# From on grid to off grid: The changing ideals of machine rhythm

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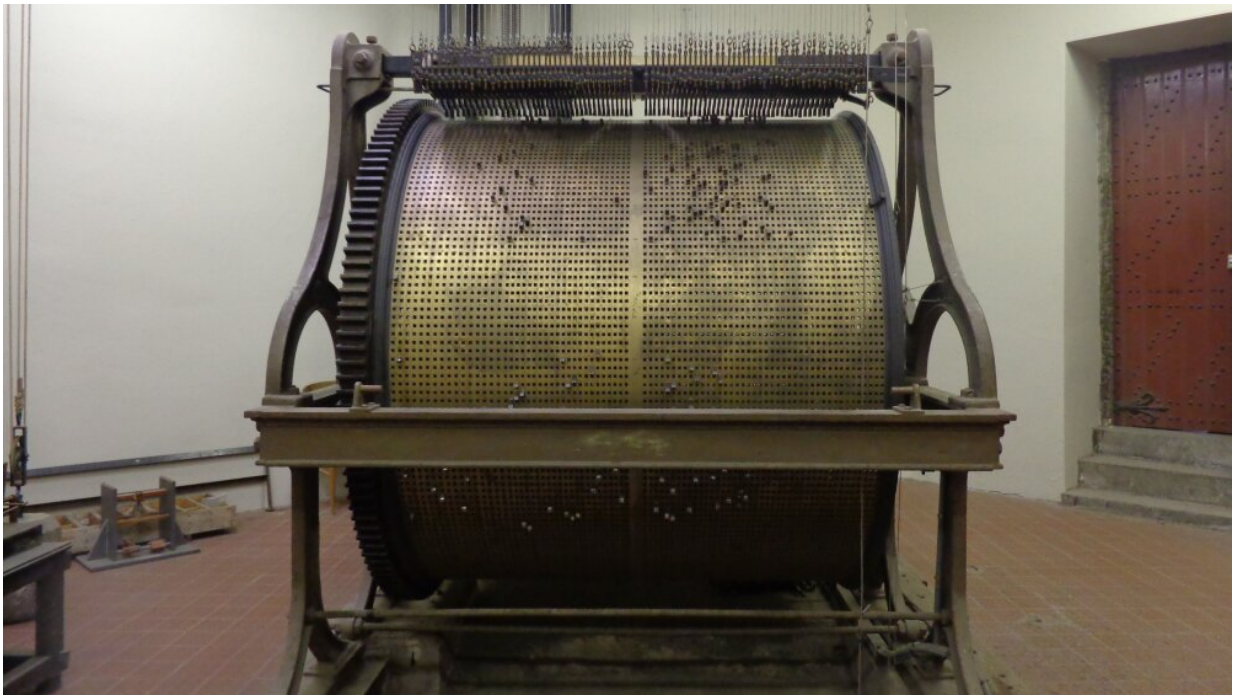

The clock tower in the Belgian city Ghent plays pre-programmed music for the residents. Although it may sound beautiful, the music is 100 percent on grid – and it does not make you want to dance. Credit: University of Oslo

In the past, it was a challenge to make machines play music on the grid. Today, the challenge is the opposite.

For hundreds of years, machines have been making music. In Belgium

and the Netherlands, you can still hear music from carillons in ancient bell towers. These carillons share a common feature with your cell phone : They can play music programmed by humans, and they can play by themselves.

"We easily think that digital technology is a revolution and that everything is new. However, humans have always been interested in how technologies can help them control the dimension of time in music," says Bjørnar Sandvik, music researcher at RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion, University of Oslo.

## The practice of 'time tinkering'

In a Ph.D. he has studied various practices of what he calls "time tinkering"—the deliberate experimentation with time, structure, and rhythm in contexts of producing machine rhythm.

"My approach is based on a simple yet often overlooked premise: The very concept of machine rhythm presupposes a process where music is stored or represented on a physical material, and thus 'frozen' in time. While time flows irreversibly, media technologies make it possible to manipulate and experiment with the placement of sounds along the time axis," says Sandvik.

Humans have done this since antiquity, he adds. Grids have been a necessity.

"For example, to program self-playing carillons or music boxes, you must position small pins on a rotating cylinder. If you want it to produce rhythmic music, these pins need to be spaced at the exact right distance from each other, and for this, you need a grid—a spatialized time axis—to attach the events to."

Even today we use the same principle, he points out.

"Many of the techniques used to compose and edit music with digital production tools are possible because the music is presented visually and graphically to us on our screens. This gives us events to move along the time axis or organize in a grid on the screen."

## An ideal that changed

In his thesis, he had a historical approach but he also investigated today's time tinkering in machine music. The grid has influenced the way rhythms have been programmed and understood in different technological eras, he explains.

"In the past, a common challenge was to make machines play music that had already been composed as notes on paper. Thus, the ideal was to surpass the human ability to follow the notation and play on grid. In the digital age, the challenge is often the opposite," says Sandvik.

"It is easy to get a modern computer to play on the beat. The challenge is to make it go off grid, and to do it in a human and creative way."

Today, software programs used in music production offer automatic time correction features. There are also several other functions that can synchronize events to the exact same timing on a common grid.

"This makes it more interesting to move and juxtapose single elements in order to create rhythmic friction."

## The mechanical sound

Humans have always experimented with different types of microrhythms

by deviating from a note-based norm. During the last hundred years, this has shaped the development of rhythmic genres within popular music such as jazz, rock, blues, funk and soul, Sandvik explains.

"However, for a long time it was complicated, resource-intensive and time consuming to explore such microrhythms in machine programming. This is one of the reasons why machine rhythm has gotten a reputation of being 'mechanical' and 'perfect', even though today we no longer have such boundaries."

## A new standard

At the turn of the millennium, digital recording technology made it possible to move sounds along the time axis in a new and far more flexible way. This led to a new trend where songwriters seriously began experimenting with microrhythm in pop music.

Today, manipulation of time on a micro level is central to the composition practice of music producers—in fact, it is a new standard, Sandvik claims.

"Digital recording technology makes it much easier to try and retry different timings. You can make repeated recordings without losing the original or the sound quality. It is easy to program intricate rhythmic patterns, or place recorded sounds wherever you want along the time axis on your screen."

## It is (almost) unnoticeable

As part of the research project Timing and Sound in Musical Microrhythm (TIME), Sandvik interviewed several producers of electronic dance music (EDM) and he even analyzed their music.

"The fact that EDM is characterized as dance music may to some people seem like a paradox. According to rhythm research, music should deviate from the beat if it is to provide groove and a desire to dance. We often experience the rhythms in EDM as mechanistic and strictly on the grid," says Sandvik.

However, according to findings from the TIME project and other research, it only takes a few milliseconds of deviation to create an experience of groove—in fact, listeners often do not even notice it. Through their study of the practices of EDM production, Sandvik and his colleagues concluded that producers take several measures to create a groove.

"Producers work hard to achieve rhythmic friction against the grid, either by moving the temporal onset of events or by shaping how the sounds and their intensity themselves unfold in time. Such techniques are crucial for the grooves to be successful."

**More information:**

- Thesis: Public defence: Tinkering with time: On the practices and technologies of machine rhythm
- Project: www.uio.no/ritmo/english/projects/time/

Provided by University of Oslo

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