



EXPLORING THE ROLE OF ARTIFICIAL INTELLIGENCE IN AUTOMATED MUSIC COMPOSITION AND CREATIVITY

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Abstract

AI is transforming the process of making music by helping composers be more creative, make things easier to produce and collaborate in new ways. With the help of machine learning, deep learning, generative adversarial networks and rule-based systems, AI can produce music in many genres. Because of AI-powered tools, music production is now open to anyone, even if they are not professional musicians. They make it possible for artists to team up with AI, try out new musical ideas and perform alongside intelligent machines. Even though AI can have a big impact, it brings up issues related to who owns the music, ethics and the importance of human creativity. The study investigates how AI affects musical creativity and teamwork, mentioning the advantages, tools and emerging issues in the music industry.

Keywords: *Artificial Intelligence, Music Composition, Machine Learning, Deep Learning, Generative Adversarial Networks, Music Production, Human-AI Collaboration, Democratization of Music, Creativity.*

1. INTRODUCTION

Many creative disciplines have been changed by Artificial Intelligence (AI) and its use in music composition is especially notable. It has long been believed that music creation is a uniquely human thing, tied to feelings, the culture we belong to and creative individual thoughts. These days, AI developments enable machines to compose songs that sometimes copy human musical styles and sometimes even do something new (Carnovalini & Rodà, 2020; Miranda, 2021).

Many algorithms, neural networks and deep learning techniques are used in automated music composition to study large musical datasets. Because these systems discover rhythm, harmony, melody and dynamics, they can compose their own music no matter the input they receive. These platforms such as AIVA, Amper Music, Google’s Magenta and OpenAI’s MuseNet, have proven that AI music capabilities can create many musical genres, from old-fashioned orchestral works to popular electronic tracks (Anantrasirichai & Bull, 2022; Civit et al., 2022).

Using AI for music creation not only changes the way music is written but also brings up major questions about what it means to be creative. Does deep learning mean that machines can invent new things or are they reproducing what humans have already made? Do listeners prefer AI music over music written by people? Besides, do musicians and producers believe that AI tools work more as teammates, helpers or opponents (Huang et al., 2020; Tigre Moura & Maw, 2021)?

Table 1: Research Study

Author(s) & Year	Focus of Study	Key Findings	Challenges/Remarks
Goswami (2023)	Interaction of AI and music creation	AI-enabled instruments are widely used for composing, improvising, and performing; AI combines multiple musical samples to create original songs.	AI broadens musical creativity by collaborating with musicians.
El Ardelya, Taylor, and Wolfson (2024)	AI applications in music, generative art, and design	Machine learning, neural networks, GANs help machines copy and create new art; AI systems find patterns, rhythms, and harmonies to generate music.	Ethical and philosophical issues exist; need for guidelines in AI-based art.
Kurmi, Maurya, and Pujari (2024)	Relationship between AI and human creativity in music	AI supports and enhances human creativity, providing new ideas for musicians and composers.	Current AI models lack emotional depth and cultural diversity essential in music.

Gioti (2020)	AI as extended intelligence in music composition (STEMI concept)	AI is an extension of human intelligence, enabling new exploration and collaboration in music composition.	Emphasizes the central role of human creativity alongside AI.
Zhang (2024)	Computational music analysis and AI in music education	Combining music analysis with AI improves the quality and uniqueness of compositions; AI aids music theory and composition teaching.	Highlights benefit for educational linkage between theory and artistic accomplishment.

2. AI TECHNIQUES AND TOOLS IN MUSIC COMPOSITION

Artificial Intelligence has brought major changes to music composition by allowing systems to copy and generate unique musical styles. AI uses modern algorithms to examine musical structures and write new pieces that match various genres, moods and types of instruments. The next sections examine the most important techniques and popular tools involved in AI-driven music composition.

2.1. AI Techniques Used in Music Composition

AI uses different computational approaches to create music and each approach has its own strengths and uses.

a. Machine Learning (ML)

Different computer-based methods are used by AI to make music and each has its own benefits and uses.

b. Deep Learning

In particular, Recurrent Neural Networks (RNNs) and Long Short-Term Memory networks (LSTMs) are very effective for creating sequential data such as music. Being able to remember when each note appears, these models write compositions that sound more like a human. MuseNet and Jukebox from OpenAI are examples that rely on deep learning to make complex music (Hernandez-Olivan & Beltran, 2022).

c. Generative Adversarial Networks (GANs)

They use two networks, a generator and a discriminator, which are set up to contest one another. The generator makes music samples and the discriminator checks if they sound real. Thanks to this competition, what the AI composes becomes more expressive and original (El Ardelyia et al., 2024).

d. Markov Chains

Markov Chains rely on probability to guess the next musical event by looking at a few previous ones. Even though not as complicated as deep learning models, Markov Chains help create stylistic imitations and background music.

e. Rule-Based Systems

They take rules from music theory and implement them as algorithms. Because they stick to classical principles, rule-based models are valuable in structured musical environments (Miranda, 2021).

