EXPERIMENTAL TOOL

This workshop introduced 'traces of use' as a design approach to help uncover our relationship with technology. We sought to explore how design can facilitate ethical relationships between people and data-intensive technologies. Specifically, how can a design approach using material traces support relationships that engage with people and communicate how these kinds of technologies work, and how we work and live with them? How can it shape them, and with what impact?

»A dollar is a trace. It reports back to us. You know what you have and you can connect it to a larger system. [...] We may have more or less an idea of the influences of why it is there. Google does not offer us traces of their intrusions into our lives.«
Susan Cox Smith

The advancement of technology's complexity is masked from the people and the environment that they are situated in. This promotes smoother interactions with the technology; however, our modes of engagement are obscured. We lack cues for how the device works and how we work with it. This can come with consequences such as overconsumption. It is much easier now to push a button to turn up the heat in our homes and then forget about it when we leave the house for the day. This can lead to questions of sustainability.

Our disconnection and disengagement from how the technology works becomes weighted with political concerns when we introduce data-intensive and connected technologies. In the case of a thermostat, it learns our behaviour and adjusts itself accordingly, but it can leave us over-reliant on the technology and at the mercy of software updates or bugs. Now, data is being collected and is often made available to third parties who may make use of it in ways that are beyond our control.

At the root of this are questions about the character of the engagement and the relationship we have with these technologies. How can reciprocity between people and objects exist and be represented? We propose that a material approach, specifically those that trace our usage, can promote this mutuality by unveiling how the technology works and how we work with it.

WHAT HAPPENED?

In this workshop, we developed our understanding of the expressive capabilities of traces and how they can function as a design approach to reveal how data-intensive technologies work and how we work with them.

The workshop consisted of three phases:

1 MATERIAL EXPLORATION

We developed our understanding of how material traces currently communicate via objects. We then participated in a hands-on design exploration to experiment with the expressive capacity of traces on various materials.

Traces already exist in our product environment, communicating various things regarding our context (such as metal oxidising from contact with water), the passage of time (metal browning), and how we use objects (metal polishing). During the hands-on session, we made our own library of traces on samples of leather, copper, and wood with trace-making materials such as ink, corrosive chemicals, sandpaper, a sandblaster, heat, and water.

2 SPECULATIVE DESIGN: IDEATION OF IOT DEVICES

IoT technologies are still very much a design frontier. We developed a unique technique to inspire provocative IoT products that touch upon ethical boundaries.

In small groups, participants played a game where players completed provocative statements with provocative responses.

Participants designed a speculative Internet of Things device addressing one of these statements. These shocking statements naturally gave rise to ethical questions, which we later attempted to defuse with traces.

»Reducing the physicality of something reduces its functionality. My phone can be a wallet, the internet, music, a camera, etc.«
Sjef van Gaalen

3 DESIGN PHASE: EXPLORING TRACES AS A DESIGN APPROACH

Equipped with a deeper understanding of the material potential of traces and with the provocative IoT devices, we went through three structured iterative design cycles to experiment with how traces could shape and enhance the ethical relationships between people and data-intensive objects.

Previous research has identified three design guidelines of how traces can support mutual relations with technology. In each iterative cycle, participants redesigned their prototype in accordance with a particular guideline. After each cycle, participants reflected on the impact or challenges that arose from the implementation of that guideline.

MATERIAL EXPLORATION

IDEATION OF IOT DEVICES

DESIGN PHASE

WHAT DID WE LEARN?

TAXONOMY OF TRACES AS 'STEPS IN TIME'

Traces inherently touch upon questions of time and how the object and its materials interact with that time. We divide these traces between 'design time' and 'use time' to understand how traces emerge and what they convey:

Design Time
a. Accelerated Traces
    Contrary to the established industry trend to avoid signs of traces, designers fabricate traces in the initial design of their object, imitating how they would emerge during 'use time'.

b. Anticipated Traces
    Designers anticipate interactions that will transpire with their object and deliberately choose materials and aesthetics that will change in 'use time'.

Use Time
a. Traces of Use
    Traces emerge after the object has been designed, which result from exposure to the elements, time, or use. These traces could have possibly been anticipated and intentionally facilitated in 'design time'.

»Traces shouldn't just be art [they should also have a function].«
Group Discussion

In the workshop, our focus, either on accelerated traces or traces of use, limited the scope of how designers can anticipate traces and utilise them as a design approach. We suggest an approach that examines what the material is and what it does [1], and also how people work and possibly use it [2] to better understand how anticipated traces can be utilised.

