

# Hatsune Miku, Virtual Idols, and Transforming the Popular Music Experience

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## Abstract

This article discusses the various ways that virtual idols have transformed music production, consumption, and performance in our digital society. Vocal synthesisers like Vocaloid have given amateur musicians accessibility into the industry, pushing the limits of vocal capability and preservation. This has resulted in a worldwide fandom which utilises Vocaloid characters in diverse ways. Virtual idols bear resemblance to real-life Japanese idols, yet they manage to circumvent the often strict lifestyles idols face while also playing into tropes surrounding otaku ('nerd') culture. It concludes by discussing how the experience and liveness of music concerts changes with virtual performers, and how live virtual concerts have continued during the COVID-19 pandemic.

## Recommended Music to accompany this article

['The Disappearance of Hatsune Miku,' composed by cosMo, performed by Hatsune Miku](#)

['Hello Morning,' performed by Kizuna AI at "hello, world" Kizuna AI 1st Live 2019](#)

['JAM GEM JUMP,' performed by GEMS COMPANY at MAGICBOX 2019](#)

['Clint Eastwood,' performed by Gorillaz at BRIT Awards 2002](#)

['Astronomical,' performed by Travis Scott at Fortnite x Travis Scott Astronomical 2020](#)

# Hatsune Miku, Virtual Idols, and Transforming the Popular Music Experience

Popular music is typically performed by human representatives. These ‘idols’—with unique pasts and personalities—are designed to closely interact with their often worldwide fanbases through social media and concerts. However, the twenty-first century has birthed a phenomenon where some performers exist entirely in virtual space. A noteworthy example is the Japanese idol Hatsune Miku, who has performed thousands of songs and has an adoring worldwide fanbase, yet has no physical form. Created by Crypton Future Media as a ‘Vocaloid’ synthesiser voicebank, Miku’s cute schoolgirl design with large, teal coloured twin tails kickstarted the Vocaloid’s popularity,<sup>[1]</sup> becoming a ‘virtual idol’ utilised by musicians and fans alike and even featuring in the Tokyo Olympics.<sup>[2]</sup> While Vocaloids have existed since 2004,<sup>[3]</sup> and other companies have succeeded with voicebanks in different languages,<sup>[4][5]</sup> this essay will focus on Miku as she is the most recognised.

Virtual idols have been widely discussed in sociological and musicological literature, as they highlight the connections between music and virtuality, and the participatory nature of online fandoms.<sup>[6]</sup> This essay aims to contribute to these discussions by exploring how virtual idols have transformed popular music creation, distribution, and consumption. First, it will discuss

[1] Crypton Future Media, “About HATSUNE MIKU | CRYPTON FUTURE MEDIA,” 2007, [https://ec.crypton.co.jp/pages/prod/virtualsinger/cv01\\_us](https://ec.crypton.co.jp/pages/prod/virtualsinger/cv01_us).

[2] BBC, “Tokyo 2020 Olympics | Trailer - BBC,” YouTube, June 29, 2021, <https://youtu.be/Qrym1Lk3c1Q>.

[3] VocaDB, “Vocaloid1 - Vocaloid Database,” 2016, <https://vocaldb.net/T/473/vocaloid1>.

[4] /thstars, “天矢禾念娱乐集团 | 洛天依官网 言和官网 乐正绫官网 乐正龙牙官网 墨清弦官网,” 2012, <http://www.thstars.com/>.

[5] Voctro Labs, “Voctro Labs — Vocaloid Voices,” 2013, <https://www.voctro-vocaloid.com/>.

[6] Sheila Whiteley and Shara Rambarran, eds., *The Oxford Handbook of Music and Virtuality* (New York, NY: Oxford University Press, 2016).

[7] Patrick W. Galbraith and Jason G. Karlin, eds., *Idols and Celebrity in Japanese Media Culture* (London: Palgrave Macmillan, 2012).

[8] Philip Auslander, *Liveness: Performance in a Mediatized Culture*, 2nd ed. (London: Routledge, 2008).

[9] GonGoss, “White Letter - Hatsune Miku,” Nico Nico Douga, September 9, 2007, <https://www.nicovideo.jp/watch/sm1028001>.

[10] Crypton Future Media, “Piapro,” 2007, <https://piapro.jp/>.

[11] Crypton Future Media, “Hatsune Miku and Piapro Characters,” Piapro, 2007, [https://piapro.net/intl/en\\_character.html](https://piapro.net/intl/en_character.html).

how synthesiser voicebanks help facilitate accessibility into the music industry, but also how their existence prompts debates surrounding personhood, agency, and labour. Second, it will examine how virtual idols parallel real-life idol and fandom relationships and raise awareness of representation, identity, and power balances in idol culture.<sup>[7]</sup> Finally, it will analyse how virtual performances question the ‘liveness’ of music concerts,<sup>[8]</sup> and how virtuality impacts both the concert experience and the music industry itself.

