

The IdIoT in the smart home

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‘Smartness’: from industrial applications towards the domestic space

Internet of Things (IoT) technology, as defined as a system in which everyday objects are digitally identifiable, programmable, and connected to the Internet, emerged in the nineties in the context of industrial applications. These connected objects are able to send (and often, but not always, receive) data, pair with other devices, and respond to the algorithms that command them. Based on developments in the field of Artificial Intelligence (AI), these algorithmic processes particularly draw on Big Data and Machine Learning. The term ‘Internet of Things’ was coined in 1999 by MIT researcher Kevin Ashton. According to Ashton, it was first used in the title of his presentation made at US consumer goods corporation Procter & Gamble in 1999, where he described how wireless (RFID) tags could link products in P&G’s supply chain to the Internet.¹

The evolution of the technology lead to a multiplicity of rhetorical terms. As the science fiction author Bruce Sterling describes in his book *The Epic Struggle of Internet of Things*, “Microsoft call its efforts at the Internet of Things ‘The Internet of Your Things’. That slogan was deliberately to insinuate that Google’s Internet of Things is, in fact, a sinister mass of Google’s things.

Cisco is the ‘Internet of Everything’, GE is ‘Industrial Internet’, and so on.”² Since the nineties there has been a substantial growth of the IoT market. In statistical terms, Gartner has estimated that 25 billion connected ‘things’ will be in use by 2020, while Cisco projected that, in 2020, 50 billion objects would be connected.³ This disparity in the figures advocates how rapidly the field is developing, and the uncertainty that comes with that rate.

Due to their role in aiding optimization, convenience, efficiency, tracking (e.g., via RFID), managing resources, and reducing costs, IoT applications have been successful in the industry. Following this vision, IoT technology started to colonize the domestic space. Currently the 'smart' home market is a fast-growing business: it is forecasted that by 2022 a typical family home will contain as many as 500 networked devices.⁴ As Rem Koolhaas suggests,

architecture has entered into a new engagement with digital culture and capital—which amounts to the most radical change within the discipline since the confluence of modernism and industrial production in the early twentieth century [...] for thousands of years, the elements of architecture were deaf and mute—they could be trusted. Now, many of them are listening, thinking, and talking back, collecting information and performing accordingly.⁵

'Smartness' is starting to inhabit the domestic space, consequently a new architectural narrative is beginning to emerge. By offering services such as automation, control, monitoring, and prediction of user behaviours, current applications of IoT technology in the home include security, heating control, lighting automation, and smart home hubs, fused together by the large market of 'smart' appliances. In the 'smart' home this quantitative behavioural approach has been translated into a specific language. Objects are marketed as being 'thoughtful' and even 'conscious'. Nest's founding CEO Tony Fadell states: "We're about creating the conscious home [...] From the beginning, our vision was to create a conscious home. A home that is more thoughtful, intuitive—and nice to look at."⁶

The figure of the idiot

When it comes to 'smartness' integrated within the domestic space, the figure of the idIoT—based on Stengers' figure of the idiot in the context of IoT technology (ID: identification + IoT technology)—plays a crucial role. Through this figure, by slowing down assumptions, it is possible to examine 'smart' home technology by reflecting on the problems and challenges of introducing this technology into our domestic space. The figure of the idiot described by Stengers is based on the conceptual character of the idiot proposed by Deleuze, who in turn borrowed it from Prince Myshkin, the fictional character in Dostoevsky's novel *The Idiot* (2003).⁷ Considering, as Stengers suggests, that the idiot creates an interstice, "a space for thinking," it thus becomes important to ask, "What are we busy doing?" Stengers describes this as "a proposal to 'slow down' reasoning and create an opportunity to arouse a slightly different awareness of the problems and situations."⁸

As Stengers indicates, her proposal is intended not to say what is, or what ought to be, but to provoke thought; one that requires no other verification than the way in which it is able to “slow down” reasoning and create an opportunity to arouse a slightly different awareness of the problems and situations mobilizing us.⁹

