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ORIGINAL ARTICLE

Reconsidering the user in IoT: the subjectivity of things

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Abstract
This essay develops an interdisciplinary framework for understanding the relationship between "the person" and "the user" in the Internet of Things (IoT) by exploring a similarly troubled dyadic discourse: the thing. The goal is twofold: first, to provide a critical framework for scholars studying the humanistic and social implications of IoT; second, to broaden the scholarly discussion of IoT beyond an increasingly standard set of topics that includes usability, security, and privacy. I focus on the role of the subject in comprising things and things' social role in constructing the placeness of the home. By considering "smart" and "unsmart" objects through the lens of an advertisement for Sony's smart home ecology, I demonstrate that "unsmart" objects frame smart devices in a historical materiality that, paradoxically, allows for an overly technical approach to IoT devices. Such an approach risks effacement of the social, subjectival makeup of things in which the human is primarily framed within the ontology of the object rather than that of the agential subject. Where things are ubiquitously understood as objects, we are primed to understand people as users rather than humans.

Keywords User · Internet of Things · Humanistic HCI · Smart homes

1 Introduction

A user is a human, but a human is not necessarily a user. This logic is well represented in the canon of socially oriented human-computer interaction (HCI) literature (e.g., [3, 15, 33]) and forms an implicit cornerstone for the sub-field of social informatics [32]. With the increasing ubiquity of computational objects, such as that which occurs in the imaginary of the Internet of Things (IoT), reducing the human to the status of the user has never appeared more functionally correct. Where the user interface is ubiquitous, so is the user.

As an increasing number of objects in our daily worlds come to constitute user interfaces, they reconfigure or transform the discourse [21] of the human into a discourse of the user (*cf* [14, 46]). Where the computer has successfully reached out [25], aren't humans necessarily users? As this question takes hold—say, in the implicit validity of the colonial epistemic culture [12, 13] of big data—what forms of knowledge and modes of being are we effacing? What do we lose when humans become users?

A few of our strongest visions of computational futures are predicated on the reductionist bait-and-switch of the human for the user: the "darkening of the digital dream" represented in Zuboff's *Age of Surveillance Capitalism* ([47], p. x); the emergence of the data double [26] and the creepiness of interacting with it [41, 45]; the wholesale digital representability of the phenomenal world represented by the digital twin paradigm [24]. Even the privacy paradox [37] can be interpreted in terms of the difference between the user and the person—a sort of discursive implementation gap [19]. The user emerges as the machine-readable corollary to the historical discourse of the human.

From a phenomenological, existential, or broadly humanistic perspective—each of which are variously in line with practices in third-wave HCI [28]—this is deeply unsatisfying. Too much is potentially lost, leaving only the absurdity of alienation [10] in the form of creepiness and the uncanny. But more than being *merely* unsatisfying, the discursive transformation of the human to the user brings with it far-reaching philosophical implications. It hints at a fundamentally new ontology, wherein the subjectivity of the person is understood through the objectivity of the user. What will the

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objectification of subjectivity mean for the experience of being human in our computational futures? Put differently, what sort of humans and human futures are we designing when we stop actively interrogating the language of our "technotales" [4] and the imaginaries to which they give rise?

This essay, written in the tradition of humanistic HCI [2], grounds the distinction between the subjectival person and the objectival user in the phenomenology and ontology of "the thing." Even as the paradigmatic implications of IoT effect a transformation from the person to the user, the phrase "Internet of Things" carries with it an entry into the philosophical implications of defining humans as users: "things." What can we learn about the discourse of "users" through analysis of "things"?

By considering the thing as a gathering, as in the tradition of Heideggerian phenomenology [29, 30], I highlight the duality and co-construction of the subject and the object. Such duality implies the duality of the human and the user. Where this is true, the transformation of the human to the user does not recreate the person as the user, but rather obfuscates and disempowers the human in the name of the user: subjectivity takes on the appearance of invalidity when faced with the epistemic culture of big data.