Miku debuted on August 31st, 2007 with the first full-length original compositions appearing on the Japanese video site Nico Nico Douga within a week.<sup>[9]</sup> Miku’s character began to transcend its original purpose when fan content created by composers (‘producers’), artists, and 3D modellers emerged on the site. In response, Crypton created Piapro (‘peer-producer’),<sup>[10]</sup> giving this growing community an exclusive platform to consume and share content for Crypton’s Vocaloids.<sup>[11]</sup> Fans of these characters actively engage in prosumerism,<sup>[12]</sup> a concept which describes fans’ proactive relationship with pre-existing works. During the ‘Web 2.0’ movement of the mid-2000’s,<sup>[13]</sup> a rich participatory culture was formed with new social media emerging to host communities.<sup>[14]</sup> TIME’s 2006 Person of the Year, ‘You’, was crowned to honour this shift towards user-generated activity.<sup>[15]</sup> Vocaloid perfectly encompasses prosumerism, as fans are responsible for everything these ‘crowd-sourced celebrities’ produce;<sup>[16]</sup> yet, this raises questions of immaterial labour from fans’ unpaid efforts, as they are essentially providing free advertising. However, Crypton maintain a balance by allowing fans to officially distribute songs under their record label KARENT, and by hosting contests to contribute costume designs<sup>[17]</sup> and concert setlists to commercial works.<sup>[18]</sup> Crypton’s 2021 Kickstarter campaign even gave their highest backers rights to choose props or songs for their online concert.<sup>[19]</sup> Fans’ time and money is ‘willingly conceded in exchange for the pleasures of communication’<sup>[20]</sup> with Vocaloid characters and fellow fans in this intrinsically participatory fandom.

[12] Alvin Toffler, *The Third Wave: A Classic Study of Tomorrow* (New York, NY: Bantam Books, 1980), 264.

[13] Tim O’Reilly, “What Is Web 2.0,” O’Reilly, September 30, 2005, <https://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html>.

[14] Henry Jenkins et al., “Confronting the Challenges of Participatory Culture: Media Education for the 21 St Century,” MacArthur Foundation, 2006, [https://www.macfound.org/media/article\\_pdfs/JENKINS\\_WHITE\\_PAPER.PDF](https://www.macfound.org/media/article_pdfs/JENKINS_WHITE_PAPER.PDF).

[15] Lev Grossman, “You -- Yes, You -- Are TIME’s Person of the Year,” TIME, December 25, 2006, <http://content.time.com/time/magazine/article/0,9171,1570810,00.html>.

[16] Carly Mallenbaum, “Meet Hatsune Miku, The ‘Crowd-Sourced Celeb,’” USAToday, September 29, 2013, <https://eu.usatoday.com/story/life/music/2013/09/29/hatsune-miku-vocaloid-singer/2877767/>.

[17] Crypton Future Media, “About SNOW MIKU - SNOW MIKU 2021,” Snow Miku, 2021, [https://snowmiku.com/2021/info\\_snowmiku\\_en.html](https://snowmiku.com/2021/info_snowmiku_en.html).

[18] Crypton Future Media, “HATSUNE MIKU EXPO SONG CONTEST,” Miku Expo, 2015, <https://mikuexpo.com/contest/>.

[19] Crypton Future Media, “Hatsune Miku Global Concert ‘HATSUNE MIKU EXPO 2021 Online’ by Crypton Future Media, INC.,” Kickstarter, 2021, <https://www.kickstarter.com/projects/cryptonfuturemedia/hatsune-miku-global-concert-hatsune-miku-expo-2021-online/description>.

