The animation medium in the realm of Vocaloid: A multidimensional semiotic overview

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ABSTRACT

The digital voicebanks / virtual idols known as 'Vocaloids' are associated with a vast and diverse repertoire of artifacts, most of which are not industry-sourced but rather the product of self-published hobbyist labor. Among the diverse media through which Vocaloid culture has developed and spread, the animation medium stands out for its variety of uses and the multiplicity of affordances it provides. Not only have the animation practices surrounding Vocaloid impacted the objectual consumption of these entities both as musical instruments and as virtual idol personas, but they have also given rise to the development of new specialized software tools, in addition to having propagated fandom-distinguishing subcultural markers and genre-defining aesthetic orientations to be found within the vast corpora of artistic productions utilizing the Vocaloid technology and / or characters. This article examines these practices from a semiotic perspective by reflecting on their underlying technological and cultural conditions of development and the manners in which they may serve as both subcultural and genre-identifying signifiers in the resulting repertoire of user / fan-generated media. It furthermore looks at how the generation of and engagement with kinetic scripts in the animation practices tied to Vocaloid are seen to incorporate materialities that are exogenous to the medium and considers the role of animation in the playful engagements of users and fans with the virtual idol characters. Finally, it examines some of the aesthetic features that particularly distinguish the repertoire of Vocaloid music videos, most notably in their recourse to principles of limited animation.

1. Introduction

The concatenative voice synthesis technology commonly known as *Vocaloid* has been at the center of a vast body of crowd-sourced artistic production since its first release to the public in 2004. Though the name 'Vocaloid'[1] has become chiefly evocative of the now emblematic virtual idol characters associated with the various voicebanks it utilizes, it appears that the primary intent behind the development of these software products may not have initially been so much to create virtual idols, but foremost to produce digital musical instruments (Itoh, as cited in Okada 2008).

In the progression of these entities from the status of mere musical instruments to that of fully-fledged virtual idols, mainly at the hands of user/fan hobbyists, the recourse to kinetic ensoulment through various animation techniques has played a key role. Not only have such animation practices impacted the objectual consumption of the entities known as 'Vocaloids,' but they have also led to the development of new animation software tools and to the emergence of fandom-distinguishing subcultural markers and genre-defining aesthetic orientations to be found within the vast corpora of artistic productions utilizing the Vocaloid technology and/or characters.

This article aims to examine these practices from a semiotic perspective by reflecting on the technological and cultural conditions that have shaped their development and the manners in which they may serve as both subcultural and genre-identifying signifiers in the resulting repertoire of user/fan-generated media. It furthermore looks at how the generation of and engagement with kinetic scripts in the animation practices tied to Vocaloid are seen to incorporate materialities that are exogenous to the medium and considers how they may serve in the playful engagements of user/fans with the virtual idol characters themselves. Finally, from a semiotic point of view, it examines some of the aesthetic features that particularly distinguish the repertoire of Vocaloid music videos, most notably in the recourse to principles of limited animation.

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[1] VOCALOID™, a trademark of Yamaha Corporation, refers to a set of digital vocal synthesis software products released or licensed by Yamaha. Colloquially, the term 'Vocaloid' is, in practice, most often employed to designate any concatenative synthesis software voicebank or associated character such as those produced by Yamaha or by other manufacturers, and even sometimes to designate unofficial, fan-created Vocaloid-derivative characters. In this article, the term 'Vocaloid' is generally used in the common, broader colloquial sense while reference to Yamaha's trademarked brand name is distinguished by its capitalized letter case stylization.

2. The Vocaloid technology and its associated virtual idol characters

The anthropomorphic characterization of the very first Vocaloids to reach the market – a pair of English-language voicebanks produced by British company Zero-G (Zero-G Development 2004a, 2004b), intended for use by technologically-savvy professional musicians – was initially limited to their designation by human names (LEON and LOLA, respectively) as well as to pronouns that were both speciated and gendered ('he' and 'she,' rather than 'it' and 'it'), as shown in the product descriptions and various announcements by the manufacturer.

Rather than serving the narrative purpose of character development, the box art for both software products (Figure 1) modestly used variants of the same stock image depicting a female pair of lips in profile, in one case decolorized and flipped, while the 'gender' attributed to each synthetic voice was notably underscored by the typographic stylizations using the male and female planetary gender symbols, these being in conformance with the genders of the human providers upon whose vocal substance these digital voicebanks were based. The real-world identities of the human providers of the vocal specimens for these early Vocaloid voicebanks remained undisclosed, in contrast to the manufacturer's later release of the Vocaloid MIRIAM, based on the voice of South African-born singer Miriam Stockley, represented in both name and photographic image on the product box, and to whose real-world identity the digital voicebank was closely tied.

Figure 1. Box art for the LEON and LOLA Vocaloids by Zero-G, historically the first Vocaloid voicebanks to be commercially released. Images © Zero-G Ltd.

Figure 2. Box art for the current releases (VOCALOID™ 3) of Crypton's MEIKO and KAITO Vocaloids. Art by iXima © Crypton Future Media, INC. www.piapro.net

As for the Japanese Vocaloids, it was only later the same year that Crypton Media Future Inc. would begin releasing libraries associated with graphically-developed anime-style characters for use with the VOCALOID™ software (colloquially designated as 'Cryptonloids' by fans), the first of which, designated as MEIKO and released in 2004, being marketed as a female-gendered voicebank character (based on real-world singer Meiko Haigou), and a second one, named KAITO, released in 2006, marketed as male-gendered (based on the voice of the singer known as Naoto Fuuga). It may be contended that this visual characterization of the voicebank personifications eventually favored their development into fully-fledged virtual idol personas and stimulated their playful figuration by users and fans within a wide body of media productions, including numerous animation videos.

Though still considered to this day to form somewhat of a 'niche' interest, it is, however, only with the later release, in 2007, of the voicebank known as Hatsune Miku (Figure 3), derived from the vocal substance provided by voice actress Saki Fujita, that the Vocaloid technology began to gain widespread visibility and to achieve anything akin to commercial success.[2] Following this, another concatenative vocal synthesis software called UTAU was developed and released as shareware starting in 2008, rendering the confection of one's own vocal synthesis digital libraries widely accessible and spurring the rise of a plethora of novel digital voicebank characters to be projected into the narrative universe of Vocaloid, most often in conjunction with the recourse to graphical avatars to be used in fanart, cosplay, and/or animation videos, just like the Vocaloids, with some UTAUs even being integrated into industry-sourced Vocaloid-themed products.[3]

Figure 3. Crypton's Hatsune Miku, most famous among the Vocaloids. Art by iXima © Crypton Future Media, INC. www.piapro.net

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[2] It must be noted that Crypton Future Media's latest installment of Hatsune Miku, that is, Hatsune Miku NT (New Type), released in 2020, rather uses Crypton's own *Piapro Studio NT* editor.
[3] We may think, for instance, of the availability of the Kasane Teto UTAU character in games of the *Project DIVA* series by Sega.

