# Ethical Considerations in the Production and Consumption of Music in the Metaverse

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*Abstract*— **Volumetric music videos (VMVs) transform immersive entertainment to create 3D musical performances using volumetric video technology. These videos, accessible via 2D screens or extended reality (XR) platforms, offer novel interactive experiences in the interconnected worlds of the Metaverse. As VMVs rapidly integrate into immersive virtual environments (IVEs), they raise critical ethical concerns about data privacy, content authenticity, and user well-being. Here, we show that addressing these ethical issues is crucial for the responsible development of VMVs. We present a survey-based analysis where we first identify key ethical guidelines through an extensive literature review. We then apply these guidelines to the emerging domain of the Musical Metaverse, particularly focusing on VMVs and musical XR IVEs. Our findings reveal that robust privacy protection, accurate representation, and inclusive design are essential to safeguard user rights and promote a positive user experience. This study builds upon previous work and highlights the need for industry-wide standards and collaborative efforts to ensure ethical practices in VMV production and consumption, fostering trust and sustainability in the emergent Musical Metaverse.**

*Index Terms*—**Volumetric Music Videos, Ethical Guidelines, Musical Metaverse**

## I. INTRODUCTION

Volumetric Music Videos (VMVs) are transforming immersive entertainment by utilizing volumetric video (VV) technology to produce three-dimensional (3D) representations of musical performances [1], [2], see Figure 1. These videos can be enjoyed on standard 2D screens or through other extended reality (XR) platforms, offering audiences new and engaging ways to engage with content using augmented, virtual, and mixed reality (AR/VR/MR) technology [1]. By incorporating VMVs into persistent interconnected immersive virtual environments (IVEs) like the Metaverse [3], innovative telematic performances and interactive experiences are made possible [4]. This technology supports platform-independent, multi-user environments with 3D or spatial audio and video streaming capabilities [4]. VV enhances the representation of real-world scenes and objects from any viewpoint, facilitating new forms of immersive storytelling in XR applications [5]. As this field evolves, researchers are exploring audience responses to VMVs and their potential impact on the future development of public-facing music performances [1].

As IVEs and the Metaverse evolve, addressing the ethical considerations associated with these technologies becomes in-creasingly important. Key concerns within the artificial intelligence (AI) discipline include content moderation, privacy, data protection, and inclusivity [6], and similar concerns should be shared in conceptualizing AI in a Musical Metaverse [7]. For example, the prevalence of microtransactions in IVEs also poses risks of addictive behaviors and financial burdens, particularly among young male players [8]. The rapid growth of the Metaverse further raises questions about privacy, safety, and social implications, necessitating the development of ethical principles to guide its design and development [9]. Addressing ethical challenges is essential to ensure responsible practices among multimedia creators, producers, and consumers in the Metaverse [9]–[11].



Fig. 1. New Pagans by Volograms (www.newpagans.com / www.volograms. com)

While this study focuses on ethical considerations specific to VMVs in the Musical Metaverse, it is crucial to contextualize these issues within the broader ongoing research in 21st-century music technology. Previous work on the ethical dimensions of Music Information Retrieval (MIR) [12], AI in music

creation [7], [13], and the ethics framework for the Internet of Musical Things (IoMusT) [14] provide a foundation that informs and extends the ethical discussions in this study. We also acknowledge the comprehensive vision and detailed technical framework for the Musical Metaverse presented in [15], which explores the integration of XR, IoMusT, blockchain, and digital twins, along with specific industry use cases and practical implementations.

In contrast, we delve deeply into the ethical considerations specific to VMVs, offering guidelines on data privacy, content authenticity, inclusivity, and user well-being. This paper explores key ethical issues surrounding VMVs in the Musical Metaverse, focusing on data privacy and security, mental health impacts, content creation ethics, accessibility and inclusivity, and regulatory frameworks. Each section will explore these concerns and conclude with recommendations for effectively addressing them.

