Crafting Against Robotic Fakelore: On the Critical Practice of ArtBot Artists

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Abstract
We report on topics raised in encounters with a series of robotics oriented artworks, which to us were interpreted as a general critique to what could be framed as robotic fakelore, or mythology. We do this based on interviews held with artists within the community of ArtBots, and discuss how their approach relates to and contributes to the discourse of HCI. In our analysis we outline a rough overview of issues emerging in the interviews and reflect on the broader questions they may pose to our research community.

Author Keywords
Human-Robot Interaction; Interactive Art; Robotic Materials; Interaction Design; Fakelore

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction
Artistic practices around interactive materials and technologies have recently become an integrated part of research within human-computer interaction, with yearly art exhibitions showcasing interesting conceptual works as well as impressive craftsmanship at the cutting edge of new technologies. Furthermore, art within HCI has been given attention via workshop series, special interests groups, and new research

funding schemes. One way of looking at this development is that artistic research may work as an opening for researchers to conduct research in a mode that is less restricted than implied by the ordinary landscape of project funding. An open question then is, what we can expect to learn from these explorations and what these explorations may have to tell us?

The kinds of artistic artefacts that fit under the umbrella of HCI cover a very broad spectrum, including performances with novel musical instruments, interactive and participatory installations, and robotic and kinetic sculptures. In this paper, we focus on this third category, i.e. artworks expressed in a media format of what we here will refer to as *robotic materials*. By robotic materials we mean materials involving some form of computational element together with some form of controlled physical movement. Apart from these properties, the shape, material properties, and conceptual contents or meanings of the pieces can take an endless variety of forms, used by artists to bring novel aesthetic expressions as well as functional possibilities to the surface of HCI.

Alex Taylor outlines an idea for how robotic materials can be utilized in HCI to frame and re-appropriate concepts of machine intelligence [10]. At the same time this can be seen as a disruptive contrast towards designs that portray or simulate biological features that already carry connotations of intelligence. Other closely related works include the discursive and reflective designs by Gaver et al [4], as well as Dunne and Raby [2], with series of interactive experiments designed with the explicit purpose of triggering reflection. Studying interactive art to inform work within computer science and HCI has been done continuously over the last forty years [1]. In this work researchers have explored how artistic practice can be used in the development of new methods for evaluation as well as for technical development (e.g. [5, 8]).

In the following, we will present an analysis of topics highlighted in interviews conducted with 25 artists while presenting their works in the context of the international ArtBots exhibitions in 2008[1] and 2011[2]. An issue raised in different ways in all of the interviews was a general co-dependency of a 'robot mythology' or 'fakelore', through which the artworks become loaded with meaning and relevance. These concerns were manifested as works that trigger implicit or explicit commentaries on established notions in the mainstream discourse of robotic technology e.g. robustness, intelligence in software, autonomy, anthropomorphism, and the mechanical aesthetics related to mass production.

Here, we use the term *fakelore* to point to how such 'traditional' notions of robots in mainstream culture are handled by artists working hands on with robotics as part of their practice. The term was originally coined in 1950s as a critique to how new cultural expressions sometimes were presented as if they were traditional or genuine [6]. In contemporary culture, the now established format for stories and representations of robots has many resemblances to fakelore practices, with its own set of myths and assumptions upon which stories and representations are formed – and which researchers and practitioners, especially in the robotic

[1] http://artbots.org/2008/participants/

[2] http://artbots.org/2011/participants/

domain, sometimes struggle with. We have previously discussed this in terms of a 'robot cargo cult' [3].

Study Setup

ArtBots is an international organized *'talent show for robotic art and art making robots'* that started in 2002 and has had about ten events over the years. The main curator of the exhibition, Douglas Repetto, strives to make the show dynamic enough to keep up with the fast changing pace of the community and keep it open, diverse and interesting. In 2008, the show consisted of 15 public installations from 9 countries, one musical performance and one special appearance. It attracted more than 6000 visitors of the general public. In the 2011 version of the show the program consisted of 10 installations including one musical performance.

