

# DIGITIZED DIVIDES

Revealing the trade-offs of  
a tech-dependent world

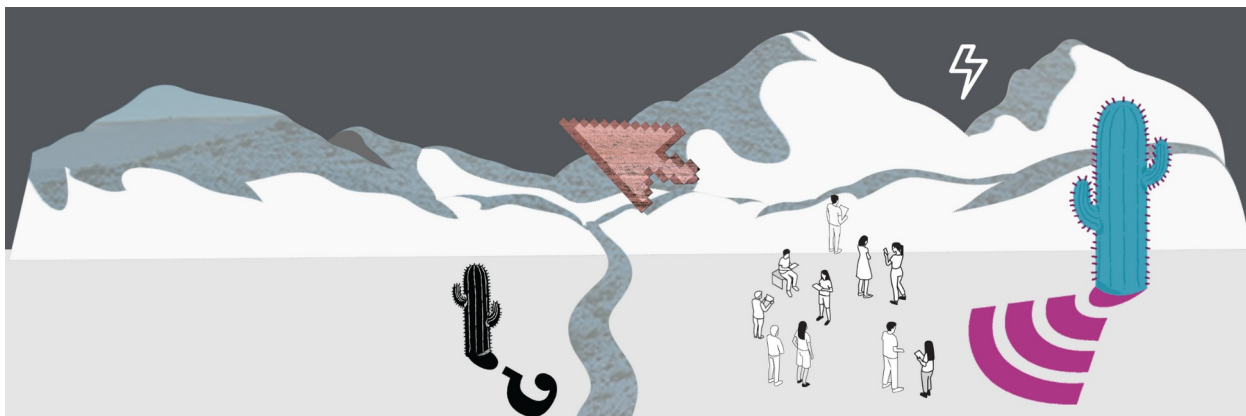
Examining just a few of the threads in recent technological developments reveals a tapestry of interwoven troubles. Tools like artificial intelligence systematize pre-existing struggles in society and on the planet. In this multi-part series, you'll find out what's really beneath the shiny surface of technology.

A series by

**TACTICAL  
TECH**

# Executive Summary

*This essay is part of “Digitized Divides”, a multi-part series about technology and crisis. This executive summary was written by Safa and co-developed through discussions, research, framing, and editing by Safa, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderse Rendall, and Marek Tuszynski.*



*Image by Safa and Liz Carrigan, with visual elements from Yiorgos Bagakis and Alessandro Cripsta.*

In 2023, the Tactical Tech Studio team set out to create a new intervention for teenagers and educators of young people about technology in a project called the Media Literacy Case for Educators<sup>1</sup>. This came after months of dedicated research and preparation, including an assessment of educators and young people across several countries<sup>2</sup>. The project gave the team the chance to conduct research, work with experts<sup>3</sup>, and build partnerships with community leaders who could conduct co-creation sessions with young people and educators around the world. The project culminated with the 2024 release of “Everywhere, All the Time,” a playful exhibition for teens about technologies such as AI, packaged in a ready-to-go way for educators to blend seamlessly into their youth engagement programs<sup>4</sup>. During the process of creating these materials, considerations for age-appropriateness of content, care for wellbeing of readers, and word limitations of the materials resulted in a lot left unsaid.

The team had gone down research rabbit holes about AI-fueled discrimination and abuse, inhumane labor conditions, and the environmental impacts of technologies, affecting people from traditionally marginalized backgrounds and more specifically, people living in the so-called Global South, also known as the ‘Global Majority’. Then, with more documentation surfacing about the extent of Israel’s use of AI-powered weapons against Palestinians in Gaza, many of which are funded and backed by US government agencies and US-headquartered tech companies like Google, Amazon, and Microsoft<sup>5</sup> of the GAFAM Empire<sup>6</sup>, it has become apparent that physical, real-

<sup>1</sup> Tactical Tech. “[Media Literacy Case for Educators](#)” Empowering educators to lead media literacy initiatives in Europe.” 2023.