## II. METHODOLOGY

This paper aims to explore and synthesize existing literature on the ethical, legal, inclusivity, and mental health issues related to VMVs and their application within the Musical Metaverse. To achieve this, a narrative literature review methodology was employed. This approach allows for a broad exploration of the topic, capturing various perspectives and insights from various disciplines.

The review began with a comprehensive search of academic databases, including but not limited to Google Scholar, JSTOR, IEEE Xplore, and PubMed. The following keywords were used to guide the search:

- **Primary Keywords:** "Volumetric Music Videos," "Ethics in Extended Reality," "Legal Issues in XR," "Inclusivity in Virtual Environments," "Mental Health and VR"
- **Secondary Keywords:** "Content Authenticity," "Data Privacy in XR," "Accountability in Digital Media," "XR Artistic Creation"

To maintain the relevance and quality of the review, the following criteria were applied:

*1) Inclusion Criteria::*

- Articles that directly address ethical, legal, inclusivity, or mental health concerns in digital media, with a specific focus on XR technologies or VMVs.
- Publications that propose or critique ethical frameworks applicable to digital media or immersive environments.
- Case studies or empirical research providing insights into the practical implications of these technologies.

*2) Exclusion Criteria::*

- Articles not available in full text or those behind paywalls without institutional access.
- Publications that focus solely on the technical development of XR technologies without discussing their ethical or social implications.

The selected literature was systematically reviewed and categorized based on key themes relevant to the study. The analysis focused on identifying common themes, conflicts,

and gaps in the literature. This initial thematic categorization ultimately allowed for the development of a three-tier ethical framework to guide the responsible development and use of VMVs in the Musical Metaverse.

## III. RESULTS

The findings from the literature were initially structured around Data Privacy and Security, Regulatory and Legal Frameworks, Accessibility and Inclusivity, and Mental Health Impacts. This approach was designed to present the existing complex interplay of primary issues identified in the literature, providing a structured approach to understanding and addressing the ethical challenges in developing and applying VMVs.

### A. Data Privacy and Security

The extensive data collection required for XR operation raises significant privacy concerns. Research has shown that biometric identification can be achieved through users' kinesiological movements in VR, with high accuracy using machine learning techniques [16], [17]. Studies have demonstrated that seemingly anonymous VR users can be profiled based on body motion, potentially revealing over 25 personal attributes within minutes of gameplay [18]. This profiling extends to both VR and AR environments, with VR offering higher accuracy due to additional sensors like eye tracking [19]. In VR, user identification accuracy can reach up to 97%, with gender and age inference achieving 82% and 90% accuracy, respectively. In AR, identification accuracy is slightly lower at 80%. [19]. These findings highlight the need for robust privacy protection measures to safeguard users' personal information.

As such, data breaches and unauthorized access pose significant risks in IVEs. The increasing digitalization of sensitive information makes it a lucrative target for cyberattacks [20]. Common threats include hacking, malicious attacks, and unauthorized access, leading to privacy violations, data theft, and misuse of personal information [21]. Researchers have proposed various security mechanisms to mitigate these risks, including encryption, blockchain, and AI [20]. Secure proxy-based approaches using hashed Diffie-Hellman keys have been developed to enhance user access control and virtual machine (VM) deployment in mobile cloud environments [22]. As emerging technologies like those used within the Metaverse gain traction, new security challenges arise, necessitating robust protection measures for user data and identities [23]. Continuous technological advancements and regular security audits are necessary for maintaining data integrity and user trust in all nascent digital systems.