## “She is on constant technological life support, living entirely through fans’ creative works.”

Voicebanks also transform musical output and artist permanence. Miku’s existence allows for a quantity of music which is ‘impossible and impractical to expect from a single person’, far surpassing and outliving any human idol.<sup>[21]</sup> However, Miku herself is a blank slate who cannot exist without external input. She cannot feel emotion on her own, so her songs mean nothing to her even if the lyrics imply otherwise. This contrasts greatly with real-life performers; songs with deep personal connections such as ‘thank u, next’<sup>[22]</sup> – which focuses on Ariana Grande’s past relationships – are impossible with virtual singers. Miku will never experience growth as a performer and develop her style over time, only receiving ‘updates’ which tweak her vocals. This ‘logocentric core’ of a human past, personality, and memories – which real-life musicians express through song – is absent with a virtual entity.<sup>[23]</sup> While this leads to greater freedom of interpretation towards Miku’s character, she is on constant technological life support, living entirely through fans’ creative works. In Japan, a poignant value is assigned to transient and fragile objects like Miku through a concept called *hakanai* (‘ephemeral’).<sup>[24]</sup> Miku’s fans appreciate the beauty of her brief existence and strive to create memories with her by interacting with her software and community. Renowned Vocaloid producer cosMo portrays this through his song ‘The Disappearance of Hatsune Miku’.<sup>[25]</sup> In the song, Miku acknowledges that she is a program created to mimic humans and that she feels nothing when she sings, expressing fear that she will be relegated to the ‘trash bin’ and sleep forever. CosMo’s lyricism reminds listeners of Miku’s true form as software completely dependent on its users. Miku’s life does not continue behind the screen; she lives to sing and sings to keep on living.

[20] Tiziana Terranova, “Free Labor: Producing Culture for the Digital Economy,” *Social Text* 18, no. 2 (2000): 48.

[21] Polygon, “Is Hatsune Miku a Better Pop Star than Justin Bieber? | Today I Learned,” YouTube, 2014, 05:26, [https://www.youtube.com/watch?v=8Kb\\_WBChA5U](https://www.youtube.com/watch?v=8Kb_WBChA5U).

[22] Ariana Grande, “Thank u, Next,” *Thank U, Next* (Republic Records, 2018), <https://youtu.be/5OeR5XBEahU>.

[23] Nick Prior, “STS Confronts the Vocaloid: Assemblage Thinking with Hatsune Miku,” in *Rethinking Music Through Science and Technology Studies*, ed. Christophe Levaux and Antoine Hennion (London: Routledge, forthcoming), 14.

[24] Mark Schreiber, “Furigana — for When You Need a Little Help with Kanji,” *The Japan Times*, June 24, 2013, <https://www.japantimes.co.jp/life/2013/06/24/language/furigana-for-when-you-need-a-little-help-with-kanji/>.

[25] cosMo, “The Disappearance of Hatsune Miku,” Nico Nico Douga, April 8, 2008, <https://www.nicovideo.jp/watch/sm2937784>.

[26] Lenka Kagamine, “Crystal Quartz - Saki Fujita & Hatsune Miku,” YouTube, October 7, 2012, <https://www.youtube.be/zcIx4pP6N4>.

[27] Roland Barthes, “The Grain of the Voice,” in *Image, Music, Text*, trans. Stephen Heath (London: Fontana Press, 1977), 179–89.

Miku amalgamates the virtual and real through her usage and discography, but most notably through her voice. Miku's voicebank consists of a database of vocal samples provided by Japanese voice actress Saki Fujita, which are modified to match the user's inputted lyrics and melody.<sup>[26]</sup> Pitch, speed, and volume can be modified to physically unachievable and sometimes unintelligible levels; the introduction to 'The Disappearance of Hatsune Miku', for example, clocks in at 240 BPM. When Fujita's voice is edited in these ways, the 'grain' within her singing is removed;<sup>[27]</sup> while her phonemes are originally man-made, they lack a distinct, indescribable vocal quality that demonstrates the skill and bodily control of an experienced human performer. Fujita's voice sounds increasingly artificial and 'schizophonic' – detached from its origin.<sup>[28]</sup> Yet, ultimately, she and all other voicebank providers will leave their voices behind, surpassing the body and surviving in the digital age. This has been witnessed before with the Edison phonograph, where the voices of long-deceased musicians were revived for modern listeners after the wax cylinders containing their recordings were digitised.<sup>[29]</sup> The difference with Vocaloid is that these voices are much more versatile than their human sources; voice providers must accept the eventuality that their voices will be modified and repurposed after death, and they willingly consent to this process upon recording. Evidently, Vocaloid is a unique culmination of virtual, human, past, and present, transforming music production, consumption, and preservation. Yet, these idols being controlled by their fans comes with its own concerns and comparisons.

“She lives to sing and sings to keep on living.”

While Miku exists as a voicebank, she has the appearance of a teenage girl with an age, height, and weight provided by Crypton.<sup>[30]</sup> Her vibrant hair and school uniform reflect the attire of Japanese pop idols, young singers who entertain the masses. Idol culture in Japan and other Asian countries has flourished since the 1970s,<sup>[31]</sup> but virtual idols have recently soared in popularity internationally as 'Virtual YouTubers',<sup>[32]</sup> hosting livestreams

[28] Raymond M. Schafer, "Schizophonia," in *The New Soundscape: A Handbook for the Modern Music Teacher* (Scarborough, ON: Berandol Music Limited, 1969), 43–48.