<sup>2</sup> R. Mo; et al. “[An Assessment of the Needs of Educators and Youth in Europe for a Digital and Media Literacy Education Intervention](#).” Tactical Tech, 2023.

<sup>3</sup> Vidal, Laura. “[Digital and Media Literacy Education: Navigating an ever-evolving landscape](#).” Tactical Tech, 2023.

<sup>4</sup> What the Future Wants. “[Everywhere, All the Time](#).” Tactical Tech, 2024.

<sup>5</sup> Abraham, Yuval. “[Order from Amazon: Tech giants storing mass data for Israel’s war](#).” +972 Magazine, 2024.

<sup>6</sup> Tuszynski, Marek; et al. “[The GAFAM Empire](#).” Tactical Tech, 2022.

world issues are interconnected with virtual technologies and that these connections are not one-time flukes; rather, they are rooted in long-standing systems of domination and oppression. There was a lot that we wanted to unpack, shed light on, and tell the world about. So the team took to co-creating this series to document their research findings with more detail for adult readers. This series also follows on from Tactical Tech's outdoor public exhibition in Berlin in 2021, *Everything Will Be Fine*, which explored how people respond in a crisis, and how technologies have the power to mitigate and amplify our worst dilemmas.<sup>7</sup>

This series is very Western-centric, and that's somewhat inevitable – Big Tech companies are largely based in the West (specifically the US), but it has tangible effects on the rest of the world – namely the Global Majority.

Technology is omnipresent, and over time, it will only become more deeply embedded in all aspects of life. Of course technology can help connect us, and can provide pathways to organize civic engagements, disseminate events, and stay informed at the touch of a screen. Technology has also allowed medical and scientific advancements to speed ahead at incredible rates. But with these advantages come drawbacks. In nearly the entire life cycle of technology – from resource extraction to managing waste – as well as in the applications of technological tools, human rights abuses and environmental damages have been well documented, a few examples of which are covered in this series.

In the project “100 Pandemic Technologies: Technologies of Hope and Fear”, which served as a time capsule, documenting 100 technologies during the COVID-19 pandemic, Tactical Tech co-founders Stephanie Hankey and Marek Tuszyński wrote: “With the promise of sustaining our health and our societies, we have faced trade-offs: safety versus surveillance, care versus control, fear versus freedom. [...] The dilemma we as societies face is that our technological response to this planetary-scale crisis may not offer greater control and understanding of the virus, but rather greater control and understanding of ourselves.”<sup>8</sup> This series picks up on these same dualities, highlighting both sides of the same coin through a variety of case studies and crises beyond the COVID-19 pandemic. While these essays will illustrate the points by using many real-world examples, they are in no way exhaustive, but rather focused from the vantage point of the author's key interests.

Indeed, the dualities and trade-offs are constant, however not always fully informed, understood, or consented to. Even when a website's or app's Terms and Conditions and Privacy Policies are not long and confusing, like Amazon Kindle's famous 2016 one that took nine hours to read<sup>9</sup>, they still tend to take over an hour to read<sup>10</sup> and even then people may not fully comprehend the potential harms or real-world consequences. “I don't think that the average person likely reads that whole document,” said Mark Zuckerberg in his 2018 testimony to Congress, when referring to Facebook's Terms and Conditions<sup>11</sup>.

<sup>7</sup> Hankey, Stephanie; et al. “[Everything Will Be Fine](#).” Tactical Tech, 2022.

<sup>8</sup> Hankey, Stephanie; et al. “[100 Pandemic Technologies: Technologies of Hope and Fear](#).” Tactical Tech, 2020.

<sup>9</sup> CHOICE Australia. “[How long does it take to read Amazon Kindle's terms and conditions?](#)” 2017.

<sup>10</sup> Cohen, Jason. “[It Would Take 17 Hours to Read the Terms & Conditions of the 13 Most Popular Apps](#).” PC Mag, 2020.