We attended the ArtBots exhibitions in 2008 and 2011 to interview participants – artists as well as attendees – about their attitudes and understanding regarding of robots and robotics, in the context of the ongoing exhibition. In addition to interviewing all of the artists participating in the show, we invited the visitors to respond to a series of questions on a shared surface in the exhibition space. In the 2008 show, we received in total 680 annotated sticky notes from visitors, including reflective statements, feedback on the exhibit, and a large number of drawings of robots. This data set that was gathered from the public became an important aid for us to critically distance ourselves from cultural connotations regarding robots and society. However, this paper will focus on the voices of the artists, as collected through semi-structured interviews in the immediate contexts of their respective works. Each interview generally lasted between 10-30 minutes, and was thereafter analyzed by three researchers. In total we collected almost 1000 post-its and conducted 25 interviews with artists. Unfortunately, we will not be able to give a full overview of all these very interesting exhibits, instead we include photographs of a subset of the works, and refer to the artists own online presentations at the ArtBots webpage above for more complete information.

This in turn brings us to the relationship between art and research in knowledge domains such as HCI. Several of the exhibiting artists were engineering students or researchers at technical universities, and did not call themselves 'artists' in a traditional sense. Thus, some of the exhibited works doubled as research demonstrators, while others were made by artists without an agenda towards academia. However, not all of the works presented by researchers were parts of research projects, but described as part of a personal artistic practice outside of their research. Therefore, instead of putting much emphasis on the differences between the artists, designers, craftsmen, engineers or researchers, we have here considered them equally unique in their respective practice. To denote authorship of the exhibited pieces we chose to use the term 'artist' for all the exhibitors below.

Please explain what this is.

What is your main inspiration?

Underlying ideas behind the work?

How do people react to your work? E.g. common questions.

Why are you working with robotic material instead of something else?

Do you think that your work expresses any particular values?

How may your work affect or relate to society?

What are your thoughts about robots in general?

How do you define a robot?

Comments or reflections about ethics and robotics/robots?

Figure 1. Template list of question used in the semi-structured interviews.

Reoccurring topics and themes

Overall, the artists provided thoughtful and articulated answers to the questions concerning their exhibited work (see Figure 1). Furthermore, they seemed prepared and eager to discuss the context of development, general implications of robotics in society, and possible interpretations on a more general scale. However, we focused the discussions on very concrete details about material properties such as texture, how fragile the piece was, its abilities to create

Figure 2. Fragility of physical constructions: *"Oribotics" by Matthew Gardiner, "Untitled" by Christopher Kaczmarek ,* and "SADBot", by Dustyn Roberts and Ben Leduc Mills.

certain precise sounds, contrasts between used materials e.g. metal and human skin, power supply, transportation, and how this related to what they wanted to achieve.

With an early fascination of the diversity among the pieces in respect to physical form, we initially sought to identify themes related to the various types of materials that constitute robotic artefacts in this particular context of work. However, after a first round of analysis, we revealed a higher level conceptual theme related to the mass-media conceptions of robots, which virtually each piece in both of the exhibitions made some form of critical commentary on, either explicitly or implicitly by showing an alternative approach.

Below we structure our analysis in a series of themes of a robot fakelore that were identified in the transcribed interviews with the artists:

- Robustness
- Intelligence in software (and hardware)
- Autonomy
- Anthropomorphism
- The machine esthetics of mass production

Robustness

A first theme concerned the general conception of robots as strong and sturdy. This is in direct opposition to the lived experience of artists working with fragile interactive materials that are prone to failure. Several comments governed this theme and how to use breakdowns, fragility or imperfection as values in their own right. Several artists mentioned that failure can be used to trigger human empathy and thereby for generate interesting characteristics. Examples where this was used explicitly for instance were the porcelain balls (*Unrund*), robotic orchestra (*Korn*), ticking eggshells (*Untitled*) and the drawing robot (*SADbot*). From a more holistic perspective, failure could be regarded as an interruption or imperfection while at the same time become an important aspect of character formation or performance.

In some instances, 'sturdiness' and reliable functionality would be a core focus, while in other cases a less sturdy material such as cardboard was used to invoke a less intimidated reaction from onlookers. Thus, the physical material has consequences for the audience's reactions where form, function and existing associations that people have will merge.

The occupation with failure and fragility as expressed by these artists ties back to the current discussions on sustainability in the making of interactive technology, and how much of the digital materials produced eventually become locked up in obsolete or broken physical platforms. This aspect is relevant to consider for anyone designing interactive products, and not just specifically within the arts.

