AI relied on mathematical algorithms and simple rule-based systems. The first computer-aided music composition was achieved in 1956 by Lejaren Hiller and Leonard Isaacson. They applied rule-based algorithms to the Illiac computer to compose the first computer-aided music, the "Illiac Suite" for string quartet. This method, which arranges notes according to musical rules, uses notes within an octave and defines rules for major and minor chords without dissonance, allowing the computer to generate sheet music. While different from today's generative AI compositions, this marked a significant starting point, demonstrating the potential of machines to compete with human creative forces. In the 1980s, David Cope developed the Experiments in Musical Intelligence (EMI) program, which analyzes existing musical patterns to generate new pieces. EMI analyzes scores by renowned composers such as Bach, Mozart, and Chopin, identifying patterns and regularities, such as which notes follow which notes. A small amount of randomness is added to this process, allowing the computer to generate new pieces that reflect the composer's style without imitating existing pieces. The introduction of machine learning in the 1990s revitalized the field of AI, and in the early 2000s, music generation using machine learning was introduced. Machine learning is the process by which AI learns musical data to understand specific patterns and rules. It uses data such as music, sheet music, and MIDI files from various genres to identify the fundamental principles of rhythm, harmony, and melody. Through this learning, it extracts musical features such as pitch, duration, tempo, and rhythm to understand the unique patterns of specific genres and styles. The evolution of generative AI in the modern sense began in earnest in the mid-2010s with the advancement of deep learning technology. Generative AI refers to artificial intelligence that automatically generates new content, such as text, images, videos, music, and code. Deep learning, a sub-technology of machine learning, trains large-scale music data to predict musical sequences and generate more complex musical elements such as melodies, harmony, and rhythms. Unlike existing rule-based approaches, this represents a groundbreaking shift in the ability to autonomously generate music by training neural network models on large datasets. As the possibility of AI moving beyond mere tools to become a collaborative agent of creation emerged, the potential for human-AI collaboration began to be discussed in earnest. Generative AI music, in its modern sense, refers to the creative generation of music without human rules or explicit instructions, leveraging large-scale data learning and neural network-based models. A turning point was the 2019 release of MuseNet by OpenAI, which demonstrated the ability to generate music across multiple genres and instruments, thereby highlighting new possibilities for AI music. The years after 2019 are considered the period when generative AI music moved beyond the experimental research phase and began to expand into a practical creative tool and industrial asset.

2.2   Human-AI Collaboration Theory

Human-machine collaboration theory refers to the collaborative work between humans and machines, particularly intelligent systems such as artificial intelligence (AI), robots, and software, leveraging each other's strengths. It goes beyond the simple use of machines as tools; it emphasizes an interactive relationship where machines actively support humans and, at times, complement their judgments to achieve a common goal. It aims to create synergy by combining human capabilities such as creativity, intuition, ethical judgment, and complex problem-solving with machines' vast data processing capabilities, high computational speed, and error-free repetitive tasks. The development of human-

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machine collaboration theory began in the early 1940s, with the emergence of computer science, with the question, "Can machines think?" Marvin Minsky, one of the pioneers in the field of AI, had a significant impact on the development of human-machine collaboration theory by conceptualizing AI, integrating human and machine thinking, and providing a theoretical foundation for how humans and machines can interact and collaborate. Marvin Minsky proposed the Society of Mind in 1986, viewing the mind as a collection of independently operating sub-organisms (agents) that interact to produce complex thoughts and behaviors. This perspective attempts to replicate the complexity of human thought through a mechanical structure and is likened to a model in which humans and machines collaborate to solve problems. AI, too, is not a single intelligence, but rather a coalition of small agents with diverse purposes and functions. This opened the door to collaboration with humans and suggested a direction in which machines and humans could leverage each other's strengths. He emphasized the value of combining human intuition and experience with the computational and data processing capabilities of machines. Minsky contributed to a paradigm shift in human-AI collaboration beyond mere tool use to a "cognitive partnership," and is considered to have laid a crucial foundation for the development of human-machine collaboration models in diverse fields, including industry, art, education, and medicine. With the rapid advancement of technologies such as AI, robotics, the Internet of Things (IoT), and 5G communications, machines are evolving beyond simple command execution to autonomous learning and decision-making, forming a new human-machine relationship beyond mere assistance tools and acting as active team members. This shift signals the emergence of the concept of "Augmented Intelligence," which extends and enhances human capabilities. Various social factors, such as the increasingly complex tasks of modern society, the aging population and labor shortage, and the increased demand for contactless and automated work due to the COVID-19 pandemic, further highlight the importance of human-machine collaboration.

