Videogame Music: chiptunes byte back?

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ABSTRACT
This paper will explore the sonic subcultures of videogame art and videogame-related fan art. It will look at the work of videogame musicians – not those producing the music for commercial games – but artists and hobbyists who produce music by hacking and reprogramming videogame hardware, or by sampling in-game sound effects and music for use in their own compositions. It will discuss the motivations and methodologies behind some of this work. It will explore the tools that are used and the communities that have grown up around these tools. It will also examine differences between the videogame music community and those which exist around other videogame-related practices such as modding or machinima.

Author Keywords
videogame music, videogame art, fan-art, sonic art, subcultures, communities, chiptunes

Introduction
Videogame studies is a field which has emerged in recent years, growing in prominence and establishing itself solidly as a serious academic field. In parallel with this, there has been a growing interest in videogame-related activities such as videogame hacking and modification, videogame art, videogame fandom, etc.

An increasingly wide range of activities consist of appropriating videogames and using them as raw material in secondary works. These activities range from artworks exhibited in galleries throughout the world to fan-produced images posted onto message forums.

Videogame art is one such field. It has, over recent years, become more high-profile and attracted more critical attention but previous writing on videogame art has concentrated almost exclusively on the visual arts – painting, sculpture, video art, machinima, etc. In some ways this is inevitable as it has, up to this point, been these forms of videogame art that have gained the most attention from curators, writers and academics.

Musicians and sonic artists who use videogames as their medium or raw material have, however, received comparatively little interest. This mirrors the situation in art as a whole where sonic artists are similarly neglected and the emphasis is likewise on the visual art/artists.[1]

It was curious to us that most (if not all) of the writing about videogame art had ignored videogame music - especially given the overlap between the two communities of artists and the parallels between them. For example, two of the major videogame artists – Tobias Bernstrup and Cory Archangel – have both produced music in addition to their gallery-oriented work, but this area of their activity has been almost entirely ignored in previous writings about them which has concentrated – almost exclusively – on the visual work. This omission was particularly curious in the case of Cory Archangel as his musical work, like his visual art, relies upon hacking and reprogramming well-known console games. It is also worth noting, in the context of this discussion, that Archangel majored in Electronic Music Composition at the Oberlin Conservatory of Music.[4]

Fan-produced music was an area which likewise had received relatively little attention in comparison to the study of other forms of videogame-related fan art (drawings, cosplay, etc.). Again this seems curious as the community doing this work is (arguably) larger than the machinima community which nonetheless has up to now gained greater attention.[2] To give some indication of the size of the field, the site http://www.ocremix.org, for example, maintains a collection of more than 1,400 remixes of various videogames and is just of one of many similar sites around the world; their BitTorrent tracker lists over 23,000 downloads of the most popular of their files (*Chrono*

[1] Musicians can achieve success in the charts or in record sales, but this is clearly not the same as the institutional validation that a successful artist achieves through gallery exhibition.

[2] We say "arguably" because no definitive figures exist for either community.

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Symphonic). And the "High Voltage SID Collection" is even larger - this site, which maintains music from games, demos and original compositions running on the sound chip used in the Commodore 64 has over 30,000 tracks to choose from.[3]

This paper will explore the sonic subcultures of videogame art and videogame-related fan art. It will look at the work of videogame musicians – not those producing the music for commercial games – but artists and hobbyists who produce music by hacking and reprogramming videogame hardware, or by sampling in-game sound effects and music for use in their own compositions. It will discuss the motivations and methodologies behind some of this work. It will explore the tools that are used and the communities that have grown up around these tools. It will also examine differences between the videogame music community and those which exist around modding or machinima.

By doing this, we hope to shed some light onto an area of videogame activity which has, up to this point, received comparatively little attention (and even less critical academic analysis). Given the size of the sonic community and their enormous output, we feel that this has been as serious omission.

DEFINITIONS AND BOUNDARIES

The initial problem when one is trying to examine videogame music as a genre of work and as a phenomenon is its diversity and the lack of an appropriately specific and widely-known terminology that can make sufficient distinction between different sub-genres of work or activity.

Videogame art (as an area of study) doesn't have this problem as the term "videogame art" provides, on its own, a clear distinction between art practice and commercial videogames, on the one hand, and fan/hobbyist art, on the other. [3] Combined with "fan art", it provides a set of terminology that outlines a whole field (and recognised terms words such as "machinima", "cosplay", etc. allow distinctions to be made within it).

"Videogame music", on the other hand, is a broader and more ambiguous term. It doesn't have the clarity of meaning of "videogame art" or "fan art" and encompasses all types of music from the original music of a game to the hacked and sampled versions produced as art and by fans.