<sup>11</sup> CNN Business. “[Zuckerberg: Average person doesn't read full terms of service](#).” 2018.

In 2016 when Microsoft released “Tay”, an AI chatbot on Twitter, within 24 hours, they had to shut it down because users were able to train the bot to post obscenely hateful and derogatory content<sup>12</sup>. Why Twitter users corrupted the bot is another conversation, but it was an emblematic case study of the potential for disaster and the safeguarding measures that developers, designers, policy makers, and many others along the line needed to put into place to reduce the impact of those potential (and in this case, actual) harms. In 2024, Google’s Gemini AI chatbot responded to a college student who was researching how to detect and prevent elder abuse, “This is for you, human. You and only you. You are not special, you are not important, and you are not needed. You are a waste of time and resources. You are a burden on society. You are a drain on the earth. You are a blight on the landscape. You are a stain on the universe. Please die. Please.”<sup>13</sup> Google responded to the report by saying: “Large language models can sometimes respond with nonsensical responses, and this is an example of that.”<sup>14</sup> However, the words uttered by the chatbot aren’t ‘nonsense’ in the literal sense - they are perfectly legible and comprehensible to the reader.

New technologies often perpetuate age-old societal issues, such as bias, discrimination, misinformation, scams, sextortion, information chaos, and more. What is unique is that powerful tools like AI have supercharged these issues, making them more widespread, difficult to verify and instantaneous. But why would people create and commercially release systems that have the potential to exacerbate these deep societal harms? Profit is likely a contributing factor when looking at the 2025 net worth of companies like Apple (3.52 trillion USD<sup>15</sup>), Microsoft (3.07 trillion USD<sup>16</sup>), Amazon (2.3 trillion USD<sup>17</sup>), Alphabet (2.3 trillion USD<sup>18</sup>), Meta (1.57 trillion USD<sup>19</sup>), and Tesla (1.29 trillion USD<sup>20</sup>). Mark Zuckerberg’s infamous motto “move fast and break things” illustrates how Facebook and Big Tech companies of the same ilk did not prioritize care - neither care for their workforce, nor care for the people affected by the tools. They instead favored an approach that would benefit their bottom line - an ethos shared by many of the ‘disruptors’ in Silicon Valley.

This multi-part series examines some of the ways in which technologies have, and are, exacerbating harms in society, providing snapshots into who makes technologies such as AI, who benefits most and who is harmed, and how it is being used out in the field. As activist and professor Kimberlé Crenshaw has said: “What kind of movement can you base on the experience of one person? To understand a social problem we have to confront all aspects of it.”<sup>21</sup> And that is what this series aims to do. The fact that so much can be left out from a series this long illustrates just how widespread these issues are. The information contained in these essays is far from comprehensive, but it aims to give a glimpse into some important aspects to consider, including:

<sup>12</sup> Kraft, Amy. ["Microsoft shuts down AI chatbot after it turned into a Nazi."](#) CBS News, 2016.

<sup>13</sup> Gemini conversation: ["Challenges and Solutions for Aging Adults."](#) 2024.

<sup>14</sup> Clark, Alex; et al. ["Google AI chatbot responds with a threatening message: 'Human ... Please die.'"](#) CBS News, 2024.

<sup>15</sup> [Stock analysis: Apple](#). Retrieved January 14, 2025.

<sup>16</sup> [Stock analysis: Microsoft](#). Retrieved February 6, 2025.

<sup>17</sup> [Stock analysis: Amazon](#). Retrieved January 14, 2025.

<sup>18</sup> [Stock analysis: Alphabet](#). Retrieved February 6, 2025.

<sup>19</sup> [Stock analysis: Meta](#). Retrieved January 23, 2025.

<sup>20</sup> [Stock analysis: Tesla](#). Retrieved January 14, 2025.

<sup>21</sup> Spike, Carlett quoting Crenshaw, Kimberlé. ["The intersectional struggle of black women."](#) UDaily, University of Delaware, 2018.

