

# Algorave: Live Performance of Algorithmic Electronic Dance Music

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## ABSTRACT

The algorave movement has received international exposure in the last two years, including a series of concerts in Europe and beyond, and press coverage in a number of media. This paper seeks to illuminate some of the historical precedents to the scene, its primary aesthetic goals, and the divergent technological and musical approaches of representative participants. We keep in mind the novel possibilities in musical expression explored by algoravers. The scene is by no means homogeneous, and the very lack of uniformity of technique, from new live coding languages through code DJing to plug-in combination, with or without visual extension, is indicative of the flexibility of computers themselves as general information processors.

## Keywords

algorave, electronic dance music, algorithmic composition

## 1. INTRODUCTION

Algorave is a current locus of activity where algorithms are explored in alliance with live electronic dance music; frequently they are the means of generating novel dance music on the spot from individual component events, or the manipulation of existing dance music segments. The nature of the algorithms for such production includes probabilistic generation within constrained parameters, and higher order transformation of pattern, and the interface of control varies from live coding to DJ-like instrumentation. The algorave website defines the movement by the statement ‘sounds wholly or predominantly characterised by the emission of a succession of repetitive conditionals.’ (<http://algorave.com>), which seems to foreground repetition and conditional instructions, whilst underplaying random number generation.

The live generation of electronic dance music (including late 1980s to 1990s styles such as hardcore rave [20]) from an algorithm is not in itself novel, but has precedents extending back more than a decade. Indeed, the heartland of algorithmic composition itself (for reviews see for example [15, 13, 17]) provides a backdrop where dance music styles have been the target as much as experimental, jazz and classical music. Table 1 presents a catalogue of precedents where algorithmic composition has met dance music; most

have a live performance component, or at least the potential for live rendering. Some of the sources here remain less well established in terms of the exact algorithm deployed, but most have some academic or commercial documentation.

There are many more interesting experiments and performance projects of relevance beyond the scope of this review. We could have made more of recent mobile app and web audio application experiments (whether flash or most recently Web Audio API) as areas of mass endeavour where generative music software has had more popular impact. We might point further to a general software backdrop, from Max to SuperCollider to Ableton Live. Other early performer experiments include work around 2001 such as Matt Olden’s Jungulator, SuperCollider performance system authors such as Fabrice Mogini, mintyfresh and crucial all actively playing out in the early part of the 2000s, the Coldcutter, Glitch and LiveCut VST plugins, René Wooller’s work on note sequence morphing in a context of ‘mainstream electronic music’ [27] or more current generative electronica explorations by Arne Eigenfeldt and collaborators [9]. There have also been a number of dance music oriented events which have welcomed algorithmic approaches to music; acts playing at algoraves have previously played to nightclub audiences at international digital music festivals such as Club Transmediale, Sonar, STRP and Sonic Acts, and the *nil* series of events in Karlsruhe in recent years is a further precursor. Algorithmic music has only been one component in these events however, and not made as explicit as at algoraves.

Given such a rich tapestry, the algorave movement might be viewed as rather late to the party. However, the theme has provided a strong rallying point for a new generation of algorithmic performers, alongside some old hands, and provided a new realm for audiences, performers and promoters to collaborate on exploring ways to stage, respond to and enjoy algorithmic music. That algorave has been met with some enthusiasm suggests that it was time to bring these pockets of culture together.

The paper proceeds now to describe more detail on the algorave movement, and its musical practices. It is early in a movement which still appears to be in its ascendancy, but we review the work which has been brought together so far, and the reaction of journalists and critics.

## 2. ALGORAVES SO FAR

Table 2 lists the events which have been billed as algoraves so far. The *algorave* portmanteau is not trademarked, and any central control is limited to informal negotiation. The format of an algorave is not clearly defined, and what goes on is ultimately the choice of the artists involved on the night, and audience members who choose to attend. Nonetheless, certain features of the archetypal algorave are explicit: algorithms, music and dancing should be involved. Yet as we see from Table 2, audiences do not always dance.

