

# Ethic Concerns for AI Powered Elementary Music Making Tool

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## 1 Introduction

In the evolving landscape of digital music production, the integration of artificial intelligence (AI) has opened new avenues for creativity and accessibility. This senior project aims to develop a web-based digital audio workstation (DAW) equipped with an AI-powered music generation tool that transforms text input into MIDI information. This tool guides users step-by-step through the music creation process, from melody and harmony to rhythm, ultimately producing 30 seconds to a minute of original music. This innovative approach allows users to not only edit MIDI tracks and apply various musical attributes like quantization, triplets, and tempo changes but also to leverage AI to create music, offering a blend of traditional composition techniques and cutting-edge technology. The resulting platform also includes features enabling users to download their creations as well as those generated by the AI.

The project holds significant ethical potential by promoting accessibility and democratizing the music creation process. By lowering the barriers to entry for music production, the tool can empower a diverse range of individuals, including those without formal musical training or access to traditional musical instruments, to express themselves creatively and participate in cultural creation. This democratization could foster a more inclusive musical landscape where more voices can be heard and more stories told through the universal language of music. Additionally, the use of AI can streamline complex production processes, allowing users to focus more on the artistic aspects of music creation.

While this project holds the potential to democratize music production by providing powerful tools to a wider audience, it simultaneously raises several ethical concerns that must be addressed to ensure its beneficial impact on society. The core of these concerns revolves around issues of data bias, accessibility, transparency, and the long-term implications of AI dependency in the creative domains. These issues challenge the assumption that technology inherently brings equitable advancements and require a critical examination of how such tools are developed and implemented.

The thesis of this paper argues that while AI can significantly enhance the music production process, ensuring ethical deployment is complex and impossible to be addressed for this project in multiple intertwined challenges:

- **Data Bias** - It is crucial to ensure that the AI does not perpetuate cultural biases through its output, which could lead to a lack of representation and diversity in the music generated.
- **Accessibility** - The project must focus on making the tool equally usable by individuals from various backgrounds and abilities to truly democratize the field of music production.
- **Transparency** - It is essential to provide users with clear insights into how their inputs are transformed into musical outputs by the AI, fostering a better understanding and trust in the technology.
- **Creative Authenticity** - The use of AI in music production may undermine the perceived authenticity and originality of music, potentially altering the value and meaning attributed to human-created art.

## 2 Data Bias

AI music generation tools, including those powered by advanced APIs like GPT (from OpenAI) or Stability, risk unintentionally perpetuating cultural biases inherent in their training data. This concern arises because these models, and their developers, often do not have complete transparency about the specifics of the data used for training. Typically, AI models are reflective of the data they are exposed to, and if this data primarily encompasses Western music or popular genres, the diversity of the music generated by the AI is inherently limited. This limitation can perpetuate and even exacerbate existing disparities within the music industry, where certain styles and communities are already marginalized. Although ethnomusicology is a significant area of study within musicology, the overwhelming focus of most AI music models tends to lean towards Western music theory. This focus shapes the output of the AI, potentially sidelining a rich spectrum of underrepresented musical genres and traditions.

In discussing data bias in AI music generation tools, it's essential to consider how cultural stereotypes can influence the emotional interpretation and representation of music. A pivotal study [2] that sheds light on this issue investigated the emotional responses to various music genres and their associated cultural stereotypes. The research, exam-

ining genres such as Fado, Koto, Heavy Metal, and Hip Hop, demonstrated that listeners often project stereotypical emotions of a culture onto its music. For instance, listeners associated peace and calm with Koto music and Japanese culture, and anger and aggression with Heavy Metal and its corresponding culture. This phenomenon, explained through the stereotype theory of emotion in music (STEM), suggests that an emotion filter simplifies the assessment process for unfamiliar music genres, leading to stereotyped emotional responses (Study on Emotional Responses to Music Genres and Cultural Stereotypes). This insight is critical for AI music generation, as it highlights the risk of AI systems perpetuating these stereotypes, particularly when trained on data that does not adequately represent the diversity of musical expressions and the complexities of cultural backgrounds. Such bias can distort the AI's music generation capabilities, emphasizing the need for developers to incorporate a wide and diverse range of cultural and musical inputs to mitigate these biases.

