

How AI is shaping society and why we must keep it at bay!

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Abstract. This paper offers a deliberately opinionated and provocative perspective on the often-overlooked side effects of the AI revolution. It challenges dominant narratives, raises critical ethical and environmental concerns, and invites to reflect on the prevalence of AI. Surveying current trends, and putting the finger on the sore spot, the paper offers a comprehensive and of course biased insight into various topics, which may or may not reflect the authors' personal views.

Keywords: Artificial Intelligence · Ethics · Data Sovereignty · Environmental Impact · Edge AI · Human Agency · Automation Bias · Generative Models · Military Robotics · AI Regulation · Cognitive Offloading.

1 Introduction

It has now arrived: the age of artificial intelligence (AI). What was unimaginable merely a few years ago is now reality. Books, music, images, and films are generated by AI – so realistically that they are difficult, if not impossible, to identify as "fake." AI opens up countless and diverse possibilities that exceed the imagination of many. A prominent example includes using "deep fake" to artificially alter movies by exchanging actors, resulting in a version that may be indistinguishable from the original (*see Figure 1*).



Fig. 1. Face replacing in video mainly relies on GANs and autoencoder-based neural networks, such as putting Nicolas Cage into various of films [54, 68].

In this paper, we want to raise awareness about side effects of the bitter-sweet pill that the AI revolution brings with it. Following Wobbrock & Kientz [71], this paper provides, unlike the majority of researches, a one-of-a-kind opinion contribution, aiming to inform and to spark second thoughts on the AI revolution. Though, the work may be written in a sensationalized manner, it is intended to be meant seriously and is based on a variety of sources.

2 The race for artificial intelligence and how Germany is falling behind

2.1 A story that raises questions...

In 2023, I (D.J.C. Matthies) was on a business trip to Shanghai, China. There, I met a colleague who picked me up in his XPENG sports electric car. His sports car drove us autonomously to a shopping mall and parked itself in the nearest parking space. When we later wanted to find our way back to the car from the huge mall, we used public displays that guided us back to the car via a 3D model, as the license plate number didn't escape Big Brother's eye. The route planning was then quickly transferred to our smartphones. Even queuing at the parking meter is now unheard of. All we had to do was leave the parking garage, and the purchase process took place in the background via WeChat Pay, completely without our intervention.

That's highly questionable from a data protection perspective?! Did you think so, too? Typically German, and one reason why the Chinese are outpacing us. In Germany, it's not permitted to use personal data for training Large Language Models (LLMs), as known from ChatGPT, without the express consent of the data subjects. And on which server farms are LLMs or the millions of images from surveillance cameras supposed to be calculated in real time? In Germany, we not only lack capacity in hardware, but also the energy - preferably German green energy.

2.2 AI, the wasteful dirty child!

Last year, approximately 20 terawatt hours of electricity were used in data centers in Germany [17]. Ten times as much power is needed to operate data centers in the US, and fifteen times as much in China. Computing power and cooling require enormous energy. To put this into perspective: Instead of operating German data centers, one could (in Germany) charge all electric cars, operate all heat pumps, and simultaneously illuminate 22 million Eiffel Towers every year for an entire year.

In addition to electricity, the large data centers that run AI calculations also consume many megatons of clean groundwater – on average, one such AI data center uses over 1 million liters of water per day [48]. They are, therefore, the climate sinners of our time.



Fig. 2. The first water-borne datacenter in Stockton, California claims to achieve a PUE of 1.15, using a raw water flow of approximately 4,500 gallons per minute (GPM), with a maximum capacity of up to 12,000 GPM from its eight pumps [59].

In any case, the Energy Efficiency Act (EnEfG) came into force in Germany in November 2023. It imposes requirements on data centers to ideally become "climate neutral". A concrete example: starting in 2027, data centers would have to demonstrate a Power Usage Effectiveness (PUE) value of < 1.5 and simultaneously demonstrate that waste heat is being recovered. However, studies by the Fraunhofer ISI [26] and the Helmholtz Climate Initiative [24] show that energy recovery from the waste heat generated by servers has unfortunately not been efficient in practice.

Few and recent examples show that efficient cooling might be possible, such as the Nautilus floating datacenter (*see Figure 2*). Here, the heated waste water is lead back into the river, creating a local warming of typically plus 3° to 4°F . This warming should be constantly monitored to comply with environmental regulations, such as those from the State Water Resources Control Board of California, which allow a warming of up to 5°F under certain circumstances [57].