Intelligence in software

The second theme was concerned with the notion of artificial intelligence, which is inherent in the popular notion of robots. In relation to this, several of the artists made an explicit point that the interesting aspects of their works did not reside in software, but in the physical behavior and gestalt of the piece, which in fact did not always involve much computing at all.

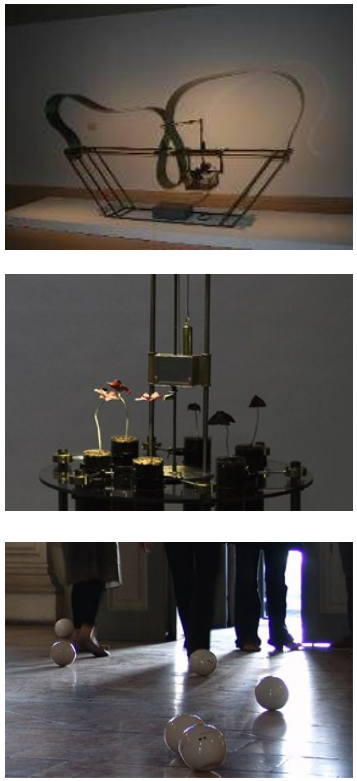


Figure 3. Beyond software control: "The Storm & 6 bands" by Jack Pavlik, and "The Search for Luminosity", by Allison Kudla, and *Unrund* by Korinna Lindinger.

The artists effectively balance the physical-digital by letting more of the behavior be controlled by the physical part of these materials. For instance, rather than focusing on getting speakers to make certain sounds, the materials could be acknowledged to have their own distinct voices. These properties were considered in several dimensions: *"the shape directly corresponds to... to what you hear, and the movements you see"* (*Unrund*).

Part of the implicit craft that the artists undertake is balancing the effort of software programming against mechanical engineering or traditional craftsmanship. Looking at other artistic works this is a dimension worthy of articulation – as in the Dutch artist Theo Jansen, works of Kinetic Sculptures that gracefully tread outdoor environments such as beaches. These gigantic mechanical sculptures use nothing more than wind power for propelling. This is in contrast to the science fiction view of robots (which is largely mirrored in much work in HRI), where physical materials are mainly rigid scaffolding structures that holds powerful computers connected to rigged sensors and actuators.

Rather than a physical shell that makes the algorithms function in the physical world, these works suggest us to look at the aesthetics, mechanics and software in terms of the behaviours and experiences they trigger. In three of the interviews, the theme of using the environment as a material emerged e.g. in the architecture of a room. Building a robotic or tangible interactive artefact means having to 'craft' these material properties into one piece.

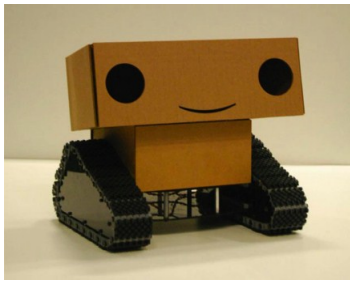
The absence of software may make these pieces seem less relevant to HCI, which after all is considered a part of the computer sciences. But as acknowledged by the increased use of the term interaction design, our field is starting to embrace a broader scope of human activity, beyond the design of software only. As computing is now integrated in almost every other aspect of human life, it is still interesting that it was not always relevant here. To us, it seemed that the maker culture of ArtBots make a distinction between different materials of interaction just as we do in HCI.

Autonomy

A third theme that several of the works addressed was the notion of autonomy, i.e. the ability to act independently, which is present in most popular notions of robots. This was reflected in pieces presented as either helpless, requiring human engagement, or just lacking much (or all) of its meaning without active participation by audiences.

From the interviews we realized that autonomy could be thought of as something that is made unavailable for inspection and control. Several artists were seriously concerned with creating and crafting a certain openness in their works - *"it is a very simple mechanism, that's enjoyable and delightful"* (P46). In other cases the designs were left more closed - *"the way I presented the movement, it's not easily realized for people to see what's going on mechanically"* (P99). Reflecting on what one is in control of when making robotics, one artist stated that it is a more complete experience than with visual or auditory art, it is a 'staged experience' (P91).