The two-pronged nature of the Vocaloids (and UTAUs) as both musical instruments and virtual idols leads us to reflect, from an object-oriented semiotic perspective, on their artifactual status and on the semiotic practices through which each of these natures are realized. This article contends that as these vocal synthesis library characters developed into virtual idols, the fictional embodiment that solidified their constitution into doll figures of sorts was achieved through a broad set of decentralized semiotic mediations, which included, among others, a vast array of animation practices adopted by music creators, dedicated animators, and fans alike, be it, for instance, to produce music videos to accompany audio tracks using Vocaloid synthesizers or as an autonomous vector through which to engage in play with the visual representations of the personified voicebank characters. Thus, the visual constitution of the fictional personas of the Vocaloids, galvanizing the enthusiasm the latter garnered from a subcultural demography in considerable measure made up of *otaku*,[4] became central among the semiotic objectification[5] practices underlying the crowd-sourced development of these ontologically dual entities. So much so that even the avatarless Vocaloids, including the aforementioned early Voicebanks released by Zero-G, came to be endowed with their own, fanon-based avatars to be used namely in fanarts, cosplay, and, as interests us here, in fan-made animations where they would homogeneously coexist with the official, industry-sourced anthropomorphic representations of the commercial Vocaloids as well as with those of the UTAUs or even *fanloids* – the latter constituting the unofficial characters derived by fans from preexisting Vocaloids, characters that will in most cases present designs that exhibit their objectual genealogy by conserving key identifying features of their source object, with which they are often made to interact in the user/fan imagined narratives utilizing them.[6]

In terms of their objectual constitution, like dolls, the Cryptonloids were quite purposefully provided with only minimal character specification, thus leaving them with significant areas of indeterminacy to favor the creative agency of users (see the comments by Crypton developer Sasaki Wataru, as reported in Macias 2011). On the other hand, some of the Vocaloid characters remain closely entangled with the identity of their voice provider, that is, with the identity of the human entity from whose vocal substance they were materially derived (as in the case of the Vocaloids Gakupoid, Yohioloid, and Fukase, derived respectively from the vocal substances of human singers

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[4] See in this respect Karin de Rouville's 2023 paper on the topic of how the relation of Vocaloid to *otaku* subculture actually extends far beyond the mere question of the image.

[5] The semiotic practices by which they are constituted into objects (artifacts).

[6] One example may be found in the animation music video by Atora (2009) for Suzuki-P's *Nishiki no Mai* [Dance of Brocade] (2008), which figures in both audible and visible form Internet Co. Ltd.'s Vocaloid Gackpoid and his gender-bent fan-derivative Gakuko, uploaded to: https://www.nicovideo.jp/watch/sm8620311

Gackt, Yohio, and Satoshi Fukase), while in other cases, their identity remains closely intertwined with the identity of another, preexisting fictional character of which they are deemed to be the embodiment in Vocaloid form (as in the case of Gachapoid, derived from cartoon character Gachapin, and of ARSLoid, derived from 2.5D dance unit ARSMAGNA character Akira Kano[7]).

Thus, it must be considered that the animation practices engaged by several Vocaloid users and fans occur within multi-layered schemes of semiotic objectification, with the kinetically ensouled visual representations employed therein having in some cases as a final object either a character distinct from the Vocaloid locally executing its role, the Vocaloid character itself in its own transcending identity, or with such Vocaloid character (simultaneously) serving as a medium towards a real-world artist or other entity with which it stands in a relation of rigid historical dependence – to employ a term used in the artifactualist ontology of Thomasson (1999). By virtue of this, many fans have been keen on playfully leveraging the indexical link between the Vocaloid character and its voice provider, including their recourses to the animation medium.[8] It must be noted that in the animations or other narratively operative semiotic practices where Vocaloids are made to perform characters 'other' than themselves – thereby instituting a regime of second-order fictionality – rarely do the respective identities of each character (of the character local to the piece and the Vocaloid character 'performing' said local character) remain, ontologically speaking, fully hermetic to one another. Instead, by virtue of the feedback dynamics between performer and performed taking place in the semiotic realization of the performance, the identity of the Vocaloid is likely to be accreted with the determinations of the performed character and reciprocally, regardless of the author's actual intent.

Be this as it may, it should equally be stressed that in enabling the kinetic ensoulment of the visible representation of the Vocaloid characters, the animation medium provided not only a supplementary means of character instantiation to support the musical usage of the software but itself became a vector of play in its own right – one often even completely autonomized with respect to the musical purpose of the Vocaloid.[9] As for the distinguishing features developed by the animation practices surrounding Vocaloids, one will find that they were facilitated by the convergence of a specific set of technological and subcultural conditions, which we will now proceed to overview.

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[7] Himself performed by real-world artist Keiichi Oosemachi. See ARSMAGNA's character list at: https://ars-magna.jp/chara/

[8] For an example, see the MMD animation video by Sukaretto Gonzales (2020) where PowerFX's Vocaloid Yohioloid is made to perform a cover of a song originally performed by its own voice provider, Swedish singer Yohio, uploaded to: https://www.youtube.com/watch?v=I13z-oI_F80

[9] One may think of the numerous animation videos where Vocaloid models are used to perform preexisting comedic sketches, gesticulating and lip-syncing to the voices of human comedians having nothing to do with Vocaloid.

3. The Vocaloid (sub)cultural ecosystem and its technological underpinning

The popularization of the Vocaloids and the development of the semiotic and sub-cultural practices surrounding them was, from a historical standpoint, narrowly tied to the development of the Internet and, particularly, to a specific range of content-sharing platforms. Such platforms, favoring the fandom-sourced conventionalization of many of the visual, acoustic, and narrative attributes of each Vocaloid persona, developed around the same time as the release of Crypton's Hatsune Miku. Thus, the formation of the cultures surrounding these platforms was intertwined with the semiotically-based evolution of the entities known as Vocaloids into virtual idols. In particular, the Niconico Douga video-sharing site,[10] set up in 2006 and of which Vocaloid-related media still forms a significant proportion of the content to this day, became a privileged channel for disseminating Vocaloid music. Its capability for audio-visual diffusion may have contributed to the simultaneous emergence of genre-specific conventions around Vocaloid music videos and adjoining semiotic practices.[11] Parallel to this, the illustration-focused art-sharing website Pixiv,[12] launched in 2007, became another essential platform for the development of Vocaloid-related visual content, while Crypton set up its own online peer-production platform named Piapro,[13] intended to favor the development and sharing of user-generated content related to the Crypton Vocaloid characters.[14] The latter aim was achieved not only by Crypton's establishment of the platform but also by its design of a favorable, modular licensing scheme (akin to the Creative Commons licenses). The site thus enabled the sharing of single-media materials (for instance, illustrations, text, audio, and animatable 3D models) and the possibility for their creators to define specific terms of usage according to standardized licenses modularizing different usage rights. This allowed the single-media artifacts thereby made accessible to become an essential source of materials employed by other users / fans, notably in their creation of Vocaloid animation videos, giving rise to a vast body of asynchronous and distributed collective artifact production mainly operating according to the terms of a creative gift economy thoroughly rooted in independent, DIY subcultures formed around the engagement with niche-interest