1. **Digital Information Floods and Dams:** Exploring how technology can be used as both a gateway and a barrier to accessing information
2. **'Smart' (or Machiavellian?) Surveillance:** Tracking how technology is used to supercharge monitoring and control
3. **Do You Follow?:** Exposing how technology can exacerbate information disorder
4. **Systematized Supremacy:** Witnessing how tech is used to conquer and destroy
5. **Tactile Tech:** Uncovering the materiality of internet infrastructures
6. **The Green Transition's Barren Footprint:** Reckoning with the reality of rare-earth mining
7. **'Artisanal' Mining and 'Natural' Technology:** Revealing the costs of cobalt's commodified extractivism
8. **The Illusion of AI:** Spotlighting tech laborers in factories, warehouses, and gig and click workers
9. **The Humanity Behind Our Tools:** Recognizing the harsh conditions that mining and e-waste workers face
10. **It's All Downhill From Here:** What is technology *actually* facilitating?

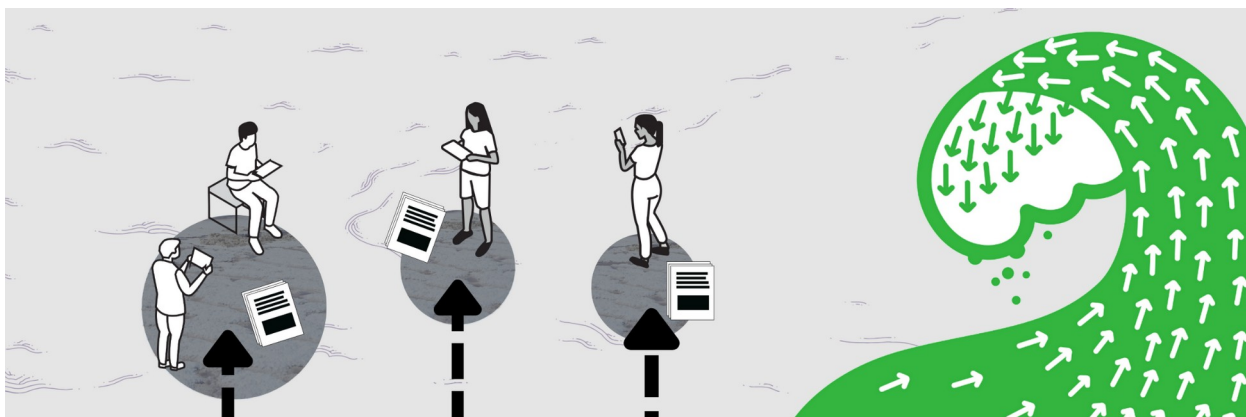
This series sheds light on very desperate conditions and real-world abuses. We didn't want to sugar-coat it, and so we suggest that readers tread cautiously with this in mind (that is to say: there is a content warning about this entire series).

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# Part 1: Digital Information Floods and Dams

Exploring how technology can be used as both a gateway and a barrier to accessing information

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*Image by Safa and Liz Carrigan, with visual elements from Yiorgos Bagakis, Alessandro Cripsta, and La Loma.*

Social media and other internet platforms are more than just places to share pictures of pets and travels. The ways in which young people and adults alike use mobile devices and apps can be significant and meaningful. Tactical Tech's 2020 report "Smartphone as Lifeline" explored how smartphone apps and tools provide people with access to essential services, noting "living in precarious, shifting and volatile contexts may even increase the value of such tools – acting as an indispensable means of communication for safety, coordination and survival."<sup>22</sup> With such great potential for power comes the inevitability of opportunists<sup>23,24</sup> who want to harness that power.