Through data collection, data aggregation, and automation, ‘smart’ technology is redefining the relationship between the dweller and the home. The IdIoT in the context of the ‘smart’ home is a critical methodological approach for revealing ‘smart’ oversimplifications and analyzing interdependences between non-neutral algorithms and the domestic space. In this context, the idIoT observes the scenario of the ‘smart’ domestic space by analyzing who is at the door. As Koolhaas points out in relation to ‘smart’ technologies and architecture, “this shift has gone largely unnoticed because it has not taken the form of a visible upheaval or wholesale transformation. To the contrary, it is a stealthy infiltration of architecture via its constitutive elements.”¹⁰

‘Smart’ home expedition

Already from the outside, you are being observed by exterior cameras. With the support of a ‘smart’ doorbell, which captures the exterior view and notifies the dweller of a visitor’s arrival, it is possible to enter the home without human intervention. As the August Doorbell Cam Pro motto indicates, “Home, even when you’re not.” It is also possible to encounter ‘smart’ thermostats, which are embedded in the walls of the house and used to control the indoor temperature. By registering its user’s habits, the device claims to decrease the amount of energy used on heating: it knows when you are at home. To make sure your home is safe 24/7, ‘smart’ CO₂ and smoke detectors are connected. A ‘smart’ fan can be found hanging from the ceiling, one which has the ability to communicate with the ‘smart’ thermostat. Lighting is not exempt from the phenomenon of ‘smartness’; not only is it possible to illuminate the home, but users can also regulate the light source. Natural light can also be controlled remotely, thanks to the ‘smart’ shades placed over the windows. Light, whether natural or artificial, can be effortlessly controlled with the use of a mere app.

Several 'smart' appliances permeate the kitchen; 'smart' washing machines, 'smart' ovens, 'smart' toasters, to name but a few. The 'smart' coffee maker, which allows you to make coffee from your bed, promises to give users a stress-free start to the day. The 'smart' bin will notify you when the container needs emptying. A remarkable IoT product is the 'smart' fridge; this particular 'smartness' means that the fridge can manage groceries by monitoring fridge contents, suggest recipes based what is available, and even directly order food online. The interface for such functions is often a tablet computer integrated into the fridge door, and for this reason, the screen is a very important element: it allows the user to listen to music, access a calendar, notes and cooking apps.

The screen on Samsung's Family Hub Refrigerator is of considerable size, at 21.5 inches. Other functions of 'smart' fridges include design features in the interior, such as a 'pizza drawer' or 'infinity shelves', which can be moved to make room for taller items placed below. It is already possible to see commercial alliances emerging in the domain of 'smart' fridges; Samsung's Family Hub Refrigerator, for example, comes connected to Mastercard, which is in turn linked to FreshDirect and ShopRite delivery services and has a potential relationship with Amazon's Alexa voice control service. 'Smart' fridges can also be connected to other IoT devices, as can be seen with Whirlpool's French Door Refrigerator, which is linked with the Nest thermostat.

WiFi-enabled buttons, such as Amazon's Dash, are also present throughout the 'smart' home. These buttons can be placed around the house to automatically order specified household products; a wide range of goods, from Doritos to detergent, can be bought at the touch of a 'smart' button. Toilets can now be flushed using an app. Beyond that, music can be played, the toilet lid can be controlled, the bidet activated, and the room deodorized. 'Smart' toothbrushes, which store and analyze your brushing behaviour, complete the composition. The bedroom is also equipped with a 'smart' mattress. Advertised as 'sleep consultants', 'smart' mattresses are able to monitor your sleep. The children's bedroom has 'smart' monitors and 'smart' toys. But the protagonists of the 'smart' home are the speakers, which have spawned the concept of the 'personal assistant' for the domestic daily tasks. As they can connect to other 'smart' devices (brand dependent), 'smart' speakers are most likely to be found in the kitchen, the living room, and in the bedroom.

Critical for the interconnection of devices are 'smart' home hubs. These objects are responsible for making 'smart' devices work together; crucially, a single app promises to provide total user control. This category includes 'Mother', a data hub in the shape of a Russian matryoshka which comes with 'motion cookies' sensors and is advertised to be "like a mom, only better." Moving through the home, you can encounter a Roomba, an automated robot vacuum cleaner hoovering the floor. In the living room you can spot 'smart' innovations that allow users to create a 'smart' environment for their pets.