[10] https://www.nicovideo.jp/
[11] One may think in particular of human covers of Vocaloid pieces, be they vocal, instrumental, and / or choreographic, as well as of non-Vocaloid productions emerging from the Niconico platform and espousing many of its distinguishing features
[12] https://www.pixiv.net/en/
[13] https://piapro.jp/
[14] See https://piapro.net/intl/en.html

peer-produced media. In the West, websites such as DeviantArt[15] became essential platforms for users to share media components for Vocaloid animation videos. In contrast, YouTube[16] became a privileged site for sharing original Vocaloid-related animated videos as well as reprints of media originally uploaded to Niconico, with an increasing number of creators themselves publishing on both sites in parallel. These various platforms were key not only in providing the technical infrastructure that was to ensure the circulation of the artifacts and media components based on which the Vocaloid repertoire of animation videos would develop but also in solidifying, through their nurturing of the user / fan communities surrounding the Vocaloid genre, the cultural norms underlying the bulk of Vocaloid artifactual production and shaping many of the features that the Vocaloid animation music videos would come to be associated with.

In addition to the impact made by the development of these Internet-based platforms on the diffusion of media components and on the emergence of creative communities collectively forming aesthetic inclinations, genre characteristics, pools of media components, and shared narratives, two other critical technological developments should be discussed for their historical significance in shaping the animation practices that interest us here: the development of the MikuMikuDance 3D animation freeware and the licensing of the Cryptonloids to Sega Corporation for the *Project DIVA* series of video games.

As the Vocaloid user / fan community developed and as the latter's creative aspirations expanded, in 2008, the freeware animation program called MikuMikuDance (MMD), developed by Yu Higuchi (HiguchiM), was released to provide Vocaloid enthusiasts with a highly accessible means for producing 3D model animations, initially intended for use in the production of Vocaloid music videos. Similar to what occurred with the vocal scripts used by the VOCALOID™ editor software (.vsq, or 'Vocaloid Sequence' files), which could be readily shared with other users and made to be executed by any other Vocaloid voicebank library – thus giving rise to endless possibilities for experimentation and remakes utilizing a same programmatic sequence of musical data – the kinetic scripts generated using MMD (.vmd, or 'Vocaloid Motion Data' files), thanks to their similar limitless transferability, paved the way for the development of a whole new set of collectivized practices of videographic creation and play, practices that, in turn, themselves led to the emergence of a significant number of specialized creators, such as MMD modelers, pose designers, accessory makers, and stage builders, to name but a few.

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[15] https://www.deviantart.com/
[16] https://www.youtube.com/

It may reasonably be argued that as semiotic processes, the creative and playful engagements of users and fans with the Vocaloid characters using the MMD animation software brought the doll status of the Vocaloids to new heights, in addition to expanding and enmeshing their diegetic universe, and even their artifactual genealogy, with those of non-Vocaloid characters. Thus, many non-Vocaloid characters have also been modeled for use in MMD – for instance, by altering and repurposing Vocaloid MMD model design components (Figure 4) – and/or made to interact with the Vocaloid characters themselves in playful MMD animation videos.

Figure 4. A transformative Miku-based MMD model serving as a substrate for instantiating a gender-bent anthropomorphization of the FNAF character Toy Bonnie. Video by Temiichi Art (2016), https://www.youtube.com/watch?v=9Hqf-Vcm7PY

The introduction and uptake of the MMD animation software also had the effect of establishing a new pathway of distributed embodiment along the human-machine continuum as both the moving human body and animatable programmatic components became treated as pooled resources for much of the choreographic production to accompany Vocaloid music. So much that many Niconico dancers (*odorite*) have been seen to exhibit a doll-like or puppet-like style of corporeality in their own original choreographies to Vocaloid music, thus endowing the resulting choreographies with a predisposition for entailing aesthetically pleasing results should they be applied to MMD models – despite such applications historically having had recourse principally to modest techniques of motion-tracing – demonstrating the extension of the human dancers' cognition of the body to the machine's virtual manner of corporeality to which they have become acculturated and transmedially co-extensive (Figure 5).

Parallel to this, the eventual licensing of the Crypton Vocaloid characters to Sega Corporation for the development of the *Hatsune Miku: Project DIVA* series of rhythm-based video games, for its part, not only opened up an additional route for music dissemination – one providing for the establishment of a canonical musical repertoire making famous
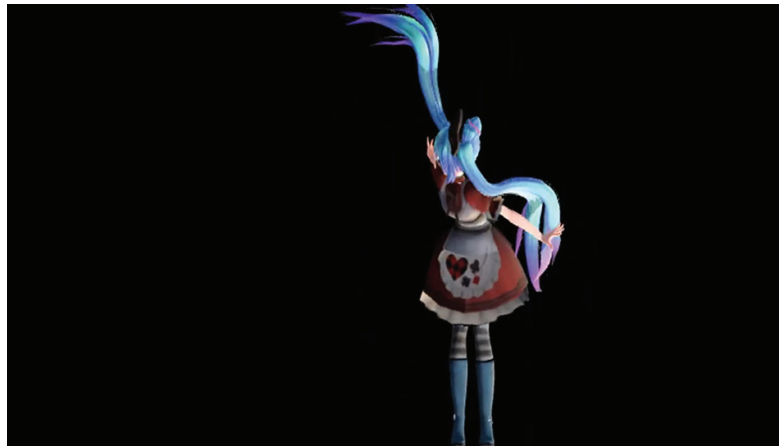
Figure 5. Demonstration of an MMD animation using a kinetic sequence originally motion-traced from a human choreographic performance to Giga-P's *Drop Pop Candy*. Video by Carlos Sneyder Higuera Oliveros (2015),
https://www.youtube.com/watch?v=5jTVtLmgTts

a roster of composers (known as 'Vocaloid-Ps') – but also for the circulation of a whole new set of Vocaloid choreographies executed in-game by animated 3D models (generally created using sophisticated motion-capture technologies that were historically less accessible to the average user/fan), many of which have been and continue to be replicated by human dancer-fans (Figure 6), further intermeshing, through the transferral of kinetic scripts, the material corporeality of the participating human (fan)artist with the virtual corporeality of the semiotically-constructed fictional 'body' of the animated Vocaloid.