Privacy concerns in IVEs encompass user consent, data ownership, and the right to be forgotten. Previous research underscores the need for explicit mechanisms that allow users to control their personal information and understand its storage and accessibility [24]. The right to be forgotten represents a critical aspect of privacy concerns, necessitating validated measurement instruments [25]. In Metaverse-enabled IVEs where personal data is extensively used, service providers must address user privacy concerns through appropriate measures

[26]. Complex privacy policies in mobile health technologies face challenges in data security, re-identification risks, and obtaining informed consent. A "*healthcare fiduciary*" has been proposed to protect data subjects' interests amid rapidly advancing technology and diverse international regulatory frameworks [27]. This highlights the critical need for robust data privacy and security measures in the Musical Metaverse, emphasizing the importance of protecting user information from profiling, breaches, and unauthorized access to maintain user trust and integrity in IVEs.

## B. Regulatory and Legal Frameworks

The rapid evolution of XR technology presents significant challenges to the existing legal and ethical framework. Existing regulations struggle to keep pace with technological advancements, necessitating ongoing updates [28]. The unique properties of XR, combining physical reality and the virtual [3], create difficulties in applying existing laws [28]. For example, key ethical concerns in VR include privacy, informed consent, responsibility, transparency, and freedom [29]. Moreover, advertisers and regulators face challenges in promoting VR products while adhering to consumer protection laws not designed for this technology [30]. Research-creation projects involving VR and personal data highlight the inadequacy of current ethical review standards for university-based artists [31]. To address these issues, recommendations include developing new laws and guidelines, adopting inclusive design approaches, minimizing risks for research participants, empowering users, and promoting responsible conduct in virtual spaces [29].

## C. Accessibility and Inclusivity

The digital divide refers to disparities in access to digital technologies between high-income and low- and middle-income countries (LMIC), affecting various aspects of life, including opportunities for individuals with autism [32]. This divide creates social inequalities between those with reliable internet access and those without [33]. In this context, the Metaverse, as an interconnected shared virtual space, presents both opportunities and challenges. While it can potentially transcend traditional accessibility barriers for people with disabilities, it also faces significant challenges in ensuring equitable access [34]. Addressing the digital divide requires affordable technologies tailored to the income levels and socio-economic conditions of developing countries [35]. Therefore, emphasis should be placed on providing universal access to information technologies rather than individual ownership.

Still, researchers still believe that the Metaverse presents an opportunity to create inclusive and accessible IVEs for all users, including those with disabilities [36]–[39]. Research emphasizes the importance of designing the Metaverse with accessibility as a foundational principle, incorporating assistive technologies, and ensuring platform interoperability [38]. Key considerations include user-centric design, universal access, and the integration of ethical and legal frameworks to address privacy and non-discrimination concerns [38], [39]. Experts highlight the need for technological adaptation, innovation, and the establishment of global standards to foster inclusivity [38]. While progress has been made, significant challenges remain in creating a fully accessible Metaverse [36], [37]. Ongoing research and stakeholder collaboration are critical for developing best practices and evaluation methodologies to ensure the Metaverse complements rather than substitutes the physical world [39].

## D. Mental Health

XR platforms present promising applications in mental health assessment, understanding, and treatment. VR-based therapies have demonstrated effectiveness in reducing anxiety disorders and managing pain through immersive experiences [40], [41]. The technology allows for realistic simulations of problematic situations, enabling individuals to practice coping strategies in controlled environments [40]. VR interventions have been studied for various mental health conditions, including anxiety, post-traumatic stress disorder, and depression [42]. Although VR has demonstrated positive effects on mental wellness, the efficacy of these treatments largely depends on the quality of the technology and content [43]. However, research gaps still exist, particularly in areas such as depression and stress [41]. As VR technology becomes more accessible and mobile, it has the potential to transform mental health care, but further research is needed to optimize its applications and understand its long-term effects [40], [43].

The Metaverse also presents opportunities and risks for mental health. While it may offer benefits such as control, cognitive activation, and social connections [44], there are significant concerns about its addictive potential. The immersive and interactive features of the Metaverse could exacerbate media addiction [45], leading to excessive time spent in IVEs at the expense of real-world responsibilities and interactions. This overuse can result in various mental health issues, including anxiety, depression, and behavioral addiction [46]. Young adults are particularly vulnerable to these negative effects, with social media use already linked to insecurity and attention problems. In extreme cases, social media can profoundly harm the mental health and well-being of children and adolescents [47]. As the Metaverse develops, it is beneficial to balance innovation with societal well-being [45].