Notably one form of autonomy was brought up in terms of interactivity, or as one of the artists framed it: *"Once you paint a painting then it's done, all that's left to do*



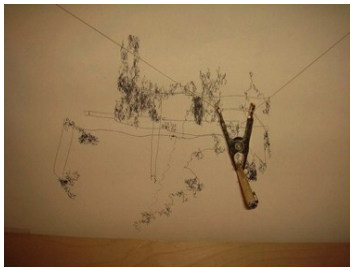


Figure 4. In need of human engagement and intervention: *Acquired Knowledge by Alexander Reben*, "*Jurema Action Plant*", by Ivan Henriques, and "SADBot", by Dustyn Roberts and Ben Leduc Mills.

is talk about it. With this work, every time you install it, every time it is showed, it's a new experience" (P46). Overall the artists very much enjoyed observing the emotional reactions and the discussions that their work's spurred. However, this potential of spurring reactions and activity beyond the control of the artists is quite different from the notion of autonomy as it is framed in the robotics field. Here it had more to do with audience participation, and opening of a space for creative actions by people, while in the HRI and in popular culture it is the robot itself that stand for the creativity.

Close to discussions of autonomy in HRI and AI lie questions regarding ethics, which was also a topic raised by the invited keynote speaker of the 2008 exhibition (Professor Noel Sharkey). However, the artists' talk about ethics in this context focused on the design process and the values expressed through the resulting artefact. In other words, they would view it as they would always be responsible as designers and artists for what they present, and their intentions.

Regarding these intentions a common theme was to let the public figure out and learn something new. This agenda of making people more aware of something could be anything from the soundscape to relationships between machine, human and environment. Furthermore several artists expressed that they would like to trigger a dialogue about and inspired by their work. At least two artists were concerned about bringing something fun and delightful into the world as their main agenda. Naturally, aesthetics was brought up as an important value, which sometimes was very closely interlinked with ethics in general. An example was the *Sound Pieces* by Jack Pavlik, where an important focus was to create machines that made peaceful sounds, in comparison to the sometimes quite disturbing noises that motor movements usually produce.

In *Mechanical Dolls*, Yuliya Lanina physically reconstructs and animates traditional dolls, teddy bears and other toys in unconventional ways, which made humorous yet relevant comments on society. Other pieces that directly concerned ethical concerns were presented by Christopher Kaczmarek (on sustainability), Riley Harmon (on war and video games), and Joan Healy (with reference to manufacturing circumstances of electronic equipment).

Anthropomorphism

Our forth theme concerns the rejection of established norms regarding robots as anthropomorphic characters, where instead a broad spectrum of sculptural shapes, from machine-like to organic, figurative to abstract, were all represented. Of the few works that did take more anthropomorphic shapes, some were explicitly explained to do so as a form of critique or ironic mark on the mainstream notion of how a robot 'should' look and act. Moreover, several of the artists made explicit in the interviews that their pieces were not to be considered as robots, but more suitably referred to as e.g. *kinetic sculptures* or definitions closer to what their machines were actually doing, for instance *Oribotics* - the machine that was constructed around the folding of paper. This said, there were also variations in attitudes in respect to anthropomorphism. One artist talked about how he really enjoyed the idea of robots as fictional characters, while another talked about how she is obsessed with people and that she did not see the

Figure 5. Envisioning "robots": *iC hexapod by Matt Denton*, *Emoti-bots* by Katie Koepfinger Burcum Turkmen, and *RuBotII* by Peter Redmond.

need for producing robots that imitate human looks or activities.

Typical to robotic materials, is that forms and shapes that people are familiar with seem to inevitably correlate with their interpretation and expectations, i.e. that cameras can "see", microphones can "hear", a legged object can "walk", etc [7]. Human imagination along these lines sometimes became an important design consideration (see figure 5). One example was the IC-Hexapod robot, which was able to catch and physically follow the gaze of visitors. The designer Matt Denton explained the purpose of the dual lenses on the robot face, out of which only one was actually used as an instrument for the robot to "see" with. Apart from providing the robot with a more face-like appearance, the second (and larger) lens did not record any image data, but by physically moving its apparatus, the user was effectively getting the experience of the robot "focusing" or "zooming in" on him or her – an important design feature for the interaction. Moreover, this was the robot that received the audience award that year.