3   Research Methods

This study aims to analyze the collaborative approaches between humans and AI in popular music creation and, based on this analysis, propose an ideal collaboration model. Human-AI collaboration is still in its nascent stages and is being experimented with in various ways, requiring a comprehensive collection and analysis of existing examples. Therefore, this study focused on qualitative case studies, conducting literature and case studies. The study focused on cases of generative AI use in popular music published after 2019. Around 2019, AI-based generative technologies, driven by deep learning and neural network models, advanced beyond simple experiments to a level applicable to actual creative settings. This accelerated the commercial and industrial expansion of generative AI. Following MuseNet and Jukebox, commercial AI music platforms such as AIVA, Amper Music, and Mubert gained widespread popularity. In 2023, text-to-music generative AI platforms such as Suno, Udio, and MusicLM emerged, enabling general users to create entire songs using input prompts. AI composition has seen an increase in collaborative efforts not only in advertising and film scores, but also in the production of popular music. This demonstrates that generative AI has moved beyond the experimental stage and established itself as a practical creative tool and industrial asset. Among the cases since 2019, we highlighted those where AI has gone beyond mere assistance tools and has participated in significant aspects of creative processes, such as composition and lyrics, generating significant buzz among the media and public, or demonstrating technological advancement.

4   Collaborative Cases of AI and Human Music Creation in Popular Music

4.1   Artificial Digitality

The 2019 album "Artificial Digitality" is a concept album created through collaboration between humans and AI. The album musically explores the rise of AI and questions a future where automation replaces human labor in various fields, including music production and artistic creation. The composer converted his compositions into mathematical data that could be fed into a neural network, which then trained the neural network to generate music. The album begins with a song written solely by the composer, followed by pieces created collaboratively by open-source neural networks and engineers, and concludes with a song entirely generated by the trained neural network. This composition presents a range of possibilities for addressing these questions by demonstrating how humans and AI perform their respective roles, at what stages they collaborate, and ultimately, whether AI can achieve independent creative capabilities.

4.2 Artificial Digitality

In 2019, YouTuber Infodick, a non-musician, composed the pop song "Dahaejuttyeon" ("I Done It All") using AI music. This song achieved widespread success, garnering over 10 million views on YouTube. The song features the director of the game MapleStory, humorously expressing user complaints about the game's excessive in-game spending. Infodick utilized photos of MapleStory director Kim Chang-seop as AI-generated output, compositing them onto various video sources, such as dancing and expressing anger. The song became a widely used meme, mocking the developers' absurd patches. The song's self-deprecating message, reflecting the Korean sentiment of making fun of one another, gained popularity not only among MapleStory users but also the general public. "Dahaejuttyeon" rapidly spread among online communities and YouTubers, spawning a cultural phenomenon that led to the creation of secondary and tertiary content. Infodick utilized AI throughout the entire process, from ideation to song release, and combined multiple AI-generated outputs into a cohesive piece through a collage and refinement process. Deep learning technology was utilized in the music production, with deep learning models like recurrent neural networks being used to generate melodies and rhythms. This song demonstrated that music created by non-experts using AI can have a ripple effect close to a cultural phenomenon, and its success sparked the rapid spread of AI music among people in their 20s.

4.3 SophiaPop

The 2020 SophiaPop project was an experiment in which AI and humans collaborated to create pop music, using Sophia, a robotic celebrity and animated character, as a platform for art, research, and other uses. The SophiaPop project involved a diverse team of engineers, artists, and algorithms, with key musicians Frankie Storm, Adam Pickrell, and Tiger Darrow contributing. The team combined AI technology and art by creating a fictional narrative of Sophia's pop star career. Based on Sophia's personality, they collected and organized learning materials needed to create pop music. They then trained several AI algorithms, including a Transformer Neural Network, to generate original pop song lyrics and melodies. Human musicians interpreted the AI-generated music content, singing and playing instruments. The human-sung data was processed by Sophia's neural network-based voice. Using various animation generators and human-generated animations, they produced a music video featuring Sophia singing. The project was published in a scientific paper, a project overview, and lyrics. The SophiaPop project demonstrates the maximization of collective intelligence through creative convergence across diverse fields and the positive outlook for human-AI collaboration. It is also an artistic exploration that explores the essence of existence in both art and AI development.