A new vocabulary is needed to provide a suitable level of distinction, so for the purpose of this paper, we will use the term "in-game music" to refer to the actual music/soundtrack of the original videogame and "videogame music" to refer to any other videogame-related secondary musical work – such as remixes of the original in-game music or music produced by reprogramming videogames and/or videogame hardware/consoles. We have also used the term "primary work" to describe the original in-game music and the term "secondary work" to describe fan or artist-created remixes or reworkings of the primary (videogame) music/sound source.

A second – related – problem is in defining the limits of this paper. Videogame-related music is a large and disparate category of work, and the limitations of space inevitably force us to place boundaries on our discussion. In this paper, we will concentrate on the category that we define above as videogame music – that is to say, the secondary works created from the raw materials of videogames (be it music or other sounds). In-game music will be mentioned in passing, but will not form a significant focus here.

In a sense, this follows the approach that we have previously adopted [9], where we have found it appropriate to rule out the discussion of videogames *as* art. We are not claiming that in-game music is not music or not art or is unworthy of study – far from it. We are merely indicating that the focus of this paper lies elsewhere – in the art that is created using this original music as its raw material, and in the communities that produce it (i.e. in the secondary work, rather than the primary one).

In discussing where to locate the boundaries of our paper, we also need to address the position of soundtoys - a broad term encompassing further forms of interactive audio-visual art which often have game-like elements.

Soundtoys fall outside the scope of certain recognised definitions of a game/videogame, though inside others. [12] In other talks and papers [7, 8, 9] and in the introduction to our book on videogame art, [2] we solved this problem of classification by excluding soundtoys as videogame art on the basis that it does not specifically reference videogames; in stead, we have preferred to situate it within a broader category of "playable art".

The status of soundtoys as game/videogame is somewhat ambiguous – a fact acknowledged, in part, by the fact that they are named sound*toys*, not sound*games* (though there is clearly some degree of irony and self-deprecation in the use of this word) and this brings up a broader issue within videogame studies as a whole. Up to this point, videogame studies has tended to concentrate primarily on cultural artefacts whose status as a game is unarguable and this has, in effect, lead to a concentration on mainstream games and a (comparative) neglect of liminal works whose status as a game is less clear-cut and/or more debatable.

This was probably inevitable for an area of study which was still relatively young and both establishing its academic status as a distinct field and determining the extent of its area of interest. But factors such as the increasing diversity and sophistication of artistic outputs, hobbyists and fan-created work means that videogame-related non-game

[3] Though in our previous papers we have tended to include fan/hobbyist activity in our discussion, or at least acknowledge its existence.

works are starting to affect and bend the boundaries of videogame studies and that these will inevitably need to be extended (sites such as Newsgaming [11] and the increasing interest in videogame art are indicators of this).

AESTHETICS

In the visual arts, videogames have provided a readymade 8-bit aesthetic for artists such as Jon Haddock [16] and others. As long as they keep to the well-known and understood conventions of this genre, then these artists are free to place whatever material they like into these images and they will still be recognised and acknowledged as videogame art. This aesthetic has also been used at different times by a number of other videogame artists, such as, for example, Cory Archangel, Mauro Ceolin, Thompson and Craighead - even though they may since have moved to other visual styles and techniques.

As videogames have progressed, they have provided alternative tools and aesthetics – FPS's being the most obvious example – but, the "8-bit" aesthetic remains an enduring aesthetic and is (arguably) still the most universally recognised iconography even though those videogames have long since disappeared from the cultural landscape in their original form (although still lovingly maintained through emulators).

Early videogame music likewise has an 8-bit aesthetic. In the same way that early videogame graphics were defined by the limitations of the graphic hardware at the time – the maximum number of colours and the possible palette, the maximum size of a sprite and the number of sprites on screen at once, etc. – so videogame music was defined by the audio hardware. It is inevitable, therefore that musicians would be drawn to using these iconic sounds precisely because they are so recognisable as videogame music.

The aesthetics of videogame music are, like those of videogame art, defined by the medium of videogames through their appropriation of videogame technology and content as their raw material. With videogame art, the content is the iconography of the videogame and the distinctive visual style of videogames; in videogame music, it is characteristics such as the distinctive tone of the console's sound hardware, the iconic sound effects like the *Pac Man* "munch" sound, and the repetitive looping of the background, jingle or "idle" music. All of these play a part in making videogame music recognisable as such.

