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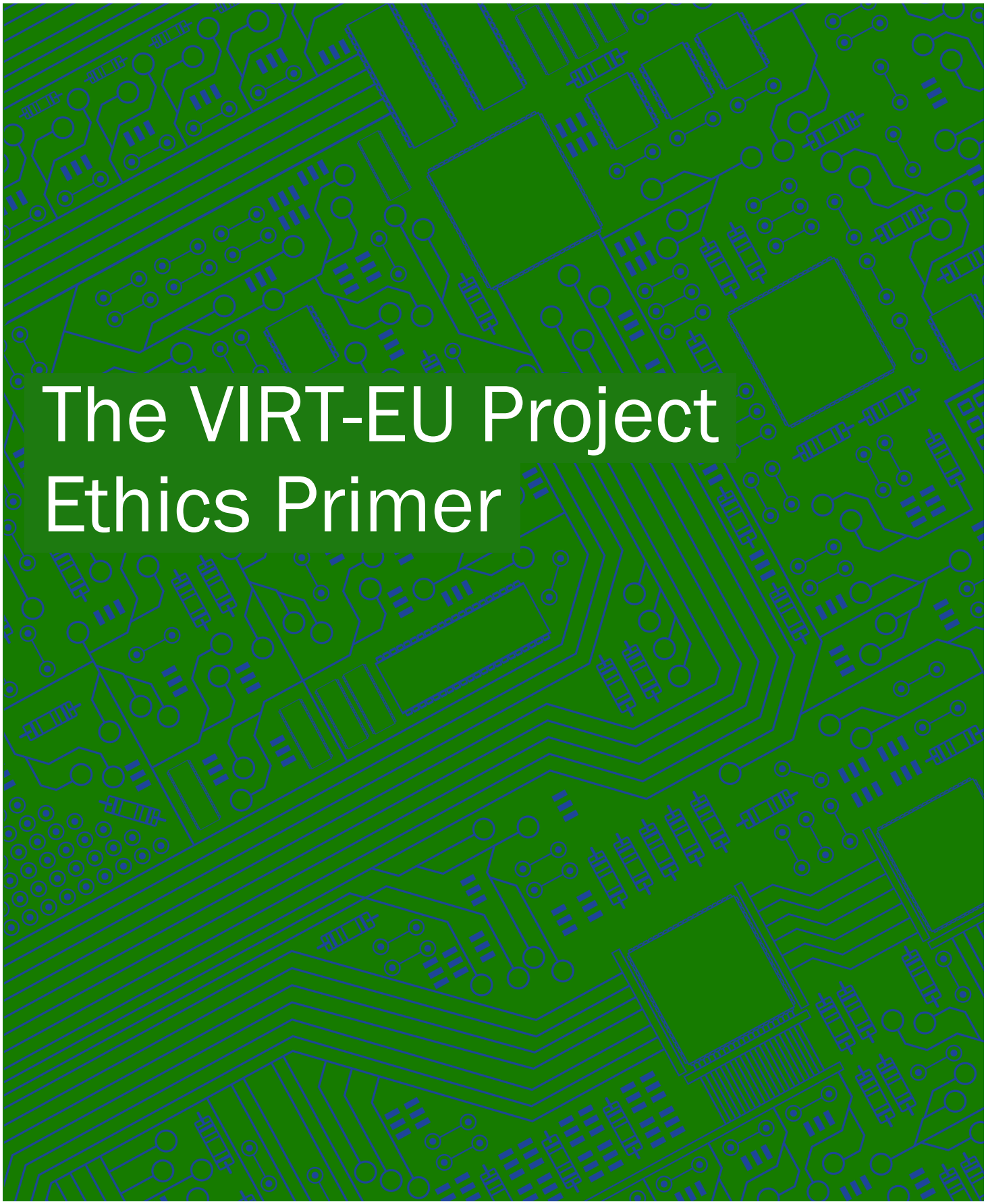

The VIRT-EU Project Ethics Primer

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Ethics is the word of the day in IoT and rightly so.
But what do people really mean when they use terms like *ethical* or *responsible* technology?

The VIRT-EU project created this primer to help IoT innovators navigate the ethical landscape of designing and building IoT products and services.