When subjectivity becomes invalid—as a mode of experience, as a mode of knowledge production—we, as humans, become something other than ourselves. This otherness is a form of posthumanism that replaces the vision of positive evolution for an objectifying post-humanistic epistemic culture. And where the computer's having reached out has been effected by our—scholars'—efforts to push it out ([2], p. *xix*), we owe it to ourselves and the users we are participant in creating to understand and take seriously our work's philosophical effects.

2 Parallel discourses: from person/user to thing/object

It has been said that science does not deal well with *things* unless they are operationalized as objects [30]. But things and objects are just not the same: they are as distinct as pineapples and pickup trucks. Through processes of data extraction and analysis, science creates objects from things. The philosophical difference between the thing and the object is core to understanding the discursive implications of the user in the experiential futures of the human: the user is the objectified form of the human.

The separate and separable classifications of *the thing* and *the object* prime us to think about the world in different ways. Things are processual and experiential, objects are things made static: known. Each one presents as a lens through which to see the world, just as *the user* and *the person* prime different epistemologies. Classifications, as it goes, have consequences [6]. With the rise of the Internet of Things (IoT), the difference between the thing and the object is becoming blurred. Mundane things—the gathering processes and material grammars of our lives—are becoming understood objects, and with them, so is the human.

As I will argue in this essay, the discourse of the human and its potential transformation to a discourse of the user is inextricably bound up in the discourse of the thing. Where things are known as objects, the human is, too. Any change in the classification of the thing—say, from heterogeneous gathering [30, 34] grounded in the phenomenology of experience to data-driven object grounded in the reductionism of computerized empiricism—results in a change in the discourse of the human.

When objects *qua* things populate and co-comprise our personal spaces—the home, in particular—the human is fundamentally changed. The wilds of our experiential selves become tamed by the reductionist lens of data. As Drucker [18] has eloquently argued, data are not endogenous to the world: they are created. In such creation, one finds reductionist re-creation. Things become objects; humans become users. Whereas once we, as humans, were filtered through multiple simultaneous gazes [22], the possibility of a ubiquitous data-driven, computational gaze is upon us: a gaze that interpolates fully. It is a gaze that aspires to the God trick [27] and proselytizes on behalf of an objectival and reductionist human: a user.

To refer to a human as a user, is to refer to that human in specific, constructed terms; to refer to a thing as an object is to reduce the wildness of the thing—and the ontologically heterogeneous actants that gather to produce it—to the tameness of the object as it exists under very specific conditions.

That we may well come to understand ourselves through an epistemic culture predicated on computational reductionism is largely at odds with the *sui generis* logic of the humanities [2], and indeed with the *sui generis* modality of subjective experience. In becoming objects, we become our own others. The matter at hand, then, is to identify characteristics of the others we are becoming and to ask a difficult question: is this what we had in mind as we have pushed the computer out into the world?

What happens when we, as humans, become naturalized as users? And in being naturalized as users, become philosophically framed as objects?[1] As the computational objects that populate IoT—disguised and ambiguated through/by the term "things"—make their way into our most private spaces (e.g., the home), developing answers to these questions becomes somewhat pressing.

[1] If this sounds strange, consider Shoshanna Zuboff's [47] work on surveillance capitalism: humans are already becoming objects of our designed, computational infrastructures. Garnet Hertz [31] has done some very provocative and worthwhile artistic/designerly work that illustrates this, as well.

3 Analysis: the subjectivity of things in Sony's "Movie Night" advertisement

In 2017, Sony released a series of three video advertisements on their smart home website. One of these videos, entitled, "Movie Night," highlights the functionality of Sony's line of smart home devices.[2] Although the primary focus of this advertisement is the functionality of Sony's Harmony Hub device, much can be read from the unaffected, unsmart objects that populate these scenes. I present a description and critique of "Movie Night" in order to highlight a blind spot in visions of IoT futures: the deeply personal role that objects, particularly books, play in the construction of our personal spaces, our homes. This is a personalness that is obfuscated by the term "user," and one that we must begin to account for.