4.4 FN Meka

Factory New, an AI-powered music and virtual influencer company, launched FN Meka, a virtual influencer and AI-powered Black rapper, in 2022. The primary goal of FN Meka's creation was to explore the potential of virtual influencers and AI-powered music, thereby exploring new possibilities for the music industry. FN Meka was created by a collaboration of white and Asian men, and his voice was created using Black artists' voices. His music is inspired by real-life rap artists, portrays Black culture in a way that reflects their work, and uses AI to create his music. He gained significant popularity on TikTok, amassing over 10 million followers, who gravitated towards his cybernetic themes and artistic style. FN Meka signed with Capitol Records, but his contract was terminated after a week due to criticism of his alleged appropriation of Black culture. Cultural appropriation occurs when an idea from another culture is used without consent, understanding, or respect. FN Meka's creation was met with criticism that the company was attempting to profit from and emulate Black culture, while his braids, facial tattoos, and grillz were criticized for reinforcing stereotypes about Black rappers. Furthermore, some of FN Meka's Instagram posts sparked significant controversy. One post depicted FN Meka being assaulted by police, which was criticized for trivializing the suffering Black men experience due to police brutality. He was also accused of using the N-word. This was perceived as a lack of respect for Black culture, and FN Meka was likely created by a team lacking a deep understanding of Black culture. These criticisms highlight that FN Meka goes beyond simply appropriating elements of Black culture, perpetuating harmful stereotypes, distorting the experiences of the Black community, and ultimately violating cultural ownership and authenticity. FN Meka demonstrates the challenges that arise when virtual artists address real-world cultural and social sensitivities. On the one hand, the controversy surrounding FN Meka has prompted a critical

exploration of the redefining concepts of identity, authenticity, and subjectivity that arise from the creation and ownership of virtual influencers. Furthermore, by uniquely combining AI and human creativity, the platform has gained significant popularity, serving as a case study for exploring the future trajectories of humans and AI. FN Meka has not engaged in any other activities since its contract with Capitol Records was terminated, and its activities are currently on hiatus.

4.5 Heart on my sleeves

In 2023, an artist known as ghostwriter977 created "Heart on My Sleeve," a song that replicated the voices of Drake and The Weeknd. He created an artificial model of each artist's voice by feeding various tracks containing only the artists' vocals into a deep learning algorithm, which then mapped this model to his own song. The track gained widespread popularity on TikTok and was officially released on Apple Music, Spotify, and YouTube. However, it was later removed from all platforms by Universal Music Group, which owns the copyrights to Drake and The Weeknd. This marked a significant moment in AI voice cloning, but it also sparked discussions about copyright and ethical issues. In 2023, singer Grimes collaborated with CreateSafe, an AI design and development studio, to launch an AI project called Elf.Tech. Grimes enabled people to create new music using her AI-generated voice. Creators would record and upload their voices, which would then be converted into Grimes's voice and delivered as a WAV file. Grimes has stated that she will only pursue copyright removal for lyrics that are deemed particularly harmful and has pledged to share 50

4.6 Now and then

In 2023, the Beatles completed the unfinished song "Now and Then" using the voice of John Lennon, who died in 1980. The Beatles attempted to complete the song in 1995 using demo tapes of Lennon's voice recorded in the late 1970s. However, the demo tape's poor audio quality, the inclusion of Lennon singing while playing the piano, and the presence of background noise such as television and electrical noise made it difficult to separate Lennon's vocals from the piano, leading to technical issues. During the production of the 2021 documentary series "The Beatles: Get Back," director Peter Jackson and his sound team developed AI-based stem separation technology that allowed them to isolate individual instruments and vocals from the recording. Jackson's team trained a computer to understand and recognize the frequency ranges occupied by individual elements such as vocals, guitar, and drums, using machine learning to extract, restore, and complete Lennon's voice. The song won the 2025 Grammy Award for Best Rock Performance, reviving the Beatles' legacy and reaching a new generation of fans.

