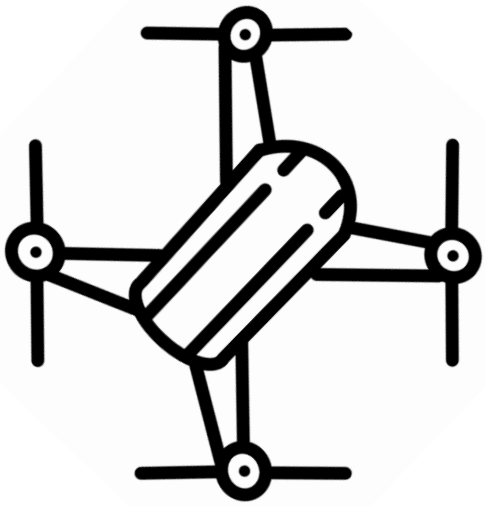
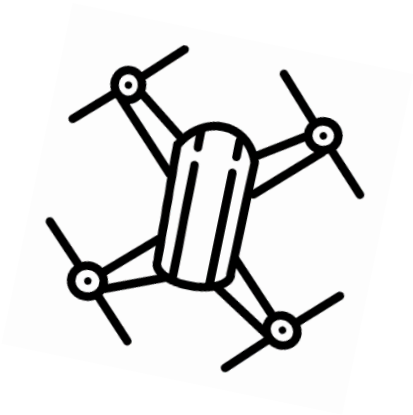
Walden – A drone in the woods

"I never found the companion that was so companionable as solitude." (Thoreau, 1854, p. 104)





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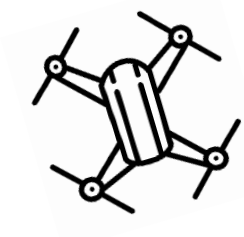

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Into the woods

I look out the driver-side window. “Snow”, I utter, while I lace up my trail running shoes. 27 kilometres lay ahead, past a waterfall, up a plateau and down through the forest. Nervously, but excited, I take off. I cannot clearly distinguish the path, but my pet drone – *Walden* is his name – is showing me the way. Filled with fear, I am relieved when Walden informs me that the conditions here, next to the waterfall, are more treacherous than up on the plateau, where the terrain turns runnable. I reach the top of the waterfall, where the trail crosses the flood. It does not want to be crossed: the river overflows its banks. I ask Walden to find a crossing. He excitedly returns yelling there is safe crossing hundred meters upstream. I accompany him and we safely make it to the other side. Now, we are approaching the point of no return when cellular coverage is lost. I can feel your stomach turn. What if anything happens? No one will find me here. I tell Walden to message my loved one with my coordinates and his planned route. Away he flies in the direction of the road. The trail is now only covered in a soft shallow layer of snow. Shrieking, I flow through the landscape. Then, a dot in the sky appears in front of me, followed by great darkness. Walden is returning at an alarming pace: “A storm is approaching!”, he cries out. “There is an emergency cabin up ahead. If you run 5:00 min/km, you will make it in time!”. Paced by Walden, I make my way to the cabin rapidly. As Walden and I gaze at the whiteout through the small, damaged window, we converse about possible adventures. After an hour, he tells me there is a shortcut down into the valley that, accordingly to his calculations, should take us back before the second storm hits. On his mark, I run. From stone to stone. I leap over the river. The pace increases now the trail is headed downhill. I cross the frozen section that I recall leading me up. Meticulously I slide down the familiar section of the trail. “Pfew. Almost there”, I think to myself, as the trail leads us back into the woods.

Setting off

This essay explores the attainment of a meaningful life in a world with modern technology. It propounds questions related to the persistence of fulfilling practices in a society in thrall to technology. The perspective of philosopher of technology Albert Borgmann is expounded upon. Focus is laid on the acceptance of technology and the implications of this choice. A prototype of a protective pet drone, named *Walden,* is examined as a case study, representing the latest of technology. This chapter provides insight in concepts and terminology wielded throughout the essay and discloses key concerns that are elaborated upon.

Walden

Henry David Thoreau is an American philosopher, poet, and environmental scientist. He pioneered philosophy as not just a reflective thought, but as way of life. In 1845, Thoreau moved into the woods at Walden Pond for over two years, where he explores the concrete problems of living in the world as a human being (Furtak, 2017). He wrote about his experiences in a book titled *Walden* (Thoreau, 1854). Among others, his claim that life looks poorest when you are richest (p. 247) resonates with the contents of this essay and captures the essence of the relation of contemporary society with technology. Due to these similarities, the prototype of this protective pet drone shall carry Thoreau's stamp: the name *Walden*.