The frame is filled with black. "Smart Home with Sony" appears in stark white and transitions to the phrase, "Movie Night." The camera pans out to reveal a wall-mounted flat-screen television within a single-family residence. As the camera continues to pan out to reveal more of the room centered around the TV, the words "at the touch of a button" appear below "Movie Night."

The video cuts to an external shot of a suburban home. It's a brown brick ranch with white trim around the windows and roof. The sky above it is light blue with hints of pink—the gloaming. A general sense of suburban relaxation pervades. A long stretch of windows overlooking the front yard are the central focal point. They are open, and there is a hint of light emanating from them. The clouds in the sky, animated by time lapse, race towards the left side of the frame as the last hues of pink and blue fade from the sky.

Night falls. The viewer sees a living room through the windows. Two kids, early teenagers, race from another room into the living room; two adults, presumably Mom and Dad, are already sitting on the couch. The scene is one in which the viewer supplants a glossy fictionalization of home life for all of the grit and honesty of autobiography. In the ad—as with any ad—the viewer is not drawn into the world, *per se*, but rather into an imaginary of the world: a series of representations that speak to the order and shared sensibility of the world. The family and the home are not the focus, but rather the concept of the family and the concept of the home: this video will demonstrate how IoT-enabled technologies will augment these concepts.

Inside the house, the camera faces the kitchen. There are framed photos on the wall, a gently cluttered kitchen table, and blankets on the couch. It is a cozy, but clean house. Various baubles populate the shelves, and plants line the exposed brick wall behind the couch. The kids are dressed casually: the girl wears an open flannel-style shirt over a grey tee with blue jeans and nondescript sneakers; the boy wears a short-sleeve button-up shirt with brown corduroys. The teenage boy jumps enthusiastically over the arm of the couch to sit next to Dad. The family is laughing and smiling. Dad extends his arm around his son; Mom reaches toward the coffee table to pick something up.

Another cut reveals a close up of Mom's hand grabbing a remote from the table. Text appears at the bottom left of the frame: "Discover Button/One button launches multiple actions." The wooden coffee table, seen up close, sits empty. It is impeccably clean. Once Mom has pressed the "discover" button, yet another smash cut reveals the flat screen TV again. A sound bar sits on the media center below it. More than any other object in the scene, one type jumps out: books. They sit, functionally bare-spined—their spinal texts are barely perceptible—beneath the sound bar and near to the Sony Smart Hub. They are the generic of the generic, absent anything but their physical form. Their spines display no metadata, no descriptive information beyond the apparent modernity of their printing. They are simply books, stand-ins for a commonly understood category of objects. They signify the *category* of the book: to the family and the home we can thus add the book as a proxy for pre-IoT, or "unsmart," objects.

The remainder of the video portrays various functions within the smart home. Blinds are automatically drawn to reduce ambient lighting; the temperature of the house is adjusted; popcorn is popped in a skeuomorphic smart popcorn-maker, the lights in the living room dim. But it is at the first sighting of these books on the family's media console and the appearance of the word, 'discover,' that my description, for present purposes, stops.

The presence of the word "discover" deserves focus. At first, it presents as mundane—it belongs to the language of smart TVs, to the language of a generation of applications and their users who, through interaction, expect to gain access into a universe of digital data, digital content. But just what does it mean to "discover" something within one's home? I, for one, do not readily associate the act of discovery with the act of being at home. My association is quite the opposite, in fact: one cultivates one's home, populating it with particular objects, particular experiences. To discover something within one's home is to experience, perhaps, surprise in one's home: one discovers an infestation; one discovers the cause of that smell in the kitchen; one discovers that something has been misplaced.