4.7 Love you like that

In 2023, American pop singer Lauv collaborated with Korean singer AI to release the song "Love You Like That," sung in Korean with Lauv's voice. Midnatt, a singer under Hybe Entertainment, participated in the song's composition and music production. Lauv collaborated with voice startup Hooky to develop his own AI voice model. Hooky's AI model played a key role in mapping Lauv's unique vocal characteristics to the song. Korean singer Kevin translated the song's lyrics, used Lauv's AI voice model to sound like Lauv, and then overlaid Lauv's vocal characteristics to create a vocal that sounded like Lauv singing in Korean. This combination of Midnatt's composition, Lauv's AI-generated voice, and Kevin's singing resulted in the pop singer's Korean track. This work fuses artistic elements from various artists, allows pop singers to sing in Korean, making their music more accessible to international fans, and introduces new collaborative methods in the music production process and new creative works such as multilingual songs.

4.7.1 Where that came from

In May 2024, country singer Randy Travis, who suffered a stroke that left him unable to sing, released a new song titled "Where That Came From." The recording recreated Travis's singing voice using AI technology, synthesizing it with over 40 existing vocal recordings, along with that of singer James Dupre. This is Travis' first new song since his stroke, and marks a moving example of how AI can extend an artist's career and create music in new ways.

5 Case Analysis

5.1 The Achievements and Significance of AI-Human Collaboration

5.1.1 Expansion and democratization of creative activities

Generative AI clearly demonstrates its potential as a tool for expanding new musical possibilities in the popular music industry through collaboration with human creators. It not only generates original melodies and lyrics based on human-provided data and ideas, but also acts as a co-creator, providing inspiration. As seen in the case of "Dahaejootdang," even non-experts can leverage AI to create and distribute their own music, lowering the barrier to entry for music creation. This democratizes the music production process, providing more people with opportunities to participate in creative music activities and contributing to the formation of a new culture.

5.1.2 Transcending technical limitations and preserving musical heritage

Examples of AI-powered solutions include replicating and reconstructing existing artists' voices ('Now and Then', 'Where That Came From'), creating songs in a foreign language by artists ('Love You Like That'), and performing with robots ('SophiaPop'), all of which were previously impossible with existing technologies. AI contributes to the creation, preservation, and expansion of a musical legacy, transcending temporal, physical, and cultural boundaries. This has significant implications not only in the artistic realm but also in humanitarian terms, extending the careers of artists.

5.1.3 Creating creative synergy

By establishing a division of roles and collaborative stages between humans and AI, efficiency is increased, and creative synergy is created through the fusion of human emotional interpretation and AI technology. AI acts as a "muse" that sparks creative thinking by suggesting new combinations and possibilities previously unaware of human creators through its vast data processing and pattern analysis capabilities. In addition, it handles repetitive tasks that require a lot of labor, allowing human creators to focus on the core creative process.

5.2 Challenges and Limitations of AI-Human Collaboration

The "Heart on My Sleeve" case clearly illustrates the infringement of existing artists' rights and copyright issues caused by the use of AI. Legal and cultural responses, such as the consent of original artists used in AI model training, ownership of generated content, and profit distribution, remain inadequate. However, Grimes' "Elf.Tech" project formalized the distribution of usage rights and copyright in advance, suggesting a path toward a solution. This highlights the need for a new copyright management and compensation system necessary in the AI era. The "FN Meka" case demonstrated the potential for AI-generated content to appropriate or distort the identities of specific cultures or ethnicities. This highlights the importance of in-depth consideration of cultural sensitivity, ethical responsibility, and social impact when utilizing AI. It suggests that bias in the data used by AI and a lack of cultural understanding on the part of the development team can contribute to these issues. The table below summarizes the achievements and challenges identified in each case. AI overcomes temporal, physical, and cultural boundaries, creating new forms of collaboration. It supports creative activities by providing inspiration and production, provides technologies that make the impossible possible, and contributes significantly to popular music production by popularizing creative activities. However, until now, only humans have been able to identify problems, raise issues, and generate ideas—the starting points of creative activity. Human intervention is essential to produce high-quality results suited to the intended purpose. Therefore, we must continuously explore the direction of AI-human collaboration. Furthermore, collaboration with AI can raise new copyright, ethical, legal, and cultural issues, making the establishment of systems and legal institutions to address these issues essential.