Figure 6. Human dancers in cosplay performing a cover of the dance to sunzriver's *Reverse Rainbow*, which was initially developed to be executed by animated 3D models in the *Hatsune Miku: Project Mirai* video games by Sega. Pup Kity (2023),
https://www.youtube.com/watch?v=OikHl8sV900

In addition to providing more routes for the interchange of kinetic scripts between the concrete body of the human dancer and the virtual body of the animated Vocaloid character, the release of the *Project DIVA* games also led to the emergence among the fandom of a whole supplementary set of user-generated animation works. In addition to the modification (modding) of the music videos that were included in the games from the onset and that served as a backdrop to the actual gameplay, users and fans enjoyed the ability to import their own audio tracks and chart their own gameplay of rhythmical sequences by utilizing the available 'Edit mode.' This functionality gave rise to a new repertoire of user/fan-sourced animations and edits, not only for audio tracks already available in-game but also by importing other, non-included tracks of Vocaloid music. The novel animation music videos thus produced would leverage the videographic resources available through the game's video editor while developing new sets of fictional roles for the Vocaloid characters they would stage.[17] In addition to studying the significance of the use of the Vocaloid character models in the user/fan-made animated music videos thus generated, the manners of using the 'Melody Icons' and 'Targets' in the track's charting[18] may also be considered for semiotic analysis, as these can be observed to function semantically through a variety of modes ranging from iconicity (for instance, when the indicators are made to draw shapes presenting a visual resemblance with an element forming part of the theme or narrative of the lyrics)[19] to elicitation (for instance, when their presentation triggers in the player physiological and/or psychological states that are akin to those exposed in the piece's narrative).[20]

It must also be noted that a considerable measure of the hedonics of the ludic offering provided by the games of the *Project DIVA* series, beyond the rhythm-based gameplay and access to music they enable, lies in those of their functionalities that may correctly be classified as doll play: for instance, prettily dressing up the Vocaloid models with unlockable costumes and accessories, customizing the animated music videos so as to deploy the interchangeable Vocaloid characters through the whole diversity of narrative and choreographic roles the videos comprise, programming simple movements or elaborate scenarios using the 'Edit mode,' or cultivating fictional parasociality by 'hanging out' with the Vocaloids in the user-decoratable dollhouse of sorts called the 'Diva Room' (where one can 'communicate' with the Vocaloids by 'patting' them through interface-mediated simulated touch, by giving them gifts they

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[17] See for instance the surrealistic Diva F 'Edit mode' animation by MuikaMe (2013) set to Chiitan's *Francium*, uploaded to: https://www.youtube.com/watch?v=OdmPzGmjz9E

[18] This refers to the on-screen indicators that dictate the commands the player must activate to succeed in the challenge.

[19] One example may be seen in the fan charting for Masa-P's *The Fox's Wedding* (credited to PSN ID: xSyNtheTic_FeaRx), in which we can see, notably, a fox head being traced using the 'Linked Star' lines. An example of a gameplay video using this chart has been made available at: https://www.youtube.com/watch?v=P5bnjRqbRrA

[20] For instance, with the eye movements required from the player inducing vertiginous states in parallel to those being experienced by the main character of *The Fox's Wedding* (Ibid.).

enjoy so as to increase affinity scores, by playing games with them, by 'conversing' with them through the console's microphone, etc.).[21]

As specifically concerns the interfacing of the human player with the game interface rendered on screen through the animation medium, it has also been observed to form a point of insertion where fans and hobbyists may interpose a supplementary mediatic stratum of doll play, expanding the scope of gameplay to incorporate unforeseen materialities. An example of this may be seen, for instance, when *Project SEKAI* player jack (2024) manually puppeteers a plush doll of *fanloid* Hachune Miku in real time to interface with the game's commands displayed on-screen,[22] or, for instance, when HiRaKi (2011) builds a Hachune Miku-shaped animatronic robot to execute the gameplay set out by the on-screen commands for *Sadistic.Music∞Factory* in *Diva F* on PSP, thereby also altering the expected temporal structure of the gameplay through the interposition of programmatic (differed time) puppeteering.[23]

It should also be noted that the animation medium, from very early on in the *Project DIVA* series, was notably put to the service of the simulacrum of the live musical performance. Referring to the latest among the Sega Vocaloid-themed games to be released at the time of writing this article (*Hatsune Miku: Colorful Stage!*, aka *Project SEKAI*, produced in collaboration with both Colorful Palette and Crypton Future Media Inc., and initially released in September 2020), the quality of the simulacrum of the live performance is observed to be heightened through means such as temporal restriction (lives accessible at a specific date and time), 'spatial' circumscription (player-spectators being summoned to direct their animated avatars to 'enter' a lobby to wait, and then, at the designated time, to proceed to the concert room), communication (with other attendees or by directing messages of encouragement towards the performing virtual idols), and kinetic engagement with the event through the manual control of one's avatar (ability to wave one's glow sticks in sync with the crowd, to jump up and down to the beat, etc.). In these cases, the animation medium will serve to virtually insert spectators amidst the virtual space of the simulated live concert through the phenomenic continuity of their physical, embodied movements on the interface with the visible movements of their avatar within the virtual environment thanks to the conjoint functioning of what Enzo D'Armenio would call the visual and kinetic syntaxes[24] exploited by the interface design.

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[21] This functionality was initially made available as the 'Miku Room' in *Hatsune Miku: Project DIVA* and then as the 'Diva Room' in subsequent releases, and as 'My Room' in the *Hatsune Miku: Project Mirai* installments of the game, the specifics of the functionality varying from one installment to the other. A gameplay video documenting the Diva Room functionality in *DIVA F 2nd* has been uploaded to: https://www.youtube.com/watch?v=JNs9xDckE4Q

[22] Gameplay video uploaded to: https://www.youtube.com/watch?v=qKerV96TMEE

[23] Gameplay and robot design video uploaded to: https://www.nicovideo.jp/watch/sm19266574

[24] See D'Armenio (2022) for an exposition of the semiotic relevance of accounting for the conjoint working of the visual and kinetic syntaxes for the analysis of interactive media such as video games and VR experiences.

Conversely, and this will be the last area of mediatic development concerning Vocaloid-related animation practices to be inventoried here, the semiotically actualized co-presence, within a shared space, of spectators and Vocaloid characters is also seen to be pursued in the opposite direction in the case of the Vocaloid concerts held in physical space and in which the Vocaloids may be actualized in real-time using effects produced using so-called 'holographic' projections. Most typically, up until recently at least, the 'live' Vocaloid concerts would showcase real-life, in-the-flesh musicians, usually positioned to the sides, with a large transparent screen being set in a central position on the stage to receive the animated 'hologram' of the Vocaloid model-puppet rendered in physical space thanks to Pepper's ghost illusion effect.[25] The animated Vocaloid 'hologram' would then be made to execute choreographies and simulate vocal production by lip-syncing to its preprogrammed vocal audio track, in addition to having the ability to engage in simulated exchanges with the audience. Though wholly dependent on semiotic mediation, the 'materialization' of the animated Vocaloid character in the shared space of co-presence with the viewer provides an additional phenomenic extension to the spectatorial consumption of the virtual idol.

Having introduced the dual nature of the Vocaloids as both musical instruments and as crowd-sourced fictional entities and presented the technological and cultural circumstances of their objectual development through a vast body of user, fan, and industry-sourced works and resources, all the while addressing the role played therein by the animation medium of which several of the uses have been introduced, we shall now turn towards an examination of the genre-defining animation practices to be found within the repertoire of Vocaloid music videos and adjoining semiotic practices engaged by users and fans. This account purports by no means to be exhaustive given the extensive range of observable videographic styles and semiotic functions realized therein, but rather seeks to provide a glimpse into the distinguishing features of the corpus and into how the latter may be semiotically approached.