Research indicates that XR and interactive media can evoke strong emotional responses in users. Studies have shown that VR games can elicit positive emotions and reduce negative emotions and anxiety, with higher body involvement leading to greater effects [48]. Audio-visual effects can induce specific emotional states in IVEs [49]. While VR experiences can be designed for positive outcomes, such as building resilience to street harassment [50], there are ethical concerns regarding using virtual avatars in consumer entertainment. These include potential risks and the need for further investigation before mainstream adoption [51]. As XR technology advances, understanding its psychological impacts and designing content that promotes positive experiences while minimizing negative effects is necessary for the ethical production and use of immersive media. This underscores the dual impact of XR

Fig. 2. 3D reconstruction of physical musician

technology on mental health within the Metaverse, highlighting its therapeutic potential alongside risks of addiction and negative psychological effects, thus emphasizing the need for balanced, ethical design and implementation to safeguard user well-being.

### E. Content Creation Ethics

Emphasizing diverse representation in IVEs is critical to promoting inclusivity and enhancing the user experience. For example, Pate [52] describes a collaborative process for developing VR biology simulations with diverse avatars and inclusive environments. Hayes & Johnson [53] argue for incorporating diverse self-representations in VR training systems, noting the impact on engagement and behavior transfer. Gallardo-Williams & Dunnagan [54] highlight the creation of inclusive VR organic chemistry laboratories to minimize instructor bias and provide equal access for underrepresented minorities. Fundamentally, Peck et al. [55] expose the bias in VR technology, which primarily caters to a narrow demographic, and calls for increased diversity in VR research, development, and usability testing.

The authenticity of performances in IVEs and the ethical implications of deepfake technology are also significant concerns, see Figure 2. Fortune [56] highlights the challenges of maintaining authenticity in electronic music performances, emphasizing the tension between visual elements and sound output. De Ruiter [57] examines the moral dimensions of deepfakes, arguing that they become problematic when they misrepresent individuals without consent or deceive viewers. Langayan [58] emphasizes the importance of emotional intelligence and balanced human-like qualities in virtual entities to foster trust and engagement. In the context of performing arts using live electronics, Guercio et al. [59] propose an authenticity-based approach based on provenance, studying production processes to extract key elements for future authenticity assessment.

The Metaverse presents significant challenges for creating intellectual property rights, requiring new legal frameworks to address ownership, copyright, and trademark protection [60]. As IVEs in the Metaverse transcend international boundaries, questions of jurisdiction and enforcement arise, necessitating

interdisciplinary approaches to balance stakeholder interests [61]. Furthermore, the Metaverse's potential for virtual performances and content creation raises concerns about copyright management, licensing, and profit distribution [62]. This topic has been particularly relevant in the Indian context, where policymakers consider the implications for intellectual property rights (IPRs) in IVEs [63]. To address these challenges, platforms for managing copyrights and facilitating licensing contracts in the Metaverse are being developed [62]. Overall, the complex nature of intellectual property in the Metaverse requires a comprehensive framework considering technological advancements, legal considerations, and the evolving nature of virtual spaces [60].

### F. The Implications of Current Research Findings

The ethical implications of emerging technologies, focusing on XR and the Metaverse, are gaining attention as these technologies advance. Key concerns include privacy, data protection, content moderation, and user well-being [6], [64]. Ethical frameworks for XR emphasize respect for persons, well-being, safety, and justice, with principles including privacy, informed consent, and transparency [29]. Industry stakeholders must collaborate to establish and enforce comprehensive guidelines for these technologies' ethical development and use [65]. Current recommendations include developing laws and guidelines for ethical, legal, and social issues, adopting inclusive design approaches, minimizing risks for research participants, empowering users, and promoting responsible behavior in virtual spaces [29]. Addressing these ethical challenges is imperative for maximizing the potential of immersive technologies while safeguarding user rights and well-being [6].