6 Suggesting a Complementary Solution for AI-Human Collaboration

While technological advancements in AI have lowered the threshold for creativity and opened up new possibilities, they have also raised complex issues such as copyright, ethics, and cultural appropriation.

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By synthesizing these positive and negative aspects, we propose a future-oriented complementary approach to maximize creative synergy and build a sustainable ecosystem in the popular music industry through the complementary interaction of AI and humans.

6.1 Development of an AI Creative Verification Program

As the use of AI increases, the potential for social, ethical, and copyright-related issues increases. Currently, comprehensively reviewing all of these issues before a creative work is released is challenging, requiring complex expertise. To address this challenge, we propose the development of an "AI Creative Verification Program" that utilizes AI trained on specialized knowledge data from various fields. The technical implementation and operating principles of this program are as follows. The program performs a complex analysis by inputting various components of a creative work, including text (lyrics and descriptions), audio (the music itself), and images (related artwork). To verify ethical compliance, it utilizes natural language processing technology based on a Large Language Model (LLM) to analyze lyrics for hate speech, discriminatory content, and the potential for inappropriate appropriation of specific cultures. This assessment is made by learning data related to social norms and cultural sensitivities. Copyright infringement verification utilizes AI (Music Information Retrieval, MIR) technology to analyze melody, harmonic progression, and rhythmic patterns against existing copyright databases to determine plagiarism and similarity. Furthermore, if AI voice technology is used, the original artist's license for the voice is verified through a blockchain-based copyright registration system. Finally, the program verifies whether the technology used in the AI creation process (e.g., specific AI models, training data) is transparently disclosed. This serves as the basis for future copyright allocation and liability determinations. To ensure economic sustainability, the program is provided as an official, free online service to avoid hindering creative activities. Initial development and maintenance costs can be funded through government or public funding, or through a consortium of music industry companies. Furthermore, long-term financial independence can be achieved through premium distribution contracts for works that have received certification marks, or through a model that partially shares licensing fees for the use of specific AI voices or technologies. By only allowing the release of works that have received certification marks, the program enhances the credibility of the work and prevents potential problems.

6.2 Establishing an Automated Copyright Royalty Distribution System

Because AI learns from human data to generate content, there is a constant risk of copyright infringement on the artists whose data is used for training. As demonstrated by the Elf.tech case, where Grimes proposed a model where her voice is used for AI training and revenue sharing, establishing a system to protect the rights of artists using AI is urgent. The technical implementation and operating principles of this system are as follows: A system will be built that automatically distributes copyright royalties to artists when copyright infringement or the use of a specific artist's technology (e.g., voice, performance style) is confirmed through an "AI Creative Verification Program." To achieve this, a standardized licensing agreement model will be developed to allow existing artists' voices, performance styles, and engineering skills to be utilized in AI training. Companies like ElevenLabs train diffusion models and neural networks using massive licensed music datasets to generate AI music. Copyright information, usage history, and distribution terms will be recorded on the blockchain, enabling a transparent and automated settlement system. Smart contracts are used to automatically calculate and distribute copyright royalties to the relevant rights holders based on factors such as the number of times the music is used and the percentage of revenue generated. The royalty distribution ratio is determined through discussion, taking into account both the AI's contribution and the original artist's contribution, referring to existing copyright royalty distribution models for human-created works (contributions such as lyrics, composition, and arrangement). This could expand the role of copyright trust organizations, such as the Korea Music Copyright Association (KOMCA). From an economic sustainability perspective, this system presents a clear revenue distribution model for AI use, encouraging artists to utilize their creations for AI training, thus promoting healthy growth of the AI music industry. Through licensing revenue and royalty distribution, artists secure new revenue streams, while AI technology developers can build sustainable business models by securing high-quality data and reducing the risk of copyright disputes. This also contributes to addressing existing issues such as opacity in the distribution process and complex copyright attribution relationships by increasing the transparency of copyright management.