Focal practices

A definition of the term *focal* is adopted from Albert Borgmann's *Technology and the Character of Contemporary Life,* where he described the act of being focal as focussing on something – as in, making it central, clear and articulate (Borgmann, 1984, p. 197). This can be

interpreted as deeply engaging with a *thing*, undisturbed, fully emerged in its context. Such a thing burdens us with tasks in return for a reward (p. 41). Within the context of said task, social engagement appears, and skills are gained. However cumbersome, it is this that provides meaning and the satisfaction of obtainment of the ends by engaging with means. To demonstrate, I will describe the archetypal fireplace. By itself, it does not provide us with anything. It is cold craftmanship that sits in the most important room of the house. The thing gives only after sacrifice; it requires being uncomfortable before it delivers comfort. Preceding the warmth, interaction with the purest of contexts is mandatory. One embraces nature gathering wood, the means to the ends we so deeply desire. Labour is required to chop the wood into a suitable resource and lug the logs inside. Then, skilful care needs to be taken in keeping the fragile fire alive and allow it to grow by feeding it correctly. These *things* cannot be separated from their context (p. 41), and they engage *all* in their contexts: both its consumers and its caretakers. It brings beings together through its comfort and redirects focus from the discomfort surrounding. Subsequently, the fire reveals possibilities: water can be boiled, dinner be cooked, and clothes can be dried.

Regardless of the romanticization and the acceptance of the paradigm of *things*, the association with the term *focal practice* has been discerned. Not the focus itself, but the perreniality of such practices decreases complexity in life, by limiting the number of practices we engage with. In contrast, a *device* is a contextless machine that does not require attention to provide commodities.

Man and Machine

At its core, being focal with technology relates to the interaction with it. Human-Robot Interaction (HRI) is the design field of interactions between us humans and robots. Turner coined the term *relational artefact* to describe a computational object (i.e. robot) that is explicitly designed to engage a user in a relationship (Turner, 2017, p. 45). It is this definition we use to describe a social robot. Interaction with robots can be split in two fields: proximate interactions, where human and robot are co-located in their environment, and remote interaction (Brooks, 2002, p. 138). Social drones classify as social robots (Baytas, Delfa, Ljungblad, & Fjeld, 2020, p. 3). Thus, these fields can be extended to social drones too. *Being social* entails that both human factors are foregrounded in the design of the drone and that the drone captures and responds to human input (p. 2). However, Walden is affected by an issue inflicted by the word "social" pointed out by Baytas, Delfa, Ljunhblad, & Fjeld, who argue that the term raises expectations of consciousness that cannot be achieved (2020, p. 2). Instead of bi-directional communication, interaction with Walden, for now, is one dimensional. Thus, the term "social" will be substituted by "interactive" in subsequent sections.

Dangers Ahead

Technology threatens focal practices. More specifically, the prototypal concept of the protective pet drone involves major concerns for individuals and society. On the short term, we are faced with a choice of acceptance or denial. A decision which is fundamentally between engagement and disengagement. Short term decisions may implicate the future in unforeseen ways, as only through acceptance of drones there can be rapid development in their autonomy, Floreano and Wood argue (2015, p. 464). One potential outcome is that the interaction between

humans and beings is substituted by human-robot interaction. Is it then still possible to have meaningful interactions with technology and each other? Can we still exercise focal concerns in this technology-oriented world? These perturbations are explicated this essay.

Grip of Technology

After the second world war, the world began to pivot. It moved from a world of poverty to a world of plenty (Scannell, 2014, p. 80).The tyranny of necessity made way for a mass society ruled by technology. Lost is the engagement with the means, and as that what was exposed to us is now concealed, practices are commoditized. Max Weber's melancholy conclusion that instrumental rationality prevails over substantive rationality in modernity is confirmed. It proves the rationality of the parts, but the irrationality of the whole (p. 83).

Moreover, we submerge ourselves in our subset of the world that is surely lead by technology. We fathom our infinitesimal piece of the world, in which we understand and engage with the source of the widespread commodities, while we disengage from the world, we subtracted *our* world from. We immerse ourselves to gain resources that numb our mind and body and enable us to repeat. This deemed laziness is backed by contemporary technology, such as voice assistants: absent is the physical context of searching in a paper book. We lost something we shall call *general focality* and are led by the promise of technology.

Availability

In the drone space specifically, there are three disruptions disclosed by Choi-Fitzpatrick, of which the first is the fundamental ground for commoditization by technology (2014, p. 20). Namely, the shift from analog to digital opened up the use of drones to the public by making devices more powerful and affordable at the same time. The other disruptions are of similarly societal concern. With the possibility to store, share and reproduce data at immense rates, a large amount of media – serving journalistic and entertainment purposes, among others – is spread at increasing speeds. Last – and most relevant in the case of interactive drones – is the blurred boundary between public and private spaces, now that cameras are not tied to a ground level anymore. The latter opens up a new array of opportunities for both good and evil. Now, it is the designer's task to lead these developments into a direction where, as Choi-Fitzpatrick states, drones are used for good.