So, in the term "discover" one encounters a breakdown. Not a breakdown of functionality as in a power outage, but a breakdown of the insular nature of the home. The smart home, it seems, differs from a traditional home in that the "smart" quality of the objects that co-comprise the smart home invite

[2] Originally published at https://www.sony.com/regional/smart-home, these videos are no longer publicly available in their original location. They were, however, archived by archive.org and can be accessed at the following URL: https://web.archive.org/web/20170519071859/http://www.sony.com/regional/smart-home .

the world in: it is the world outside that is to be discovered (in some sense) by means of Mom's remote control. The gesture of picking up the remote—arm extended, hand grasping, fingers pressing—is an act of exploration. The television becomes less a television with a set number of broadcast options, but a window more like that which one might find at the user-end of a computer's operating system. In the smart home, the television (like the personal computer before it) becomes a member of an already residentially based metaphor: it becomes a window, but a window to nowhere and everywhere, to a limited but functionally limitless number of scenes. A movie is just one genre of scene to which the gesture of picking up the remote control within a smart home gives rise. In the imaginary of the smart home as it is presented through this advertisement, viewers and potential users are invited to discover their homes anew. It is the previously unknown, signified by the act of discovery, that propels the present discussion: what awaits discovery in the imaginary of the smart home? And what might this discovery mean for the ontological composition of things in the home? And for the people that co-comprise these things?

Like the other "unsmart" objects in the scene, the bare-spined books that rest proximal to the Smart Hub serve to ground the advertisement in the concept of a "home." The smart home meets the unsmart home—presents as a continuation or evolution thereof—precisely because smart objects reside alongside unsmart objects. The objects create a personalized space, a space defined by them. A sense of home—as opposed to "house"—emerges from the assemblage of these objects. The overtly social tone of the advertisement smuggles in an assumption that the realm of social will remain unchanged in the futures of IoT because IoT-enabled objects will reside next to pre-IoT objects. Because this position is implicit, it deserves close scrutiny.

In the next sections, I scrutinize this position through the lens of those bare-spined books. First, I turn to the potential contents of these books in order to demonstrate the role that objects play in telling stories about the world; second, I provide an analysis of the relationship between the book collector and the book-as-object through the writing of Walter Benjamin. Through these analyses, I demonstrate that there is at least as much subjectivity to the thing as there is objectivity, which indicates the validity of theorizing IoT-enabled things in the same way, not as mere objects, or even objective things, but as objects that couple with subjects to produce the things that foster the richness of experience so prized in humanistic fields. Things are subjective; things are social.

3.1 Stories between the covers

What might the stories contained in those bare-spined books tell us about the subjectival composition of things?[3] About what's left out when we frame the human and the thing as users and objects?

Let's assume that one of these books is a novel. Probably any novel would do—one needs only consult Calvino's two readers [9]—but since it is fresh in my mind, let's say it is Truman Capote's *In Cold Blood.* Consider the following description of Mrs. Clutter's room:

> The room she so seldom let was austere; had the bed been made, a visitor might have thought it permanently unoccupied. An oak bed, a walnut bureau, a bedside table—nothing else except lamps, one curtained window, and a picture of Jesus walking on the water. It was as though by keeping this room impersonal, by not importing her intimate belongings but leaving them mingled with those of her husband, she lessened the offense of not sharing his quarters ([11], p. 29).

The room in Oklahoma in which Mrs. Clutter sleeps defines her in a negative sense: not through the objects that are present, but through the objects that are absent. The bed, the bureau, the Mid-West-American-generic portrait of Jesus: these are what might be called standard objects, so devoid of personality as to approach the generic quality of the objectified "thing" as it transforms from gathering to concept [36]. In their absence of specificity, they reflect the hollowness of Mrs. Clutter's shattered nerves, the echo of thunderous fits. In the absence of personal objects found in her sleeping quarters, one reciprocally sees the spread of her character across time and space in the presence of her personal objects still found in the marital bedroom: in the spatial divorce of Mrs. Clutter and her personal objects, the reader finds evidence of a fracture, of a co-constitution between subject and objects that is no longer possible. In her distance from her personal objects, Mrs. Clutter evidences a distance from herself.