We discuss what the term ethics can mean and then explain the basics of five major ethical frameworks. What you will see is that not all ethical questions and their underlying ideas are compatible with each other. We show how to negotiate and apply these different ethical frameworks in practice by asking different questions in the example case. You can find some pointers to additional resources at the end or visit virteuproject.eu for practical tools, resources and information.

This primer was created as part of the VIRT-EU project by Irina Shklovski from IT University of Copenhagen and Funda Ustek-Spilda, Alison Powell, and Sebastián Lehuedé from London School of Economics. The primer is part of the VIRT-EU toolkit available at virteuproject.eu.

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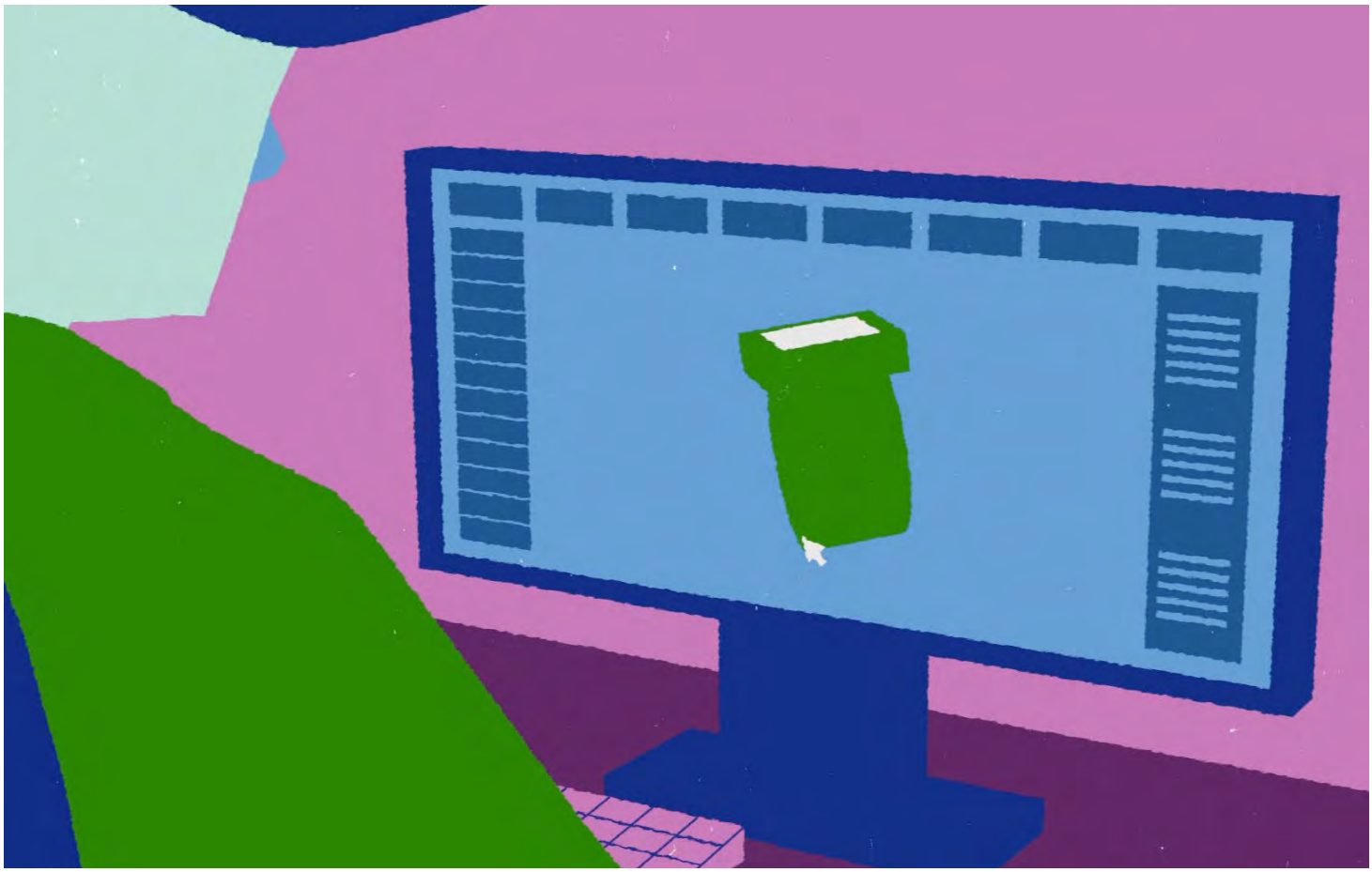
What does it mean to make ethical decisions in IoT?