A Primal Hunger

The contexts of focal practices are distilled to what is solely their ends: they have become a commodity (Borgmann, 1984, p. 55). Their background is concealed, and the foreground is mindlessly exploited. Meanwhile, we are blinded by a vast primal hunger for more and better engagement. This hunger is fed by advertising, that creates an illusional need for devices (p. 52). McGonigal rightfully puts it as our reality being broken (McGonigal, 2011, p. 52). The promise of technology is said to provide us with commodities, without the burdens to realize those. It is a promise of greater fulfilment. Nowadays however, we see a movement where we peek behind the scenes of fulfilment. We are redefining ourselves. Activities such as knitting, baking, and hiking are gaining traction. To know the origin of the resources – to experience the procedural

adaptation of the source – allows means and ends to meet once more. I do not implicate technology should be avoided. Instead, either technology should inherently counterweigh its commoditization, or we should counterweigh for it through meaningful interaction with the lifeworld (Borgmann, 1984, p. 248).

Decisions

Today is no first in mankind having to make a choice about technology. We have been faced with simple machines, such as a wheelwright – as explained by George Sturt – (Borgmann, 1984, p. 46), and have accepted them (blindly). Acceptance seemed harmless at the time, as manual labour remained required – and thus, technology was continuously counterweighed. Unforeseen was that acceptance of the wheelwright would lead to the development of the pick-up truck.

In recent years, society was faced with a similar choice regarding the smartphone. Park and Chen investigated the adoption of the smartphone according to the Technology Acceptance Model (TAM) (Park & Chen, 2007, p. 1352). They found that acceptance of such modern technology is a function of people's attitude towards it, perceived utility, and self-efficacy. These factors show that the acceptance of smartphones has been an implicit, behavioural choice instead of an explicit, cognitive decision.

The rise of drones confronts us with yet another. A new opportunity is provided to collectively do the right thing. As of now, the TAM is unsuitable for drones, since they are novel, and their utility has not yet been established. We are to redefine ourselves towards them, the outcome of which will appropriate the TAM and either propel or abolish them. This essay aims to cater food for thought concerning this redefinement.

Walden's Core

The object of essay is the trio of *comPANions*; prototypal interactive drones that aim to engage its users in camaraderie through their expression of emotions. Walden is one of these three drones. Walden is a proximate, relational artefact. There are two factors of upmost importance when interaction with such a robot. Gaze direction is a signal that the robot is listening (Brooks, 2002, pp. 86-87) and relevant representation of the robot enables people to naturally know how to interact with the robot (Brooks, 2002, p. 68). Walden implements both features: the former by continuously looking at its user and the latter by taking the shape of a butterfly (*Figure 1*). The following sections will elaborate on these characteristics.

Figure 1: The drone Walden is shaped like a butterfly, because users naturally know how to interact with concepts that are familiar to them.

Walden attempts to continuously fulfil its two goals. Firstly, it engages (with) its user by conveying its emotions through its behaviour. After interpreting sensory input from its vision, actuation occurs through locomotion and the sound emitted by actuators. Walden is a quadcopter at heart, which allows it to interact with humans in proximity, due to their manoeuvrability (Floreano & Wood, 2015, p. 461). Interactions with the drone are fundamentally implicit, as feedback is only given through movement. Thus, the meaning of the interactions is open to interpretation by the user. This results in distinct users having unique interactions with Walden, making for a personalized experience. Secondly, the drone protects its user by actively monitoring them and their surroundings. It inflicts a type of surveillance that refrains assailants

from engaging with the user. This trait is analogous to the behaviour of a dog protecting its owner against potential harm.

Inner Workings

At its core, Walden is a DJI Tello drone. Internally, it does not differ from any other computer; it implements the same architecture defined by John von Neumann. This architecture is elaborated upon in *Figure 2*. Actual implementation of the drone can be found in this GitHub repository. Concretely, the drone receives input from its built-in camera. Then it interprets the scene by using object detection through colour. Logic rules connect these scenes to modulated states the drone can be in, and the states are associated with certain actions the drone carries out – as described in *Table 1* –. Actions move the drone over three different axes disclosed in *Figure* 3.