Table 2: Comparison of AI Techniques in Music Composition

Technique	Key Feature	Use Case Example
Machine Learning	Learns from musical data	Style-based composition
Deep Learning (RNN/LSTM)	Handles sequence and time-based data	Melodic and harmonic progression
GANs	Competes to produce realistic results	Expressive, novel music creation
Markov Chains	Predicts next event from previous state	Simple melodic line generation
Rule-Based Systems	Follows music theory rules	Classical or structured music

2.2.AI-Based Tools for Music Composition

Many new platforms and tools are available that use these AI methods to help or automate music creation.

a. AIVA (Artificial Intelligence Virtual Artist)

Among the best AI composers, AIVA is able to produce classical music. Film composers and game developers have used it. It uses famous classical music to help it create orchestral pieces that are emotional (Goswami, 2023).

b. Amper Music

Amper is a simple and cloud-based tool that lets people make royalty-free music fast. Amper is made for content creators who can adjust the style, pace and mood of their music without knowing music theory.

c. Google Magenta

Magenta is a research project created by Google to automate making art and music using AI. For example, MusicVAE handles changing melodies and NSynth is for sound synthesis. It supports the use of open-source tools for creative AI (Zhou & Lee, 2024).

d. OpenAI's MuseNet and Jukebox

It is able to compose songs with multiple instruments and mix different composers' musical styles. Jukebox can produce full songs with lyrics and vocals, in many different languages and musical styles (Hernandez-Olivan & Beltran, 2022).

Table 3: Popular AI Tools for Music Composition

Tool	Developer	Functionality	Key Strength
AIVA	AIVA Tech	Composes classical and cinematic music	Emotion-rich orchestration
Amper Music	Amper Music	Royalty-free music generation for creators	Ease of use, fast production
Magenta	Google	Open-source creative ML tools	Flexibility and community-driven

MuseNet	OpenAI	Generates multi-instrument music	Style blending and long compositions
Jukebox	OpenAI	Produces full songs with lyrics and vocals	Raw audio generation, genre diversity

AI has made it possible to merge technology with creative ideas in making music. Because of deep learning, GANs and rule-based modeling, along with AIVA and Jukebox, computers can now create music without human composers. They allow more people to make music and discover new ways to be creative, yet also bring up questions about what it means for a machine to create something original (Gioti, 2020).

3. IMPACT OF AI ON MUSICAL CREATIVITY AND COLLABORATION

AI is changing the way music is made, played and enjoyed by providing new approaches for musicians to work together. AI is not just about making things faster—it is changing the creative process so that artists and non-artists can create new and interesting music. The way people use intelligent systems is influencing the future of music (Vinchon et al., 2023).

3.1. Redefining Musical Creativity with AI

With AI, musicians are able to create music that is new and unique, as it often goes past what people can do by themselves. AI models that are advanced enough can go through a lot of current music and create new melodies, harmonies and rhythms. To illustrate, OpenAI's Jukebox can make new songs that have vocals and lyrics, sometimes mixing different musical styles together. This ability to create music on its own raises questions about creativity only being human and introduces new paths for musical creativity (Kurmi et al., 2024).

3.2. AI as a Creative Partner

AI usually helps and supports people in their creative work, rather than taking over their place. It is useful for musicians because it can provide inspiration and complete any unfinished songs. The speed and experimentation offered by augmentation help artists discover and try out different styles and combinations (Gioti, 2020). So, AI allows composers to use different tools and ideas, making their work more enjoyable.

3.3.Style Transfer and Genre Innovation

One interesting thing AI does in music is to mix different genres or composers' styles to form new hybrid types of music. An example could be that an AI model produces a piece with the detailed music of classical music and the free-flowing aspects of jazz (Anantrasirichai & Bull, 2022). Because of this blend, musicians are encouraged to try out new musical styles, which often leads to sounds that attract many listeners.

3.4.Human-AI Collaboration in Music Creation

AI in music is most exciting because it allows people and AI systems to work together to create music. Magenta Studio, Amper Music and AIVA enable artists to guide the AI by sharing their ideas and tastes, which the software enhances (El Ardeliya et al., 2024). By working together, we create an environment where the skills of people and computers are put to good use. This allows for quick prototyping, experimenting more and sometimes inspires musicians with new musical routes.

3.5.Real-Time AI in Live Performance

Live performances now often include AI interacting with human musicians as they play. The systems are able to listen, analyze and make instant changes to match shifts in the rhythm, tempo or mood of the musicians. Because of this interactive approach, people and technology join for a special and engaging musical experience (Huang et al., 2020). It encourages new ideas in live music and more interaction with the audience.