Ethics is not a checklist or an impact assessment, but a discussion we have to engage in whenever we make decisions. It is about thinking about the bigger picture whenever trade-offs need to be considered.

For example, building devices that store data only locally is a laudable goal but this puts limits on the value and services you can provide to users or the ways in which you can improve your product offerings. Similarly, the decision to design the device interface requiring all data to be routed via the cloud may be less technically complex, but what does it mean for user privacy? Sure, working with cheaper hardware might help your bottom line, but is it also a security trade-off?

At VIRT-EU, **we think of ethics as values in action**. This means that there is no particular point where we should start or stop thinking about ethics, because ethics is embedded in most of the decisions we take. Whether or not our decisions end up being ethical or not is a separate question. In general terms, **ethics provide a set of principles** that help us to think clearly about rights, obligations and responsibilities. This cannot just be bolted on to the end of a design process, nor only used as a set of outcomes against which our actions are measured. **Ethical frameworks are ways of structuring decisions** in the process of design and development of technology. They are the very principles that we use to find answers to difficult questions, often without even recognising it.

Below we discuss some common approaches to ethics. In the 1940s Kurt Lewin said, *"there is nothing so practical as a good theory."* There are many theories and ethical frameworks out there. What you might notice is that each of the frameworks we present below answers certain questions, but will leave others unanswered. This is because each ethical lens privileges some values over others and shapes what we believe as constituting goodness, justice and respect for others. At times, whichever framework a designer might use, they might arrive at exactly the same decisions, but we think, the journey matters as much as the outcome.



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Ethics as compliance with requirements and regulations and impact assessment

Ethical reasoning requires reflection, discussion, deliberation – it might slow the process down, but perhaps that is exactly what we need – to slow down the rush to move fast and break things. When we worry about ensuring compliance or consider potential impacts of the technologies we create, we engage in ethical thinking. Modern writing on ethical concerns about technology mentions a great many ethical approaches. The most common and well-known of these approaches are deontological (duty) or consequentialist (utilitarian) ethics. We will start our review with these two and then introduce alternative frameworks that we think are a better fit for technology development processes.

Duty ethics

Perhaps the most familiar ethical approach is that of duty ethics – the idea that laws, regulations and rules are the ethical guidelines that must be followed. Duty ethics is centred around the notion of universal good. As an example, the Universal Declaration of Human Rights is one attempt at articulating a universal conception of ethical conduct. Given the idea of universal good, duty ethicists ask – what would happen if everyone behaved similarly? From this point of view, it is our duty to adhere to ethical rules to the best of our ability at all times. The legal and regulatory context of technology development is a manifestation of this school of thought, which is often referred to as deontological ethics. Once a particular principle, rule, standard or legal requirement has been articulated as 'right', it becomes our moral duty to follow it.

While this is an important way of looking at any issue, it has its own drawbacks. After all, what do we mean by "everyone" and "at all times"? There are many instances where something may be legal but perhaps its ethical nature is questionable. Moreover, laws and regulations often lag behind changes in our notions of right and wrong. One can think of many examples of things that were once considered right and/or legal and are no longer considered as such; and vice versa. More importantly, societal response to technological developments may not move as fast as the technologies themselves. As a result, we find ourselves in many situations where there are too many grey areas and unanswered questions; and no regulation to turn to for an answer.

Consequentialist ethics

In contrast to duty ethics, consequentialist ethics generally focuses on the potential consequences of actions. While there are differences within consequentialist ethics, ranging from the "greatest good for the greatest number" [utilitarian ethics] to evaluating the range of options for everyone except one's own self [ethical altruism], the general focus in this school of thought is on the consequences of an action and its presumed impact. Needless to say, this kind of thinking is evident in conversations about emerging technologies, with stress placed upon efficiency, optimisation, and cost-benefit analysis. For example, discussions of self-driving cars often focus on utilitarian concerns of minimising harm and maximising benefits for all those affected. But how should we define harm or benefit or even, who should we include and exclude from such a calculus?