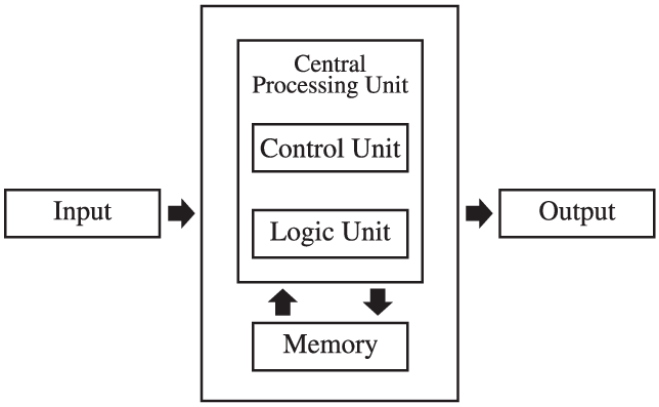

Figure 2. The Von Neumann architecture (Shankar, 2017, p. 461)

Emotions of Walden

Emotion	Initial movement	Repeated movement
Neutral	No associated movement	No associated movement
Happy	Chance of backflipping	Move quickly up and down
Sad	Chance of backflipping and failing	Move slowly side to side
Confused	No associated movement	Turn around its Y axis

Table 1: The emotions of Walden and their associated movements. The initial movement is executed once, whereas the repeated movement is continuously repeated until the mood of the drone changes. Mood changes occur through losing and finding its user.

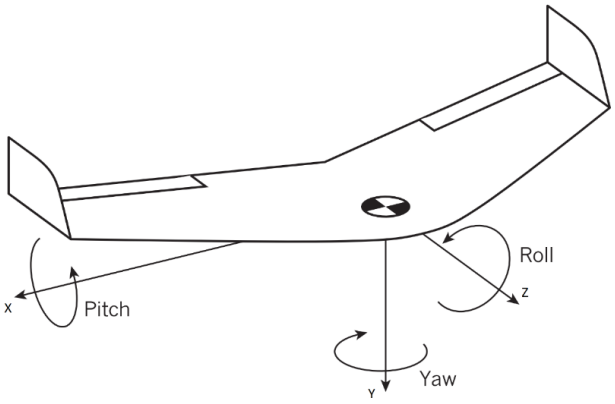

Figure 3: Coordinate system of the DJI Tello drone. The drone position is defined in the x, y and z coordinates. Orientation on these axes are respectively called "pitch", "yaw" and "roll".

The interpretation processes of the drone are running in respective threads, meaning that different parts of the brain can process information concurrently. This considerably improves the performance of scene interpretation, resulting in normal proprioception; a sense of self-movement and body position. This type of autonomy is described by Floreano and Wood as sensory-motor autonomy. Walden can also to take off and land autonomously, avoid obstacles, maintain a predefined distance from the ground and coordinate its movements with other moving objects, such as the user it is interacting with. These traits characterize reactive autonomy (Floreano & Wood, 2015, p. 462). Through its camera sensor, Walden relies on optic flow (p. 463) to navigate its surroundings.

Disabilities

Calling Walden a social robot is controversial. Margaret Boden proposes a way to express shortcomings in this field: the concept of the uncanny valley (Boden, 2018, p. 55). In the uncanny valley, the perceived autonomy has exceeded the state of being obviously artificial. Rather, it is so realistic that it cannot be distinguished from real autonomy aside from quirks that

break that immersion. *Figure 4* shows the uncanny valley. Walden currently ties with the "Humanoid Robot" in the graph, falling short of the uncanny valley. The next paragraphs will describe the deficiencies responsible for that shortcoming.