The generic quality of Mrs. Clutter's objects is mirrored by the generic quality of the smart devices represented in the Sony advertisement above. When, in the context of a thing, a specific subject is replaced with the generic category of subject—as in the reductionist operationalization of the user—subjectivity recedes into an objectivity. The personal space of the home is colonized by the objectified subject, the form of subject that is constructed through a focus on objects. In acting through and by means of those devices—in what John Durham Peters, riffing on Marshal McLuhan and Walter J. Ong, would call the ablative mode [38]—the human user, at home in their living room, enrolls into an onto-epistemological culture of objectification. They are constructed through and by means of the objects that frame them. At the

[3] Few scholars, if any, have done more to examine the role that objects play in the realm of literature than Bill Brown [7, 8]. Rather than speaking through examples found in those works, I hope to add to them.

edges of this culture—a culture of default settings and objectification, of "discover" buttons linked to factory settings—the human subject peers into a space wherein their specter resides. This specter is the presence of absence, presence through absence [17]: the absence of the primacy of the subjective. It is in this presence of absence that the future human, the human transformed, and the human of IoT is to be found: a standardized component of IoT-enabled subject-object gatherings where the object's ontological status is transferred to the subject.

But we need not turn to canonical examples from literature to encounter rich evocations of the role that things – gatherings of subjectival and objectival components – play in the performance and maintenance of human identity. What if one of the bare-spined books was a children's book left from the kids' youths? As an example, take "A House that Once Was" [20]. It's a charming little book about two small kids who wander into the woods and come upon an old house—an empty house. After a short stanza describing the emptiness of the house, the kids begin to wonder about the former tenants by way of the objects they left behind:

> "Who was this someone
> who ate beans for dinner
> who sat by this fire
> who looked in this mirror?
> Who was this someone
> whose books have been waiting
> whose bed is still made
> whose pictures are fading?
> Who was this someone
> who walked down this hallway
> who cooked in this kitchen
> who napped in this chair?
> Who was this someone
> who left without packing
> someone who's gone
> but is still everywhere?"
> ([20], pp. 14–16)

The quote from Fogliano and Smith above cuts to the quick: "Who was this someone/who left without packing/someone who's gone/but is still everywhere?" The absent tenants are everywhere in the shape of the objects they left behind. These are the objects through which and by means of which they lived their home life, their mundane moments of eating beans, walking from one room to the next, napping.

And yet, the presence that lingers in the form of these objects, like the spectral memory of a life lived, is predominantly an absence. Each of the objects listed in the passages provided are themselves half-empty. The naive explorers central to this short text realize the emptiness of the home through the absence of the former tenants, but also (and more directly) through the unused objects that populate the space, the house that *was* a home. These objects, disused and abandoned, exist as spectral things: they remain as ghosts of themselves as they were when coupled with human subjects that acted through them, lived their daily lives by means of them. They are as empty of their former thingness as the house is of its former tenants.

Fogliano and Smith's juvenile explorers nudge the reader into imagining the type of people who lived in this space: if a picture is worth a thousand words, then objects must certainly be worth more. It is as if to say that people can be reconstructed, at least in-part, through the objects that surround them, but never wholly: they are reconstructed as concepts, categories of person. The objects with which we surround ourselves not only bound sets of potential actions, but they allude to the apparently idiosyncratic, but ultimately standardized, material grammars that guide our daily lives. When the subject is seen through the lens of the object, they are only ever specters of themselves: generic categories of potential actions devoid of the memory of actions taken. The set of objects present in this abandoned home constitute an infrastructure: but it is not the infrastructure of a city (as in the case of electricity, roads, sidewalks, plumbing). Rather, it is the infrastructure of a life, of quiet moments of apprehension or comfort, sleep or wakefulness, hunger or satiation.