4. Animation and the Vocaloid music video genre

As previously mentioned, independent artists and hobbyists produce the vastest proportion of Vocaloid-related content, thereby anchoring the greatest part of the resulting repertoire within *doujin*, or self-publishing, DIY culture. The most important source of Vocaloid-related animations in terms of volume of production is undoubtedly to be found in the music videos created to accompany audio tracks utilizing Vocaloid voicebanks and made available mainly through Niconico and/or YouTube, be it by

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[25] See Stark (2018) who discusses the employment of this technique in various virtual idol performances.

the original producers of the musical tracks or by other creatives making either cover versions of the songs (which may be voiced by other Vocaloids/UTAUs or by human singers) or simply new animation videos for preexisting Vocaloid audio tracks, at times developing additional narrative extensions through new roles to be played by the Vocaloid characters or even by other, non-Vocaloid characters they wish to see portray the roles laid out by the piece.[26]

As for the genre-defining preference that the Vocaloid music video and its derivatives exhibit for animation over live-action, it may be attributed to a variety of causes, the foremost of which most likely being the fictional nature of the Vocaloid characters and their association with standardized anime-style character designs, but also including economic and/or technical reasons tied to the independent, DIY, and often hobbyistic conditions of their production, due to the greater facility in relying on self-made or freely usable illustrations than on live actors. We may also identify (sub)cultural aesthetic dispositions, notably in the affinity for 2D representations[27] and character *moé*,[28] and, by no small measure, the ecological makeup of the subcultural sphere within which such artifacts are produced, notably the availability through the previously discussed art-sharing platforms of animation-ready mediatic components and the overarching cultural norms regarding the creative repurposing of peer-generated materials (be it in compliance with explicitly favorable copyright management regimes such as those provided for by Crypton's PCL and by the Creative Commons modular licenses, or by relying on an ethics of proper attribution or on principles of fair use).

It must also be noted that owing to the operation of the fandom-entrenched practices whereby a significant proportion of the media consumed by fans is produced by other fans within the same niche fandom, genre-identifying stylistic markers are often quick to develop upon attainment of a critical number of creatives among the fandom employing within their own productions mediatic components generated by their peers, potentially favoring the emergence of something of a closed-circuit, circular economy of artifact generation and normative reinforcement. Thus, from the abundant production resulting from the body of creative practices engaged by Vocaloid users and fans, we have witnessed the development of something of a style typical of Vocaloid music videos, firstly emerging from the Niconico platform and having eventually expanded to other ones such as YouTube, in the latter case notably under the impetus of the fandom's internationalization. When Vocaloid music videos do incorporate elements of actual footage or static photography (i.e., in mixed-media

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[26] One example would be yu-kichi's 2009 remake animation video for OSTER project's *Trick And Treat* (2008), using characters from the mafia-themed anime *Katekyō Hitman Reborn* to play out the roles sung by the Vocaloids. Uploaded to: https://www.nicovideo.jp/watch/sm6237510

[27] See Murakami (2000).

[28] See Azuma (2009) and Galbraith (2014).

Figure 7. Example of the subsumption of photographic components under the (limited) animation medium's syntax in the Vocaloid music video genre. higma (2021), https://www.youtube.com/watch?v=gkYod7bRkTg

videos), and though exceptions certainly exist, this will often be achieved according to a hierarchy of mediatic subsumption, that is, either conferring to the pictorially sourced animation components a more significant share of 'exposure' (in terms of screentime and/or surface area) and/or by treating the photographically sourced material as a resource for animation (e.g. using techniques of collage animation), thereby still upholding the genre's stylistic identity through the preferential reliance on the animation medium's syntax in the treatment of such photographically-sourced components (Figure 7).

The dominance of these recognizable stylistic markers characterizing the typical Vocaloid music video may also extend to adjacent spheres of cultural production, manifest, for instance, when considering the music videos for songs written by current or former Voca-Ps, not for Vocaloids, but for human singers, who may be themselves or other artists.[29] In these cases, the propensity for (usually limited) animation over footage may be seen as indicative of the adjacence of the resulting music video to Vocaloid user/fan culture within the self-publishing *doujin* sphere or, in some cases, as a purposeful means for incorporating it within, by displaying adherence to the fandom's distinguishing stylistic norms and subcultural identity markers.

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[29] One may think, for example, of the videos for pieces such as syudou's *Usseewa* written for singer Ado (https://www.youtube.com/watch?v=Qp3b-RXtz4w) or of Jin's *Kimi no me wo* written for singer Soraru (https://www.nicovideo.jp/watch/sm18016289).

It must be noted that the Niconico practitioners of *utattemita* (lit. 'tried to sing'), that is, the *utaite*, and, by extension, the *youtaite* of YouTube – often of whom a sizable proportion of the work will consist in engaging in the production of Vocaloid music covers – will, on a graphical level, more often than not, project their own artistic personas into the world of Vocaloid though 2D avatars, at times serving the additional purpose of ensuring their facial anonymity as they make public their musical creations by sharing them online.[30] In the animated music videos for their Vocaloid music covers, a significant number of *utaite* will therefore be seen to embed visual representations of their own virtualized artistic persona in the form of their 2D avatar, often substituting the figure of the original Vocaloid with their own and, in doing so, asserting through extra-acoustic means the paradigmatic substitutability within the medium of the human and machine-produced voice (Figure 8), while homogenizing to some extent their projected identity and virtualized corporeality with those of the Vocaloids alongside which they may be made to stand in audible and/or visual form.[31]
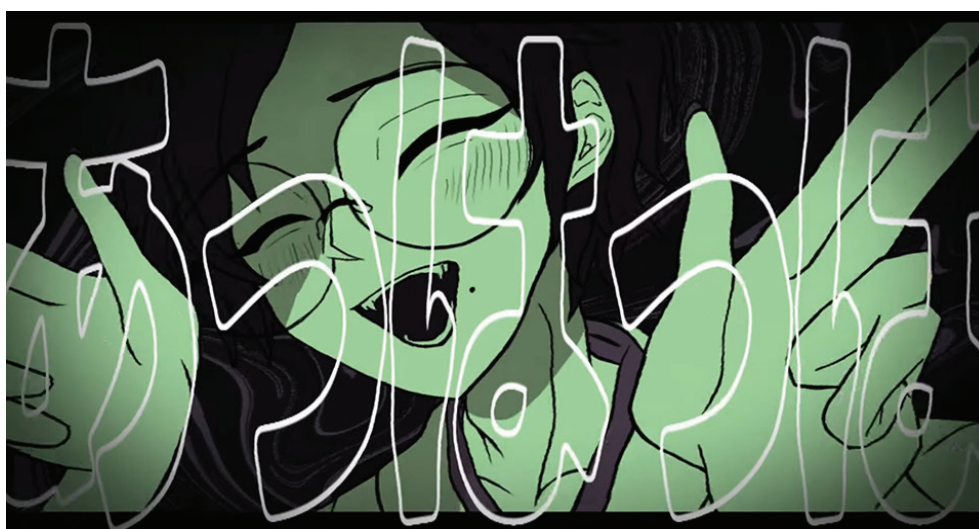
Figure 8. Example of a cover of Meddmia's *Kikkai Kettai* (initially created using Vocaloid Hatsune Miku and CeVIO voice synthesizer KAFU), deploying the 2D avatar of voice actor/singer Satō Hebi, performing the main character's role and choreography in human-voiced animated form. Satō Hebi (2023), https://www.youtube.com/watch?v=T3TWujGUQeE