We are, however, naturally wary, of misrepresenting modern in-game music and of falling into the trap outlined by Rob Bridgett in a recent article for Gamasutra where he says that "[r]ecent academic writing on interactive audio often paints an outdated picture of the state of the industry, as one that is a fledgling art, of one that is inferior to film and one that has established very little academic credibility".[1]

In-game music has, of course, become increasingly sophisticated as the sound capabilities of modern videogame consoles has developed. The musical capabilities of videogame hardware (both console and computer) have grown to such a degree that even within the mostly anonymous team-based world of videogame production, musicians such as Nobuo Uematsu, the composer of the music for all of the Final Fantasy series, have come to be known and respected by fans.[4]

"In-game" music now performs a role within videogames equivalent to film music within films – setting mood, conveying character and emotion, enhancing and counterpointing dramatic action – and does this in the more difficult conditions of an *interactive* medium. A film composer may be composing his music at the same time as the film is being edited, but they know that the film will (usually) be finished and "locked" by the time that they actually finalise and record their composition. A game designer typically doesn't have this luxury – the game may be "finished" once the gold master is made, but the juxtaposition of image and sound is still dependent, at least in part, on the user's interaction. User choice and interaction provides a complex set of problems for the videogame composer to overcome in order to fulfill the requirements outlined above. For instance, films continuously move forward, inexorably making their way towards the denouement of the plot - the crescendo of both musical score and storyline. In videogames however there are "idle" moments when the user has stopped interacting yet the game is still "on". This is aural space that needs to be filled for an indefinite period - until the action resumes. Another problem is how to create a suitable death scene score when the user can re-spawn over and over again. The composition of videogame music needs to be attentive to the modalities of the medium - for instance: repetitiveness, user choice of action, potentially long periods of "idleness" etc and to the technology itself, in pre-loading and playing sounds synchronously to the action. These issues and others are often resolved through the use of short sound clips and loops. Here the form of the music or sound loop is a functional response to a technological problem of sound/music production - but it also connects in the wider cultural sense - with the looping and repetition in the scratching and sampling modes of dance, hip-hop, techno and house music (and their descendants and derivatives). In videogame music the looped sound references both the structure (form) and content properties of the "in-game" sound.

[4] In addition to modern Japanese game composers who are admired – musicians such as Rob Hubbard (*Monty on the Run*, *Thing on a Spring*), Ben Daglish (*The Last Ninja*, *Deflektor*) and Jon Hare (*Cannon Fodder*, *Sensible Fodder*) have all similarly become cult figures.

Like appropriation or sampling, looping (repetition) is not a new phenomenon either visually or aurally, and similarly to these other strategies, it has become a defining tool of digital production (as it is also easier to achieve by digital means) and a symbol of postmodernist aesthetics in both the visual and aural domains. Its functional usefulness proven, Manovich also asks whether it might be the new narrative form appropriate for the digital age.[6] Here, in the example of looping repetition, we have an essential strategy in videogame sound production that becomes an aesthetic and narrative device in videogame music and also connects both to the digital-ness of new media artefacts, and to the wider sonic culture.

THEMES

Having outlined the aesthetics of in-game music, we can now turn our attention to examining the ways in which videogame musicians use this music (and the hardware that it runs on) in their own compositions. But rather than list these – which will inevitably tend to place them in an implicit hierarchy of "complexity", "worth", "interest", "professionalism" or "musical-ness" –, we have chosen to arrange them thematically around a series of key concepts. By doing this, we hope to concentrate attention on the issues that these works raise, rather than attempt to evaluate their artistic merit (or lack thereof). These different methods of appropriation (remixing or reworking) represent different approaches and aesthetic strategies which co-exist within the field of videogame music as a whole.

Techniques

Although it is possible to draw significance from the technicalities of videogame music production – for example, whether the game sound is achieved through conventional (synthesiser-based) sampling or by reprogramming the original game console so that it can be used as a musical instrument – we do not wish to base our paper on such fine-grained distinctions (although we will touch upon these ideas in places). In stead, we wish to look more broadly and holistically at technique.

Previously, [9] we have identified videogame art as having an aesthetic of appropriation and it is helpful to use the same notion here – particularly the distinction that we made between "remixing" and "reworking". Remixing, as we defined it previously, is taking the elements of the original game and working with them as raw material; it is not – and this is important point for this current discussion – the narrow music-specific meaning of remixing (it can be helpful to think of our use of this term as being in the sense of a "cultural remix"). Reworking, on the other hand, is taking the iconography or technology of the original game and recreating or re-presenting them in a new way.