Consider the trolley problem often discussed in the media as an important ethical test with respect to autonomous technologies (e.g. MIT Moral Machine experiment). Here, a trolley is going down the tracks and you can pull a switch, deciding the fate of whoever is on one of the two tracks that are your options. Would you save a child and kill and old person? What about an elderly couple or a puppy? The ultimate question is simplified into an either/or and where at least one person/entity definitely gets killed as a consequence. Programming a trolley, which will *inevitably* kill someone instead of somebody else, is a hugely complex task. In order to make this hypothetical decision at all possible, however, the trolley problem reduces the issues that need to be considered down to just a few supposedly important variables such as age, gender, weight, reproductive ability or numbers of humans and animals involved.

Such reductionism begs the question: What are the benefits of getting it "right" and how do we even get it 'right' (because we can never save everybody from the speeding trolley)? A common criticism of this approach asks how we got into a situation where killing is the only option in the first place. Perhaps we ought to reconsider the routes that result in such a dilemma instead of interpreting the proposed solution as a test of human morality.

The problem with utilitarian/consequentialist frameworks is the conviction that it is possible to reduce the risks represented by innovation. If only we can identify and mitigate enough possible consequences, everything should be okay and fine. Unfortunately, predicting the future is easier said than done, and even with enormous amounts of data, such predictions are tricky. The problem is that creating new technologies is necessarily a future-oriented exercise. The goal is, very literally, to change the future. This means that the past is unlikely to repeat itself precisely because the very things we design are likely to bring about changes that make potential consequences less predictable. So, what should we do instead?

The VIRT-EU approach to ethics

In the VIRT-EU project, we use alternative ethical approaches that we believe fit better with the problems at hand. These include VIRTUE ETHICS which tend to focus on an individual's process of attempting to live a good life, CAPABILITIES APPROACH that examines the ability to act, including to choose an alternative, given the existing structural constraints and opportunities, and CARE ETHICS which take into account the shifting obligations and responsibilities of individuals as they are positioned in a web of relations. By bringing these three approaches together into a coherent framework we are able to acknowledge that ethics as a process is not exclusively dependent on the principles and actions of the individuals or the outcomes of their actions. Instead, ethics works through the inherent dialectic of life where conflicting demands, obligations and structural conditions can limit and reshape even the best intentions. Let's take a brief look at these schools of thought and how they apply to decision making in the context of technology development.

Virtue ethics

Virtue ethics focuses on the overall moral character of the individual. To live well, we must develop our moral character and demonstrate virtues in our decision-making and behaviour. Essentially, virtue ethics is concerned with questions such as "What is a good life?" or, "What does it mean to be a good person?" The familiar demands of "technologies for good" or "don't be evil" speak to the idea that the virtuous moral choices of technology developers and designers can bring about a better life for all. From a virtue ethics point of view, this is made possible through the efforts of individuals to cultivate and act upon their own virtues when they are making decisions. This boils down to developing a kind of practical wisdom that allows people to continuously determine the morality of their choices. As such, a virtuous agent is expected to know the correct way to act in various contexts while also desiring to act in this way. As such, virtue ethics determines your principles and ideals.