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[30] Concerning the culture of Niconico, it must also be noted that the relative preference of the platform's community for facial anonymity (foremost observable in singers, then musicians, and occasionally in dancers) will also often be supported by other means of facial concealment than the use of avatars, both across various media and in real-life settings. These means may include, for instance in the photographic medium, strategic cropping, blurring, the use of facemasks, interposed physical objects or digital filters to conceal one's face, or, during live performances, the avoidance of spotlights, allowing one's facial identity to remain in the shadow should one be performing maskless.

[31] See, for instance, *utaite* 96neko's cover duet with Vocaloid Kagamine Len, uploaded to: https://www.youtube.com/watch?v=ma-5MTrFWMg

Conversely, for those human cover singers (*utaite*) of Vocaloid music who use actual footage of their own performing body in their videos, as are increasingly found on YouTube (*youtaite*) as the fandom evolves, strategies for underscoring the indexical link to the original video of the song covered may include the recourse to thematic cosplay, the overlaying of the original animation in transparency over the footage of their performing figure, or the incorporation of some of the original animation's mediatic or structural components, some of these being especially advantageous in the production of thumbnails for helping in the rapid identification of the song by viewers by emphasizing the hypotextual relation[32] between the cover and its original.[33]

In addition to the mediatic hierarchy of animation over footage in the Vocaloid music video genre, among its characteristic features, mention should be made of the place occupied by typographical animation and the aestheticization of the limited animation style. Concerning the former, while it may have been indicated that one of the significant factors of appeal that have led to the popularization of Vocaloid lies in the pursuit of character *moé*, it must be noted that not all Vocaloid music videos visually showcase any character whatsoever, be it a Vocaloid or otherwise, though video remakes for these same songs by other users or fans often will. As for the typographical animations frequently used in Vocaloid music videos, their semiotic function may at times keep to the mere display of the lyrics to improve their intelligibility (or, conversely, to stress their unspeakability through blurring or various forms of ostentatious 'self-censorship').[34] At the same time, their temporalized presentation is likely to produce rhythmic effects, which are often purposefully exploited by video makers.[35] It should also be mentioned, for readers who may be unfamiliar with the Niconico streaming platform, that the comments posted by users are time-synched to the video to which they are tied, not only accreting it with possibilities of infinite semantic expansion but also enhancing its visual rhythm, with commentators sometimes transmodally producing effects reminiscent of the fan chants[36] one may hear in a concert setting, but in text animation form and graphically sedimenting into cumulative traces of asynchronously programmed interjections, rather than constituting events having actually occurred synchronously in real-time (Figure 9).

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[32] In the sense of Genette (1997).

[33] The works of *utaite* such as Umi Kun (https://www.youtube.com/@UmiKun/videos) or Chogakusei (https://www.youtube.com/@ChogakuseiOfficial/videos) are exemplary in this respect.

[34] One will notice, for instance, that in the video for EZFG's *Hurting for a Very Hurtful Pain* (2012), voiced by Yamaha's VY1 and VY2 Vocaloids, the animated text displayed towards the beginning and end of the song loses its legibility while VY2's vocalizations are made less decipherable through the application of an acoustic filter. Uploaded to: https://www.nicovideo.jp/watch/sm16658127

[35] See, for instance, the rhythmic play underlying the typographic animations in Maretu's *Tool*, uploaded to: https://www.youtube.com/watch?v=7pirFsqx9H8

[36] That is, synchronized projective vocal interjections by the audience.
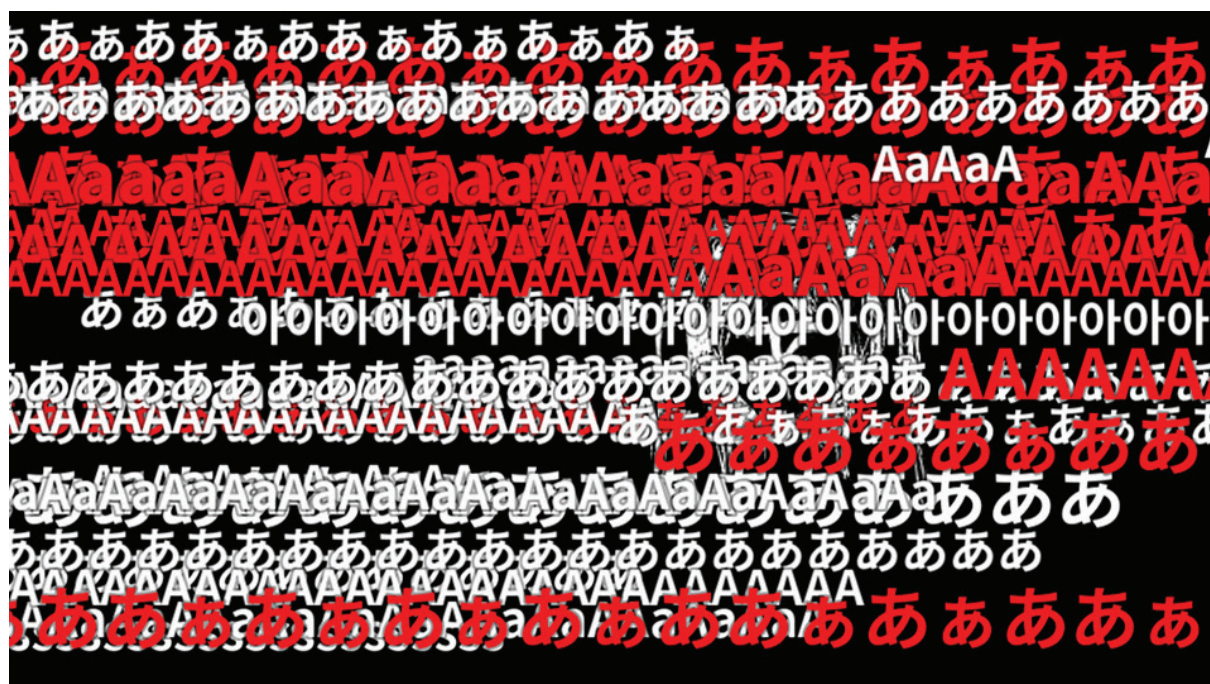
Figure 9. Cumulative traces of various users 'type-singing' along to the chorus of Nashimoto P's *AaAaAaAAaAaAAa* (2009). Captured on Apr 18, 2024, from https://www.nicovideo.jp/watch/sm6816232

Furthermore, while the graphical stylization of the text and its animation may indeed be exploited in music videos for its sole plastic qualities in and of themselves, such stylization will often be put to the service of the semantics of the narrative, including through iconographic resemblance or metaphorical analogy (e.g., the feelings of anxiety depicted in the dithery and at times suffusing movements of the animated script in Kikuo's *Aishite Aishite Aishite*),[37] and through elicitative functioning (e.g., the vertigo-inducing pulsating and spinning text of Masa's *Outburn Kamikaze*).[38] At other times, such videos may showcase textual elements that do not reproduce the actual lyrics of the track but are instead used as a supplementary semiotic layer through which to develop and convey the theme. One example of this may be seen in Maretu's *S.I.U.*,[39] with the first scrambled and then legible text spatially disposed to form a graphical figure tabularly conveying thematic elements in a usage that formally contrasts with the otherwise linear display of the text conveying the lyrics.