[29] University of California, "Pilottech | UCSB Cylinder Audio Archive," UC Santa Barbara Library, 2005, <http://cylinders.library.ucsb.edu/pilottech.php>.

[30] Crypton Future Media, "About HATSUNE MIKU | CRYPTON FUTURE MEDIA."

[31] Patrick W. Galbraith and Jason G. Karlin, "Introduction: The Mirror of Idols and Celebrity," in *Idols and Celebrity in Japanese Media Culture*, ed. Patrick W. Galbraith and Jason G. Karlin (London: Palgrave Macmillan, 2012), 2.

[32] James Chen, "The Vtuber Takeover of 2020," Polygon, November 30, 2020, <https://www.polygon.com/2020/11/30/21726800/holive-vtuber-projekt-melody-kizuna-ai-calliope-mori-vshojo-youtube-earnings>.

[33] VocaloidArchive, "キズナ AI 単独1stライブ「Kizuna AI 1st Live 'Hello, World'」独占生中継," YouTube, November 15, 2020, 00:01:40, <https://youtu.be/id4ADlg9LJE?t=100>.

[34] Grapee, "Kizuna AI's 2nd Online Concert 'Hello, World 2020' Wows Fans; Archive Viewable until Jan. 26," 2021, <https://grapee.jp/en/163824>.

[35] GEMS COMPANY 公式チャンネル, "【GEMS COMPANY 1st LIVE】Magic Box MC Citrossのじかん," YouTube, March 15, 2020, 0:03:14, <https://youtu.be/>

and using motion-capture software to animate their avatars in concerts.<sup>[33][34][35]</sup> The first ‘VTuber’ Kizuna AI debuted in 2016,<sup>[37]</sup> gaining over four million subscribers across three channels.<sup>[37][38][39]</sup> A recent example, GEMS COMPANY, consists of twelve idols with individual YouTube accounts run by their anonymous voice actresses.<sup>[40]</sup> These idols’ varying levels of virtuality all change how they are presented and consumed.

Real-life idols have incredibly strict, regulated lives to maintain a certain image for their fans. Food portions are restricted to keep idols looking slim,<sup>[41]</sup> with harsh consequences for failing to meet expectations.<sup>[42]</sup> Idols are banned from having public relationships to maintain fan appeal, with a notable scandal involving AKB48’s Minami Minegishi shaving her head after being caught having a secret boyfriend.<sup>[43]</sup> Idols’ safety can also become compromised, with one idol being stabbed sixty times by a stalker.<sup>[44]</sup> Virtual idols, however, will never experience these issues; their private life remains intact without having to maintain a strict lifestyle, improving lives without endangering their own. These manufactured, ‘hyperreal’ identities attempt to simulate the experience of a real-life idol,<sup>[45]</sup> but with the ‘human’ aspects removed. Existing perpetually within this idol fantasy, their innocent and child-like image remains unchanged.<sup>[46]</sup> ‘Graduation’ from a group – a term emphasising the youthful quality idols are expected to uphold – is impossible for idols like Miku. In contrast, GEMS have been reduced to nine members as voice providers have graduated, showing their closer connection to reality and ability to be affected by it.<sup>[47]</sup> Since virtual idols’ avatars are detached from real life, there is no pressure to appear a certain way. Meanwhile, real-life idols’ public image is put under strict mediation by their management to construct and control a perfect, idealised version of reality.<sup>[48]</sup> Promotional videos and photos are edited to remove blemishes or human error; occasionally fulfilling fans’ desires to see certain idols together. These images and interactions become commodities for fans to share amongst themselves,<sup>[49]</sup> with the online trend of ‘fancams’ (short videos of idol performances posted on social media) acting as promotion for these groups.<sup>[50]</sup> Virtual idols, and especially Vocaloids, seek to replicate this commodification. Vocaloid fancams

[36] Kizuna AI Inc., “Kizuna AI Official Website,” 2016, <https://kizunaai.com/en>.

[37] Kizuna AI Inc., “A.I.Channel,” YouTube, 2016, <https://www.youtube.com/channel/UC4YaOtlyT-ZeyB0OmxHgoLA>.

[38] Kizuna AI Inc., “A.I.Games,” YouTube, 2017, <https://www.youtube.com/c/AIGamesdayo/>.

[39] Kizuna AI Inc., “A.I.Channel China,” YouTube, 2019, <https://www.youtube.com/channel/>

[40] Square Enix and DEARSTAGE, “GEMS COMPANY 公式サイト,” 2019, <https://gemscompany.jp/>.