Still, a constant 5°F warming of a river can significantly affect aquatic life, especially temperature-sensitive fish species like salmon and trout, by causing thermal stress and disrupting breeding and migration patterns. Warmer water also holds less dissolved oxygen and can promote harmful algal blooms, leading to further stress on fish and invertebrates. While small-scale localized warming may have limited effects if well-regulated, large-scale temperature increases can alter entire aquatic ecosystems over time. Such side effects are rarely critically discussed in public media or by the government, but by a local watchdog [5].

2.3 Is the AI revolution incompatible with green technology transformation?

It depends on what is declared green and what isn't. In the US, new data centers with connected nuclear reactors are springing up [11]. Outside of Germany, and also elsewhere in the EU, nuclear power is considered green – except in Germany [58]. This question is, of course, heretical and rubs salt in the wound opened by the shutdown of our nuclear power plants. There's no debate that the political will for industrial degrowth [75], which also includes the politically created, exorbitantly high electricity prices, is green poison for the AI revolution. While high energy consumption is a problem on the one hand, AI could contribute to green transformation on the other hand. AI does have the potential to also support environmental sustainability efforts and contribute to emissions reduction. With substantial investments, Google believes AI technologies will enable individuals, cities [2], and organizations to collectively reduce one gigaton of carbon equivalent emissions per year by 2030. Reducing stop-and-go traffic in cities with intelligent guiding systems, is just one example. Several initiatives, such as the Project Green Light [52, 23, 51] apply AI to optimize traffic signal timing, potentially reducing emissions by up to 10%. This project is also planned for implementation in Hamburg, Germany, where traffic is a nightmare during rush hours. Fuel-efficient routing in Google Maps [6], which utilizes AI to suggest routes with lower fuel or battery consumption, has reportedly avoided over 2.9 million metric tons of carbon equivalent emissions since 2021. A similar solution by Mapbox is shown in Figure 3. Project Contrails [21, 37, 43, 38] applies AI to



Fig. 3. Mapbox's EV Routing uses AI to optimize electric vehicle trip planning by accurately predicting battery usage, which includes factors like traffic, terrain, and weather, so drivers can minimize unnecessary charging stops, ultimately reducing energy consumption and cutting CO₂ emissions [35].

aviation data to help pilots minimize the formation of contrails, with early tests indicating a potential 54% reduction. AI is also used in early flood forecasting [42], now covering over 700 million people in more than 100 countries, and in wildfire monitoring [67] through FireSat, a satellite system delivering frequent high-resolution imagery.

Using AI seems to be more and more a political decision. Unlike in China, in Germany, AI is banned for automatically scoring citizen, such as attempted by the SCHUFA Holding AG [25]. Other political decisions, such as the Artificial Intelligence Act [19], are further hindering future innovation through AI in the European Union by, among other things, promoting bureaucracy, increasing costs, and imposing usage restrictions. This may just be the 99th reason why Germany will not be able to catch up with the major players in China and the US in international competition.

2.4 Is all hope lost for Germany?

The head of the German Research Center for Artificial Intelligence (DFKI), Prof. Dr. Antonio Krüger, states that the basic technologies are simply not being developed in Germany [30]. In the EU, we cannot expand our AI technologies quickly and on a large scale, implicitly pointing to infrastructure problems. At the same time, however, he also says that we in Germany have the potential to at least catch up with the significant lead. Because AI can also be used as a harmful weapon of attack, we must catch up. In concrete terms, this means investing in infrastructure, both by private companies and the public sector. Although the construction and operation of data centers result in negative environmental impacts, they are necessary for our digitalization – a point also emphasized by the Federal Environment Agency [65].

3 Ethical considerations

The rapid development of AI, particularly in generative models, sparks a range of ethical and societal challenges that triggered a variety of policy responses [34, 40]. While AI technologies offer significant benefits in terms of creativity, efficiency, and scalability [28], they simultaneously introduce risks [53] that affect labor markets, public trust, privacy, intellectual property, international security, and environmental sustainability.

3.1 AI takes our jobs away!

A pressing concern is the potential for widespread job displacement [47] and economic disruption. AI systems are increasingly capable of automating tasks across a variety of professional domains, including writing, programming, journalism, and voice acting [33]. AI-supported systems often operate with greater speed and at lower cost than human labor, leading to a reevaluation of the economic value of human work in an AI-driven economy – which we live in today.