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[37] https://www.youtube.com/watch?v=NTrm_idbhUk
[38] https://www.youtube.com/watch?v=mTgpfG3Myh0
[39] https://www.youtube.com/watch?v=LCOItseOsFE

It was previously mentioned that the frequent recourse to limited animation, sometimes taken to the extreme, may also be viewed as a genre-defining, often highly aestheticized feature that sets apart the repertoire of *doujin* music videos – to which the bulk of Vocaloid music belongs – from what may be more typical of what can be found beyond, notably in industry-sourced mainstream animation. This is even when accounting for the fact that Japanese animation generally tends to display a proclivity for aestheticizing limited animation to a greater extent than the West.[40]

Though some critics may contend that limited animation represents a departure from what constitutes the essence of animation art, it may be argued that, in fact, due to its parsimonious employment of movement, the limited animation genre further convenes us to reflect upon the various modalities of movement within the medium beyond the production of mere illusions of naturalistic continuous object motions. For instance, it has been noted that the movements *between* images (using cuts) and their rhythms will acquire heightened salience in a context of limited animation (Lamarre 2009:191), which, in music videos, may undoubtedly contribute to enhancing the rhythmic structure of the musical stratum.[41] As for movements *over* images (e.g., the Ken Burns effect), though not necessarily productive of illusions of movement intrinsic to the individual objects within the frame, they may undoubtedly serve to instill dynamism while using only a minimum of pictorial source material. Thus, many Vocaloid animation music videos will be constituted of a single yet visually complex and semantically dense internally static image that may be used to support the whole narration of the song through the sole application of techniques of zooming and panning or by alternating, using cuts, between cropped areas conveying their own, discretized semantics forming part of the global visual narrative.[42]

Regarding movement *within* images, it is the feature most generally thought of when defining the art of animation. Concerning this type of movement, limited animation can designate, for instance, the reliance upon techniques such as two-frame animation.[43] In the Vocaloid music video genre, one particularly striking example of this is to be found in several of NayutalieN's videos,[44] which take this principle to the extreme combined with other limited animation features such as a minimal color palette, rendered in flat coloring, and the recurrent use of a cut-out character figure remaining perfectly immobile during most of the song, but sporadically breaking into a two-frame
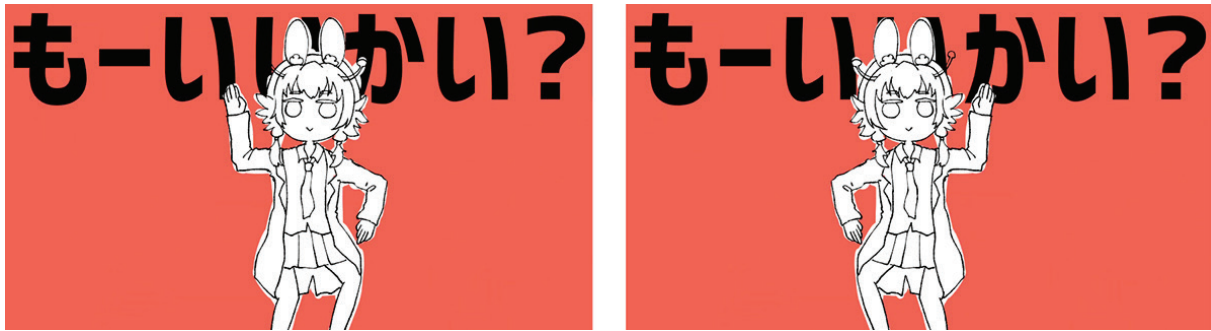
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[40] See Lamarre (2009).
[41] See, for instance, the video for Hachi's *Donut Hole*, uploaded to: https://www.nicovideo.jp/watch/sm22138447
[42] To cite but one example, in Momocashew's 2014 video for *Pumpkin Spice Dummy* utilizing PowerFX's Vocaloid Oliver, pannings over a single but visually dense illustration (by Nai) convey dynamism while cuts between cropped details support the narration. Uploaded to: https://www.youtube.com/watch?v=CnHtaYiTrVM
[43] I.e., the alternation between two key frames to suggest repetitive movement.
[44] See https://www.youtube.com/@officialnayutalien1318/videos

Figure 10. Two-frame dance move in vtuber Nemui Fuwari's cover of NayutalieN's *Dance Robot Dance*. Nemui Fuwari Juku (2021), https://www.youtube.com/watch?v=sywDMyxCXqo

animation dance (e.g., Figure 10). The hedonics of this aesthetics of limited animation is further underscored by the existence of a dance cover of NayutalieN's video for *Alien Alien* in cosplay[45] that reproduces the limited color palette and transmedially simulates the two-frame animation through human-executed choreographic means.

The notion of limited animation *within* images may also designate the circumscription of movement to restricted parts of the image, for instance, a moving character against a static background or a character of which only the lips and eyes are made to move. Such uses are widespread within the repertoire of Vocaloid music videos and also condition the gestures that will eventually be developed by cover dancers (*odorite*) for the song (see, for instance, the animation video for Hachi's *Matryoshka*[46] and the multiple dance covers it entailed),[47] which in many cases remain closely tied to the piece's kinetic identity.

