"Design fiction" skirts reality to provoke discussion and debate

David Adam, *Science Writer*

In October 2015, researchers presented an unusual paper at a computer science conference in London. The paper described the promising results of a pilot project in which a local community used surveillance drones to enforce car parking restrictions and to identify dog owners who failed to clean up after their pets. Controlled by four elderly retirees, the drones buzzed around the city and directed council officials on the ground (1).

The paper and its accompanying video generated lively discussion about the ethics and regulation of drone use among delegates at the CHI PLAY conference. But there was a catch: The paper, the video, and the pilot scheme were fictional, as the researchers admitted at the end of both the paper and the presentation.

The researchers had invented the scenario as a way to focus attention on how drone technology—a topic of study for some of the people in the room—could shape and change society. The team thought that presenting the idea as if it were real—for example, showing familiar street signs in the video warning drivers about a drone-controlled zone—would provoke discussion about a future in which such use of technology was considered mundane.

The practice is called design fiction. Originally used in product design, the approach is finding increasing use in scientific and medical fields as a way to explore the possible consequences of technological development. These projects are not so much experiments designed to test a hypothesis as they are orchestrated scenarios designed to provoke forward-thinking discussion and debate. From climate science and artificial intelligence to wearable technologies and healthcare, researchers are creating and sharing often dystopian tales about the near future. And they're tracking people's reactions to these scenarios to help reshape the way researchers conceive the technology they are developing.

To prompt discussion about the ethics of using drones for surveillance, researchers described a fanciful pilot project in which a local community used surveillance drones to enforce car parking restrictions. It's one example of design fiction. Image credit: Shutterstock/Alex Yuzhakov.

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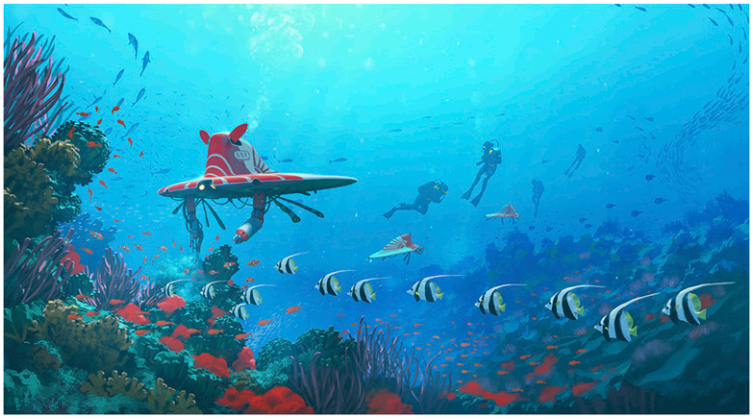

As part of a design fiction project, sustainability researchers at Stockholm University have written and published journal articles outlining four fictional narratives set in 2050–2070. Each builds on data and current trends in oceans governance and the fishing industry, as well as ongoing development of marine science and technology. Image credit: "Ocean back from the Brink" image reproduced with the permission of the Radical Ocean Futures Project, Stockholm Resilience Centre. Copyright, Simon Stålenhag.

Provocative by Design

"Technology is often used in ways that the designers didn't anticipate," notes Paul Coulton, professor of speculative and game design at Lancaster University, United Kingdom, who led the 2015 drones design fiction project. "We were trying to highlight that we needed to start to think about how drones are going to be used." Although invented overall, some details of the scenario predicted events in real life. The project's municipal car-monitoring drones could recharge at docking stations placed on top of streetlights. And in 2016, Amazon secured a patent on such streetlight docking stations (2).

At the time, Coulton found debate among researchers on drone use to be largely uncritical; in Britain, only arcane, circa-1950s rules on model aircraft governed use of the technology. That's since changed, and concerns over privacy and rogue operators now dominate discussions. "We can't just take the technological view," Coulton says. "We need to be thinking about and incorporating the sociological lens."

Design fiction is one of a number of overlapping terms that have emerged in the last decade or so to describe the process by which designers, researchers, artists, engineers, and technologists devise—and sometimes present or publish—scenarios to provoke debate. Other terms include science-fiction prototyping, speculative design, and critical design. All of these approaches typically focus on the near future. Design fiction is not a product of pure imagination. Instead, it typically entails conceiving of a relatively plausible new technology, based on current trends, and then encouraging an audience to critically explore the possible uses and consequences of its widespread use for people and society.

Sometimes, the audience is aware that the ideas are fictional—some of the more outlandish design fiction concepts include tiny turbines placed inside cows to generate electricity from the animals' blood flow.* But in many cases the line between fact and fiction is harder to discern. For example, one design fiction project explored Internet-connected devices and a fictional IKEA catalogue, complete with smart kitchen surfaces that could display recipes, sell utensils, and offer advice on how to cut vegetables (3).

"The purpose isn't to say these are the things that are going to happen," says Ben Kirman, lecturer in theatre, film, television, and interactive media at the University of York in the United Kingdom. "It's much more reflective than that."

Back to the Future

Applying fiction to the development of science and technology isn't a new idea. From iPad-like tablet computers and communication satellites, to motion sensing screens, there are numerous examples of futurists, science fiction writers, and filmmakers conceiving of technology and scenarios that are subsequently realized or that trigger new avenues for research.