6.3 Improving the Music Distribution System by Indicating the Use of AI

Korean copyright law currently does not recognize copyright in works created solely by AI, and tends to recognize it only when there is creative human contribution. The Korea Music Copyright Association (KOMCA) suspended royalties for six songs by AI composer Lee Bom in 2022. Furthermore, starting February 24, 2025, the KOMCA introduced a system requiring copyright holders to declare that the work did not utilize AI and was solely the result of human creative contribution. The issue of copyright recognition for AI creations remains controversial, leading to confusion among creators who utilize AI.

However, the use of AI offers numerous benefits, including reducing repetitive human labor, allowing humans to focus on higher-level creativity, providing new inspiration, and enhancing the quality of their work. Furthermore, AI intervention can foster healthy competition between human and AI creations, leading to improved quality. Therefore, rather than blocking AI creations entirely, transparently disclosing their use is crucial to encourage independent market judgment. The technical implementation and operating principles for improving the music distribution system are as follows. The music distribution system should expand its metadata standards to include fields that clearly indicate the use of AI and its contribution. Music should be categorized into three categories: "Human Creation," "AI and Human Collaboration," and "100From an economic sustainability perspective, this notation method guarantees consumer choice and promotes healthy competition among creators by increasing the transparency of AI utilization. Music distributors can pioneer new markets for AI-powered music and diversify their revenue models by strengthening personalized recommendation services based on consumer data. Furthermore, the clearer standards for distributing copyright royalties based on AI utilization contribute to ensuring industry-wide stability. These three complementary measures will organically combine to enhance the transparency of creative rights in the AI-era pop music creation environment, foster healthy competition and collaboration, and ultimately promote the sustainable development of the music industry.

7 Conclusion

This study explores the profound impact of advances in artificial intelligence (AI) technology on popular music creation and the resulting importance of human-AI collaboration. In the field of popular music creation, where efficiency and industrial viability are crucial, AI-human collaboration is emerging as a zeitgeist and an indispensable element. An analysis of eight cases of AI collaboration in popular music clearly demonstrates that AI is expanding the scope of creation beyond mere tools and making innovative contributions to the music industry. AI enables areas previously impossible with human capabilities, such as restoring and reconstructing existing artists' voices, generating multilingual songs, and implementing performances with robots. This contributes significantly to preserving and expanding musical heritage. Furthermore, as in the case of "Dahaejootjan," even non-experts can utilize AI to create and distribute their own music, lowering the barriers to entry for music creation and promoting the democratization of the production process. These achievements demonstrate the potential of AI as a co-creator, providing inspiration to human creators, handling repetitive tasks, and facilitating the generation of new ideas, thereby fostering creative synergy. However, the legal, social, and ethical issues that arise during collaboration with AI cannot be overlooked. The "Heart on My Sleeve" case demonstrated the severity of copyright infringement caused by AI voice cloning, while the "FN Meka" case raised cultural and ethical concerns about the potential for AI-generated content to appropriate or distort the identity of a specific culture or ethnicity. These issues are likely to become more complex as the technological advancement and utilization of AI accelerate. Furthermore, in all cases, the initial idea generation, creative planning, and final selection and judgment were the responsibility of humans, and AI still faces limitations in initiating creative activities with purpose and intention. This highlights the irreplaceable core elements of human emotion, intuition, and ethical judgment in music creation in the AI era. Based on this analysis, this study proposes specific solutions for a future-oriented collaboration model between AI and humans in the popular music field. First, the development of an AI creation verification program will preemptively verify the ethicality, cultural appropriateness, and copyright infringement of AI-enabled works. Second, the establishment of an automated copyright royalty distribution system will automatically distribute royalties when existing artists' voices and performance skills are licensed and applied to AI-generated works. Third, the improvement of the music distribution system will involve labeling the use of AI. By categorizing music into three categories—"human

creation," "AI-human collaboration," and "100In popular music creation, AI is a powerful tool and collaborator, augmenting human creativity and providing new artistic experiences. Collaboration with AI is no longer an option, but a necessity, and its potential is limitless. However, it is crucial to swiftly establish legal, institutional, and ethical frameworks to address the complex challenges that arise. When human creativity and AI technology harmoniously merge, popular music will open new horizons and usher in a more prosperous future. This study suggests the direction the music creation ecosystem should take in the AI era and hopes to contribute to the formation of a sustainable music culture where creativity is maximized through collaboration between humans and AI.

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