The notion of limited animation may also designate the synchronic repetition of parts within the frame and the diachronic repetition of sequences of images, potentially forming cycles underscoring the piece's musical structure.[48] In extreme cases, limited animation may occur in the sole fluctuation of an image's coloring (or texturing) or in that of some of its parts. Although this sometimes produces apparent semantic effects (e.g., indicating a change in lighting, a change in the mental states portrayed, etc.), in other cases, it may be restricted to plastic functions of beautification and dynamism impartment. However, one may argue that in such cases, semantic content may also be identified in the rhythms and general ambiance conveyed and in the very

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[45] Dance cover uploaded to: https://www.youtube.com/watch?v=KVrHMcCNPIM; original video URL: https://www.nicovideo.jp/watch/sm28576299

[46] Uploaded to: https://www.nicovideo.jp/watch/sm11809611

[47] One famous cover by Bouto (2010) to the *utattemita* version of the song by Zebra and Hashiyan may be viewed at: https://www.nicovideo.jp/watch/sm12784522

[48] One example that prominently features both types of repetition (synchronic and diachronic) would be Kikuo's *Dance of the Corpses* (2013), uploaded to: https://www.youtube.com/watch?v=O9eHRiaTuL4
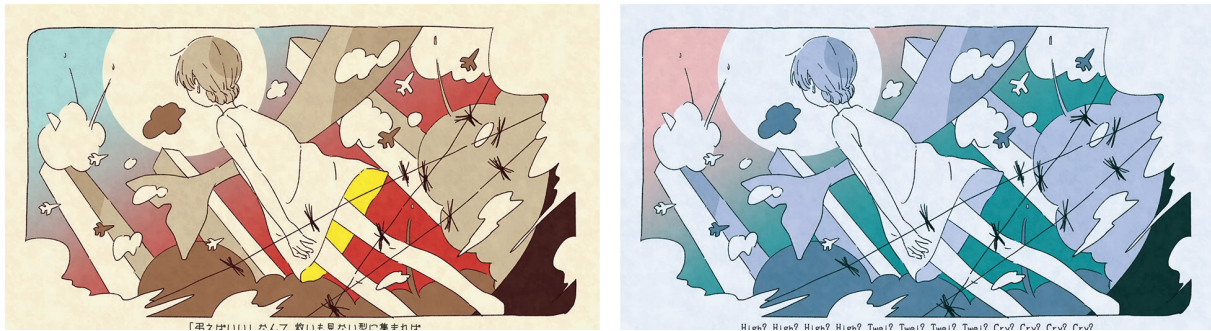
Figure 11. Challenging the notion of animation through its limitation to sparsely distributed chromatic shifts. seeeeecun (2018), with illustration work by Mitsuki Sanagi, https://www.youtube.com/watch?v=2jPdLWJwVb8

sensations elicited by the textural or chromatic fluctuations. In the most extreme cases, the sole recourse to mere recoloring, be they full or partial, may challenge the notion of animation, especially when they are so sparsely distributed that they do not entail the formation of a kinetic Gestalt (Figure 11).

The last modality of limited animation to be inventoried here is the conveyance of movement through still image videography. In this respect, it must be stated that the repertoire of Vocaloid animation music videos certainly counts pieces aestheticizing the still frame's potential for movement narration to the point of even making it into a core aesthetic principle to apply in videographic art, sometimes even putting it to the service of the textual and/or musical semantics of the piece it accompanies. One exemplary piece that conveys a sense of movement without sustaining perceptual illusions of it is the video for r-906's *Manimani*,[49] in which frame changes (notwithstanding the display of the textual elements such as credits and lyrics) occur at an average rate closer to one image per twenty-four seconds than to the habitual twenty-four images per second, to a point where the illusion of perceived ongoing continuous motion is replaced by the inference of fulfilled motion through a series of jump cuts between positions of momentary immobility, breaking with the medium's habitual modality of movement conveyance and incidentally conferring a heightened sense of the careful control the portrayed character is itself construed to exert over its movements, following a rhythm that accentuates the piece's musical modulation of tension and release (Figure 12). As the video progresses and the musical tension accumulates, the cycle of the movements inferred from the discrete, discontinuously displayed positions takes on an accelerated pace. At the same time, a series of dramatic focusings propel the tensional build-up towards the ultimate graphical burst and its cooccurring musical climax.

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[49] Uploaded to: https://www.youtube.com/watch?v=9O2VyUM5MlQ
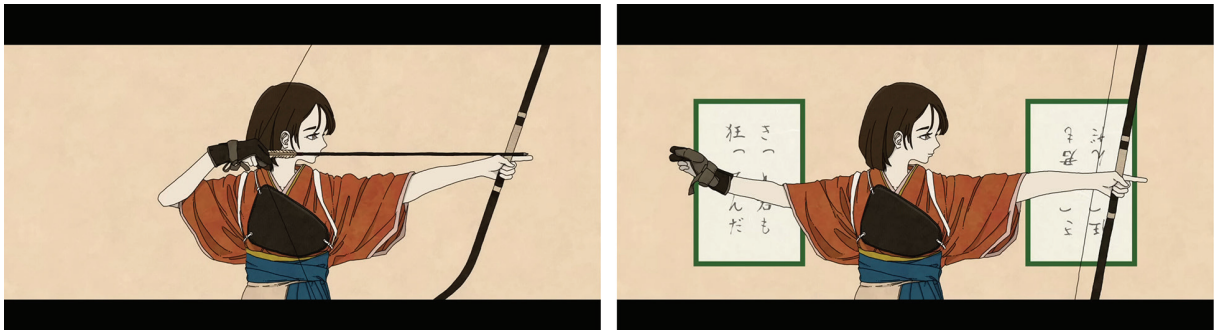
Figure 12. Fulfilled movement inferred between discretized postural states in this limited animation utilizing illustrations by Tsubasa Ueda replaces the medium's habitual perceived illusion of ongoing continuous movement. r-906 (2022), https://www.youtube.com/watch?v=9O2VyUM5MlQ

Although all the forms of limited animation non-exhaustively listed here may not, when taken individually, be viewed as being exclusively unique to Vocaloid music videos, the frequency and high consistency of their occurrence among the repertoire may undoubtedly form the basis upon which to speak of a videographic genre, replete with its own formal, stylistic, and aesthetic determinants tying it to a creative subculture of which it reflects both the conditions of production, history of development, and aesthetic inclinations.

5. Conclusion

This article examined through a semiotic lens the animation practices surrounding Vocaloid along three broad dimensions. Following a brief introduction to the inception of Vocaloid technology and its associated characters, we examined the role played by the animation medium in objectually developing the Vocaloid characters in their capacity as virtual idols themselves or as virtual performers of other characters through semiotic configurations of second-order fictionality. In addition to this, we examined the technological, gift-economical, and subcultural conditions underlying the collective labor through which the Vocaloid characters and their repertoire of mediatically diverse creations developed, with a special focus on the intertwining of this process with both the development of an array of Internet-based media-sharing platforms and the emergence of fandom-entrenched regimes of mediatic resource pooling, one that includes the incorporation of the performing human body as regards the transferral of digitizable kinetic scripts. Finally, we examined the role of animation in distinguishing the Vocaloid music video genre, focusing on its characteristically limited animation style and the latter's particular semiotic modalities of movement conveyance. While addressing these topics, account was taken of how

the animation practices under study could configure the relationship between the participating human artists or hobbyists and machine-based virtual entities, be it through the substantial-cum-identitary continuity between the voicebank character and its human voice provider or through the user's own kinetic and/or symbolic interfacing with the character through various manners of animation-mediated play or artifact generation. Further research could expand upon several of the individual topics addressed herein, be it regarding the analysis of singular artifacts, the syncretic functioning of the diverse modal strata engaged by the animation practices surrounding Vocaloid, or the social semiotics underlying the production of these crowd-sourced, functionally dual entities.

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