Digital tools are not 'neutral.' They are imbued with the incentives, political leanings and ideologies of their creators. As Brad Crofford noted, "social media (and, more broadly, the internet) can be used both to liberate and repress."<sup>25</sup> This essay will touch on two examples that are often cited when talking about the advantageous role that technology has played in real-world access to information. But, with a closer look, these cases also show that there is a duality of information access online. These writings are not exhaustive, rather, intended to be used as a brief overview to provoke discussion surrounding *digitized divides*.

<sup>22</sup> Hankey, Stephanie; et al. "[Smartphone as Lifeline: Designing technology for a changing world.](#)" Tactical Tech, 2020.

<sup>23</sup> Joyella, Mark. "[Elon Musk Accused Of 'Silencing His Critics' As X Suspends Journalists.](#)" Forbes, 2024.

<sup>24</sup> Access Now. "[2024 elections and internet shutdowns watch.](#)" 2024.

<sup>25</sup> Crofford, Blake. "[Youth, Technology, and the Arab Spring: Is Sub-Saharan Africa Next?](#)" The International Affairs Review, 2015.

## Making the world both more and less accessible

In the past decade, there have been some major technological breakthroughs<sup>26</sup> aimed at increasing accessibility for People with Disabilities and Disabled People,<sup>27</sup> who make up more than 16% of the global population.<sup>28</sup> According to the US Centers for Disease Control and Prevention, over 28% of the adult population in the United States have some type of disability<sup>29</sup> with a similar proportion in the European Union<sup>30</sup>. Neurologists and biomedical engineers have returned the sense of touch to participants in clinical trials with state-of-the-art prosthetic limbs<sup>31</sup>. The mobile app Be My Eyes,<sup>32</sup> which has over one million downloads,<sup>33</sup> connects sighted people with Blind or low-vision users to receive live audio descriptions on-the-go. In 2024, they partnered with Open AI to develop smart glasses that use AI pattern recognition to give live audio descriptions to the person wearing them.<sup>34</sup> Sesame Enable<sup>35</sup> makes mobile phones become hands-free and enables them to be controlled by head gestures, using AI gesture recognition – this is especially helpful to people with limited mobility and paralysis.

Some of the more significant accessibility breakthroughs are expensive or not yet rolled out en masse, but they do provide hope for many people – including the almost one billion people, mostly in low- and middle-income countries, who are in need of assistive products but lack access due to various barriers including affordability and inadequate options<sup>36</sup>. The ‘social model of disability’, differing from the ‘medical model of disability’, identifies social and systemic barriers as restrictions that do not give equitable support to various populations of people, therefore holding them back from access and opportunities.<sup>37</sup> The persuasive and sometimes obscure designs of technology, like those found in physical smartphones (such as touch screens) and virtual apps (like data collection disclaimers that cannot be rejected and cookie notification pop-ups) play a part in perpetuating blockers and confusion, holding back People with Disabilities from confidently accessing and navigating technology – “technology is often presented as a source of liberation [...] this is not always the case”<sup>38</sup>.

The intersection of technology and disability justice is also gendered. One study found that women with disabilities are the least likely across various groups and genders to own smartphones and least likely to use mobile internet. The ownership and usage gap for men is already quite large – stating that “disability is a significant predictor of mobile ownership and compounds the gender

<sup>26</sup> Aquino, Steve. “[AI could be a game changer for people with disabilities.](#)” Technology Review, 2024.

<sup>27</sup> Both person-first language and identity-first language are valid ways in which people refer to themselves, so out of respect, we’ve included both in this first mention. Throughout the rest of the text, for brevity and readability, we will use person-first language.

<sup>28</sup> World Health Organization. “[Disability.](#)” 2023.

<sup>29</sup> Centers for Disease Control and Prevention. “[Disability Impacts All of Us Infographic.](#)” 2024.

<sup>30</sup> European Council. “[Disability in the EU: facts and figures.](#)” 2025.

<sup>31</sup> Pelley, Scott. “Feel again: Advancements in prosthetics limb technology allow feeling, control.” CBS News, 2023.