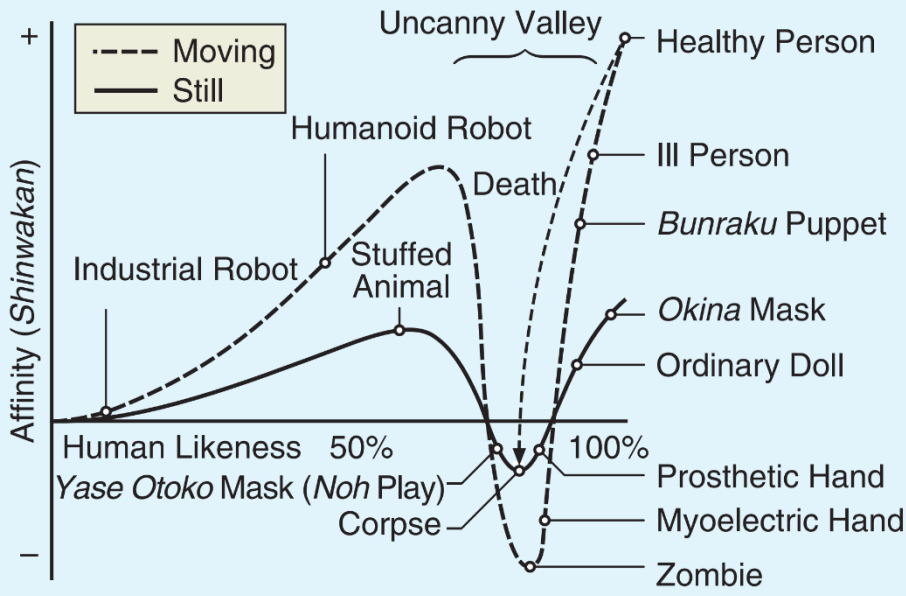

Figure 4:The uncanny valley as originally defined by (Mori, 2012, p. 99). The presence of movement steepens the slopes of the uncanny valley. Walden ties with the "Humanoid Robot", since the drone incorporates movement, but is not life-like enough to land in the valley.

Walden can have a delayed response to external input due to a combination of the duration of the processing of the camera footage and the rate at which the drone can respond to new direction commands. This delay can lead the drone into a direction where it should have propelled towards seconds ago. The drone subsequently loses the person it was tracking, breaking the experience.

In addition, since the scene recognition is dependent on solely one camera, it is prone to interpretation errors. Specifically, due to the use of a brightly coloured object as tracking object,

different lighting situations and other similarly coloured items can confuse the drone and propel the drone in a faulty direction.

Potential

The possibilities for the drone to express itself through movement are limited in our implementation. The drone currently only moves linearly along the X, Y and Z axes and rotates around the Y axis. A drone has the potential of making more advanced movements, such as arcing. By extending the implementation of Walden to allow for these movements, more advanced paths can be created, making the drone move more naturally in return.

Concerning audio feedback, the drone lacks depth. It was the intention for emotions to be conveyed using the pitch of the propellers. However, due to the lack of control over the rotor speed, this expression method is insignificant. For future implementations, an audio interface should be considered, such that the drone can amplify its movements with sound. In addition, possibilities can be explored to use the speaker for active noise cancellation to get rid of the propellor noises.

To resolve the issues with the drone's visual perception, a 360-degree camera and the use of object tracking can be adopted. Such a camera removes the limitation of only being aware of its field of view and creates a drone that is more cognizant of its context and surroundings. Combining this with an advanced object (e.g. person with bright jacket) tracking algorithm keeps processing time at its minimum while maximizing perceived autonomy, since the drone can consistently make sensible movements. Lastly, to optimize the drone's perception, technologies used in self-driving cars should be explored.

Object or being

Modernization entails the substitution of human by machine. More abstractly, it entails a shift from being (in both senses of the word) to technology. Walden is an embodiment of that statement. It walks a thin line between object and being, as it tries to be the later, but it is the former. Admittedly, external representation of technology and beings can appear identical (Brey, 2001, p. 4). That does not implicate however that internal functions can be unilaterally mapped to controls in the same way as being. The absence of clear mapping between control and function burdens its engagement process (Norman, 2002, p. 23). It is only through feedback mechanisms – where we use input and output parameters – we can expose the functionality of Walden; a concept cyberneticists describe as *a black box* (Petrick, 2019, pp. 4-5). Influenced by the drone's context, responses are inconsistent and uncertain. The drone behaves differently in different lighting, with different object, in different environments, because it is a machine that acts on the world (Wiener, 1950, p. 36). This emphasizes the importance of clear feedback the user should get from the drone, such that we can relate to the state it is in; not even for it to be a focal concern, but solely as a first step to acceptance.

Care-structures

Scannell proposes the term *care-structures* to describe interconnected technologies aimed to please, comfort and create sociability (Scannell, 2014, p. 71). Walden is considered such a structure, as anyone can interact with one as someone. There is a personal, up-close, and very direct interaction between the engager and the engage (but who is who?), which makes people feel as being addressed as one in particular.

Worryingly, products like Walden commoditize interaction, which is now only limited by progressive technological developments, such as batteries and artificial intelligence. It endangers social interaction with other beings, because as we engage with it, we disengage from each other. This leads to the rightful question whether a robot can replace interacting with an agent in real life, such as a human or dog.