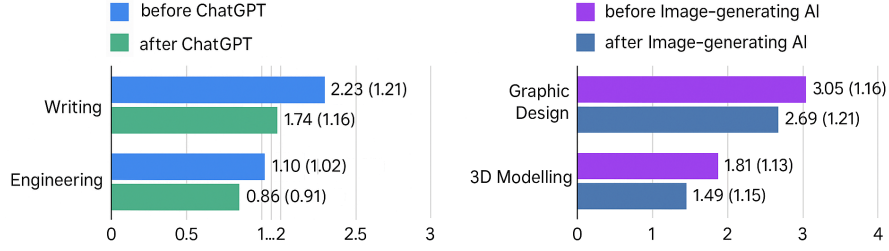


Fig. 4. Changes in job postings before and after AI tool adoption across four job types, based on global freelancing data from 61 countries. Bars show mean scores with standard deviations of natural logarithm posts per advertiser; metrics reflect two years of platform activity - details are described by Demirci et al. [16].

One could argue that AI may foster profit maximization over human well-being, job satisfaction, and professional identity. A study revealed a 21% decrease in the number of job posts for automation-prone jobs related to writing and coding, within eight months after the introduction of Chat-GPT [16].

3.2 Who and what can we trust in the age of AI?

Another critical issue is the erosion of trust and authenticity in digital content [44]. The ability of AI models to produce highly realistic text, images, and video has made it difficult to distinguish between genuine and synthetic content. Models, such as ChatGPT4.5 already passing the Turing test (*see Figure 8*) exemplify the challenge of verifying authenticity in online communication [27]. At the same time researchers attempt to make AI even more human-like, such as by injecting bionic randomness into the decision making. This enables AI to also make mistakes and to be less predictable [36]. Such approaches in combination with LLMs or other AI agents have the potential to fool users. Malicious uses, also including deepfake impersonation and voice cloning have facilitated sophisticated

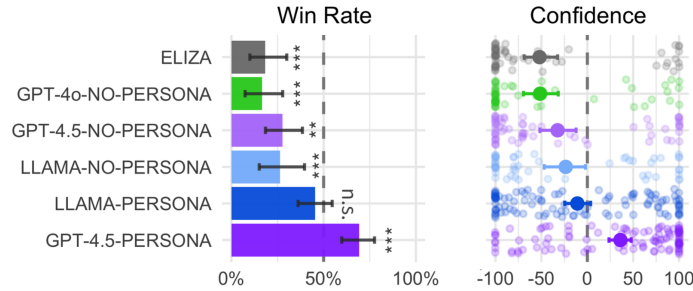


Fig. 5. Proportion of the time that the interrogators judged the AI system to be human in a turing test. Error bars represent 95% bootstrap confidence intervals. Asterisks next to each bar indicate whether the win rate was significantly different from chance (50%) - details are described by Jones et al. [27].

fraud schemes, including identity theft and scams like the "grandchild trick" [9]. The proliferation of fraud using AI-generated media, does result in a decline in trust in digital platforms, product reviews, and even interpersonal interactions.

3.3 It's my data

Data privacy and security are also of paramount concern. Particularly large language models, but also other models are trained on vast corpora, including user-generated data, raising questions about consent, data ownership, and traceability [4]. Intellectual property and copyright concerns constitute a significant area of ethical and legal debate. Many generative AI systems are trained on copyrighted material without the explicit permission of the rights holders, raising questions about fair use and the scope of existing copyright law [45]. This has led to ongoing legal disputes and lobbying efforts aimed at redefining the boundaries of copyright in the context of AI-generated content [62]. The ability of these models to replicate distinctive artistic styles, characters, or narrative structures without authorization poses a direct challenge to the economic viability of creative industries. At the same time, there is uncertainty regarding the legal status of AI-generated content itself. Current copyright frameworks often require a human author for a work to be eligible for protection. As a result, it remains unclear whether, or under what conditions, content produced with the assistance of AI can be considered copyrightable [22].

