

How We Understand Music Genres

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Everyone from [Laughing Squid](#) to [NPR](#) is talking about "[Every Noise At Once](#)," an ambitious exercise from The Echo Nest principal engineer Glenn McDonald that lets people explore arcane and general genres of music via an awesome word map. It's an incredibly simple, deep way to explore all of music, as well as searching for bands to find out where they fall, and exploring the additional genre maps to see what bands in each genre sound like, from happy hardcore to indiepop and beyond.

The breadth of information in [this chart](#) is rather breathtaking – in fact, it channels a good deal of all the work we have ever done towards understanding the world of music. Yet the interface is a marvel of simplicity, masking most of the powerful stuff going on under the hood.

Let's take a peek, shall we? How did Glenn fit the world of music onto a word map that won the internet? How do you teach computers to understand genre? Glenn himself explains:

A "music intelligence platform" ought to be able to play you some rock music. Hopefully it does more, of course, but let's start there.

Our music intelligence platform responds in great depth to a wide variety of structured inquiries. Among many other things, this means we can ask it for the 10 hottest artists commonly described with the word "rock."

This seems like a reasonable structured formulation of the question "what is rock music?", and it takes advantage of our wide-reaching and sophisticated calculations of "hotness" and descriptive terms like "rock."

Except here are the results:

1. Rihanna
2. Daft Punk
3. Justin Timberlake
4. Bruno Mars
5. P!nk
6. Taylor Swift
7. Macklemore & Ryan Lewis
8. Demi Lovato
9. Lil Wayne
10. Fall Out Boy

These are defensible answers to our query, because for all of them, “rock” is among the dozen or two most common terms with which people describe the artist, and we have insanely detailed data to prove it. But this is really not what you and I mean by rock music.

In fact, if we take out “rock” and just ask who the 10 hottest artists of any kind are right now, we get the same top 9, only swapping Pitbull out for Fall Out Boy. And if we switch the term from “pop” to “rock”, we trade Macklemore & Ryan Lewis for Pitbull, and keep Fall Out Boy.

These words don’t tell us enough on their own. The computers are doing their literal-minded best, but we need to ask them a different question.

When we say “rock music,” of course, we aren’t talking about term-frequency in a corpus of descriptive text, we’re talking about a kind of music. It’s an amorphous, evolving, imprecisely-delineated genre of music, to be sure, but still, if we were talking in person about this idea of rock music, we could straightforwardly clarify: “You know, rock music, man! Guitars, drums. The Stones, The Who, Led Zeppelin, that kind of thing.” Or maybe we’d say Nirvana and U2, or maybe we’d say The Allman Brothers and Lynyrd Skynyrd. Maybe we really mean classic rock, or album rock, or alternative rock.

8. Boston "More Than A Feeling"
9. AC/DC "Back In Black"
10. Lynyrd Skynyrd "Simple Man"

These might not be the exact same 10 songs you or I would pick by hand to define "rock," but you and I probably wouldn't pick the same 10 songs anyway. At least this is a far more plausible list than one with Rihanna and Daft Punk.

More importantly, perhaps, it's more internally consistent. This is a coherent introduction to a conception of "rock." And we can also now generate plausible and internally-consistent introductions to any number of other conceptions.

Here are 10 songs from our "alternative rock":

1. Urge Overkill "Girl, You'll Be A Woman Soon"
2. The Lemonheads "Into Your Arms"
3. Nirvana "Smells Like Teen Spirit"
4. R.E.M. "Man On The Moon"
5. Pavement "Cut Your Hair"
6. Weezer "Island In The Sun"
7. Built to Spill "Car"
8. Violent Femmes "Add It Up"
9. Soul Asylum "Runaway Train"
10. Meat Puppets "Backwater"

This, assuredly, will not end all arguments about what constitutes alternative rock. But I don't think it's an egregiously worse starting point for those arguments than whatever list you or I might personally propose.

Our computers can now enter plausibly into arguments over almost 500 genres, from *a cappella* to zydeco. Rock is the biggest and most central; we calculate a centrality score, of course, because that's the kind of thing we

do, so we mean that quantitatively. The least central genre is “skweee,” which most of us hadn’t heard of before this chart, either.

The most coherent – and thus hopefully least-debatable – genre is comedy. We don’t expect anyone to grouse that an artist we call “comedy” really plays tango or melodic hardcore. The most debatable genre is probably moombahton, a genre that could come as news to half the bands in it.

The genre with the least popularly-familiar artists is skiffle, which younger readers can be forgiven for thinking is a candy. Older readers might know that skiffle is why nobody would remember Lennon and McCartney if they’d kept playing it instead of forming the Beatles.