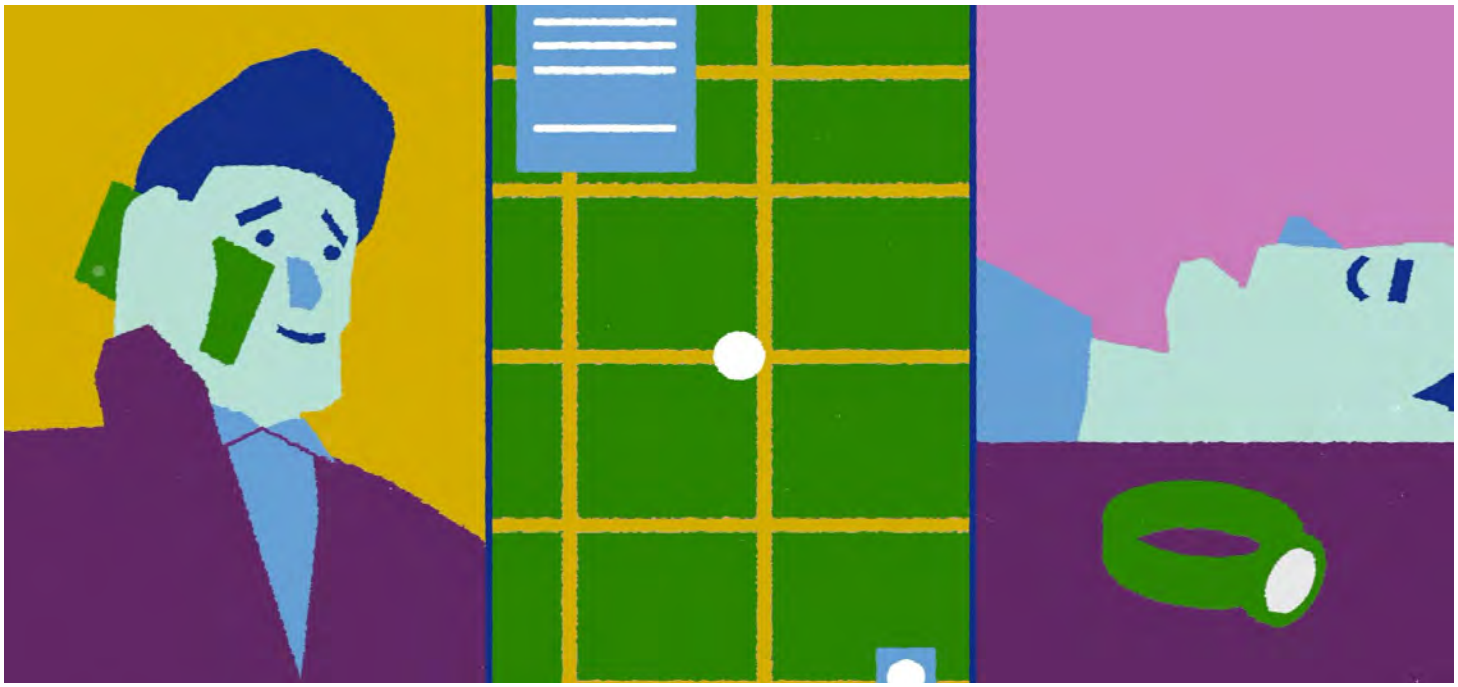
While virtue ethics highlights the importance of the desire and intention of individuals to act according to the principles they uphold, it ignores the social, cultural, economic and political structures in which all of us are embedded. In stating that decisions are made by individuals virtue ethics stipulate that individuals must take the full responsibility and be held accountable. In positioning developers as virtuous actors who must know at all times the correct ways to act, virtue ethics also positions the failure to act correctly as a personal failure. This assumes, however, that moral virtues map out a clear path that ought to be followed. The problem is that, even if we might have moral character, our own values and virtues might come into conflict in a decision-making process. This is because people are always entangled in a diversity of relations that hold contradictory values and we may be constrained by the social, economic, cultural and other structures and relations we are embedded in. As such, it is fair to say that all of us must at times respond to conflicting demands and our decisions are never taken entirely alone. Consequently, this approach does not offer satisfactory answers to questions such as: *What sort of practical reasoning or wisdom is necessary for developers to navigate the pressures and constraints of the broader contexts of life?* This includes the economic, political and social contexts that shape how people react and think about ethics. Often principles come into conflict, have to be negotiated and at times compromised because things change and well, "that's just life." What might shape or constrain the choice of action?

Capabilities approach

The moral virtues of a developer may not be sufficient to lead to good design because of structural pressures and constraints, such as the demands of investors or the costs and/or availability of particular technical components. The capabilities approach recognises that personal principles may be compromised in order to cope with structural constraints. As such, it promotes the idea that *ethical thinking is also a capability in itself and not a given for individuals* – or intrinsic to some. Instead, it can be trained as a capability [skill], but it can also be constrained. The capabilities approach recognises that individuals are not equal in their power to make ethically consequential decisions or voice their concerns in the process.

Technology developers are in a curious (and complicated) position of having to make decisions within the constraints of their contexts and having to acknowledge that the design decisions they make might end up producing other or similar constraints for their users. Thus, for developers to "do good", it is vital to not only evaluate how existing constraints (funding, supplier availability, etc.) affect design, but also consider how these constraints are translated into their design and how, if possible, they might be mitigated.