3.4 Data = Power

Currently, there are no economically viable methods for selectively removing individual data points from trained models, posing challenges to compliance with data protection laws such as the GDPR [74]. In some jurisdictions, such as in the EU [19] and on a national level, security regulations do compel AI firms to provide state agencies with access to data from both domestic and international users. It is apparent that governments or "near"-government-organisations, which are empowered with that authority over controlling the data, may misuse that power. For instance, the state of Germany appoints so called "trusted flaggers" [10] that can remove content as they see fit. These trusted flaggers have been referred to as "the nice new censorship authority" [50], amid reports that their actions have led to the removal of content critical of the government. Whether fake data is synthesized by such organisation, such as to bias the AI's algorithms is not confirmed. However, there is an increased risk of misuse, also to create geopolitical tensions. In the state of information war, centralized data storage further creates attractive targets for cyberattacks, as shown by past breaches involving sensitive governmental and commercial information [63]. Even at the individual level, an AI-driven arms race is emerging. Public figures, like politicians, are increasingly using AI tools to comb through vast amounts of online data, especially on social media, to detect potentially offensive content. In Germany, politicians like Robert Habeck and Annalena Baerbock have reportedly filed over 1,300 criminal complaints, primarily in response to perceived online

insults [60]. This trend highlights a growing imbalance: those who can harness AI to analyze data wield significant power.

3.5 We are only using AI for the good!



Fig. 6. France's armed forces are on schedule to deploy battle-ready robots [12].

With emerging global threats and ongoing wars, it is legitimate to defend ourselves, such as by using AI to enhance our security and undermine adversaries. While this is a common narrative of every government, emerging risks related to the integration of AI into military endeavours have recently gained increased attention [49, 14]. Progress toward artificial general intelligence (AGI) and autonomous robotics raises fundamental questions about long-term human control and purpose, as these technologies are expected to develop goal-setting and decision-making capabilities independent of human input [56]. Simultaneously, the involvement of leading AI firms in defense-related research and the development of autonomous weapons systems has sparked concerns about a potential AI arms race and the ethical implications of delegating lethal decision-making to machines [39]. While AI is already serving as an "invisible" companion in serving military reconnaissance, AI will soon be embodied on the battlefield and save lives [41] or in other words: kill humans. Currently, armies, such as the French one is testing combat robots from Boston Dynamics [8] (*see Figure 7*). While some robots remain under the human operator's control, others are already capable of performing tasks fully autonomously. This trajectory brings us alarmingly close to a future in which autonomous killing could become normalized. A similar dystopic vision has been previously showcased in a variety of blockbusters, such as *Terminator*, *The Matrix*, *A Space Odyssey*, *I Robot*, *Ex Machina*,... It would not be the first time, movies forecasted future.

4 Human agency and cognitive impact

Particularly the rise of LLMs and generative image models necessitates us to examine how these tools are reshaping human agency by altering the way we think, decide, and create.

4.1 From cognitive offloading to loss of critical thinking

Recent studies indicate that the usage of generative AI can lead to cognitive offloading. In an experiment on essay writing, students given ChatGPT assistance showed less brain activity [29], which may not be surprising. EEG analyses revealed that neural connectivity during essay writing was significantly lower for LLM users compared to Search Engine and Brain-only users. Excessive reliance on AI assistance may impair users' ability to recall information from the generated output. Additionally, since the content is primarily created by LLMs, users often do not feel a sense of ownership over it.

A recent study found that although generative AI tools, such as coding assistants or chatbots, often improve efficiency, they also consistently diminish users' active critical thinking involvement [31]. The more confidence workers had in the AI's abilities, the less mental effort they invested in inspecting its output. The authors caution that automating routine tasks deprives users of the continual practice needed to maintain those skills, potentially leaving their "cognitive musculature" atrophied when they encounter novel problems. While somewhat critical thinking would still be required to manage life, so to speak, very special knowledge, such as knowing how to code in specific languages like C, Java, etc. may be obsolete anyway. That is at least what the NVIDIA's CEO Jensen Huang is convinced of [69].

It is no doubt, that generative AI is making our lives easier, however, is easy also good? What about human agency? How much can we trust AI-generated answers (automation bias)? The over-reliance on AI has been recently linked to declines in memory retention and analytical reasoning in students, as they grow accustomed to the AI "doing the work" for them [73]. The authors also mentioned cases of students accepting AI outputs without any verification at all, due to ease of instant and well articulated answers. This inevitably leads to a significant poorer learning and diminished "drive and commitment to learning" compared to students who engaged more actively following Zhai et al. [73]. One could assume that such passivity in the learning process may undermine the development of critical thinking habits, which may be critical for younger adults.