The calculations and machinations with which we build these genres involve layers upon layers upon layers of data-collection and synthesis, and a carefully considered (and mercifully manageable) amount of editorial guidance. For example, we decide what to do with naming variants like “nu soul” and “neo soul” (we went with “neo”), and whether we have enough data for the computers to produce a substantial and satisfyingly distinct body of music for any given thing, such as “indie folk” (yes), “sertanejo” (yes), or “ziglibithy” (no, not yet).

We almost never make up genres, but we could. With great power comes great responsibility. The approach allows us (or our customers) to seed, and then organically grow, a new genre or style from essentially any inspiration. In a couple peculiar cases, we've gathered an initial artist list, let the computers give us some songs, and only then listened to those songs to find out what kind of music we were even talking about. (Take a [listen to the Brazilian country-music style “sertanejo”](#), which consists so overwhelmingly of male duos called something like “X & Y”, or in Portuguese, “X e Y”, that it can be checked pretty effectively purely by sight.)

The resulting system’s crucial, pragmatic quality is that it is dynamic and self-regulating on an ongoing basis. Bands appear in or disappear from

genres automatically, as they come into and out of prominence or relevance. Rankings can change as often as daily. Genres scale automatically, according to our internal data-density and the artists' inter-relatedness, so the more central genres like "rock" get more artists, while the more peripheral ones like "jug band" automatically get fewer, without anybody explicitly saying (or even knowing) whether a given genre is one sort or the other, or having to answer any existential questions about where a genre should end.

As data science, this is pretty unruly. There's no imposed taxonomy of genres, and we have no objection to genres that overlap in small or even large part if they represent a subtle distinction that somebody, somewhere might care about (e.g. "gothic metal" vs. "symphonic metal" vs. "gothic symphonic metal").

In the same spirit, any artist can be in as many different genres as apply. The genres aren't even of the same sort: "tekno" is a very particular dance-music style, defined by tempo and historical circumstance; "wind ensemble" is a configuration of performers; "Christian hip-hop" is philosophical distinction; "Slovenian rock" a cultural and geographic one.

All of these are totally fine with us. Spend some time wandering around the map and you'll get a better sense of how these genres vary.

You might also get a sense, perhaps more vividly than before encountering our map, of the contours of the overall space of musical possibility. Roughly speaking, genres at the top of the map are more electric, while those towards the bottom sound more acoustic. Genres on the left are sonically denser, the ones on the right sonically sparer and spikier.

There are other ways to plot music genres, of course, than the one used by the map at any given time. We use 10 dimensions internally, and two completely independent measures of genre similarity. I've flipped the map once already since first publishing it, and I might do so again without

warning if I find another configuration that seems more interesting.

The point of the map, as with the genres, is not to resolve disputes but to invite you to explore music. It is an attempt – however uneven, idiosyncratic, and incomplete – to embrace this new state of the world, in which nearly all of humanity’s recorded music is streamable or downloadable, and give you a way to find out what you don’t know you don’t know.

Click any genre in the map and you’ll hear what we think is a representative song. These aren’t always ideal, but they’re close. Click the » next to a genre for a similarly-clickable audio-map of the artists we’ve extrapolated for it. Hit “scan” at the top of any genre page, and you’ll take a randomized car radio-style journey through that genre. Hit “scan” at the top of the main map and your car will careen wildly around the entire planet.

Or, if you’d prefer a more orderly, guided experience, links at the bottom of each genre page can take you to introductory genre playlists on Rdio. The “»” links for each artist go to their Rdio pages. The same Echo Nest data that powers this map also powers the “related artists” links in Rdio, so if the guided tour takes you somewhere interesting, you can always veer off onto your own path at any point.

Maps are, after all, as much machines for getting lost as they are for finding yourself. There are probably things on this map you’ve never imagined. It probably contains things that you don’t yet realize you love, and branching points where you will be amazed and thrilled to have veered.

I say this from dizzyingly-repeated personal experience.

I’ve long believed that music is what we humans do best, and the main lesson I’ve learned, after all of this exploring and mapping, is that I was right about that, but had wildly underestimated the magnitude of music.

Follow any path, no matter how unlikely and untrodden it appears, and you’ll

find a hidden valley with a hundred bands who've lived there for years, reconstructing the music world in methodically- and idiosyncratically-altered miniature, as in Australian hip-hop, Hungarian pop, microhouse or Viking metal.

You might not want to abandon your old life and stay there with them forever, but you'll go home knowing that there are other ways to live.

We make maps to mark treasure when we think treasure is rare, and then, later, to remember where we've been, once we start to realize that there are treasures everywhere. Eventually, these maps become something to do with our hands while we listen.