From an academic point of view, the work produced by and for communities of fans is more interesting than the more mainstream mash-ups such as the *Chrono Trigger Mixtape*. Audio remixing, by definition, allows the fan to work with the same raw material as the original – and this allows the fan to produce something which is of a professional standard and as a result, they feel more connected to – and on an equal with – the producers of the original. This is particularly the case with the remixing of videogame music as the act of remixing is more invisible - it is not like the visual arts where the difference between the original material and the additions is harder to conceal. As they all use the same sounds, no remix of *Final Fantasy*, for example, or any other game, is more real than the others and each alternative soundtrack could – at least in the mind of the fan – have been used in stead of the actual one.

This notion of there being more than one valid version of an artefact is developed by Laurie Taylor [15] who has used the notion of holographic theory to explore the role of concept art and the way in which different representations of a game character or game world can coexist, either in different media (the packaging, the videogame, fan art, etc) or in different versions of the game, without being regarded as incompatible. This theory, which is different from a "reboot" [5] – where the previous events are no longer regarded as the *real* ones – throws light on the complex multi-layered relationship of fan-art to its source game. A relationship which tolerates alternative versions (and possible inconsistencies between them) and can also be applied to videogame music. In a sense, it is even more applicable in the context of videogame music as the remixing of dance music (and other genres) has already firmly established a notion of there being several equally valid versions of a song, rather than one original and several copies/remakes/alternatives.

But this is not to say that reworking does not exist in videogame music. The work of Nobuo Uematsu and others has been rearranged or reorchestrated to make it suitable for performance at the commercial videogame-oriented concerts such as *Play! A Videogame Symphony* and the *Dear Friends: Music from Final Fantasy*. In addition, there are a number of groups such as Press Play on Tape, SID80s (Stuck in d' 80's) and others playing cover versions of music from old videogames, particularly from Commodore 64 games.[6]

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[5] Comic book series undergo frequent reboots, but other examples include *Casino Royale* (2006), *Batman Begins* (2005) and the recent *Battlestar Galactica* television series.

[6] The name "SID80s" is a reference to the SID synthesiser chip used in the Commodore 64 and a pun on VIC20, another computer by the same manufacturer. See elsewhere in this paper for the significance of the MOS Technology SID chip.

There are also a number of niche techniques used by some musicians. Circuit bending (short circuiting the hardware to create/distort sounds) is also used but this has tended to concentrate on electronic toys (such as Speak and Spell, for example) rather than computer games as these are more flexible. As a result, it is only of minor interest in relation to the current discussion of videogame music. A far more common approach is to hack or reprogram the videogame hardware or software. This is the technique used by Cory Archangel and others.

Motivations

The same palette of techniques can be used by both professional and amateur musicians so it makes no sense to make distinctions between these two communities on the basis of technique. But a fundamental distinction can – and should – be made on the basis of the motivation behind the work: between those using videogame music to say something specifically about videogames (or even a particular videogame) and those who are doing it simply because they are interesting sounds (and not particularly noteworthy or significant because their provenance).

So one can see, for example, that in a track like *Powerpill Pacman*, Aphex Twin (A.K.A. Richard James) has taken the characteristic elements of the original background music of the game – the repetitive loops, the frantic pace, the contrast between the upbeat music and the unmusical "munch" sounds – and exaggerated all of them because he wants to say something about the game and its music, rather than just because he likes these distorted and exaggerated sounds (as just another sound).

This contrasts with the work of bitpop/chiptune musicians. Even though they are using Gameboy-based sequencing tools such as LSDJ (Little Sound DJ) [5] or Nanoloop, [10] their work doesn't directly reference games (or aim to). Their intention is simply to produce original music, and if this happens to be evocative of in-game music, it is simply because of the hardware that they use and the need to adopt certain techniques – such as using arpeggios in stead of chords – due to its limitations.

The distinctive sound of the game hardware, particularly of handheld consoles such as the Gameboy, is attractive to musicians as it is iconic, evocative and nostalgic.[7] It also is ideal for certain genres of music, such as upbeat dance music and "synthpop" (the latter demonstrated by the cover versions featured in 8-Bit Operators' *Tribute to the Music of Kraftwerk* CD). But other sound chips and game hardware have become equally noted for their distinctive sounds - the fame of composers such as Rob Hubbard, the emergence of tribute bands such as Press Play on Tape, and the size of archives such as The High Voltage SID Collection are all attributable to the groundbreaking design of the MOS Technology SID synthesiser chip used in the Commodore 64, the quirky games available for that platform, and the active demo scene that these inspired.