Such is the case of Petzi, a 'smart' treat dispenser that allows you to check on your pet remotely. Why not give your puppy a treat remotely? As the producer describes, "by a simple tap, you can see, speak, snap, or treat." User enthusiasm for this device can be estimated by reading the product's Amazon reviews:¹¹

We have tried EVERYTHING and this is the only thing that has relieved his anxiety/bad behaviors.... Now I can actually leave him home all alone & talk to him while at work or running errands.

Micki

One of my favorite things to do nowadays is go out to a bar with my husband and turn the Petzi cam on, enjoying my dog's company remotely with a margarita in hand. Our dog, Yukon, appreciates the treats this little contraption shoots out.

Jessica

In the garden or the terrace, devices such as Refuel, a 'smart' Tank Gauge Monitor for your grill, will remind you when the barbecue has run out of gas.

The interstice

After the 'idloTic' home safari, it is possible to spot several domestic issues. The 'smart' home requires numerous switches and applications, some of which can be incompatible, while others can appear unnecessary, over-complicated, time-consuming, and many, it can be argued, seem absurd. Communicating and controlling with so many objects can quickly become tiresome and tedious; 'smartness' potentially can become a constant source of domestic irritation. Now that 'smart' objects have taken up residence in the domestic space, the figure of the idIoT interrogates the datafication of the home. The idIoT traces the elements of architecture that have been affected by the tenancy of IoT devices, and by "slowing down" it detects 'smart' nuances providing valuable insights. The IdIoT realizes that 'smartness' is not neutral. Regarding the algorithmic objectionable objectivity and regulation, Adam Greenfield notes in *Radical Technologies: The Design of Everyday Life* that "it's supremely difficult to believe that any such findings would ever be encoded in public policy, and applied transparently, dispassionately and in a manner free from politics."¹²

The 'smart' home creates a particular dynamic, establishing a new set of behaviours. The enthusiasm for convenience comes hand in hand with extensive domestic behavioural data extraction, which is afterwards harvested and analyzed by big technological companies. The dweller has no control of the extrapolation of the data, no awareness of the third-party endpoint, nor the unforeseen commercial and socio-political costs. The idIoT asks: is it worth the potential control asymmetry of the home in the interest of 'smartness'?

By envisioning 'smart' devices constantly sensing and sending data integrated into the interior and exterior of millions of homes, the idIoT problematizes the ambiguities of 'smart' technology in the domestic space and asks: is the home 'smart' enough to share personal data with a third party (big tech company, or even the government)? How much control would be in their hands? How will the quantified paradigm affect our behaviour when applied to the home? With this interconnectivity, can the home still be considered a private space? How is the integration of IoT technology in the home affecting the concept of domestic space?

An algorithmic undertone is starting to become tangible when it comes to domestic territory. Architecture operates as a source of *governmentality* which can lead to the control of the domestic space. As Antoinette Rouvroy points out: "The impacts of the computational turn on governmentality are far from trivial. The constant 'adaptation' of environments to individual and collective 'profiles' produced by 'data intelligence'—be it called 'personalization' or 'technology of security'—is an unprecedented mode of government."¹³ This relates to Evgeny Morozov's analysis of the internet and its filters,

These new filters might be faster, cheaper and more efficient, but speed, cost, and efficiency are only peripherally related to the civic roles that these filters and algorithms will be playing in our lives. Without subjecting these faster, cheaper, and more efficient filters to the close ethical scrutiny they deserve, we risk committing one of the many fallacies of solutionism and celebrating improvements related to less important problems while completely neglecting more burning, more less obvious, issues.¹⁴

