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So you want to build a generator...



This is a beginner-level advice essay for people just getting started with building generators. It's also for practiced experts who want a way to organize their knowledge. The advice is meant for any kind of generators: humorous twitterbots, fanciful art-making bots, level generators, planet builders, makers of music, architecture, poetry, and cocktails. (edit: it turned out to be 4000 words long, so enjoy the ride!)

Aesthetics: the toughest challenge

The most common way that generators fail is that they produce content that fails to be interesting. What is "interesting"? That depends on the situation. Very few generators produce only one of a thing. Most generate multiples, but a twitterbot posting every hour will generate more content than a novel-generator outputting one novel every NaNoGenMo. So achieving novelty with the first Twitterbot will be more difficult because there are so many artifacts being produced that any given one of them will probably start seeming less special.

So your algorithm may generate 18,446,744,073,709,551,616 planets. They may each be subtly different, but as they player is exploring them rapidly, will they be *perceived as different*? I like to call this problem the **10,000 Bowls of Oatmeal** problem. I can easily generate 10,000 bowls of plain oatmeal, with each oat being in a different position and different orientation, and *mathematically speaking* they will all be completely unique. But the user will likely just see *a lot of oatmeal*. **Perceptual uniqueness** is the real metric, and it's darn tough.

In some situations, just **perceptual differentiation** is enough, and an easier bar to clear. Perceptual differentiation is the feeling that this piece of content is not identical to the last. A user glancing at a line of trees can tell if they are identical, or if they are less-varied-than-expected suggesting unnaturalness. This fulfills an aesthetic need even if no tree is particularly memorable.

Perceptual uniqueness is much more difficult. It is the difference between being an actor being a face in a crowd scene and a *character* that is memorable. Does each artifact have a distinct personality? That may be too much to ask, and too many for any user to remember distinctly. Not everyone can be a main character. Instead many artifacts can drab background noise, highlighting the few *characterful* artifacts.

Characterful artifacts is another blog post for another time, but certain aesthetic principles create objects with *readable* meanings for human perception. Humans seem to like perceiving evidence of process and forces, like the pushed up soil at the base of a tree, or the grass growing in the shelter of a gravestone. These structurally-generated subtleties suggest to us that there is an alive world behind this object. Kevin Lynch's influential "[Image of the City](#)" demonstrates that there are factors that make cities memorable and describable. Perhaps there are other aesthetic rules that we can discover, too.