The capabilities approach acknowledges that our capabilities are shaped by both our individual circumstances, but also by the societies/groups we belong to. Although it helps us understand and reflect on the limitations we face, it does not address how we come to choose to act in the way we do, given those limitations. Put simply, capabilities approach does not explain how we come to negotiate different action positions, given the limitations we have. Here, we think it is important to look at how developers and entrepreneurs prioritise certain values, design and technology decisions [as well as investment decisions], based on issues they care about and concerns they have regarding their products, but also the societies they are part of in general.



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Care ethics

Hence the need for our third approach – care ethics. This school of thought pays attention to the value conflicts and contradictions, offering a way to deal with failures that does not entail merely accepting vast amounts of personal guilt. Care ethics recognises that relationships are central to being human because they enable individuals to face uncertainties of the future. In this way, care ethics focuses on our responsibilities and obligations to others. One of the main tenets of this approach is that it places the emphasis on an engaged, active agent who acknowledges that she is entangled in a broad web of relationships and is aware that she must constantly negotiate disparate and often conflicting demands and obligations. Consequently, some ethical values get challenged whilst others get negotiated. Instead of thinking of actors as separate individuals that happen to form communities or other social arrangements, the logic of care acknowledges that we are never separate individuals, but are composed of our many memberships, relations and social commitments that span our lives.

Care relationships are inherently asymmetric – who gives care and who receives it are never one and the same. Thus, it is important to ask "what are the conditions and possibilities of care?" "What should we care about?" and "How do we [even] begin to care?" Since it is impossible to care about everything, care is necessarily a selective model of attention and the choice of what or whom to care about is a kind of expression of power. The asymmetric expressions of power, however, are balanced by the fact that caring for someone or something can make us vulnerable. This vulnerability is a necessary component of a relation of care – by caring we expose ourselves to the demands of those we care for. Caring for the users of your product, for example, means listening to their experiences and needs and responding.

Thus, care-full decision-making requires reflection, negotiation and openness to discussion. There must be a collective process of deliberation, because if we are going to face uncertainties of the futures we are creating through innovation, these futures are best faced together, rather than alone. Care ethics offers a model of collective decision-making and distributes both the responsibility and accountability. In such a context, failure becomes a form knowledge that, if carefully considered, will help us try again and do it better next time.

What questions to ask about ethics of IoT?

In this section we demonstrate what questions you might ask that correspond to the above ethical considerations. Different groups of questions correspond to different types of ethical thought, and understanding how these might get deployed will prevent you from getting lost when the debate get hotter. Ethics happen in action, so here is a business case.

Start-up Company X develops wearable devices that can be used to monitor physical and mental well-being. These are **wristwatches** that can gather information about the individuals using them. The devices monitor steps and heart rate but can also track geo-location through GPS and monitor stress through galvanic skin response sensors (GSR). The company offers a data analytics dashboard for end-users, as well as suggestions for workout routines, management of rest and sleep and meditation techniques. The collected data can be shared with third parties, including advertisers, employers, private insurance companies, credit companies and employment agencies.

Negotiations with investors and customers have pushed Company X to make difficult choices. The founders of the company vowed to collect as little data as possible, but a health insurance company promised an investment if the company started collecting more data. Collecting these data would help the health insurance company to target, plan and adjust their insurance policies according to user behaviour. On the other hand, user-feedback indicates that customers associate the product with clarity, safety and freedom, which could be jeopardized if a single partner is given special access to user data. Software engineers have suggested that a toggle could be added to opt in or out the service. However, this would require major changes to how the technical environment is designed and could be difficult to communicate to users.

What to do? Below you find some questions that could be weighed. We have grouped them based on their type to help you think about what they are about.

[Duty ethics] Questions about what is required and expected from the company: Do the proposed designs break any of the data-management laws in the area the company is incorporated? Could sharing the data infringe human rights or create discrimination against particular groups of users? Is the data processing architecture legally compliant?

[Consequentialism/Utilitarianism] Questions about what is the impact of the design choices: Will some users be disadvantaged relative to others within each design proposal? Does one design generate a greater benefit for a larger number of users?