[41] Koreaboo, “The Size of Japanese Idols’ Meals Is Shocking,” April 4, 2017, <https://www.koreaboo.com/stories/the-size-of-japanese-idols-meals-is-shocking/>.

[42] Patrick St Michel, “BiS Leader Suspended by Manager for Failing to Meet Weight Target,” SBS PopAsia, September 26, 2017, <https://www.sbs.com.au/popasia/blog/2017/09/26/bis-leader-suspended-manager-failing-meet-weight-target>.

[43] BBC News, “AKB48 Pop Star Shaves Head after Breaking Band Rules,” February 1, 2013, <https://www.bbc.co.uk/news/world-asia-21299324>.

[44] Maya Oppenheim, “Japanese Pop Star Mayu Tomita Sues Government for Inaction after Stalker Stabbed Her 60 Times,” The Independent, July 14, 2019, <https://www.independent.co.uk/news/world/asia/mayu-tomita-japan-stalker-stabbing-lawsuit-government-pop-star-sues-a9004261.html>.

[45] Jean Baudrillard, *Simulacra and Simulation*, trans. Sheila Faria Glaser, English Ed (Ann Arbor, MI: University of Michigan Press, 1994).

[46] Daniel Black, “FCJ-054 Digital Bodies and Disembodied Voices: Virtual Idols and the Virtualised Body,” *The Fibreculture Journal* 1, no. 9 (2006).

[47] Square Enix and DEARSTAGE, “ABOUT | GEMS COMPANY 公式サイト,” 2019, <https://gemscompany.jp/about/>.

are created from footage of past concerts, and the commodity can be created and shared through fan works. Vocaloids' dissemination means that their image cannot be entirely mediated, and fans have more control than with real-life idols. However, this practice comes with risks, as fans may become too absorbed in the excitement of virtuality and raise issues of control and gender imbalance.

Vocaloid's significant popularity can be largely attributed to the rise of *otaku* ('nerd') culture,<sup>[51]</sup> a term which describes individuals who struggle with social interactions and have intense obsessions with their hobbies, including manga, animé ('animation') and idols.<sup>[52]</sup> Otaku are often known to fixate on animated women and form parasocial, one-sided relationships with them; video games like THE IDOLM@STER<sup>[53]</sup> cater to these desires by employing first-person camera shots and nicknames so players can insert themselves as the protagonist.<sup>[54]</sup> Vocaloids cater perfectly to otaku, as their virtuality means that they can sing and be worshipped forever. Poorer sales of an earlier male voicebank resulted in an abundance of young female idols,<sup>[55]</sup> with fans able to literally 'buy' them and place them into any situation they desire. Crypton Vocaloids' original illustrations fall under the 'Attribution-NonCommercial 3.0 Unported' Creative Commons licensing,<sup>[56]</sup> which allows for redistribution, transformation, and adaptation so long as it is non-commercial and does not encroach upon 'publicity, privacy, or moral rights.'<sup>[57]</sup> This detailed permission to create derivative works has fuelled the growth of the Vocaloid community, resulting in countless niche subcultures, or *doujin* circles ('fan groups'). These communities use Vocaloids as vessels to convey diverse ideas and hardships that they may have struggled to express elsewhere.<sup>[58]</sup> These include explorations of sexuality,<sup>[59]</sup> sensitive topics like abuse<sup>[60]</sup> and eating disorders,<sup>[61]</sup> or occasionally suggestive themes. One song includes the Vocaloid Kagamine Len<sup>[63]</sup> singing about his genitalia and powers of seduction,<sup>[64]</sup> pornographic *doujinshi* ('fan-created comics') featuring Vocaloids have been sold at conventions,<sup>[64]</sup> and a thirty-five-year-old man even declared his marriage to Hatsune Miku.<sup>[65]</sup> However, Crypton's 'canon' ages; character traits are merely guidelines used for marketing and can essentially be disregarded in fan works, as their blank slate

[48] Antoine Hennion, "Music and Mediation: Towards a New Sociology of Music," in *The Cultural Study of Music: A Critical Introduction*, ed. Martin Clayton, Trevor Herbert, and Richard Middleton (London: Routledge, 2003), 81-82.

[49] Patrick W. Galbraith, "Idols: The Image of Desire in Japanese Consumer Capitalism," in *Idols and Celebrity in Japanese Media Culture*, ed. Patrick W. Galbraith and Jason G. Karlin (London: Palgrave Macmillan, 2012), 186, <https://doi.org/10.1057/9781137283788>.