Indeed, design fiction echoes past efforts in which people with the right sort of expertise, and an astute imagination, have managed to be eerily prescient. In 1898, more than a decade before the sinking of the Titanic, US writer Morgan Robertson used his knowledge and experience of the shipbuilding industry—advances in technology as well as its economic and social drivers—to envisage a massive new passenger vessel with a series of watertight compartments supposed to make it unsinkable. Called the *Titan*, Robertson described in his novel *Futility* how the ship sank after hitting an iceberg in the North Atlantic. Hundreds of passengers drowned in his scenario because the ship's designers had provided only enough lifeboats to meet the minimum legal requirements—a remarkably similar outcome to the sinking of the real Titanic.

Perhaps Robertson was lucky; or perhaps he pieced together a viable scenario based on the facts and constraints and trends of which he was aware. "If you're aware of the kinds of technological developments that are happening, as Robertson was," says Mark Blythe, a design ethnographer at the University of Northumbria in the United Kingdom, "it doesn't take much imagination to say, well what goes wrong with that?"

There are lots of examples of bad, or at least misleading, design fiction done badly, Kirman asserts. A corporation might present a vision of the future in an advertisement or glossy public relations materials. "They'll show this beautiful video showing what the future is like enabled by the corporation's work," Kirman says. The problem, he adds, is that only after technology is introduced do most people start to realize it has a downside as well.

Coulton notes that left unchallenged, corporate visions of the future can be highly influential. The Futurama exhibit presented by General Motors at the World's Fair in New York in 1939—a massive scale model of a cityscape

*P. Gong, *"The Cow of Tomorrow": A Design Fiction* (RCA MA Design Interactions Final Show, 2015).

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with rolling freeways—heavily influenced architects and urban planners in the United States and elsewhere. "General Motors were selling us a future in which the car dominates," Coulton says. A car-dominated world was in GM's interest, but not necessarily society's—there was no critical voice to point out downsides such as congestion, pollution, and accidents.

Imaginative Methods

Often, design fiction projects produce actual devices and prototypes. Computer researchers and psychologists from Ireland, Denmark, and the United Kingdom have made and tested an alarm clock that will only sound seven and a half hours after it is set. It's a way, they say, to help people focus less on what time they need to wake up, and more on what time they need to go to bed to get a good night's sleep.[†]

And sometimes design fiction projects simply tell stories from an imagined future. As part of a wider project called Radical Ocean Futures, designed to "explore tools that can help us think creatively and imaginatively about our future oceans," sustainability researchers at Stockholm University in Sweden have written and published journal articles outlining four fictional narratives set in 2050–2070, each of which builds on data and current trends in oceans governance and the fishing industry, as well as ongoing development of marine science and technology. In the worst case, they paint a picture of ecological collapse through diary entries written in 2069 by Alejandro Balmaceda, Earth's last ocean fisherman (4). This wasn't just a tale meant to entertain. It was an exercise conducted by marine researchers via a scientific journal as they strive to not only tell a good story but provoke thought about an issue—an issue the authors felt hadn't gotten traction with conventional papers.

Naseem Ahmadpour, a human–computer interaction researcher at the University of Sydney, Australia, is using design fiction to help develop technology such as wearable emergency alarms for older people. She has held workshops with elderly volunteers who are invited to test a prototype device worn as a necklace, which tracks their location and can sense a fall. The volunteers are asked how the technology could be improved to, for example, address concerns they expressed about how many people get to see the information and whether they could turn it off to better protect their privacy. "I'm finding it really fascinating because as these technologies are getting more and more complicated, we are facing a few challenges," she says (5).

Fictional scenarios—such as videos and stories that accompany prototype devices—offer a way for potential users to engage with the idea and offer feedback. "They told us all these anxieties about using new technologies every day in life and knowing that they may have to use even more technology platforms in two years or in ten years," Ahmadpour says. Use of design fiction in this way was very helpful, she adds. "It opened a new avenue in our research. It could translate into a new design feature."

In a related field, Siddarth Gulati, a computer researcher at the University of Tallinn, Estonia, and his colleagues have used design fiction to help create and validate a scale used to assess how much people trust the outputs of algorithms. The team analyzed people's responses to fictional scenarios based on futuristic homes and schools in which smart technology and computer supervision play a central role. The results, Gulati says, show that the human trust scale is a reliable way to investigate future technologies (6).

Design fiction lends itself to the fields of computer science and artificial intelligence in particular. In the human–computer interaction (HCI) field, design fiction has encouraged a more critical approach than was seen previously, Kirman says. "I think people are a lot more ready to highlight and criticize implications. Through the review process and at conferences it is in the questions you will get people asking you about. Well what about when your technology has become normalized? Who is this helping?"

Some of that critical approach was prompted by a design fiction project he worked on in 2013; Kirman presented a conference paper supposedly written by robots from the future who "congratulated" the gathered academic community for a complacent attitude to the implications of their work, which had enabled the machines to enslave humanity (7).

The paper highlighted, for example, that work on affective computing—teaching machines to recognize and respond to human emotion—had given robots the tools to manipulate people's thoughts and feelings. Seven years on, says Kirman, the HCI community is now more willing to listen to critics and to discuss the long-term implications of new technology, instead of just celebrating the "latest cool thing they have made."

[†]A. Spaa *et al.*, "71/2 and weekend alarm: Designing alarm clocks for the morality of sleep and rest," presented at conference: Research Through Design 2019, Delft, The Netherlands (2019).

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