[Virtue ethics] Questions about what the company stands for: What kind of company should company X strive to be? What are the reputation concerns in the decisions they are making?

[Capabilities approach] Questions about what our product helps to do: What user capabilities for well-being will be supported, enabled or curtailed by the decisions? What are the structural barriers that the company is facing and how might these barriers be felt by the users?

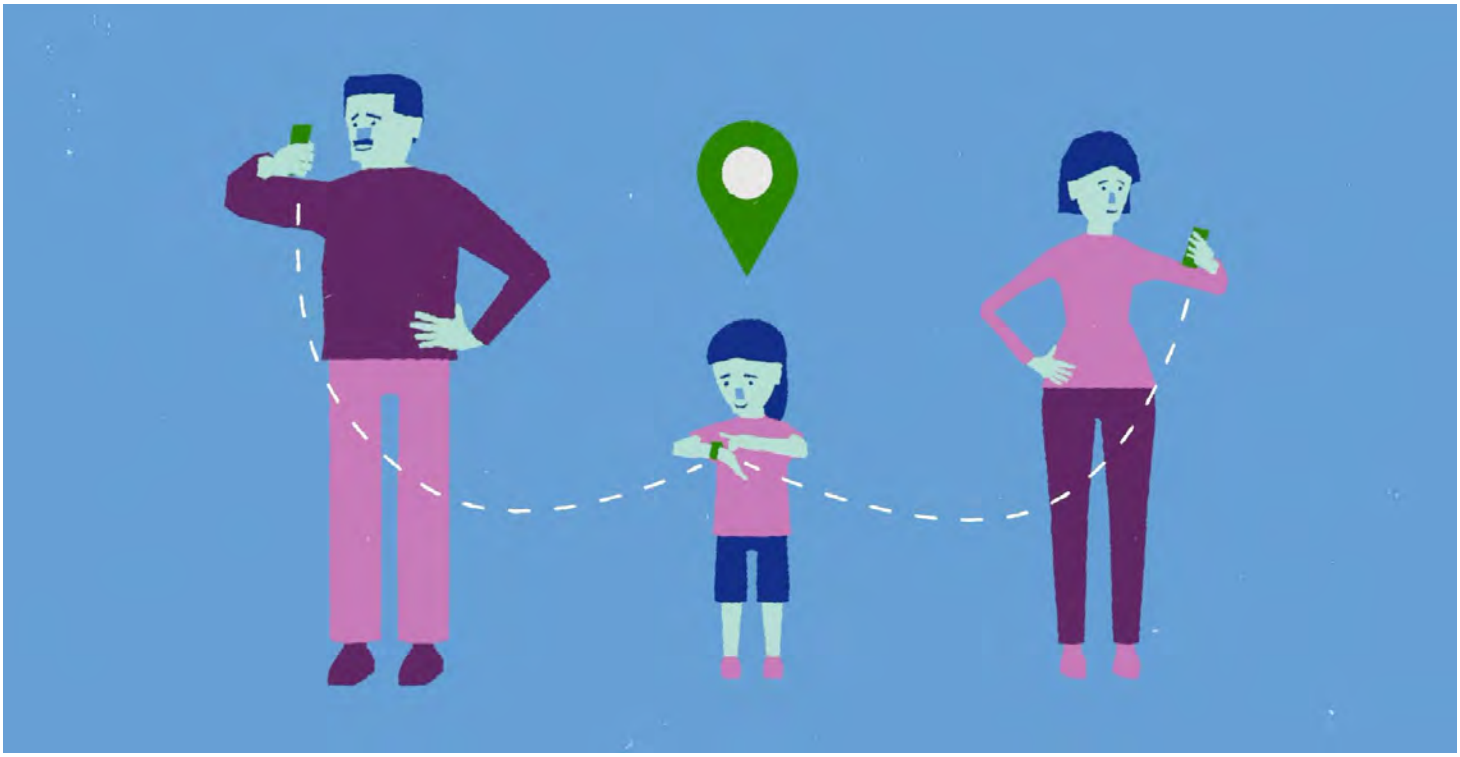
[Care ethics] Questions about what relationships the product establishes, affects and changes: How does the decision affect those that are not using the product? How might the use of the device change the relationships that people already have with their health insurers or other entities that may be using the data or the technology? Who is responsible for maintaining the device? Are there new responsibilities created by the device for users and other stakeholders and are these fair?