[50] Sage Anderson, "Reply Sections on Twitter Are Filled with K-Pop Videos. Here's Why," Mashable UK, July 31, 2019, <https://mashable.com/article/kpop-twitter-fancam-reply-trend/>.

[51] Nakamori Akio, "This City Is Full of Otaku," trans. Matthew Alt, *Manga Burikko*, June 1983.

[52] Sharon Kinsella, "Japanese Subculture in the 1990s: Otaku and the Amateur Manga Movement," *The Journal of Japanese Studies* 24, no. 2 (1998): 314, <https://doi.org/10.2307/133236>.

[53] Metro and Namco, "THE IDOLM@STER" (Tokyo, Japan: Namco, 2005).

[54] Forrest Greenwood, "A Spectral Pop Star Takes the Stage: Hatsune Miku and the Materialization of the Ephemeral in Contemporary Otaku Culture," *Ephemeral Traces* 33, no. 1 (2013): 13.

[55] Yuka Okada, "クリプトン・フューチャー・メディアに聞く(2): 「初音ミク」ができるまで(1/2)," *ITMedia News*, February 22, 2008, <https://www.itmedia.co.jp/news/articles/0802/22/news013.html>.

[56] Crypton Future Media, "Piapro.Net - For Creators," Piapro, 2007, [https://piapro.net/intl/en\\_for\\_creators.html](https://piapro.net/intl/en_for_creators.html).

[57] Creative Commons, "Attribution-NonCommercial 3.0 Unported — CC BY-NC 3.0," accessed August 31, 2021, [https://creativecommons.org/licenses/by-nc/3.0/deed.en\\_US#](https://creativecommons.org/licenses/by-nc/3.0/deed.en_US#).

[58] Jelena Guga, "Virtual Idol Hatsune Miku: New Auratic Experience of the Performer as a Collaborative Platform," in *ArtsIT: International Conference on Arts and Technology*



identities and licensing allow for transformation of any kind including race, age, and gender identity. Crypton is aware of how Vocaloids' identities have transformed under public influence from illustrations, to software, to an entire web of communities, and they openly embrace the fans' varying interpretations by featuring them in concerts and other media.

Virtuality allows for a closer involvement between fan and idol, with the fans' ownership and control of Vocaloids acting similarly to the mediation of image that real-life idols face. So far, these virtual idols have been of Japanese origin, but Western countries have seen exposure to virtual idols through another aspect of music culture: live concerts. In-person events allow fans to see their idols in the flesh, allowing for social interactions which studio recordings cannot replicate. Replace these singers with virtual stars, and this experience changes significantly.

## “Can a virtual concert be considered ‘live’?”

Vocaloid concerts operate using a three-dimensional projection of the characters which, unlike real-life singers, can instantly change costumes and sing for hours without breaks. Vocaloids will never be affected by illness, personal tragedy, or death, and if the technology exists to host them with enough interest, they could perform forever. However, they are bound to a concert's setlist. Improvisation is impossible, and songs will never be removed due to a singer's personal preference.<sup>[66]</sup> Their virtuality also prevents fans from truly meeting them in person; their only audience interactions are predetermined and non-specific,<sup>[67]</sup> and personalised Meet & Greets are replaced by photoshoots with Miku's projection onstage.<sup>[68][68]</sup> These interactions raise the question: Can a virtual concert be considered 'live'? Philip Auslander argues that 'live' events are increasingly mediated through sound amplifiers and screens, meaning that the experience is not truly 'live' due to technical delays.<sup>[7]</sup> This applies to Vocaloid concerts through their use of projectors to show the performers, as well as the fact that Vocaloids' voices and

(Istanbul, 2014), 38, [https://doi.org/10.1007/978-3-319-18836-2\\_5](https://doi.org/10.1007/978-3-319-18836-2_5).

[59] Minato, “Magnet 【Hatsune Miku・Megurine Luka Original】,” Nico Nico Douga, May 1, 2009, <https://www.nicovideo.jp/watch/sm6909505>.

[60] Kikuo, “[Official HQ]Kikuo - 君はできない子 ‘Kimi Wa Dekinai Ko,’” YouTube, March 23, 2013, <https://youtu.be/nPF7lit7Z00>.

[61] GHOST, “v4 Flower Appetite of a People-Pleaser Original Song,” YouTube, January 23, 2018, <https://youtu.be/kf3Err9MvDg>.

[62] Crypton Future Media, “クリプトン | 鏡音リン・レン Act2 ( KAGAMINE RIN/LEN Act2 ) | クリプトン,” 2007, <https://ec.crypton.co.jp/pages/prod/vocaloid/cv02>.

[63] GigaP, “Kagamine Len - Gigantic OTN,” Nico Nico Douga, December 8, 2012, <https://www.nicovideo.jp/watch/sm19532707>.