Objects are expressions of identity because they populate the spaces in which we live out our identities: the identities that we perform through our engagement in the act of gathering to constitute *things*. The reader comes to know the hollowness of Mrs. Clutter through the description of her objects, just as the viewer of "Movie Night" comes to know the family through their collection of objects—they are an idealized family of users and nothing more. Alongside the children in "A House that Once Was," we wonder through the lens of disused objects at the lives of people no longer present. If Mrs. Clutter can be so deftly described by her objects, then so too, can the family depicted in movie night; so too, can the family and individuals that populate the technotales of IoT. And so, we close the cover and return to the unnamed books on the family's media console, doubling as both filler in an ad and as opportunities to engage in speculation about the social imaginary the ad represents: a future of the human-as-user constructed through the lens of the computational objects of IoT. But we return to these books as objects that co-construct *experiential things* with their subject-partners.

3.2 Stories outside the covers

The book-as-object has its own stories to tell beyond and alongside the stories of adventure, history, self-discovery, torment and research it may carry amidst those anatomical features. These are stories that arise between subject and

object—an inner home between reader and book, constructed without intrusion.

Words inscribed on a substrate are age-old signifiers of narrative, or the hopeful durability of narrative. The narratives they contain or that are represented through inscription are not only historical—as in an untenable history devoid of subjectivity—but they are also deeply personal. Their personal qualities, however, do not extend solely to those of the author(s). Instead, as I will demonstrate through a brief reading of a piece by Walter Benjamin, the received inscriptions that populate bookshelves speak of the personal qualities of the reader, too, who has inserted herself into the narrative *as reader* and who has lived after that act of reading.

In a piece by Walter Benjamin, entitled "Unpacking My Library: A Talk About Book Collecting," [5] the author provides an invaluable glimpse into the relationship he has with his collection of books.[4] Benjamin begins this piece with a friendly description:

> I am unpacking my library. Yes, I am. The books are not yet on the shelves, not yet touched by the mild boredom of order. I cannot march up and down their ranks to pass them in review before a friendly audience. You need not fear any of that ([5], 59).

The reader is invited into the space he is claiming through the act of unpacking—his home, his office, a space that will become his *through* unpacking, *through* the selected distribution of his objects. As though he expects the glazed eyes of grade school pupils, Benjamin alludes to the boredom of stodgy "collecting," and almost immediately moves beyond it: "what I am really concerned with is giving you some insight into the relationship of a book collector to his possessions, into collecting rather than a collection" ([5], pp. 59–60).[5]

Benjamin circumvents the staid and dusty assumptions about the function of books—that is, assumptions about the book as a material form, as something owned. He does not provide the reader with a laundry list of the rarest volumes in his collection, as a child might do with a set of baseball cards. Rather, he discusses his library in terms of his life. His library is a reflection of his life, his experiences. The volumes contained in his collection are memorial, relays into memories of what he has done, where he has been.

The act of collecting books, for Benjamin, is the act of collecting not only the narratives they contain, or the artisan knowledge of printing and binding embodied in their materials, but also the narratives to which they belong outside themselves. Each book in the collection, regardless of the semantic content it bears in its inscribed form, harkens back to the moments in life when the book, the collection and acquisition of the book, overflowed into the greater narrative of Benjamin's own life:

> Now I am on the last half-emptied case and it is way past midnight. Other thoughts fill me than the ones I am talking about—not thoughts, but images, memories. Memories of the cities in which I found so many things: Riga, Naples, Munich, Danzig, Moscow, Florence, Basel; memories of Rosenthal's sumptuous rooms in Munich, of the Danzig Stockturm where the late Hans Rhaue was domiciled, of Sussengut's musty book cellar in North Berlin; memories of the rooms where these books had been housed, of my student's den in Munich, of my room in Bern, of the solitude of Iseltwald on the Lake of Brienz, and finally of my boyhood room, the former location of only four or five of the several thousand volumes that are piled up around me ([5], p. 67).