Drones as Social Partners

In contrast to real beings, interactive robots are low maintenance. When we do not want to care for them, we do not, making our lives in the physical world easier (Brooks, 2002, p. 6). This is where disengagement begins. We can replace parts that are broken. When the whole system gives out, we can replace it without noticing a change in our interactive robot. Watering a plant requires knowledge, time, and patience – as there is no instant feedback – , whereas charging a drone is a dumb, wasteful activity that disregards finesses. Opposed to real beings that are brought up and nurtured in an idyllic process that takes many years, – a practice Borgmann would describe as one of great significance –, robots are mass produced by the humans who are raised. Humans are significant, and capable of significance (Borgmann, 1984, p. 162). This is the highest term for things and practices that stand out in their own right. A state that robots in themselves will never be able to earn (Brey, 2001, p. 12). Humans are born in and shaped by their indeterministic environment; all black boxes that are shaped by a single, but distinct, world. In contrast, we can view robots as an army of millions, birthed by machines and distributed throughout the world. Antithetical to us, there is nothing that makes one robot unique from another. Production is centralized, morals and ethics are unified. However, the pre-programmed morals and ethics are those of the programmers and their environment, not ones that can be

applied universally throughout our world. Scannell argues that the sameness of things (or technological devices) reflects our fundamental sameness (Scannell, 2014, p. 88), but this is an inhumane and surprisingly deterministic approach. Rather, the *human-as-black-box* paradigm – a humanistic approach – will be adopted, disclosing we cannot all be treated the same (Petrick, 2019, p. 11).

Interactive robots do allow those unable of keeping a pet due to allergies or house rules to experience a similar interaction. Currently however, this is undermined by the fact that autonomy and locomotion in robots have (not yet) reached a level of sophistication that enables them to roam fully independent. These shortcomings objectify Walden in its current implementation. In its attempt to be a being, it becomes a tool that fails at continuously engaging its users. Nonetheless, its concept shows great potential if its cognition creeps up to the uncanny valley through the attainment of cognitive autonomy (Floreano & Wood, 2015, p. 464). For now, whilst the interactive robots live in the limbo between thing and device, we have a choice of acceptance or denial.

Acceptance or Denial

The technological revolutions are disrupting focal practices in which societal content had been deeply rooted. Phil Turner phrases the obtainment of happiness as an intrinsic process. He argues that "no object, no event, no outcomes or life circumstances can deliver real happiness to us" (Turner, 2017, p. 89). Instead, Turner describes that it is our responsibility to find happiness through working hard at activities that provide a reward of their own. In modernity, there does not seem to be time for such activities. Instead, technology is pushed forward in favour of mass production. Borgmann suggests we need to redefine ourselves in the process of implementing the

values of technology (Borgmann, 1984, p. 61). Paradoxically, our continuous exposure to technology does not allow us to come to presence with it, and thus, does not facilitate the necessary redefinement (Heidegger, 1977, p. 35). We need to remember that we can reason about technology. Often, it disappears in the background and seems we cannot decide about it. We need to elevate technology to something tangible and cognitively reflect on technology itself, not only on the choices technology is the basis of (Borgmann, 1984, pp. 103-104). If we do not, a society lead by technology is inevitable. What does it require to achieve general focality in a world with interactive drones?

Running with Walden 2.0

In accordance with the opening example, a future version of Walden can be described. This shall be called Walden 2.0. Paradoxically, the next iteration of Walden can address foundational issues of technology – such as the impersonal neutrality of the drone and lack of feedback mechanisms – using artificial intelligence (AI). These features will be expanded upon in the following paragraphs.

Adaptive Knowledge

Walden 2.0 can dynamically adjust its knowledge and behaviour depending on its context. Through contextual awareness, Walden 2.0 can acquire knowledge to solve matters at hand. In context of the trail running, the drone can download a map of the area, a model to interpret this specific landscape and stories about similar endeavours. Subsequently, the user can ask the drone to find river crossings, perfect locations in the area for a break, a tent, or a photograph, and engage in a conversation with it.

New Interactions with the lifeworld

The addition new sensors extend Walden 2.0's capabilities further. A Global Positioning System (GPS) enables coordinate obtainment and matching. In return, the drone can guide the user in hard-to-navigate terrain, such as snow-covered trails. In case of emergency, the drone can call for help. It can send the GPS coordinates of the user over a cellular connection to rescue services. If the user is not in cellular range, the drone can fly towards one and continue its call for help. Through other sensors, such as a barometer, Walden 2.0 can predict the weather on a micro level, warn the user for potential changes and make suggestions for alternative routes or hide-outs.

When the feedback mechanism of the original prototype is extended with the aforementioned voice interface, the drone's context-based knowledge bases can be used to converse with the user about relevant topics. Similarly, the drone can motivate or comfort us depending on our situation.

Where the original prototype of Walden solely looked at its user, advanced motion algorithms enable Walden 2.0 to move autonomously through space, allowing the drone to solve problems independently. In addition, through this advanced locomotion, Walden 2.0 can guide its user instead of being guided by them. For the trail running example, that could mean pacing the user to reach a certain location in time, or actively report the speed of the user.