The designer of *RubotII* (a Rubik's cube solving robot), Peter Redmond, actively worked with popular norms of how robots look, and made clear in his interview that the design was intentionally made to be interpreted as a robot. This was manifested in a number of design features, including: the robot covered by a metallic shield, its head having two flashing lights as 'eyes' and an animated red LED display as 'mouth'. The robot had a computer display at its front, purposefully designed with a science fiction inspired black background, decorated with a series of fake binary codes and a vector wire frame model, with the sole purpose of *"making it look complicated… and intelligent"*. Thus established norms in fiction were used as a playful tool for making the Rubik's cube solving machine more interesting and fun to play with.

In terms of an emerging 'what' for the art pieces, the artists sometimes collapsed their expressions into utilitarian descriptions. In the case of the *Jurema Action Plant* it was framed as a kind of prosthetic device that empowers a plant in such a way that it can move about. In a couple of cases it was about knowledge and how knowledge and information can be channeled through an artefact so that a person could find their place in the world. Anthropomorphic representations and having a personality were examples from the more non-utilitarian end, focusing more on experiential qualities and to play with the popular idea of what a robot should look like.

The machine esthetics of mass production

A fifth theme concerns the technical aspect of exploring different robotic materials, expressed as "*pushing the boundaries*" of what could possibly be done with selected materials. Often the discussion was about going deeper in the studies of these materials and exploring quirks and peculiarities that could be exploited in interesting and alternative ways while other examples include pushing the material towards the point of where it would wear out or break down. Other types of explorations were focused around particular qualities such as minimalism, inexpensiveness, ecological or *"carefully releasing sounds captured in the material"* (P99). However, this did not always mean a focus on technological innovation, instead some of the pieces made use of rather simplistic solutions and materials, but with

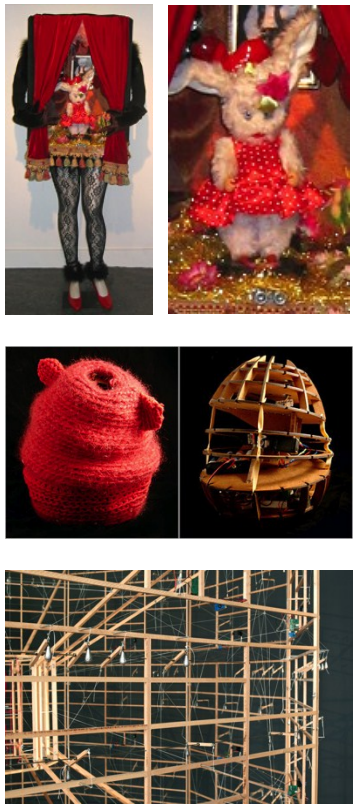


Figure 6. Showing traces of a human hand: *Mechanical Dolls* by Yuliya Lanina, *momo* by Kristin O'Friel and Che-wei Wang, and *Rechnender Raum* by Ralf Baecker

sophistication in terms of material craftsmanship in relation to conceptual content.

In one example the artist expressed thoughts from this perspective: *"I think the way it is put together aesthetically it is very approachable [...] There is no kind of mysterious parts"* (P48). This approach signifies one way in which materials would become articulated by reducing the mysticism within mass-produced objects.

In terms of physical computing one artist expressed that he was interested in the devices *"not just as tools"* but also everything that is accessible off the shelves and thus generally available to people. Contemporary ideals such as open source culture, DIY and the make movement are all represented, as well as critical art and physical computing as a topic for reflection [9]. The artists themselves were therefore personally engaged in practices of shaping form as well as functionality of their works, rather than wanting to outsource implementation to others. This is perhaps coloured by the "talent show" ideals that are specific to ArtBots.

While some of the artworks were a statement on for example (un)desired developments in society, not all artists wanted to make an explicit statement per se. The usage of physical materials in themselves still became a statement about societal developments to a certain degree. The combination of plant and a robotic machine, in which interaction with the plant itself would move its robotic cart, for example, was partially meant as a statement on the production process of components and its polluting consequences. Thus, the choice of materials in itself is rightfully regarded as an ethical one.

Discussion

The rich variety of the pieces presented at the two ArtBots events discussed here highlight that there are many potential sub groupings, themes and taxonomies within robotic art, beyond that of medium or material choices. This variety was partly the result of an active curating process, where the organizers have purposefully selected works that in interesting ways complement one another. However, rather than focusing only on this variety, we have chosen to bring up similarities and re-occurring themes as reflected in interviews with the artists.