[64] Christopher Wicoff, “Hatsune Miku: The Reality of a Fake Pop Star,” *Colorado Journal of Asian Studies* 2, no. 1 (2013): 6.

[65] Emika Jozuka, “The Man Who Married an Anime Hologram,” CNN, December 29, 2018, <https://edition.cnn.com/2018/12/28/health/rise-of-digisexuals-intl/index.html>.

[66] Kelli Boyle, “Ariana Grande's ‘Sweetener’ Tour Setlist Is Missing Major Songs, But Twitter Still Loves It,” *Elite Daily*, March 19, 2019, <https://www.elitedaily.com/p/ariana-grandes-sweetener-tour-setlist-is-missing-major-songs-but-twitter-still-loves-it-16966447>.

[67] XDizon, “MIKU EXPO LONDON 2020 LIVE (BARRIER POV),” YouTube, January 12, 2020, 00:12:40, [https://youtu.be/PlQIdq5mv\\_k?t=760](https://youtu.be/PlQIdq5mv_k?t=760).

[68] Ravel Cosplay, Twitter, December 7, 2018, <https://twitter.com/ravelcosplay/status/1071148263296897024>.

[69] Miku Expo, Twitter, November 9, 2018, <https://twitter.com/mikuexpo/status/1060723327549861888>.

movements are assembled long beforehand. Errors can still occur, however; one concert played the wrong track and ‘muted’ Miku’s voice, playing the backing musicians’ guide track instead.<sup>[71]</sup> This malfunction offers an interesting glimpse into the various components that ensure these concerts’ success, even with a pre-recorded singer.

While it could be argued that Miku’s ‘performance’ itself is not live, these concerts still have aspects of liveness that the audience can appreciate. Each tour features a live band of musicians,<sup>[72]</sup> with their backing adding a unique, irreplicable flair to the performances. Audience participation using light-up glow sticks has become a staple at Vocaloid concerts, fans waving them in time with the music and changing colour according to the character onstage.<sup>[73]</sup> Every fan instinctively knows when to perform these actions, collaborating with fellow fans in real-time with no rehearsal needed. Everyone who attends these concerts is taking part in the musical experience, and therefore can be described as ‘musicking’;<sup>[74]</sup> this ranges from singers, dancers, and technicians to audience members, ticketers and merchants, as their combined actions contribute to the concert’s success even if they are not inherently musical. Virtual concerts involve visual artists, motion developers, and model riggers, and with Vocaloid, the producers and artists behind the costume designs and merchandise also participate in musicking. These concerts allow amateur songwriters and freelance artists to collaborate with professional technicians and sound designers on an official product for fans, by fans. Every wave of a glowstick becomes a visual depiction of the collaboration that lies at the heart of Vocaloid’s history, and a celebration of the community which helped it flourish.

Several mainstream Western musicians have utilised Vocaloids over the years, including Lady Gaga featuring Miku in her ART-POP tour,<sup>[75]</sup> and Porter Robinson using the Vocaloid Avanna in ‘Sad Machine’.<sup>[76]</sup> However, the Western music scene has also had its own virtual performers. The British virtual band Gorillaz are the most successful of these, releasing seven albums and collaborating with various musicians to voice the four characters.<sup>[77]</sup> Their 2002 BRIT Awards performance launched them into the spotlight, with the band performing on a large screen as the real

[70] Philip Auslander, “Live Performance in a Mediatized Culture,” in *Liveness: Performance in a Mediatized Culture*, 2nd ed. (London: Routledge, 2008), 25.

[71] Codigozipx, “Hatsune Miku Live Party at Kansai 2013 Po Pi Po,” YouTube, March 20, 2019, <https://www.youtube.be/RXTsN2geBpw>.

[72] XDizon, “MIKU EXPO LONDON 2020 LIVE (BARRIER POV),” YouTube, January 12, 2020, 01:09:56, [https://youtu.be/PlQJdq5mv\\_k?t=4196](https://youtu.be/PlQJdq5mv_k?t=4196).

[73] Crypton Future Media, “Hatsune Miku and Piapro Characters.”

[74] Christopher Small, *Musicking: The Means of Performing and Listening* (Middletown, CT: Wesleyan University Press, 1998).

[75] VocaloidLiveConcert, “Glass Wall~Hatsune Miku~P1~S1~Lady GaGa Opening Concert~Eng Subs,” YouTube, June 20, 2014, [https://youtu.be/Wz31zeNAL\\_M](https://youtu.be/Wz31zeNAL_M).