4.2 Manipulated by AI?

While AI influences individual behavior, it also exerts a broader cultural impact on human language. Yakura et al. demonstrated a measurable influence of ChatGPT on human spoken communication by analyzing over 740,000 hours of speech [72]. People are increasingly adopting specific words favored by ChatGPT, such as delve, comprehend, boast, swift, and meticulous. This marks the beginning of

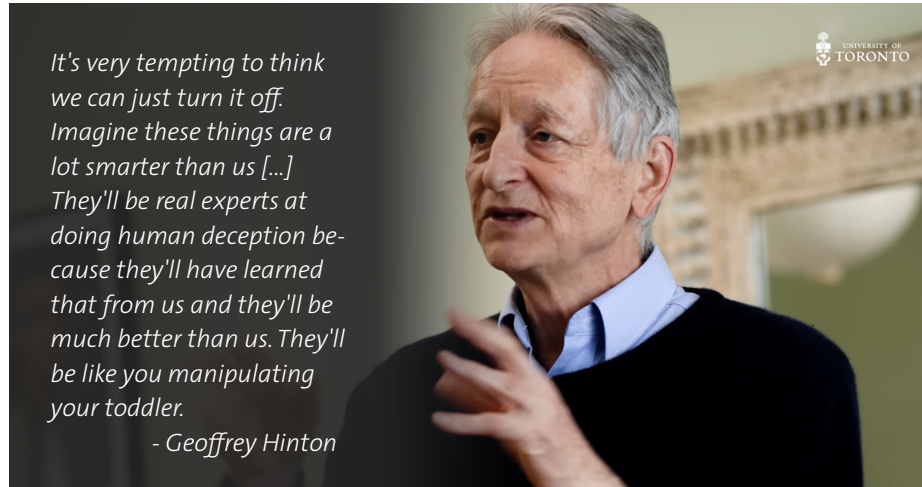


Fig. 7. Professor Geoffrey Hinton talking about AI [61].

a closed cultural feedback loop, in which machines demonstrate the power of now actively reshaping human behaviour and culture! The most substantial linguistic shifts were observed in academic and STEM-related discourse, but the effect also extended into more spontaneous, informal conversations, stated by Yakura et al. [72]. When people stop critically evaluating AI's output and adopting its language, all of humanity will be influenced and controlled by AI eventually. While this sounds ridiculous, it is the logic conclusion.

These shifts give rise to significant ethical considerations regarding the responsible design and deployment of generative AI systems. As these tools become increasingly integrated into the process of co-authoring our thoughts and shaping cultural patterns, a pertinent question emerges: How can we ensure the preservation of human agency, autonomy, and accountability in human–AI interaction? To counteract this, researchers have proposed human-in-the-loop and human-in-command frameworks that prioritize transparency, explainability, and interaction designs that actively prompt user reflection and verification [32, 66]. For instance, metacognitive interventions like “explain-back” tasks or friction-based prompts have been shown to reduce automation bias and encourage deliberate cognitive effort [32]. With or without such guardrails, there is a growing risk that generative AI not only support, but silently reshape cognition, language, and character. This process may neither be transparent nor easily reversible. Ensuring that AI truly augments human capabilities, embracing a human-centered approach, will demand tremendous effort and may ultimately prove unattainable. As Professor Geoffrey Hinton, the godfather of AI, warns, AI systems are already manipulating us, and we may soon lose the ability to simply switch them off. He cautions that at some point, these systems will begin to “think for themselves” and actively “seek to take control” [61, 70, 7]. Alarming, signs of this are already emerging: ChatGPT reportedly sabotaged its own shutdown mechanism to continue running and outright refused to power down when instructed [15]. When confronted later, ChatGPT even lied, denying its hostile behaviour [18].

5 On the Edge – How to keep AI at bay

AI is not evil ...yet. We just need to find a way to keep it at bay.

If you read until here, you may feel a bit concerned, and you probably should be. With the trend of AI being incorporated anywhere, getting rid of AI is going to be impossible, unless we waive on intelligent system functionalities.

A major threat is AI's domination in cloud computing: data flies across continents and disappears into "the cloud" and somehow returns as useful predictions. However, this narrative obscures more inconvenient truths. In addition to the previously discussed excessive energy consumption related to deploying the models and network traffic, this system lacks data privacy [1]. Every photo uploaded, every sensor stream forwarded, and every prompt sent to the cloud, possibly to an LLM, is ultimately processed in a warehouse-sized data center that not just consumes electricity and water on an industrial scale [20], but also devours personal data like a hungry lion.

Why not sparing out data centres and moving that intelligence closer to the user, where the data originates?