Benjamin throws the objectival book into the realm of the thing: the venerated thing that is both collected and collects. These are books that tell stories beyond those they contain, that stretch out spiderwebs to tie author to printer to seller to collector, resonating most clearly with the memories of the collector. The reader begins to see the object of the book not as a carrier of semantic inscriptions, but rather as a memorial dog-ear: each book in the collection is, itself, a folded page in the memory of the reader, marking the possibility of entry into that least accessible archive of the mind, of experience, of the inner narrativity of one's life.[6] Where the book serves as memorial signpost, the memory serves as text. Where the memory serves as text, the meat and substance of the mind and body, all wrapped up in one to be lived through the senses, serve as media. Where the personhood of the reader can be viewed as a form of media—and it must be for it is the root of the metaphors that describe us and reciprocally describe the sensorial prostheses we create—we find yet another inconvenient and exhilarating breakdown of the subject/object dichotomy. We are left with memory and mind as media: a type of media that knows no direct parallel outside the body. One that can maintain multiple, simultaneous, and even contradictory notions; one that can bend and flex across temporalities as no readable, externalized media can do. We are left, in the case of

[4] For the purposes of shoring up any problems arising from the conceptual space between owning books and collecting books, I contend that the combination of "media center" and "book" constitutes a collection—to have a place designed for housing a particular type of artifact is at least tentative evidence towards collection.

[5] This is perhaps not unlike the experience of an IoT-focused technologist approaching a discussion of books.

[6] One is reminded, too, of John Cusack's character in the film, "High Fidelity," who undergoes an autobiographical reorganization of his record collection [23].

Benjamin and his books, with the breadth and breath of the affordances between subject-reader and object-book, where the reader reads himself through the act of recollection, of remembering. The subject extends to the object to be met by itself, its reflection and the *act of reflection*. Beyond its membership in the archives of knowledge and narrative, the dyad of reader and read belong to *the archive*. Any transformation of this dyad results in a transformation of the discourse it comprises: the reader, the human.

My point here is not merely that things carry with them certain identity-related meanings for those subjects that co-comprise them as things. Rather, it is that subjectival agency in IoT devices extends beyond the reach of human hands and into an alien phenomenology of sensors, actuators, algorithms, machine learning, prediction, data-social construction. This agency—the agency of smart objects—recasts the human as an object known in the same way that Heidegger wrote about science's knowledge of things: as reductionist operationalizations. As these operationalizations—these reconfigurations of the human-as-user—follow us into ever more personal and mundane corners of our daily lives, our selves become both less and more than they were. Unless we are willing to blindly transform ourselves, the discursive possibilities of ourselves, through the adoption of smart devices in the name of convenience and heightened consumer power, it is essential that we bring into focus again the subjectival components of things: that we see our embodied, experiential selves in the gatherings that IoT facilitates.

4 Conclusion: the user as human

Things, comprised through a gathering of subjectival and objectival components, are expressions of self: they are the stuff of being. They are the interfaces of our spaces, spaces we turn from houses into homes, spaces where we find our own placeness through the objects with which we gather to produce actionable things—the infrastructures of our lives. When we operationalize things as objects, that operationalization extends to frame not only the objectival components of things, but the subjectival components as well. In operationalizing things as objects, we operationalize ourselves similarly. Such an operationalization necessarily reduces the human to the status of an object. We become users.

When we approach the futures of IoT through a predominantly technical lens, the human disappears into the user: it becomes a function of the technical. As a result of the rise of IoT, we are currently in the middle of a discursive transformation [21]. Ours is a social imaginary at the bleeding edge of an archive-level transformation. Without appropriate focus on the subjectival aspects of IoT-enabled things, this discursive transformation is wholly blind: we cannot know into what we are transforming. Perhaps all that is certain is that we are transforming into "users."

The objectification of subjects by way of IoT is problematic because it supplants a known version of ourselves with an unknown—an emergent, but as yet unknown discourse of the human tied to the sterile and objectified user. If we are to blindly transform ourselves into objectified subjectivities, there is no way of knowing the philosophical wicked problems such transformation will give rise to: what are the ethical implications of a flat ontology? How does a human choose which forms of knowledge to rely on across varied situations? (Am I always an object? Should I rely on subjective knowledge here and objective knowledge there?)