[VIRT-EU framework] Questions about how values of a company can be represented in the final product, given what its developers care for, but also taking into consideration their limitations: Which values of the company can be represented in the product? What are the major limitations to integrating these values to the product? Which care concerns the developers of the product can realistically integrate to the product? What kind of negotiations do they have to engage in with funders, users and other stakeholders for their design decisions?

These are all legitimate questions but correspond to different ideas about ethics. In the VIRT-EU project we found that regulations and narrowly defined consequences of an IoT product or service are often at the forefront of ethical discussion, whereas the latter groups of question are often overlooked. This is especially true with the questions about how products help customers and what kind of relationships they build, because these are not necessarily always thought of as ethical questions. In the VIRT-EU project our approach was to think how these ideas could be brought closer to the practice of ethical decision-making in IoT.

Conclusions

Ethical decision-making is complex, and answers to ethical questions are not always straightforward. This is because different ethical traditions take different positions. Pursuing ethics from these different perspectives is valuable because it allows people and organizations to think through different features of their products and decisions. Learning about different ethical traditions is a way to expand the ways we reflect and decide, what might be the benefit for ourselves, our clients and our world.



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Resources

Below we offer some suggestions for further reading. These are by no means exhaustive and presence or absence of any resource on this list is not a judgment. We selected these works as pretty good introductions to the different ideas we discuss in this document. These will offer other links to follow should you choose. The virteuproject.eu also offers a large number of resources to further explore these issues:

For a discussion of values in design, the **Value Sensitive Design** approach is a good place to start https://vsdesign.org/

As Value Sensitive Design has been developed over two decades ago, here is **a handy overview of thought on the topic:** Winkler, T., & Spiekermann, S. (2018). Twenty years of value sensitive design: a review of methodological practices in VSD projects. *Ethics and Information Technology*, 1-5. https://doi.org/10.1007/s10676-018-9476-2

A more academic but extensive **review of ethics relevant for technology development and design**: Shilton, K. (2018). Values and ethics in human-computer interaction. *Foundations and Trends® Human–Computer Interaction*, 12(2), 107-171. https://www.nowpublishers.com/article/Details/HCI-073

In general we are big fans of the **Stanford Encyclopedia of Philosophy**, which offers myriad resources on these topics: https://plato.stanford.edu/

Duty, Consequentialism, Virtue Ethics

A book oriented towards designers that provides **an overview of the three traditional ethical theories** of duty, consequentialism and virtue ethics: Bowles, C. (2018). *Future Ethics*. NowNext Press

A resource for **grappling with duty, consequentialism and virtue ethics** can be found in the Introduction to Software Engineering Ethics teaching module developed by the ethicist Shannon Vallor and computer scientist Arvind Narayanan: https://www.scu.edu/ethics/focus-areas/more/engineering-ethics/an-introduction-to-software-engineering-ethics/

For a **philosophical investigation of virtue ethics** we recommend: Vallor, S. (2016). T*echnology and the virtues: A philosophical guide to a future worth wanting.* Oxford University Press.

Capabilities approach

Martha Nussbaum builds a foundation for thinking about capabilities in her book: Nussbaum, M. C. (2011). *Creating capabilities*. Harvard University Press.

Sabina Alkire offers a basic introduction to the notion of **capabilities as a combination of opportunity and ability to act.** Alkire S (2011) The capability approach and human development. University of Oxford. Available at: http://www.ophi.org.uk/wp-content/uploads/OPHI-HDCA-SS11-Intro-to-the-Capability-Approach-SA.pdf

Care ethics

For a deep discussion of **ethics of care**, Virginia Held's book is a good place to start: Held, V. (2006). The ethics of care: Personal, political, and global. Oxford University Press on Demand.

For a more **example-focused discussion of care ethics** consider the work of Annemarie Mol: Mol, A. (2008). *The logic of care: Health and the problem of patient choice.* Routledge.

For an example of how **care ethics can be applied to think about technology** consider the following study: Ruckenstein, M., & Turunen, L. L. M. (2019). Re-humanizing the platform: Content moderators and the logic of care. *New Media & Society,* 1461444819875990.

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