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Year	Precedent	Notes
1992	<i>Cybernetic Composer</i>	Kurzweil synthesizer MIDI control demos in four music styles (standard jazz, latin jazz, rock and ragtime) [1]
1994	<i>Koan</i>	Most publicised for ambient music including Brian Eno's <i>Generative Music 1</i> installation [10], but possible to adapt to techno '...percussion thing... bass as well but it's really acidic' [12, p. 102]; according to programming collaborator Neil Cosgrove (personal communication 2014) he used SuperCollider 1
1997	Aphex Twin claims live club algorithm	Various interfaces set up in a club environment to control basic dance music loops [25]
1998	SIGGRAPH98 interactive club	C++ prototype 1999, Csound opcodes in 2000 then first SuperCollider library 2001 (Remy Muller's LiveCut VST adaptation 2005, iPhone app 2010) [5]
1999	bbc cut	A goa trance simulator
2000	Arguru and WakaX's <i>Saiko</i>	London laptop duo (later trio) play first gigs (first dancing audience at Paradiso in Amsterdam in 2001); proto-live coding
2000	slub	generative techno/gabba outfit
2000	Automatic DJ transition system	[4]
2000	IDM summer schools	Established by John Eacott to explore SuperCollider for dance music; led to the <i>Morpheus</i> CD-ROM project in 2001 [8]
2000-now	Club live coding era begins	There are however earlier precedents in a few experimental 1980s FORTH performances in particular [26]
2001	Autechre's <i>Confield</i>	[23] Tom Betts (personal communication 2014) has identified <i>EP7</i> (1999) as involving more use of generative algorithms
2001	GA and NN rhythms	techno loops via genetic algorithm [7, 24], neural net generation of drum and bass patterns [19]
2001	<i>Rez</i>	Beat-locked shoot-em-up game
2002	<i>MadPlayer</i>	Commercial generative personal music player
2003-5	raemus	Automated electronica production experiments by Arne Eigenfeldt <a href="http://www.sfu.ca/~eigenfel/arne/raemus/raemus.html">http://www.sfu.ca/~eigenfel/arne/raemus/raemus.html</a>
2004	TOPLAP	Live coding international organisation founded, appropriately, in a night club in Hamburg at 2am [26]

Table 1: Selected algorave precedents

This points to algorave's roots in an experimental approach to music, in that events are literally experiments which may in some sense fail, and those failures are learned from and perhaps even embraced. A number of events, however, "went off", with large groups moving to the music. As algorithmic artists get more used to working with crowds, and more experienced promoters get involved with producing algoraves, this picture is likely to improve.

### 3. ALGORAVE PERFORMANCE PRACTICE

Algorave performers present an eclectic range of electronic musicians, predominantly using laptop alone, but also including some experiments in control of hardware (e.g. an USB enabled newbuild analog synth) or even mic'ed up acoustic synthesis via robotic actuation. We discuss some possible techniques below. Inevitably, some performers combine multiple approaches. For example, sick lincoln has simultaneously combined code DJing from SuperCollider, live coding from a Web Audio API javascript app and live re-patching of a Max/MSP algorithmic hip hop system. Figure 1 presents three performers captured during live algoraves.

#### 3.1 What is an algoravethm?

The thorny computer science question of defining an algorithm recurs in algorave with a twist. Perhaps surprisingly for some, algorithms are not always core to computer music; for example, some electroacoustic musicians privilege sound over abstract ideas [18], often using software interfaces based on tape editing metaphors. In algorave the algorithm is celebrated as musical material, but can come in a variety of forms. Non-deterministic approaches are popular as the probabilistic mainstay of algorithmic or generative music [15, 13], but so are patternings expressed as higher-order manipulations of time [22, 16]. Following the earlier

algorave definition from the main website, repetition is an important factor, in algorithmic terms represented as iteration or perhaps fractal or temporal recursion [21]. The following section demonstrates the wide diversity of approach and outcome.