The ethical responsibility of developers in this scenario extends to ensuring that their AI systems foster cultural inclusivity and accurately represent global musical diversity. Building a diverse dataset for training music-generating AI involves meticulous curation to include a variety of musical elements such as scales, rhythms, and traditional instruments from different cultures. However, the challenge is not solely in the quantity of the data but in its qualitative representation. Developers must collaborate with musicians, ethnomusicologists, and cultural experts to achieve a nuanced understanding of the different musical traditions that their AI aims to emulate. This collaboration is crucial in avoiding not just underrepresentation but also misrepresentation, which could alienate the communities these tools seek to empower.

Furthermore, the issue of data bias in AI music generation raises important considerations about the depth of cultural understanding these technologies attain. It is insufficient for AI to superficially mimic the sounds of diverse cultures; it must also engage deeply with the cultural contexts that give these sounds meaning. Achieving this level of sophistication in AI music generation necessitates a commitment to ongoing research and development, guided by ethical considerations of fairness, respect, and cultural appreciation. Therefore, addressing data bias and ensuring cultural representation in AI music tools is not merely a technical challenge but a profound ethical obligation to use technology in ways that enrich and diversify human culture rather than narrowing it.

### 3 Accessibility

Building on the concerns of data bias and cultural representation, another significant ethical issue is the accessibil-

ity and empowerment potential of AI-powered tools in music production. While these tools aim to democratize music creation, making it accessible to individuals without a musical background, they also pose the risk of widening the digital divide if they are not designed with universal accessibility in mind. This division not only reflects disparities in technological access but also extends to variations in user capability and cultural exposure.

"Ge Wang, in 'Artful Design: Technology in Search of the Sublime'[3], articulates a vision for technology that transcends mere functionality to achieve a form of design that is deeply human-centric. This philosophy is particularly pertinent to ensuring the accessibility of AI-driven music tools. By embracing Wang's principles, developers can create a digital audio workstation that not only democratizes music production but does so in a way that is genuinely accessible to all users, regardless of physical or sensory abilities. Such an approach aligns with the ethical imperative to design technology that enriches human life and enhances human capabilities without discrimination."

Advanced features and AI capabilities, though innovative, can be complex and daunting for users with disabilities, particularly those with hearing impairments, or for individuals lacking in technical skills and internet access. Accessibility features in many software platforms are often treated as secondary considerations, potentially excluding a substantial segment of the potential user base. For example, users with hearing disabilities may find it challenging to engage fully with music production software that does not include visual aids or alternative interaction methods that compensate for auditory information. Similarly, individuals without reliable internet access may be unable to utilize cloud-based features or download necessary updates, thereby limiting their ability to use the software effectively.

Therefore, it is imperative that developers prioritize inclusive design from the outset, ensuring that the transformative potential of AI in music production is truly accessible to everyone. This approach involves not only adapting interfaces to accommodate various disabilities but also simplifying the user experience to cater to those with limited technical expertise. By committing to these principles, developers can ensure that their innovations empower all users equally, thereby truly democratizing the field of music production and bridging the gap between technology and its users. This commitment to inclusivity not only enhances the user experience but also fosters a more diverse and vibrant musical landscape, where everyone has the opportunity to create and explore their musical ideas.

### 4 Transparency

Transparency in how AI-generated music is produced is crucial for maintaining user autonomy and creative control.

Without clear visibility into the AI's decision-making processes, users may struggle to understand how their inputs are being transformed into musical outputs. This opacity can lead to a significant disconnect between the user's creative intentions and the final product. Users might find themselves puzzled by the AI's choices in melody, harmony, or rhythm, which can cause frustration and a sense of losing control over the creative process. Such scenarios are particularly detrimental in creative fields where the expression and intention behind a piece of art are paramount.

The lack of transparency can also affect how users interact with the technology. When users do not understand why the AI behaves in a certain way, they may be less likely to experiment with or fully utilize the tool, thereby stunting their creative potential and satisfaction with the software. This situation highlights the need for AI systems that not only perform tasks effectively but also do so in a manner that is comprehensible and manageable for all users, regardless of their technical background. Enhancing transparency is not merely about improving user satisfaction; it is about respecting the creative agency of each user, ensuring they remain the driving force behind their compositions.

To address these issues, it is essential to propose and implement mechanisms that increase the transparency of the AI processes. These could include features that allow users to visualize how their inputs are being processed and how decisions are made, as well as options to tweak the AI's functionality to better align with their creative preferences. For instance, providing adjustable parameters that influence the AI's composition style, or a feedback system that explains why certain choices were made, could significantly enhance user trust and engagement. By integrating such features, developers can empower users to take full advantage of AI tools in music production while maintaining a high degree of creative control and autonomy.