Similarly, the ethical implications of immersive music technology have been explored in various contexts. For instance, Holzapfel, Sturm, and Coeckelbergh [12] discuss the ethical dimensions of MIR technologies, highlighting concerns around bias, privacy, and the impact on musicians. Similarly, Morreale [13] addresses AI's ethical and political implications in music creation, raising questions about authorship and the role of human creativity in an increasingly automated process. Furthermore, Brusseau and Turchet [14] propose an ethics framework for the IoMusT, which provides a valuable perspective on how interconnected musical environments should be ethically managed. These works provide a broader ethical context directly relevant to the emerging ethical challenges of VMVs in the Musical Metaverse, particularly in content authenticity, data privacy, and user well-being.

### IV. BEST PRACTICES IN THE METAVERSE

Consider a scenario where an XR environment is used for a live volumetric music performance with multiple audience members in attendance. In this scenario, the ethical guideline of content authenticity is particularly critical. However, in practice, challenges arise, such as the potential for unauthorized alterations or deepfakes and the presentation of inappropriate content to young viewers. By analyzing cases like this, we can better understand how to apply ethical principles in

real-world musical settings and identify gaps requiring further regulatory attention.

The development of the Musical Metaverse raises significant ethical concerns that require careful consideration and collaboration among stakeholders. Hemphill [66] emphasizes the importance of inclusive standards development to embed socially and ethically responsible consensus in foundational protocols. Bermejo Fernández and Hui [67] propose a framework focusing on privacy, governance, and ethical design to guide Metaverse development. Cox et al. [29] identify key ethical values and principles, including respect for persons, well-being, safety, and privacy, recommending inclusive approaches, and user empowerment. Zallio and Clarkson [9] introduce the concept of "*Metavethics*" as a new field of study addressing ethical implications of the Metaverse, emphasizing the need to consider sociological, anthropological, and philosophical dimensions.

Throughout the manuscript, these works to date collectively highlight the need for collaborative efforts between technology developers, content creators, and regulatory bodies to establish ethical guidelines and industry standards that ensure responsible practices in the Metaverse. In the next section, we will outline how we might approach the creation of ethical guidelines that apply specifically to VMV in the Musical Metaverse concerning their synthesis into a coherent framework; see Table I.

### A. Ethics in the Musical Metaverse

As noted in section III-B, developing new guidelines is essential for the ethical development of the Metaverse. In line with research that highlights the psychological impacts of digital content consumption [68], it is crucial to consider how the immersive nature of VMVs might also affect user well-being. Musical Metaverse ethical frameworks must account for these psychological effects to ensure that the development of VMVs does not lead to adverse mental health outcomes.

*1) Privacy:* Ensuring data privacy when creating and consuming VMVs in the Musical Metaverse is paramount [26]. As discussed in section III-A, robust privacy protection is essential for user trust in the Metaverse. This is further highlighted in discussions about the manipulation of digital platforms [69], where the vast amounts of personal data collected by Metaverse platforms pose significant risks. These risks include potential misuse by corporations and bad actors, making robust data privacy protections an ethical necessity.

Therefore, transparency is essential; users must be informed about what data is being collected, how it will be used, and where it will be stored. Detailed privacy policies should be made available, and explicit consent should be obtained before data collection begins. Robust security measures, such as encryption and secure storage solutions, must be implemented to protect user data from unauthorized access and breaches. Giving users control over their data is also critical for developing robust privacy, allowing them to access, modify, and delete their personal information as needed. Furthermore, data collection should be minimized to only what is necessary

for the Musical Metaverse experience, with anonymization techniques employed wherever possible to safeguard user identities.