#### 3.2 The Algorithmicisation of Music Technology

General environments for electronic dance music and electronica performance, such as Ableton Live, can host algorithmic plug-ins. Such digital audio workstations either keep an explicit eye on live performance (such as Ableton), or can be co-opted (to a degree) for performance. Scripting environments within such software, such as python in Ableton or javascript in Logic X, may allow increased customisation (let alone Max within Ableton). This community is thoroughly familiar with the flexibility of such software as Max/MSP, Pd and SuperCollider for the building of novel performance environments; open source software is often associated with algorave performers.

#### 3.3 Live coding

Algorave is not exclusively a preserve of live coders, but they have maintained a strong presence at every event thus far. This is perhaps because the live coding tradition of projecting screens help motivates the whole endeavour; where algorithms are not made visible for periods during an algorave, we run the risk of things feeling much like a standard electronic music event. Live coding remains a powerful mechanism for live interaction with algorithms themselves, although is a technique applied in a wide variety of ways, from Meta-Ex's development of pieces across multiple performances and practice sections, to the much celebrated *blank slate* approach where code performances are improvised from scratch. In both cases a healthy library

Date	Event	Estimated audience size	Estimated dancing
26 Apr 2014	Old police house party, Gateshead, United Kingdom	50	25
22 Mar 2014	FIBER+STEIM, Amsterdam, Netherlands	150	100
05 Jan 2014	Nanahari, Toyko, Japan	10	0
01 Dec 2013	Freedonia, Barcelona, Spain	30	1
28 Nov 2013	The White Building, London, United Kingdom	60	5
28 Nov 2013	/*vivo*/ Festival, Mexico City	140	50
07 Nov 2013	Penelopes, Sheffield, United Kingdom	100	30
14 Oct 2013	Earzoom festival, Ljubljana, Slovenia	70	0
14 Sep 2013	nmmn, London, United Kingdom	60	20
10 Aug 2013	Allcaps festival, Toronto, Canada	30	10
09 Aug 2013	Homegrown Hamilton, Hamilton, Ontario, Canada	50	5
15 Jun 2013	MUME-WE, Sydney, Australia	30	0
16 May 2013	MS Stubnitz, London, United Kingdom	200	100
20 Apr 2013	Live.code.fest, Karlsruhe, Germany	150	80
18 Apr 2013	MS Stubnitz, London, United Kingdom	120	40
17 Apr 2013	Volks nightclub, Brighton, United Kingdom	60	10
23 Feb 2013	Network music festival, Birmingham, United Kingdom	50	1
17 Mar 2012	nmmn, London, United Kingdom	70	30

Table 2: Table of algoraves to date, including rough audience estimations retrieved from video documentation, event organisers, or performing artists, in that order of preference.

of musical abstractions, a well-developed programming language environment, and a programming languages designed specifically for live production of dance music can help support spontaneity.

We should also point out potential drawbacks associated with live coding. Large projected screens can flood a venue with light, killing the atmosphere. That some live coding environments come with white backgrounds as default only exacerbates this problem. Indeed, the distracting nature of code projection is a continual debate in live coding fora. One approach is to project code on as many surfaces as possible; where the code is omnipresent, it becomes part of the background, rather than drawing the attention of the audience en mass.

### 3.3.1 Mini-languages for Pattern

There are increasingly user friendly “mini-language” live coding systems which facilitate loop and layer-centric constructions typical to dance music. *ixilang* is a primary example [14], and features a structured code editor which while text-based, supports visual correspondences. *Tidal* is another, and although its focus is on speed of use rather than ease of learning, is beginning to see wider take-up. Both *ixilang* and *Tidal* promote pattern in terms of transformative functions, applying such transformations as scrambling, reversal and extrapolation in different ways. In the case of *ixilang*, the live coder writes code which schedules repeated transformation of pattern. In the case of *Tidal*, its basis in the pure functional language Haskell shows through in allowing abstract transformations to be treated as values, and providing a range of mechanisms for combining them in expressive (rich, varied and compact) ways.