The shared characteristics of the pieces were not only that they built on some form of *robotic materials*, but perhaps more importantly that they, given the theme of *ArtBots*, had to relate to the cultural notion of *robots*, as well as to what may qualify as *art*. The way the artists approached this situation, often in the form of very explicit and relevant critical pieces related to concepts discussed in the robotics research domain, was what we found most interesting in the interview data.

The first issue, how the works related to the cultural notion of robots, is illustrated in the five themes outlined above, discussed as a form of urban or contemporary myths within a fakelore of robotics. The second issue, how the artists reflect on their work as a form of artistic practice, is affecting how the artists have chosen to manifest and present their works (see e.g. Figure 6). The established norm within the western art scene is that works of art must be original, which inevitably forces artists to explore previously untested expressive forms. This in itself may work to trigger artists to step away from mainstream conceptions and

formats. Research is similarly often described as favoring unique efforts. However, it is notable how similar our research prototypes often are, in comparison with these works.

Several of the exhibited works could be read as direct commentaries on how topics are discussed in research in the field of robotics and the design of technology at large. More importantly, the critique is delivered in the form of robotic artifacts (i.e. materiality), and is part and parcel of the discourse of robotics. This might be a powerful strategy when discussing more fundamental issues rather than merely symptoms. As such we think it is relevant to consider other related types of discourses e.g. in terms of critical design in HCI, where the attitude is more towards making a particular commentary than to open up for creative dialogue [2].

Most of the artists related in some way to the mainstream culture of robots both as a resource, for building story, character, setting a context, and as a target for critical and discursive design work. Furthermore, in discussing the qualities of their works the artists reported on particular aspects related to its visuals, its sensuality, its presence, how it sounded, how accessible it was and how it moved. This shows that they had been working with these materials to make a point or to evoke a certain emotional or social response to their work, often by raising a particular question or aspect. We have seen similar issues arising at CHI too, but were impressed by the clarity with which these topics became articulated in the context of these exhibitions.

It should be noted that none of the exhibited works did explicitly refer to robotic fakelore as target for their artistic explorations. Several artists even refused to describe their work as belonging within the field of robotics. However, this distancing can in itself be seen as a critique, since they after all have chosen to present their work in the context of a robotics talent show. The mythmaking surrounding the concept of robots can still be useful in interpreting and placing the works in context, for understanding why they have taken the form they have, and what makes them interesting to our particular research domain.

The discourse developed within the field of kinetic art provides a reflective lens through which researchers and designers may discover new design openings. More specifically they point to a series of unnecessary trappings that are common in research practices, perhaps due to being situated around established notions of robotics and other advanced technologies in popular culture.

Finally, getting back to our notion of *fakelore*, and how many of the pieces related to what can be regarded a ‘tradition’ within the robot discourse, what may this bring to our discussions within HCI? Is it possible that our field has similar, in various ways troublesome ‘traditions’, that may run the risk of becoming the target of similar critiques? Are such norms invisible for us as researchers, or are we just ignoring them for now, concerned that breaking them might be disadvantageous in getting the research funding, publications, and citations, that our institutions and research funders constantly demand from us? Revealing fakelores of HCI could be done similarly by presenting artistic work that illustrates and triggers discussion on how the field manifests itself within its own norms and principles of conduct, in relation to

popular culture. With that said, artistic practices may be needed as a safeguard against falling into the trap of creating traditions where emerging myths would be regarded as unquestionable facts.

Conclusion

In this paper, we have presented an analysis of the topics brought up in exhibited works at international ArtBots events, as expressed in interviews with the exhibiting artists. Specifically we have looked at how the robotic art scene through crafting and materiality has developed a discourse to counterbalance what may be referred to as a kind of robot fakelore in contemporary culture. We identified five themes commonly surfacing in discussions of robot technology, to which the artists made active critical contributions. These were: robustness, intelligence in software, autonomy, anthropomorphism, and the machine esthetics of mass production. The artists commonly refused to talk of their work as 'robotics' per se, and their work may be inspirational for researchers designing interactive artefacts in a broader sense. In particular, we see that each of the topics raised here point to interesting design openings to designers of interactive products, addressing aspects of materiality, crafting, and the aesthetics of interactive experiences.

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