In addition, the idIoT sees the commercial potential of the 'connected' home: corporations would be able to offer a broad range of products and services once they have access to a detailed representation, not only of the home, but also of the inhabitants' behaviour. Greenfield characterizes the commercial 'smart' home push as, "Simply the latest version of this: a conscious, coherent effort to enlist our intimate spaces as a site of a continuous technological upgrade, subscription-based services and the perpetual resupply of consumables."¹⁵ To increase profits 'smart' devices must mine more data. Architecture has now the potential to operate as a data trader. An example of this *aperture* can already be seen with Roomba: while it cleans, it maps the home. As Astor notes, "Roomba may be vacuuming up more than you think." According to the article, "high-end models of Roomba, iRobot's robotic vacuum, collect data as they clean, identifying the locations of your walls and furniture. This helps them avoid crashing into your couch, but it also creates a map of your home that iRobot could share with Amazon, Apple or Google."¹⁶

The 'smart' home is equipped with technology that has the potential of exposing a vast amount of information about the house and the life of its dwellers. A consequence of this spatial disclosure of information (home maps combined with other 'smart' home data), is that now companies have detailed knowledge of the domestic space without owners having control of who is it shared with and with no clear understanding of the potential outcomes of this leakage.

Referring to the potential exposure of the connected home the journalist and architect Niklas Maak points out, "Theoretically, the home today is already better at spying on its occupants than any spying technology from outside with directional microphones." Maak continues: "The next step as part of this bottom-up monitoring, which involves assessing digital traces left by residents, rather than spying from the outside, is the analysis of data generated by sensors and devices inside the home – the interpretation of the digital shadow a resident leaves on his own fourwalls."¹⁷

It is important to note that corporations and governments might not be the only ones interested in winning control through data. 'Smart' technology can also lead to internal power struggles, resulting in a form of domestic abuse. 'Smartness' is becoming a frightening feature in the home. Could the 'smart' home betray you? An article recently published by *The New York Times* registered that there is a growing number of domestic abuse cases related to the rise of smart home technology. Smart, thoughtful, and conscious IoT devices are now also tools for "harassment, monitoring, revenge and control."¹⁸ The article describes how, via apps, smart home abusers remotely "watch, listen, and manipulate certain objects to spy, scare, or show power."

Smart home abuse has been reported to the National Domestic Violence Hotline. According to the article: "Callers have said the abusers were monitoring and controlling them remotely through the smart home appliances and the smart home system." According to *The New York Times* article, one of the affected women said "her husband, an engineer, 'controls the thermostat. He controls the lights. He controls the music.' She said, 'Abusive relationships are about power and control, and he uses technology'."¹⁹ The article emphasizes that 'smart' home connections are mainly done by men and "all of the interviewed people harassed through smart home gadgetry were women, many from wealthy environment where this type of technology has taken off."²⁰ In response to digital abuse is a deep desire for eliminating 'smartness'. The article describes how a victim fantasied about exterminating smart devices: "one of my fantasies is to be able to say: 'O.K. Google, play whatever music I want'," she said. Her desire for the smart thermostat was to "pull it out of the wall."²¹

There is a danger of our intimate space being commodified so effortlessly. As the idiot demonstrates in Dostoevsky's novel published in 1886: "if we understand too quickly, we may not understand well."²² By asking "what are we busy doing?" the idIoT questions the socio-political implications of embedding the domestic space with 'smart' devices. The idIoT detects that surveillance, control, abuse, vulnerability, and business are by-products of 'smartness'. At times the 'smart' home can be seen as unnecessary and humorous, but it can quickly turn tragic. The idIoT realizes the danger posed by the 'smart' home and reflects on the consequences of having 'smart' objects not only sensing your behaviour, observing you, and listening to your conversations, but also offering 'smart' replies, be they verbal or a decision.

Through an analysis of the 'smart' home, the idIoT poses a series of questions relating to the consequences of the datafication process of domestic space: in what ways could 'smartness' betray you? Who designs 'smartness'? What mechanisms are used? To what end? All these questions relate back to ethics. The impact of 'smartness' in architecture is a contemporary issue that must not be overlooked; an analysis of its ethical implications is needed. As described by Stengers, "We need a space for thinking in such a fast-paced field where assumptions about progress and desirability often go unchallenged—a space for hesitation regarding what it means to say 'good'."²³ Enthusiasts and companies argue that 'smartness' and surveillance bring convenience and efficiency. In contrast, the idIoT reminds us of the effects of the 'smart' paradox.

Notes

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