3.6.Democratizing Music Production

Because of AI-powered tools, more people, including those without training, can now make music. Amper Music and similar platforms let non-musicians make professional tracks just by choosing the mood, tempo and style they want (Zhang, 2024). It allows more people to be involved in making music and helps build a richer creative environment.

3.7.Challenges and Ethical Considerations

Still, the effect AI has on music creation also brings up important concerns. The issues of who makes and owns AI music are still unanswered. Who deserves credit when an AI writes a piece of music? Is it the person making the system, the person using it or the AI that is responsible (Sturm et al., 2019)? Because of these issues, copyright laws and recognition of artists have



become more difficult. Also, certain critics point out that music made by AI may be missing the emotions and cultural background that real musicians add to their music.

3.8.Ethical Implications and Bias

People are also concerned about how AI learns from copyrighted music without proper authorization, as it could be seen as stealing intellectual property. If the training data does not include a wide range of diversity, AI systems might create music that reflects the same biases and lacks cultural richness (Zhou & Lee, 2024). It is still difficult to make sure AI music generation is fair and transparent.

3.9.Future Prospects of AI-Human Musical Collaboration

As time goes on, AI and musicians are likely to team up more closely which could result in new types of music, unique concert styles and virtual artists using AI. AI tools that are easier to use and more advanced will keep changing the creative process, allowing for new types of expressions and creative limits (Vinchon et al., 2023).

4. AI'S ROLE IN DEMOCRATIZING MUSIC PRODUCTION AND ACCESS

The music industry is being transformed by AI which is helping more people to create music. In the past, only professionals or well-equipped musicians could make music because it took special skills, expensive instruments and formal training. AI-based technology has made it much simpler for both beginners and experts to write, produce and share their music (Zhang, 2024). Because of this shift, music makers are becoming more creative and diverse worldwide.

AI simplifies difficult aspects of making music, allowing more people to participate. Amper Music, AIVA and Magenta Studio are some platforms that let users make whole compositions without much musical knowledge. They allow users to concentrate on creative aspects because the tools handle melody, harmony, rhythm and mixing automatically (Civit et al., 2022). So, anyone can make music that sounds professional, even if they haven't had formal music lessons.

AI makes it possible for non-musicians to get instant ideas and complete songs that are not finished. Users start by providing chord progressions or beats and AI will develop them into full musical arrangements. Working with the AI encourages new users to gain confidence and

improve their musical abilities. By adjusting mood, tempo and instruments, users have the chance to make music that shows their own style.

AI also plays a big role in addressing cost issues. Making music professionally usually requires paying for studio time, sound engineers, session musicians and expensive instruments. AI makes it possible for independent artists, content creators and small businesses to produce good music without investing a lot of money because it automates much of the work (Goswami, 2023). Being affordable helps musicians from underrepresented places or regions, encouraging a more open and fair music industry.

AI platforms make it easier for people from different countries to work together and distribute their creations. Because many tools are cloud-based, artists in different places can join and make music together in real time. At the same time, integrated digital distribution makes it simple for creators to share their music with audiences on streaming sites and social media which increases their fan base. Because of this, there is more sharing of music between different cultures which benefits the world’s music scene.

Table 4: Comparison of AI Music Platforms: Features, Target Users, and Accessibility Impact

AI Platform	Key Features	Target Users	Accessibility Impact
Amper Music	Automated composition, style customization	Beginners, content creators	No prior skills required; fast music output
AIVA	AI composer with classical and modern styles	Composers, producers	Enables complex compositions affordably
Magenta Studio	Suite of plugins for melody and rhythm generation	Musicians, producers	Creative AI assistance integrated with DAWs
Juke deck (now part of TikTok)	AI-generated music for videos	Video creators, marketers	Simplifies soundtrack creation for non-musicians

Landr	AI-powered mastering and production tools	Independent artists, producers	Professional-quality production without studios
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AI is making it possible for more people to produce music by making creative tools simple, low-cost and easy to work with. Thanks to this technology, new talents are discovered, music is explored in different ways and people dedicated to music can easily express and share their art globally.

Table 5: Benefits and Challenges of AI in Music Creation Across Key Aspects

Aspect	Benefits	Challenges
Accessibility	Enables non-musicians to create music easily	Requires internet and device access
Cost	Lowers production costs significantly	Some advanced AI tools may have subscription fees
Creativity Support	Offers inspiration, style suggestions, and idea generation	Risk of over-reliance leading to less original creativity
Skill Development	Helps users learn and improve musical skills	May limit deep understanding of music theory
Collaboration	Facilitates remote, real-time collaboration globally	Technical glitches or latency issues during live use
Distribution	Integrates easily with streaming and social platforms	Oversaturation of AI-generated music in the market

It shows that AI helps bring music production within reach of more people, makes it cheaper and supports creativity, mainly for non-musicians and independent creators. AI tools decrease expenses, offer chances to learn new skills and help people from different places work together easily online. Still, there are problems, for example, internet access, possible fees for subscriptions, the possibility of losing originality if too much relies on AI, some lack of deep musical knowledge, issues with remote collaboration and a growing number of AI-generated songs. Making sure there is a balance between the benefits and challenges is the best way to let AI help in music creation.