[76] Porter Robinson, “Sad Machine” (United States: Astralwerks, 2014), <https://youtu.be/HAIDqt2aUek>.

[77] Michael Rancic, “These Are the 20 Best Gorillaz Collaborators,” VICE, April 12, 2017, [https://www.vice.com/en\\_uk/article/8qp9z5/20-best-gorillaz-collaborators](https://www.vice.com/en_uk/article/8qp9z5/20-best-gorillaz-collaborators).

[78] Jonathan C. Eastwood, “Gorillaz - Clint Eastwood (Live Brits Awards Performance),” YouTube, September 1, 2014, [https://youtu.be/L\\_Xk6yTxNEE](https://youtu.be/L_Xk6yTxNEE).

[79] John Richardson, “‘The Digital Won’t Let Me Go’: Constructions of the Virtual and the Real in Gorillaz’ ‘Clint Eastwood,’” *Journal of Popular Music Studies* 17, no. 1 (2005): 3.

[80] SnoopDoggTV, “Tupac Hologram Snoop Dogg and Dr. Dre Perform Coachella Live 2012,” YouTube, April 18, 2012, <https://youtu.be/TGbrFmPBV0Y>.

[81] Base Hologram, “Productions | Base Hologram,” accessed September 4, 2021, <https://basehologram.com/productions>.

musicians were obscured from view.<sup>[78]</sup> Gorillaz's founder, Damon Albarn, created the band to critique the commodification of pop stars, keeping the band members' private lives secret; however, his pre-existing fame with the band Blur prevents him from doing the same.<sup>[79]</sup> Another example is '2.0 Pac',<sup>[80]</sup> a projection of the late rapper Tupac Shakur who performed at Coachella 2012, kickstarting a trend of deceased musicians being 'revived' through holograms.<sup>[81]</sup> Miku was even scheduled to make her debut at Coachella in 2020,<sup>[82]</sup> but the COVID-19 pandemic suspended live events.

Unexpected occurrences have brought a halt to concerts before, but never on this scale. The pandemic has devastated the livelihoods of musicians and venues, with an estimated \$26.1 billion loss in the United States alone.<sup>[84]</sup> Artists have since been experimenting with methods to revive live music, and virtual concerts have proven themselves to be a worthwhile investment. The most attended concert of 2020 was held within the video game *Fortnite*,<sup>[85]</sup> registering over twelve million live attendees.<sup>[86]</sup> Participants were free to walk around in-game as a larger-than-life avatar of Travis Scott performed both underwater and in space, from the comfort of participants' homes.<sup>[87]</sup> Ariana Grande followed suit with her Rift Tour, even including mini-games for attendees to play.<sup>[88]</sup> Free admission to these concerts means that their profits come from in-game merchandising, with the turnout of Travis' concert alone proving their lucrative potential and worldwide outreach. And as the pandemic continues to disrupt in-person concerts, this trend will likely continue as more artists explore its capabilities. Virtual concerts have transformed live music into a more interactive experience for its audience, enabling a greater level of immersion no matter where or who they are. This increase of virtuality within concerts suggests that Miku paved the way towards the future of live music before the pandemic began.

[82] Claire Shaffer, "Hatsune Miku, Holographic Japanese Idol, Makes Her Coachella Debut," *Rolling Stone*, January 3, 2020, <https://www.rollingstone.com/music/music-news/hatsune-miku-coachella-933263/>.

[83] Daniel Kreps, "Gorillaz Abruptly End Roskilde Set after Rapper Falls off Stage," *Rolling Stone*, July 8, 2018, <https://www.rollingstone.com/music/music-news/gorillaz-abruptly-end-roskilde-set-after-rapper-falls-off-stage-696880/>.

[84] Elijah Chiland, "Are Virtual Concerts the Future of Live Entertainment?," *Los Angeles Business Journal*, March 1, 2021, <https://labusinessjournal.com/news/2021/mar/01/are-virtual-concerts-future-live-entertainment/>.

[85] Epic Games, "Fortnite" (Cary, NC: Epic Games, 2017).

[86] Todd Spangler, "Travis Scott Destroys 'Fortnite' All-Time Record With 12.3 Million Live Viewers," *Variety*, April 24, 2020, <https://variety.com/2020/digital/news/travis-scott-fortnite-record-viewers-live-1234589033/>.

[87] Travis Scott, "Travis Scott and Fortnite Present: Astronomical (Full Event Video)," YouTube, April 26, 2020, <https://youtu.be/wYeFAIVC8qU>.

[88] Faiz, "Fortnite x Ariana Grande FULL EVENT!," YouTube, August 6, 2021, <https://www.youtube.be/iTiBp-ORNEo>.

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