## 5 Creative Authenticity

The integration of AI in music production has brought to the fore significant ethical concerns regarding the authenticity and originality of music, challenging the traditional values and meanings attributed to human-created art. AI's ability to assist in the music creation process—from developing melodies to constructing complex rhythms—can indeed enhance creativity by offering novel suggestions and simplifying intricate production tasks. However, this assistance also blurs the lines between human and machine-generated content, raising pivotal questions about the ownership and artistic integrity of the final musical products. The challenge arises when music heavily influenced or directly generated by AI makes it difficult to ascertain the extent of human creative input versus that of the algorithm. Such scenarios provoke debates over authorship and redefine what it means

to be a creator in the contemporary digital landscape.

In exploring the intersection of AI and creativity, "Computer Models of Creativity" [1] by R. Boden provides a critical examination of how artificial intelligence can be harnessed within creative processes. Boden discusses the capability of AI to not only replicate but also potentially expand the boundaries of human creativity through unique algorithmic contributions. This discussion is particularly relevant to the field of music production, where AI-generated compositions challenge traditional notions of authorship and artistic integrity. Boden's insights into the role of AI in creativity serve as a foundation for addressing concerns about the authenticity of AI-generated art and music. While AI can produce work that is innovative and complex, questions persist about whether these creations possess the depth and emotional resonance typically associated with human-made art. For instance, while an AI can compose a piece of music that is technically sound, it may lack the personal touch and context that come from the human experience. This distinction is crucial when considering the value and reception of AI-generated music in the broader cultural landscape.

The implications of these developments are both profound and far-reaching. To navigate these challenges, there is a pressing need for the establishment of clear guidelines and norms that differentiate between AI-assisted music and AI-generated music. The music industry, along with copyright laws, must evolve to address and incorporate these new technologies, considering how they modify the traditional roles of composers, musicians, and producers. For ethical AI use in music to be achieved, it is imperative that there is transparency concerning the extent of AI involvement in creative outputs. This transparency is essential not only for maintaining a trust-based relationship between artists and their audiences but also for preserving the cultural and economic value traditionally attributed to human creativity.

To address these issues effectively, a thoughtful approach is required—one that respects the artistic contributions of individuals while also acknowledging the innovative possibilities offered by AI. This balance is crucial for fostering a music industry that values both technological innovation and human artistic expression. By recognizing and addressing these ethical concerns, the industry can ensure that AI serves as a tool for enhancing human creativity rather than diminishing it, thus supporting a future where technology and tradition coexist harmoniously.

## 6 Conclusion

In conclusion, while the integration of AI into music production through a web-based digital audio workstation presents exciting possibilities for democratizing music creation, enhancing creativity, and offering new tools for musical expression, the project is faced with substantial ethical

challenges that, at this stage, hinder its responsible deployment. The issues of data bias, accessibility, transparency, and the impact on creative authenticity collectively pose significant ethical dilemmas that cannot be overlooked.

The potential for AI to perpetuate cultural biases through its outputs raises concerns about the fairness and inclusivity of the technology. The AI's tendency to mirror its training data means that without careful consideration and curation of this data, the technology could marginalize underrepresented musical genres and traditions, thus reinforcing existing cultural disparities. Moreover, accessibility remains a critical issue; if the tool is not universally accessible, it risks widening the digital divide, going against the very principle of democratization that it aims to uphold.

Transparency about how the AI transforms user inputs into musical outputs is crucial for maintaining user autonomy and trust. Without this transparency, users may lose control over the creative process, feeling detached from their own art. Furthermore, the blurring of lines between human and machine-generated content challenges the notions of authorship and artistic integrity, potentially devaluing the personal and cultural significance of human-created music.

Although the project holds the promise of promoting good ethical values by potentially making music production more accessible and providing a platform for creative exploration, these benefits do not sufficiently outweigh the ethical risks identified. The lack of clear solutions to issues such as data bias, insufficient accessibility, and compromised transparency and authenticity indicates that proceeding with the project without significant modifications and ethical considerations would be irresponsible.

Ultimately, the ethical challenges presented by this project suggest that it cannot proceed in its current form. It is essential that any further development of such technologies carefully considers and addresses these ethical concerns. By prioritizing ethical considerations and aligning the project more closely with core human values, developers can ensure that AI in music production enriches the human experience rather than diminishing it. Only by achieving this balance can the true potential of AI in music production be realized in an ethically responsible manner.

## References

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