5. CONCLUSION

Artificial Intelligence has greatly changed how music is composed, making it simpler, more creative and more collaborative than ever. With the use of machine learning, deep learning, GANs and rule-based systems, AI can produce many different, complex and new musical pieces that challenge what creativity means conventionally. With AIVA, Amper Music and MuseNet, AI helps reduce the technical difficulties, lowers costs and makes it easy for people to create music. AI encourages people and computer systems to work together, offers new ways for musicians to be creative and makes it possible for music to be played interactively. Even so, issues related to the person who wrote the text, ethics, cultural background and overusing AI still exist. Generally, AI in music composition is changing how artists create music by giving them more creative options, fostering inclusivity, allowing people from different parts of the world to collaborate and encouraging thought about the changing relationship between human imagination and technology.

REFERENCES

- Anantrasirichai, N., & Bull, D. (2022). Artificial intelligence in the creative industries: a review. *Artificial intelligence review*, 55(1), 589-656. <https://doi.org/10.1007/s10462-021-10039-7>
- Carnovalini, F., & Rodà, A. (2020). Computational creativity and music generation systems: An introduction to the state of the art. *Frontiers in Artificial Intelligence*, 3, 14. <https://doi.org/10.3389/frai.2020.00014>
- Civit, M., Civit-Masot, J., Cuadrado, F., & Escalona, M. J. (2022). A systematic review of artificial intelligence-based music generation: Scope, applications, and future trends. *Expert Systems with Applications*, 209, 118190. <https://doi.org/10.1016/j.eswa.2022.118190>
- El Ardelya, V., Taylor, J., & Wolfson, J. (2024). Exploration of artificial intelligence in creative fields: Generative art, music, and design. *International Journal of Cyber and IT Service Management*, 4(1), 40-46. <https://doi.org/10.34306/ijcitsm.v4i1.149>
- Gioti, A. M. (2020). From artificial to extended intelligence in music composition. *Organised Sound*, 25(1), 25-32. <https://doi.org/10.1017/S1355771819000438>

- Goswami, A. (2023). Music and Artificial Intelligence: Exploring the Intersection of Creativity and Technology. *Sangeet Galaxy*, 12(2).
- Hernandez-Olivan, C., & Beltran, J. R. (2022). Music composition with deep learning: A review. *Advances in speech and music technology: computational aspects and applications*, 25-50. https://doi.org/10.1007/978-3-031-18444-4_2
- Huang, C. Z. A., Koops, H. V., Newton-Rex, E., Dinculescu, M., & Cai, C. J. (2020). AI song contest: Human-AI co-creation in songwriting. *arXiv preprint arXiv:2010.05388*. <https://doi.org/10.48550/arXiv.2010.05388>
- Kurmi, R. K., Maurya, A., & Pujari, N. M. (2024). Nexus of artificial intelligence and human creativity: exploring opportunities and challenges. *Journal of Drug Discovery and Health Sciences*, 1(01), 34-39. <https://doi.org/10.21590/xb8kta43>
- Miranda, E. R. (Ed.). (2021). *Handbook of artificial intelligence for music*. Cham, Switzerland: Springer.
- Sturm, B. L., Iglesias, M., Ben-Tal, O., Miron, M., & Gómez, E. (2019, September). Artificial intelligence and music: open questions of copyright law and engineering praxis. In *Arts* (Vol. 8, No. 3, p. 115). MDPI. <https://doi.org/10.3390/arts8030115>
- Tigre Moura, F., & Maw, C. (2021). Artificial intelligence became Beethoven: how do listeners and music professionals perceive artificially composed music? *Journal of Consumer Marketing*, 38(2), 137-146. <https://doi.org/10.1108/JCM-02-2020-3671>
- Vinchon, F., Lubart, T., Bartolotta, S., Gironnay, V., Botella, M., Bourgeois-Bougrine, S., ... & Gaggioli, A. (2023). Artificial intelligence & creativity: A manifesto for collaboration. *The Journal of Creative Behavior*, 57(4), 472-484. <https://doi.org/10.1002/jocb.597>
- Zhang, Y. (2024). Utilizing computational music analysis and AI for enhanced music composition: exploring pre-and post-analysis. *Educational Administration: Theory and Practice*, 30(5), 269-282.
- Zhou, E., & Lee, D. (2024). Generative artificial intelligence, human creativity, and art. *PNAS nexus*, 3(3), pgae052. <https://doi.org/10.1093/pnasnexus/pgae052>



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