Generating Electronica – A Virtual Producer and Virtual DJ

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ABSTRACT

We present a virtual Electronic Dance Music (EDM) producer that generates stylistically accurate Breakbeat music. GESMI, the Generative Electronica Statistical Modeling Instrument, uses a corpus of human-analysed Breakbeat tracks dating from 1994-2010: the system learns relevant musical information in order to produce a wide variety of music within the genre using knowledge culled from the transcriptions.

Author Keywords

Generative music; computational creativity; electronic dance music.

ACM Classification Keywords

H.5.5 Sound and Music Computing: Modeling, Systems.

PROJECT DESCRIPTION

The Generative Electronica Research Project (GERP) is an attempt by our research group[1] – a combination of scientists involved in artificial intelligence, cognitive science, machine-learning, as well as creative artists – to generate stylistically valid Electronic Dance Music (EDM) using human-informed machine-learning. We have employed experts to hand-transcribe 100 tracks in four genres: Breaks, House, Dubstep, and Drum and Bass. Aspects of transcription include musical details (drum beats, percussion parts, bass lines, melodic parts), timbral descriptions (i.e. "low synth kick, mid acoustic snare, tight noise closed hihat"), signal processing (i.e. the use of delay, reverb, compression and its alteration over time), and descriptions of overall musical form. This information is then compiled in a database, and machine analysed to produce data for generative purposes.

Applying generative procedures to electronic dance music is not novel; in fact, it seems to be one of the most frequent projects undertaken by nascent generative musician/ programmers. EDM's repetitive nature, explicit forms, and clearly delimited style suggest a parameterized approach.

Our goal is, as a first step, to produce generative works that are modeled on a corpus, and indistinguishable from that corpus' style. There are two purposes to our work: the first purely experimental, the second artistic. In regards to the first, can we create high quality EDM using machine-learning? Without allowing for human/artistic intervention, can we extract formal procedures from the corpus and use this data to generate all aspects of the music so that a perspicacious listener of the genre will find it acceptable? We have already undertaken validation studies of other styles of generative music [1], and now turn to EDM.

It is, however, the second purpose that dominates our motivation. As composers, we are not interested in creating mere test examples that validate our methods. Instead, the goals remain artistic: can we generate EDM tracks and produce a full-evening event that is artistically satisfying, yet entertaining for the participants?

The system created by the author – GESMI (Generative Electronica Statistical Modeling Instrument) – began producing complete EDM tracks with complete autonomy in March 2013, following two years of analysis (by both humans and machine) and coding. While it was previously possible to create EDM tracks interactively – that is, with human supervision – GESMI is one of the first truly autonomous EDM generators. A detailed description of the system is provided elsewhere [2, 3].

The system is currently undergoing further development, including autonomous control of timbre selection and signal processing.

Lastly, a virtual DJ is being created that selects from a large population of pre-generated and pre-analyzed tracks by GESMI, assembling a continual set based upon feature analysis of the generated audio. The virtual DJ will create a continuous set of autonomously generated Breakbeat music.

Links to sample material: https://soundcloud.com/loadbang

REFERENCES

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