SHORTCOMINGS OF ALGORITHMIC ACTIVITY TRACES

The speculative designs tended to utilise traces to illustrate that automated algorithmic processes were happening. The intention of this kind of trace is to trigger a person to regulate the technology as a means to promote mutual and ethical relationships such as clearing one's cache online. Can awareness of automation really be transformative? Research indicates that we are just as likely to fall into patterns of habituation and blindness towards awareness efforts as we do when we receive our heating bill and notice that we still forget to turn off the thermostat when we leave for work. Traces should not be another interface that raises awareness but instead should be part of a larger process that is rooted in a sense of 'doing' something with the object (as opposed to the object 'doing' something on its own).

REFERENCES

1. Karana, E., Barati, B., Rognoli, V. and A. Zeeuw Van Der Laan. (2015). Material driven design (MDD): A method to design for material experiences. International journal of design,19 (2) 2015.

2. Giaccardi, E., and Karana, E. (2015). Foundations of materials experience: An approach for HCI. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, pp. 2447-2456. ACM, 2015.

KEY INSIGHTS

Traces can be a means to express to people **how an object works**, which can lead to a greater understanding of how we use it and, in the case of connected technologies, **how it uses us**.

To understand **how traces can be utilised as a design approach**, materials should be examined not just for what they are and what they do but also how people could possibly use them.
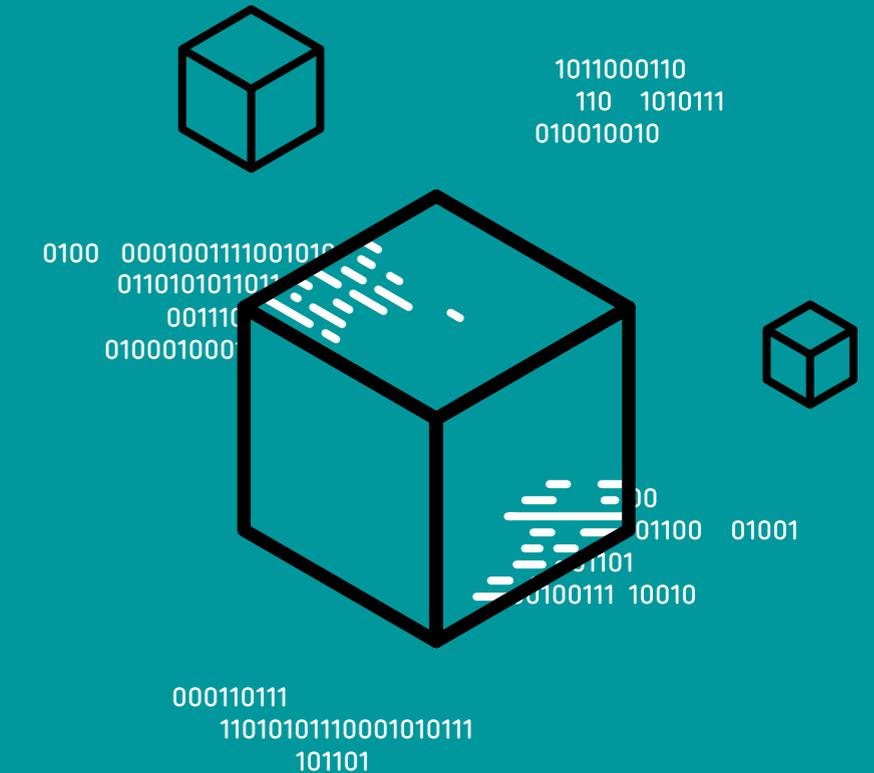
Traces should not be another interface that raises awareness but instead should be part of a larger process that is rooted in a **sense of 'doing' something with the object**.

Things2Things

ORGANISED BY
Holly Robbins
PhD candidate
Connected Everyday
Lab (TU Delft)

David Derksen
Product and
Furniture Designer

CONNECTED EVERYDAY LAB

DU DESIGN UNITED

1011000110
110   1010111
010010010

0100   00010011110010
011010101101
001110
010001000

00
01100   01001
0101
0100111 10010

000110111
11010101110001010111
101101

IM/MATERIAL

TRACES OF USE AS A DESIGN APPROACH TO AN ETHICAL IOT