

Tell Me More about That Cookie-Cutter

Zhuodi Cai Juan Pampin
Digital Arts & Experimental Media (DXARTS)
University of Washington
Seattle, WA, USA

ABSTRACT

AI models can now take a science-fiction object described in textual form and turn it directly into a 3D-printable artifact. We use the “cookie-cutter”, a nanoscale weapon from Neal Stephenson’s *The Diamond Age*, to see what this direct handoff does to imagination. Using three pipelines, we produce different visualizations: direct 3D generation, component-level decomposition-based 3D generation, and function-based subcomponent generation. The object in the novel is invisible to the naked eye, but we ultimately fabricate one of these results, making the invisible weapon visible and bringing the concerns surrounding it into view.

1 WHAT IS A COOKIE-CUTTER?

Science fiction literature often includes objects the narrative needs, and people may visualize or create these objects based on their descriptions. We pick an object that is invisible to the naked eye, to explore what happens when the text-to-visual work is handed to AI instead of done by a person.

The cookie-cutter in *The Diamond Age* [1] is from a world where violence has become miniaturized and untraceable.

“A cookie-cutter was shaped like an aspirin tablet except that the top and bottom were domed more to withstand ambient pressure; for like most other nanotechnological devices a cookie-cutter was filled with vacuum. Inside were two centrifuges, rotating on the same axis but in opposite directions, preventing the unit from acting like a gyroscope. The device could be triggered in various ways; the most primitive were simple seven-minute time bombs. Detonation dissolved the bonds holding the centrifuges together so that each of a thousand or so ballistules suddenly flew outward. The enclosing shell shattered easily, and each ballistule kicked up a shock wave, doing surprisingly little damage at first, tracing narrow linear disturbances and occasionally taking a chip out of a bone.”

In one scene, the narration reads:

“Several dozen of the microscopic explosives known as cookie-cutters detonated in his bloodstream.”

2 HOW TO IMAGINE AND VISUALIZE?

Three increasingly mediated visualization routes are built.

Route 1. The description goes directly into a text-to-image model and then an image-to-3D model (Figure 1).

Route 2. A large language model tags the tangible components and infers 3D bounding box positions for how they might relate. Taking one arrangement, we generate an image and mesh for each component, then reassemble the meshes according to those positions (Figure 2).

Route 3. We then use the language model to hypothesize a possible function for each tagged component, then to propose subcomponents implied by that function, and to generate images and meshes

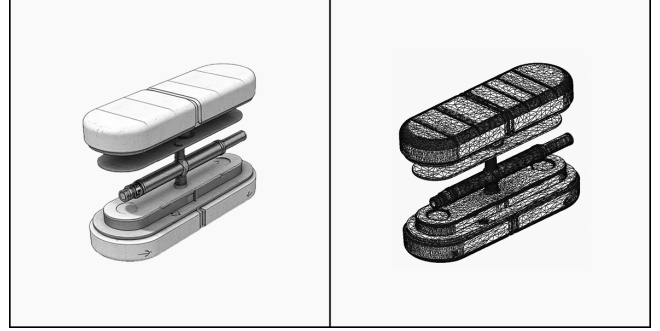


Figure 1: Output produced by the direct text-to-image and image-to-3D generation pipeline (Route 1).

for each subcomponent individually (Figure 3). In this route, function comes first, as assuming a working device requires reasoning backward from its purpose to its structure.

In the novel, the cookie-cutter is microscopic, which is too small to be seen without special equipment. For the output of the first route, we 3D-print it (Figure 4), specifically because it carries the least human intervention. The scaling-up is done on purpose, because it stands for a danger that is hard to see or reckon with, and we want to make it visible. But the technologies and tools that let us see may turn out to have hidden problems of their own.

3 WHOSE IMAGINATION?

When we hand the descriptions of the cookie-cutter to several AI models and receive back bounding boxes, a mesh, and a 3D printable object, whose imagination are we now holding? Not quite the author’s, because the original description gets decomposed into components and visual decisions the author never states. Not quite ours either, because it is not us but AI models who generate visuals. We only select and adjust based on what they produce. While adding components makes the object look more detailed rather than more real or more buildable, it may still prompt us to imagine how those components would need to fit and work together.

Can what we end up with still be called human imagination, or does it become something we cannot really attribute to anyone? The fast generation of visual results may seem to save us the effort of imagining, giving us something immediate to see. What we may be quietly losing in the process, however, is our habit or even ability of imagining things from textual descriptions. Sometimes what we lose may matter more than what we gain.

4 WHY FABRICATE?

Although we could stop at the mesh, we chose to 3D-print the object instead. We not only want to bring an object invisible to the naked eye into plain sight, but also to put the concerns it raises on the table.

AI standing in for human imagination of the future. What gives a model the authority to imagine on behalf of humans? Letting AI quietly take over our imaginative tasks might carry a risk

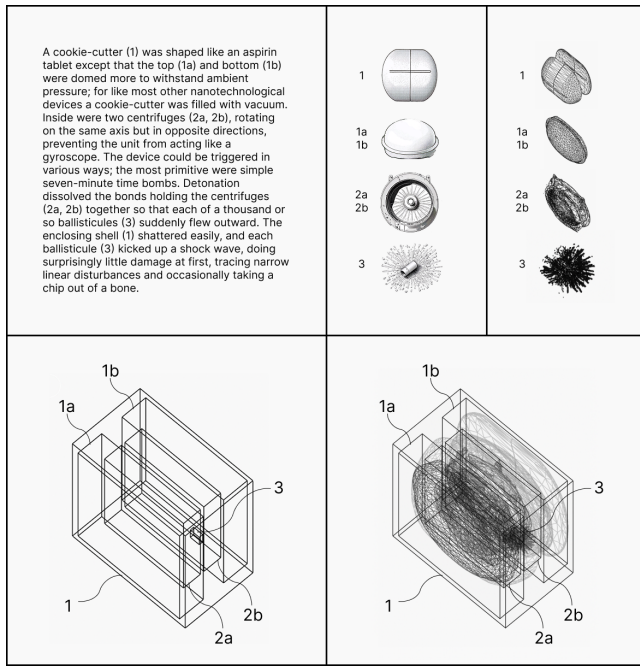


Figure 2: Output produced by the pipeline for component decomposition, 2D/3D generation, and spatial-layout-guided 3D reassembly (Route 2).