*2) Content Authenticity:* Ensuring content authenticity, as outlined in section IV-A, is crucial for maintaining the integrity of the Metaverse. The rise of practices such as fake streams and click farms, as discussed by Drott [70], underscores the importance of content authenticity in the digital music economy of the Musical Metaverse.

In the context of VMVs, ensuring authenticity is perhaps even more critical, as the immersive nature of these experiences could be compromised by similar deceptive practices in the music industry. Therefore, the authenticity of performances in VMVs is an important ethical consideration [4]. Ensuring that all performances and representations are accurate and genuine is critical [10]. The use of AI or deepfake technology to misrepresent individuals or performances without explicit consent must be avoided. Transparency in editing is also vital; any significant alterations to the original performance should be disclosed to users, providing context about what is real and what has been digitally modified. Provenance tracking can help maintain trust and authenticity by keeping a clear record of the content creation process, including details about who performed, how the content was captured, and any post-production changes. This approach not only upholds the integrity of the content but also builds trust with the audience.

*3) Representation:* Promoting diverse representation and inclusivity in VMVs is essential for reflecting the diversity of the audience and enhancing relatability. Efforts should be made to include various cultures, genders, and identities. This involves designing IVEs and avatars to be inclusive and accessible to all users, including those with disabilities. Feedback from diverse user groups should be incorporated to improve inclusivity continually. Additionally, it is important to actively identify and mitigate biases in content creation and technology development. This can be achieved by using diverse datasets for training AI models and conducting regular bias audits, ensuring that the technology serves a wide and inclusive audience.

*4) User Well-being:* As previously discussed in section III-D, designing VMVs with user well-being in mind is critical. Designing VMV experiences with user well-being in mind is pivotal [55]. This includes considering the mental health impacts of Musical Metaverse experiences and avoiding content that could be overly stimulating or distressing. Features that help prevent addictive behavior should be implemented, such as usage tracking and reminders to take breaks. Educating users about the risks of excessive use and providing resources for help if needed can also mitigate potential negative effects. The focus should be on creating content that promotes positive emotions and experiences, for example, using VR to enhance user well-being through relaxation techniques, therapeutic experiences, and positive social interactions. Ensuring users have a healthy and enjoyable experience is a key aspect of ethical VMV production and consumption.

### B. Policy & Standards in the Musical Metaverse

*1) Data:* As discussed in section III-A, robust privacy protection is essential for user trust. Establishing standardized data privacy policies that comply with international regulations, such as the General Data Protection Regulation (GDPR) or the California Consumer Privacy Act (CCPA), is essential for the ethical production and consumption of VMVs in the Musical Metaverse [66], [67]. Regular data privacy and security audits should be conducted to ensure compliance and address any XR-specific vulnerabilities. Certification programs for VMV producers who meet high data privacy and security standards can also help maintain consistency and trust. These standards should be developed in collaboration with regulatory bodies, industry leaders, and consumer advocates to ensure they address all stakeholders' diverse needs and concerns. The Musical Metaverse industry can protect user data and maintain high ethical standards by adhering to these standardized policies.

*2) Content Creation:* Developing best practice guidelines for capturing, editing, and presenting VMVs is vital for maintaining high ethical and technical standards [66]. These guidelines should include technical standards for video quality, sound, and user interaction to ensure a consistent and high-quality user experience. Ethical frameworks outlining acceptable practices for content creation, including guidelines on deepfake usage and authenticity, are also necessary. Rigorous quality assurance processes should be implemented to ensure VMVs meet these standards before release. Collaboration between technology developers, content creators, and regulatory bodies is essential for developing and maintaining these guidelines, ensuring that VMVs are created and enjoyed ethically.