As in the case of "Movie Night," like the home that no longer insulates but invites the world in through "discovery," IoT objects invites a new human, a transformed human. But we implicitly struggle with the extent to which we want—desire—this human to resemble us. The human of IoT is a hopeful monster [35]: it is frightening because it is possibly *too new*, too unhuman, too much of a user. The IoT object invites other subjects into the world of the subject-user. To put a finer point on it: the IoT object invites The Other into the deeply personal relationship that people have with the things with which they interact, collect, and keep. In inviting The Other into our assemblages, we invite The Other to become us: we become something other than what we are as humans *through and by means of* the things we co-constitute.

To change the composition of the thing—to reduce the thing to the object, the human to the user—is to change the human that knows their world by means of their things. If we are to begin to understand what it will mean to be a human (and not merely a "human-as-user") in the receding technotale of IoT, we must open ourselves and our inquiries into the "unsmart" materialities we have always used to know our worlds, to define ourselves. That is, we must attempt to identify and know the nature of the things that constitute our worlds. Rather than envisioning a break—a grand disruption—we must attempt to envision a linearity. We must imagine the specters of ourselves as we might appear, through absence, in the futures of IoT: we must envision our own spectrality. We can do this through careful consideration and analysis of the things we have always already co-constituted before the phrase Internet of Things was ever uttered in a fateful meeting at Proctor and Gamble [1]. Without this humanistic due diligence, we head blindly into a new human discourse, one that we have transformed by looking ever at the IoT of a then-future 2020 [42], 2025 [44], or 2035 [43], rather than focusing on the messy artifactual and experiential heterogeneity that emerges in a present tense that it simultaneously populated by the past and motivated by the future.

In producing knowledge about *things-as-objects* through the mode of scientific inquiry—by filtering the human life-world through the mediations of scientific tools, which are always already predicated on the validity of the subject/object dichotomy—phenomenal things are stripped of their wildness: they are reduced to representations of themselves. Where, as the Schoolhouse Rock song goes, "Knowledge is power," the world of thingly phenomena comes under human power through its translation into objects: objects we can narrate, historicize, organize, categorize, classify, manipulate, *know*.

Put differently, thingly phenomena become reductively standardized as objects such that they *can* be known, but in knowing them, we efface certain aspects of the experience *of* them: in an inversion, experience becomes framed by formalized knowledge production. As in an echo of Descartes, we think therefore we are, and the body (and its experiential foundations in phenomena) is subjugated by the power of organized knowing.

But this comes with a fundamental epistemological confound: in treating the phenomenon of the thing as an object, science does not study the phenomenon but its representation.[7] (The archive of intellectual history creates just as much as it destroys [16].) In studying its representation and subsequently building further knowledge upon it, science recreates the world as a mirror of itself: the natural phenomenon becomes the known object, which in turn becomes naturalized again across time. Hence, Heidegger's quip that science doesn't deal well with things unless they're operationalized as objects. The phenomenal world disappears behind the curtain of the known object. The known object—the ill-defined thing of IoT and the user it co-constructs—becomes the new natural state, and science in the form of a ubiquitous computerized empiricism divorces us from the humanistic historicity of our phenomenal being.

The latest greatest step in this ongoing naturalization is that of computerization: we are rebuilding our world through the lens of the computer-as-object, but also through the lens of the computer's created objects. This is the computer "reaching out" [25] to the point that its grasp envelops the phenomenon of the human and the role that human subjectivity plays in the production of the gathering. We have thus far been remarkably successful in helping the computer reach out. It touches us, grasps us in even our most private spaces—in bedrooms, kitchens, living rooms. We must now devote suitable effort to reaching back: in asserting ourselves as more than users to be designed alongside an object-centric focus on devices.

[7] The work of Bertrand Russell [39, 40] has also addressed this problem through the lens of what he refers to as "knowledge by acquaintance" and "knowledge by description." As embodied agents, humans are naturally acquainted with phenomena. Through the scientific lens, phenomena are described, and in description they are objectified.

Compliance with ethical standards

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