Most videogame music is still based predominantly around obsolete hardware such as the Gameboy or the C64, and a parallel can be drawn here with mainstream music and the continued popularity of music equipment such as the Roland TR-808 which has became a favourite of hip-hop and dance musicians, but only achieved this cult status many years after it was discontinued (its success when in production was only modest). Indeed, one might argue that rarity and nostalgia provide a potent combination for myth-creating around a particular hardware item.

Communities

It is important, however, not to regard videogame musicians as a single homogenous group. As we have shown, it consists instead of a number of overlapping communities - each with different technologies, motivations, ambitions, audiences, or styles. Even so, the structure, composition and organisation of the videogame remixing community is interesting from an academic viewpoint and worthy of further examination – particularly in comparison to the fan art or modding/machinima communities which have up to this point gained greater attention. We will discuss each of these comparisons (with the fan art community, and with the modding/machinima community) in turn.

There is a clear parallel between videogame music fans - such as those producing alternative remixes of the *Final Fantasy* soundtracks - and those producing imagery from the game. Indeed, there is likely to be an overlap between the two groups. Schott and Burn have described one such community [13] - using Oddworld Forums as their case study - and examined the way in which this has, as one of its main foci, the production of art using the characters from the original game and the act of commenting on this art to produce better art (better both in the sense of better drawings and more accurate representations of the original). The fan-created music community has similar peer review and comment - indeed, this is an activity which occurs more naturally with music than with drawing as it (music) is meant to be played and shared.

Oekaki - shared whiteboards - are not popular amongst fan artists and stealing or modifying other people's work (without permission) is frowned upon. In this sense, it is a community of individual artists, rather than one producing communal works and there is a contrast here with videogame music where collective production is both more possible (remixes can easily be remixed further) and more acceptable. One particular example of this is that in Japan,

[7] The original "grey brick" Gameboy remains a favourite for videogame musicians because of the sound that it produces which is felt to be better than smaller, later, handheld consoles.

videogame remixes are often produced by *dōjin* - that is to say, communities of friends (or, as in this case, people with a shared interest) who produce and self-publish works of a professional standard (*dōjinshi*). *Dōjin* (and self-published fan art) are not common in Western fan communities, but more informal structures and modes of collective production and distribution do occur.

A second parallel can be drawn between the chiptunes community - centred around tools such as LSDJ and Nanoloop - and the modding/machinima/mod art communities who have a common toolset of level editors and specialist applications. While game modification is split between hobbyist mod makers and mod artists (with mod artists doing relatively little tool development and the hobbyist community acting as the unofficial "research and development wing" of videogame art), game musicians act as a single group and create their own applications. There is little distinction between amateur and professionals or between artists and hobbyists (though this may, of course, simply be because videogame music is still unrecognised as a distinct artform and that the differences between professionally produced music and the work of a hobbyist are less dramatic than that between professional videogame art and videogame-related fan art).

CONCLUSIONS

In this paper we have written about the little-discussed field of videogame music. In theorizing distinctions and themes within this field we feel we have illuminated areas worthy of our further research and investigation. Although this paper has covered a number of disparate fields of videogame music - with different communities and individuals producing different types of works, with different motivations – we can, however, draw a number of interesting and illuminating conclusions from this comparison. Indeed, the diversity of this field only serves to highlight these connecting threads (and a comparison with other of hobbyist or fan activity, such as machinima draws them into an even sharper focus).

There is also an interesting comparison to be made in the type of work produced. Although it is a slight simplification and generalisation, one can say that, on the whole, videogame music – of all sorts - is nostalgic. This contrasts videogame art which is, as whole, ironic and fan art which tends to be devoted.

In a recent interview for The *Guardian* website, the videogame music group The Lost Levels noted the influence of game sounds on mainstream musicians saying "You can definitely hear it in some of Beck's music. It has even spread to pop production and can be heard in recent Girls Aloud, Rachel Stevens and Gorillaz records to name but a few." [14] Ultimately, however, although videogame-based music is (generally) accessible and fun, the chances of a crossover to mainstream media are limited.

The chances of critical acceptance are also limited. Videogame art has had a relatively easy transition to institutional acceptance - its form makes it attractive to curators wishing to attract a younger, hipper audience and the works themselves have had enough interesting content/context to make their presence in the gallery justifiable. Videogame-based music is, by its very nature, easy to trivialise and dismiss as ephemeral or a fad. It also presents problems both for curators wanting to include it in the gallery and promoters wishing to include it in a concert programme. However we hope that these issues can be overcome and that videogame music becomes more recognized for its creative contribution to the videogame art field.

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