*3) Mental Health:* Mental health is considered a critical ethical issue in Section III-D but requires addressing and implementing when discussing Musical Metaverse standards. Collecting and analyzing user feedback to understand the mental health impacts of VMVs is vital for improving the content and design of IVEs [44]. Collaborative research with mental health professionals can help study the effects of VMVs on users and develop guidelines that promote positive mental health outcomes [46]. Providing resources and support for users who may experience negative mental health effects from the Musical Metaverse is also necessary. These efforts should create a balanced, positive XR experience that enhances user well-being. The Musical Metaverse industry can ensure that immersive experiences benefit and support all users by prioritizing ethical standards for mental health considerations.

### C. Accountability in the Musical Metaverse

*1) Cross-Disciplinary Collaboration:* Engaging a wide range of stakeholders, including technology developers, content creators, regulatory bodies, and consumer advocates, is essential for developing comprehensive guidelines and standards for VMVs [66]. Regular dialogues and workshops can facilitate knowledge sharing, discussion of challenges, and the development of innovative solutions to ethical issues in VMVs [29]. Joint projects and research initiatives can explore new technologies, understand their impacts, and develop best practices [15]. By fostering cross-disciplinary collaboration, the VMV industry can ensure that ethical practices are upheld and continuously improved, benefiting all stakeholders and users [71].

*2) Accountability Mechanisms:* Implementing transparent reporting mechanisms for data privacy, content authenticity, and user well-being is beneficial for maintaining high ethical standards [6]. These reports should be shared with stakeholders and the public to ensure accountability [71]. Establishing independent oversight bodies to monitor compliance with ethical guidelines and standards policy is also important. These bodies should have the authority to enforce corrective actions when necessary. Encouraging community involvement in monitoring and reporting unethical practices can also enhance accountability. Clear channels for users to report concerns should be provided, and these concerns should be addressed promptly. By establishing robust accountability mechanisms, the Musical Metaverse can ensure that ethical standards and policies are maintained and improved over time.

## V. THE FUTURE OF VMVs IN THE MUSICAL METAVERSE

While advancing and adopting Metaverse technologies offer numerous benefits for the music industry and musical performances, they also present significant ethical dilemmas. Ethical frameworks for XR technologies emphasize respect for persons, well-being, safety, and justice [29]. For instance, while bridging the digital divide could enhance global accessibility and representation, it may also exacerbate environmental and social issues in developing regions. The question then arises: through which framework do we assess whether the benefits of increased access outweigh the potential harms?

Different ethical frameworks offer varying perspectives on these dilemmas. From a consequentialist standpoint, the universal adoption of the Metaverse might be justified by the greater good it could serve in terms of global inclusivity. However, a deontological approach might prioritize the rights and well-being of local populations, arguing against adopting technologies that could lead to ecological harm or exploitation. Therefore, hybrid approaches to content moderation have been highlighted to balance creative freedom and user safety [6].

Promoting universal adoption of the Metaverse also raises significant concerns regarding data privacy. The more users participate, the more intimate data is collected, making it a prime target for cyber-attacks. Potential solutions have been proposed to address these concerns, including the "new buckets effect" approach [72]. This creates a further moral dilemma: is the potential for greater inclusivity and accessibility worth compromising users' privacy and security? Moreover, corporations' potential misuse of this data for profit further complicates the ethical landscape, as corporate interests often conflict with the common good.

The interests of corporations often clash with the idea of public good, particularly regarding data privacy. Companies exploit user data for profit, often through seemingly free