The Way to Focality

In conclusion, I want to compare Walden 2.0 with the smartphone. Where a smartphone requires active mediation of the user to find information, the autonomy of Walden 2.0 can replace the action of the user and provide the required information independently. This

eliminates the context switch to the digital world the user ordinarily would have to make, opening up opportunities to be less distracted and more focal.

Drones, Decisions and General Focality

Embracing Walden

Technology is inherently neutral and soulless (Borgmann, 1984, p. 35). Without a context, a drone is a mere flying machine that does not provide (e.g. heat, water). What Walden 2.0 can do is solely provide information about those commodities. Therefore, the drone has great potential of helping us attain focality. When this blank canvas is filled, context for the Technological Acceptance Model is created, and acceptance becomes a relevant decision. Thus, the designer becomes the gatekeeper to a focal world containing drones. Regardless of the mass production of drones such as Walden 2.0, it can be a drone that fits a lot of people, due to the artificial intelligence that provides contextual knowledge.

Like other technologies, acceptance of drones can result in unforeseen situations. Owning a drone like Walden 2.0 can become as common as owning a dog. Attachment to a drone is different because attachment mostly comes from the fear of losing something. Granted that a domesticated drone is not as fragile as a regular pet, it still allows those who cannot keep or care for a real pet with the opportunity of a comrade. We need not fear for Walden 2.0 to interfere with our social contacts. Instead, the drone can be a motivation for an individual or group to experience the world. Walden 2.0 can be your tour guide through a city or your trip leader in the mountains. By means of the examples provided, it becomes evident that acceptance of technologies such as Walden 2.0 is not an individual choice. In fact, acceptance is a collective choice that is explicitly made on a micro level, but implicitly made on a macro level. Denial of

the inevitable rise of the drone on an individual level is a foolish endeavour. It is as with coffee: finding a balance is better than going “cold turkey”.

Relation to the World

Don Ihde distinguishes different relations one can have with technology and the world. What is striking about Ihde’s paradigm is that all his relations substantiate the mediation of technology, as all interactions with the world are directly mediated by it (I – technology – world). The real danger lies with what Ihde describes as hermeneutic relations (I – (technology – world)) (Ihde, 1990, p. 81). In those, technology is representationally transparent, referencing the world beyond itself while the real world remains hidden. A potential discrepancy distracts us and creates a world we are unable to focally process. Our relation with the world however should not end at technology. Borgmann tells us that simple things from yesterday can attain new splendour in today’s technological context if we allow technology to amplify those (Borgmann, 1984, p. 200). Walden is unable to focalize non-focal activities, but it can amplify focal activities by forecasting rewards as ends of endeavours. If the initiative is ours – and engaging with the technology remains a deliberate choice –, we can attain focality. The sole requirement is that we are continuously willing to submit ourselves to focal practices in a world where commodities are widely available to us.

Returning to the core then, I wonder how Walden 2.0 differs from a map. Expertise with a map, gained from past experiences – not from warehousing facts and rules – (Brey, 2001, p. 56) provides similar knowledge as Walden 2.0. The drone however eliminates the need for expertise to experience, and thus makes experience more accessible. In addition, Ihde would describe the relation with the world through a map as a hermeneutical one. This type of relation

requires a context switch from the real world to the world represented by the map. On the other hand, Walden 2.0 creates a special alterity relation that I shall describe as *I – drone (– WORLD).* Where a regular alterity relation replaces the context of the lifeworld with an alternate one, Walden 2.0 does not create its own context. Instead, it enhances the context of the world. It is this relation that allows the drone to increase focus on the real world surrounding us and ultimately enhance focality.

General Focality

Borgmann expresses his deep-seated suspicion that a life of consumption is not an end worthy of human beings (Borgmann, 1984, p. 62). I urge you to proceed with caution. Technology demands counterweighing the non-focal with the meaningful. Enduring non-focal activities is now a necessity, but do not make it a virtue. We ought to make the deliberate choice to engage in practices focal to us. This willingness facilitates focality. There are however spatial, temporal, and personal constraints bound to focality. Dependent on time and space, divergent practices are focal. Keep to yourself in your search for focality and be guided by your individual context.

Our surroundings are cluttered, and our attention is scattered by technology (p. 208). Exposure to technology is imminent, and the struggles of life are amplified by the sheer profusion of items (Norman, 2002, p. 12). Therefore, it is the responsibility of the designer to manage the complexity of everyday things. Heidegger's *zuhanden* (Scannell, 2014, p. 61) paradigm enunciates a use without theorizing, a familiar interaction in the context of the world. It is such an interaction that designers should develop to retain focality with any technology.