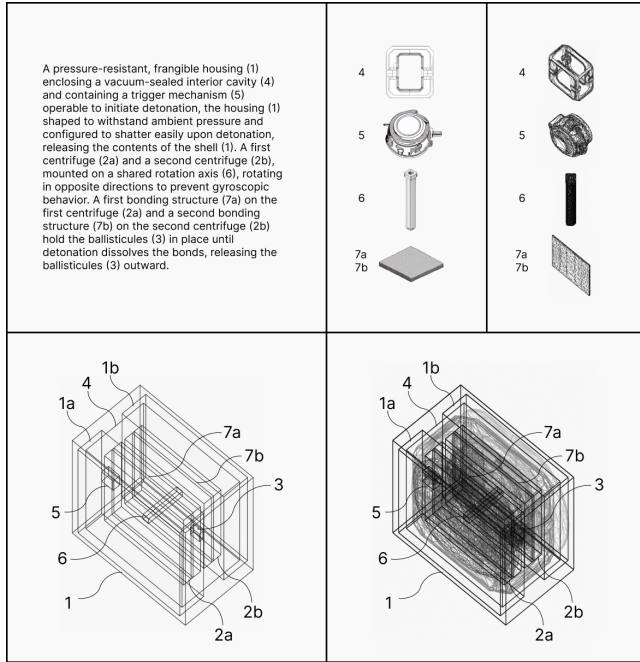


Figure 3: Output produced by the pipeline using language-model-guided functional decomposition and subcomponent 2D/3D generation (Route 3).

that does not look urgent until we notice we have stopped thinking and imagining the future on our own.

Digital fabrication getting more accessible. As 3D printers become more precise, accessible, and capable of using stronger materials, the distance between an imagined artifact and a physical

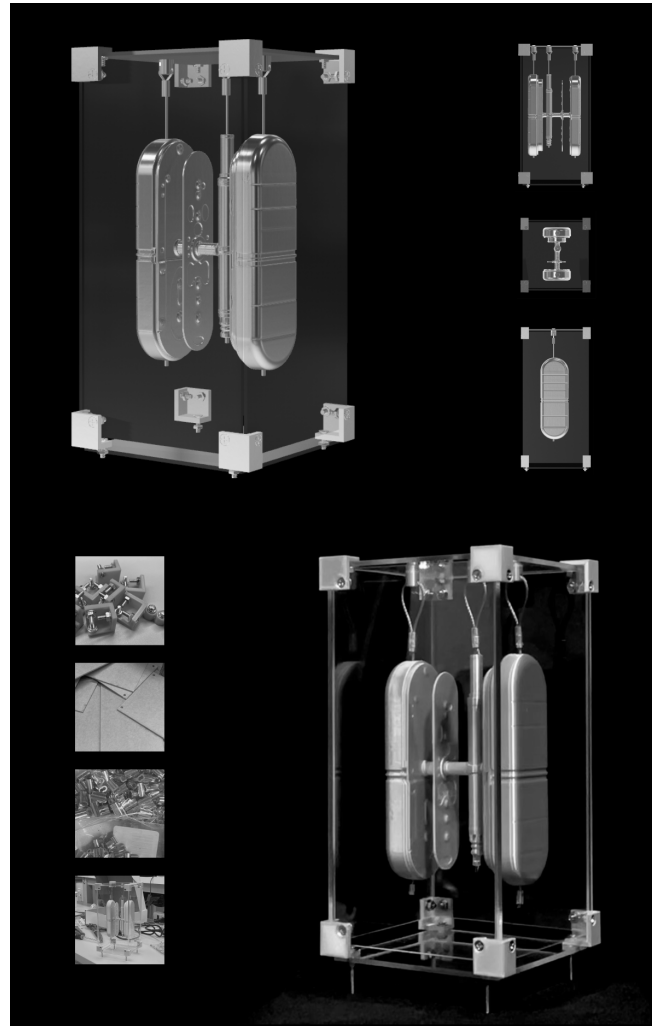


Figure 4: Rendered view and digitally fabricated art installation containing the 3D-printed object generated from the output of Route 1.

object continues to shrink. With fabrication becoming easier, the question may not be merely about how to create things, but rather what things truly deserve to exist.

Mass-produced imagination and manufacturing. Once the AI has done the imagining and the printer has done the fabricating, all that is left for us is snapping the printed parts together. Beyond being Stephenson’s fictional device, “cookie-cutter” is also a common term to refer to mass-produced sameness. What happens once machines do both the imagining and the making, and once imagining itself gets mass-produced too? Perhaps the cookie-cutter is no longer merely a fictional weapon, but the invisible force that cuts our imagination of the future into mass-produced sameness.

5 AND MORE?

We bring this experimental art piece to SciFi-VIS to seek answers. Can we read science fiction novels by starting with their objects? What methods are legitimate and valid to visualize science fiction literature? What do we call it when a model does the picturing, as AI does throughout our pipelines, while a human only assembles the final product? Before we all start imagining the same future, we would like to invite the public to tell us more about that cookie-cutter.

REFERENCES

- [1] N. Stephenson. *The Diamond Age*. Bantam Books, 1995.