TABLE I
A THEMATIC THREE-TIER REPRESENTATION FOR BEST PRACTICES THE MUSICAL METAVERSE

| Tier 1 | Tier 2 | Tier 3 | Meaning |
|---|---|---|---|
| Ethics | Privacy | Transparency | - Clear data policies and consent |
| | | Security Measures | - Use encryption and secure storage solutions. |
| | | User Controls | - Allow users to modify and delete their data. |
| | | Anonymity and Minimization | - Minimize and anonymize data |
| | Content Authenticity | Accurate Representation | - Ensure content is accurate and authentic. |
| | | Transparency in Editing | - Disclose significant digital alterations. |
| | | Provenance Tracking | - Track content creation and changes. |
| | Representation | Diversity | - Strive for diverse representation. |
| | | Inclusivity | - Design inclusive and accessible environments. |
| | | Bias Mitigation | - Identify and reduce biases. |
| | User Well-being | Mental Health | - Focus on user mental health. |
| | | Addiction Prevention | - Prevent addictive behavior. |
| | | Positive Experiences | - Promote positive experiences. |
| Policy & Standards | Data | Standardized Policies | - Develop standardized data policies. |
| | | Regular Audits | - Conduct regular data audits. |
| | | Certification Programs | - Establish certification programs. |
| | Content Creation | Best Practices | - Develop best practice guidelines. |
| | | Ethical Frameworks | - Create ethical content frameworks. |
| | | Quality Assurance | - Ensure rigorous quality checks. |
| | Mental Health | User Feedback | - Collect and analyze feedback. |
| | | Collaborative Research | - Research with professionals. |
| | | Resource Provision | - Provide user support resources. |
| Accountability | Cross-Discipline Collaboration | Stakeholder Engagement | - Engage various stakeholders. |
| | | Regular Discussion | - Facilitate regular meetings. |
| | | Conduct Joint Projects | - Collaborative projects and research. |
| | Accountability Mechanisms | Transparent Reporting | - Implement transparent reporting. |
| | | Independent Oversight | - Establish independent oversight. |
| | | Community Involvement | - Encourage community reporting. |

services, creating an asymmetrical power dynamic [73]. While companies may argue that their data practices are necessary for providing 'cost-free' services, users' behavioral data is being commodified, potentially to their detriment. The influence of these corporations on legislative processes further complicates efforts to protect user data on a global scale, as regulatory frameworks may be shaped to favor corporate interests over public welfare.

One of the greatest challenges is convincing the public of the importance of ethical concerns. A growing consensus is that a digital ethics framework is needed to address these unprecedented challenges and guide data flow governance in the modern technological landscape [74]. Many users consider the trade-off between privacy and free services acceptable or trivial. This raises a critical question: how do we effectively communicate these trade-offs' long-term risks and ethical implications to a global audience?

The ethical principles of privacy, access, inclusion, and content authenticity are not merely abstract ideals but foundational to the public good. Privacy safeguards individual autonomy and security, access ensures equitable participation in global digital spaces, inclusion fosters diversity and representation, and content authenticity maintains the integrity of digital interactions. Together, these principles help create a Musical Metaverse that serves not just corporate interests but the well-being of its users.

The ethical guidelines proposed in this paper align with and extend the broader ethical concerns identified in the literature. The emphasis on data privacy, content authenticity, and inclusivity in VMVs resonates with the ethical challenges discussed by Holzapfel et al. [12], Morreale [13], and Brusseau and Turchet [14]. By situating VMVs within these broader ethical frameworks, we can ensure that the development of the Musical Metaverse adheres to well-established ethical standards while addressing new challenges unique to this emerging technology.

## VI. CONCLUSION

Addressing the key ethical issues discussed is essential for ensuring the responsible production and consumption of VMVs in the Musical Metaverse. By focusing on data privacy, mental health, content creation, accessibility, and regulatory frameworks, stakeholders can promote ethical practices in this emerging field. These guidelines foster trust and engagement among users, ensuring that VMVs are produced and consumed in ways that respect users' rights and well-being.

Encouraging stakeholders to adopt these best practices is vital for creating a more ethical and inclusive Metaverse. Moreover, the industry can ensure that the Metaverse respects users' rights and well-being through collaboration and a commitment to high ethical standards, fostering a positive and sustainable future. As we continue to explore the landscape of the Musical Metaverse, it is essential to acknowledge and address the conflicting values and moral dilemmas that arise. By grounding our discussions in robust ethical frameworks and advocating for the public good, we can strive to create a Musical Metaverse that is both innovative and ethically sound.

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