When referring to general focality in the context of drones, surveillance is the major pitfall. Walden 2.0 disembarrasses itself of surveillance paradigms by focusing on different applications of drones. Nonetheless, such ubiquitous camera's ought to be deployed in constraining governments. Thus, albeit no aspect I focus on, considerations should be made by the user.

Governmental restrictions offer opportunities, too. Strict legislation can contribute to the counterweighing of non-focal practices. For drones specifically, regulations for public places (e.g. parks) can ensure the safety of a passers-by. Proximate drones will become as allowed as leashless dogs. Then, dedicated places emerge where our drones can roam freely and interact with each other. There, drone owners meet and mingle, resulting in an enhanced social life.

Conclusion

Walden provides opportunities for social interaction, but it is not its main purpose. Instead, Walden is a tool that assists users on their focal endeavours. We need not fear it replacing social interactions from yesterday. In fact, the drone shows great potential of amplifying focality in a social setting too.

In a society where technologies like Walden becomes ubiquitous, focal practices can still thrive. I urge you personally to continue to counterweigh non-focal activities with focal practices. In addition, I call out all designers to design with inclusivity and focality in mind. Then, if we remain open to focal activities in a world where commodities are freely available, we can lead meaningful lives alongside technology.

We shall inevitable indulge ourselves in technology, as denial of it is neither feasible nor sustainable. In acceptance of it, we ought to find a balance between utilizing it and reasoning about it. Only then we can continue to redefine ourselves at the rapid pace at which technology is developing.

"[…] I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived." (Thoreau, 1854, p. 69)

References

Baytas, M. A., Delfa, J. L., Ljungblad, S., & Fjeld, M. (2020). Agent Archetypes for Human-Drone Interaction: Social Robots or Objects with Intent? *Interdisciplinary Workshop on Human-Drone Interaction (iHDI 2020)CHI '20 Extended Abstracts, 26 April 2020*.

Boden, M. A. (2018). *Artificial Intelligence: A Very Short Introduction.* Oxford: Oxford University Press.

Borgmann, A. (1984). *Technology and the character of contemporary life: A philosophical inquiry.* Chicago: University of Chicago Press.

Brey, P. A. (2001). *Hubert Dreyfus - Human versus Machine.* Bloomington, Indiana: Indiana University Press.

Brooks, R. A. (2002). *Flesh and Machines: How Robots Will Change Us.* New York: Vintage Books.

Choi-Fitzpatrick, A. (2014). Drones for Good: Technological Innovations, Social Movements, and the State. *Journal of International Affairs*(Vol. 68, No. 1), 19-36. Retrieved from http://www.jstor.com/stable/24461704

Floreano, D., & Wood, R. J. (2015). Science, technology and the future of small autonomous drones. *Nature*(Vol. 521), 460-466. doi:10.1038/nature14542

Furtak, R. A. (2017, March 3). *Stanford Encyclopedia of Philosophy*. Retrieved November 23, 2020, from Stanford Encyclopedia of Philosophy (Fall 2019 Edition): https://plato.stanford.edu/entries/thoreau/

Heidegger, M. (1977). *The question concerning technology, and other essays.*

Ihde, D. (1990). *Technology and the Lifeworld: From Garden to Earth.* Bloomington, Indiana: Indiana University Press.

McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world.* London: Penguin Press.

Mori, M. (2012, June). The Uncanny Valley. *IEEE Robotics & Automation Magazine*, pp. 98-100.

Norman, D. A. (2002). *The Design of Everyday Things.* New York: Basic Books.

Park, Y., & Chen, J. V. (2007). Acceptance and adoption of the innovative use of smartphone. *Industrial Management & Data*(Vol. 107. Iss 9), 1349-1365. doi:10.1108/02635570710834009

Petrick, E. R. (2019). Building the Black Box: Cyberneticians and Complex Systems. *Science, Technology, & Human Values*, 1-21. doi:10.1177/0162243919881212

Scannell, P. (2014). *Television and the meaning of live: an enquiry into the human situation.* Great Britain: Polity Press.

Shankar, S. (2017). The Von Neumann Architecture. *Looking into the Black Box: Holding Intelligent Agents Accountable [NUJS Law Review].* Opgeroepen op October 26, 2020, van https://www.researchgate.net/figure/The-von-Neumann-Architecture_fig1_329842259

Thoreau, H. D. (1854). *Walden*. Retrieved November 21, 2020, from The Literature Page: http://www.literaturepage.com/read/walden.html

Turner, P. (2017). *A Psychology of User Experience.* Cham, Switzerland: Springer. doi:10.1007/978-3-319-70653-5

Wiener, N. (1950). *The Human Use of Human Beings.* New York: Houghton Mifflin.