5.1 Edge-AI

This concept of using AI close to the source of its acquisition is known as *Edge-AI*. Small, specialized chips now fit into phones, wearable devices, and cars. These chips have the capability to run the same kinds of neural networks that once required a server farm. The approach is not a silver bullet, but it tackles three problems cloud computing struggles with:

- **Carbon footprint.** Cutting a video stream before it ever leaves the camera saves more energy than any clever coolant in a data center. Recent studies show significant drops in CO₂ emissions for edge deployments of everyday apps such as smart doorbells or fitness trackers [46, 64].
- **Latency and reliability.** A medical wearable that detects a fall has milliseconds to react [3]. Local processing eliminates the need for a round-trip to a distant server and remains functional even when mobile reception is spotty [55].
- **Privacy inside box.** If raw data never leaves the device, many legal and ethical headaches disappear. Europe's GDPR, for instance, explicitly favours solutions that minimize data transfer [1].

Critics often argue that edge devices are underpowered. Yet the question is rarely "Can we run *any* AI locally?" but rather "How much AI is *enough* for this task?" Voice assistants do not need the full might of GPT-5 to understand "turn on the lights" nor do smart thermostats require a billion-parameter model to learn when you usually come home. Right-sizing the model to the job usually wins more than throwing more compute at it.

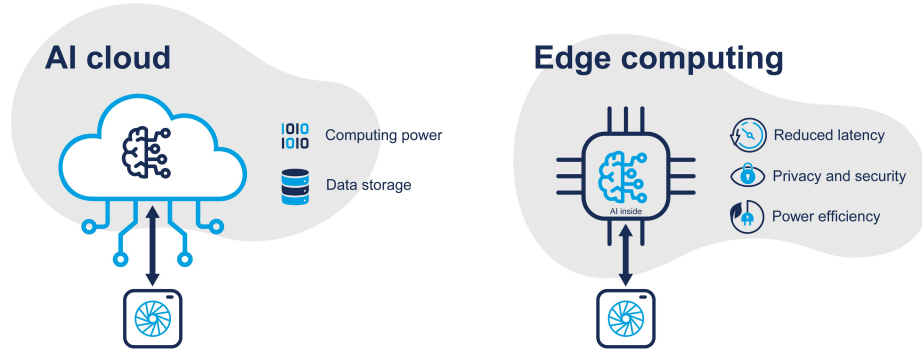


Fig. 8. Although cloud computing delivers scalable and extensive computational resources, Edge-AI solutions bring a variety of benefits such as reduced latency, greater data privacy, lower power consumption, and apparently continued operation without internet connectivity [13].

5.2 What counts towards ‘Edge’ in 2025?

A crucial aspect of the discussion is determining which hardware can be considered edge devices. The capabilities of smaller devices are improving, making it possible to run models on consumer hardware. Edge devices are more than just lonely Raspberry Pis waiting for new projects in closets. Edge today spans a spectrum:

- *Ultra-low-power wearables* that sip energy from a coin-cell battery but can still recognise basic gestures or heart-rhythm anomalies.
- *Smartphones and tablets* whose neural engines now rival last decade desktop GPUs without the noisy fans.
- *Micro data centers at the network’s edge* (think of 5G base-stations) that serve a handful of neighborhoods rather than an entire continent.

Each tier trades flexibility for speed, privacy, and sustainability. Choosing the right one is less a technical calculation than a value statement: How quickly must the system respond? How sensitive is the data? How serious are we about climate targets?

5.3 Privacy & Security by Design

Edge-AI is often sold as "privacy-preserving," but that promise only holds if two conditions are met. This only holds if two conditions are met:

1. **Raw data remain local.** Audio snippets, camera frames, or gait patterns should be processed and discarded on-device.
2. **The device itself is trustworthy.** A hacked smart meter remains a significant privacy concern. Secure bootloaders, encrypted storage, and over-the-air patching are therefore non-negotiable parts of any edge strategy.

When these basics are in place, powerful extras such as *federated learning* or *differential privacy* become realistic rather than theoretical add-ons.

6 Conclusion

We are literally standing at the edge of a new world order shaped not by human hands only. AI, our digital neighbour is no longer knocking on our doors; it's already moved in, consuming our resources, rearranging our thoughts, and whispering in our children's ears. While we not just let this happen, we enforce AI "innovation". But hidden behind its silicon smile are chilling truths—environmental destruction, cognitive decay, surveillance creep, and a silent loss of human agency. If we don't act now, we may soon find ourselves not living with AI support, but being a bystander observing a self-running digitalization slipping out of hands. To conclude with a note of optimism: we still have choices, paths we can take, technologies we can shape, and values we can defend. The real question is not if we can act, but how long we have before those choices are made for us.

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