## 3.4 Code DJing

As there is a continuum of the profundity of control in general interfaces [2], so live coding varies in the level of active change attempted. A variation on first principles algorithm construction, manipulation and deconstruction is the process of curating multiple algorithms in code jockeying. Here, pre-written snippets of code are brought into play; new combinations are always possible, indeed, likely, as exemplified by an artist like *Timeblind* who governs live performance material selection from a top level range of available processes. The original code may be recoverable for more detailed change; The live coding mixer is a mainstay here [6],

as for example, available in *SuperCollider*’s *jitlib* library.

## 3.5 Algorave Visuals

We have already covered live coding which generally includes a visual element, but *VJing* is another practice carried across from raves to algoraves. Dave Griffiths, member of the live coding band *slub*, considers the music he makes to be a side product, rather than an end-product of his live coding languages, where the visual aesthetics of his interfaces are more important [3]. There are several other live coding systems with advanced video capabilities, although the only systems we are aware of being used for algorave events are *Fluxus*, *Livecodelab* and *Pure Data*.

## 4. COVERAGE OF ALGORAVE

Algorave as a brand seems to have had some success in raising the profile of algorithmic performers. Primary news items, i.e., those interviewing algorave organisers or artists, have appeared on national television (*Arte Germany 31/Jan/2013*, *Arte France 31/Jan/2013*, *RTV Slovenia 17/Oct/2013*), print magazines (*Wired UK August 2013*, *Dazed and Confused May 2013*) and a number of high profile blogs and news sites (e.g. *Boing boing*, *Vice*, *NOS OP 3*, *SD Times*).

Not all coverage has been uncritical, and certain media tropes, such as the geek/nerd, have appeared. Comments from website visitors indicate that not all have enjoyed the music, nor the technological backdrop. Whether this is straightforward rejection of the possibilities of algorithmic music in mass culture, or a healthy reaction towards the development of a new punk aesthetic, is a matter for longer term cultural development to make clear.

## 5. CONCLUSION: THE FUTURE OF ALGORAVE

We have spent this article surveying recent developments clustered under the heading of ‘algorave’. Algoraves provide a fertile alternative concert and club scene for the live development, deployment and testing of novel musical interfaces within a context of algorithmic dance music.

With some media hype around algoraves, events in more relaxed settings, such as the *PubCode* series of algorithmic music events amongst the more comfortable, well-lit and lower volume surroundings of British public houses, have



Figure 1: A triptych of algorave performers; left, section\_9 (Ash Sagar) who performs with ixilang (photo by Christian Gallagher); middle, Andrew Sorensen, best known for virtuosic live coding and as the systems author of *impromptu* and *extempore*; right, Hernani Villaseñor and Norah Lorway, both live coding with SuperCollider, during a changeover.)

become the new unorthodoxy. The era of algorithmic dance music is already here, and algorave may only be one offshoot in culture. It does, however, present an interesting development linking research and experimentation with dance music practice, successfully bringing people together for serious fun. Following Kirnberger's 1757 *The Always Ready Polonaise and Minuet Composer*, we might look forward to 2017's *The Always Ready Polyrave and Minimal Techno Composer*, playing out in a mainstream club scene.

Somewhat paradoxically, algoraves shift some attention from the algorithms, to the people enjoying them. We attribute this to our place in a human cycle that begins with mechanisation, then leads to the development of new skills, and finally prompts new culture to blend the new activity with everyday life. As the anthropologist Tim Ingold puts it, "... at the same time that narratives of use are converted by technology into algorithmic structures, these structures are themselves put to use within the ongoing activities of inhabitants" [11, p. 62]. For us, an algorave is an opportunity for artists to bring what they have made to nightclubs, and ask "this is what we have made, what does it mean?" By dancing, we connect algorithmic abstractions with the lived experience of movement, and provide one answer.

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