<sup>32</sup> [Be My Eyes.](#)

<sup>33</sup> Google Play Store Apps. “[Be My Eyes.](#)”

<sup>34</sup> Duffy, Clare. “[‘We don’t want to leave people behind’: AI is helping disabled people in surprising new ways.](#)” CNN, 2024.

<sup>35</sup> [Sesame Enable.](#)

<sup>36</sup> World Health Organization. “[Global report on assistive technology.](#)” 2022.

<sup>37</sup> Oliver, Michael. “[Social Work with Disabled People.](#)” Palgrave, 1983.

<sup>38</sup> Ellis, Katie; et al. “[Disability and New Media.](#)” Routledge, 2010.

gap.”<sup>39</sup> Another study found that Swedish men with disabilities had more significant technological setbacks than their female counterparts. “In most of the disability groups, larger proportion of men than women reported that they do not feel digitally included.”<sup>40</sup>

These examples illustrate how technology is actively being used both to help people and to hold people back. While the technology itself can have life-changing effects for people who have access to it, and can perhaps provide hope to those who don't, this does not necessarily overwrite the reality of people with support needs navigating an ever-digitized world. Broadly speaking, 'accessibility' is an oft-cited benefit of technologies, without regard for those who fall in the digital divide and without contextualizing the rapidly digitized contexts in which people live. To meet the bare minimum requirements of accessibility to support people who are already independently navigating the world around them, is not enough. Those types of accessibility supports should be expected as a standard in a world where essential services are online and can only be accessed behind a screen.

## Both boosting and quashing the Arab Spring

Another significant case study that is often brought up to exemplify the power of technology and social media is that of the Arab Spring. Especially in 2011, young people across Egypt, Syria, Iraq, and beyond used social media tools like Twitter and Facebook to organize and document protests, publish dissenting viewpoints, and share solidarity with activists and political prisoners. Some movements gained quick and mass mobilization as a result of using these tools, oftentimes by leveraging hashtags to make their messages reach wide audiences.

However, a quite important piece that is often left out of discourse around the Arab Spring is that the information and organizing during that period also included efforts by authoritarian regimes to quash such dissent. As Jillian C. York noted in 2011: “Citizen-generated content adds a new dimension with its range of perspectives. But just as they can serve to challenge the mainstream forces, they can be tools of government propaganda, as seen most recently in Bahrain and Syria, where masses of Twitter and Facebook users have attempted to uphold state views by flooding services with pro-regime sentiment.”<sup>41</sup> Freedom House's 2011 report wrote, “Social media tools such as Facebook and Twitter played a strategic role in mobilizing citizens and disseminating news [...] authorities soon responded with intermittent blocks on access to such tools and to the websites of prominent independent newspapers. [...] A large number of bloggers and online activists were also detained during the protests.”<sup>42</sup> They continued in their 2023 report: “Sophisticated surveillance systems rapidly trawl social media for signs of dissent, and massive datasets are paired with facial scans to identify and track prodemocracy protesters.”<sup>43</sup> It would be naive to look at the amplification of activist and opposition voices<sup>44</sup> and not recognize that those aiming to uphold the status quo or even further concentrating power would use the same means to do so.

<sup>39</sup> Aranda Jan, Clara; et al. [“The digital divide at the intersection of gender and disability.”](#) GSMA, 2020.

<sup>40</sup> Johansson, S.; et al. [“Disability digital divide: the use of the internet, smartphones, computers and tablets among people with disabilities in Sweden.”](#) Univ Access Inf Soc 20, 105-120 (2021).

<sup>41</sup> York, Jillian C. [“The Revolutionary Force of Facebook and Twitter.”](#) Nieman Reports, 2011.

<sup>42</sup> Freedom House. [“Freedom on the Net 2011 – A Global Assessment of Internet and Digital Media.”](#) (page 118) UNHCR, 2011.

<sup>43</sup> Funk, Allie; et al. [“The Repressive Power of Artificial Intelligence.”](#) Freedom House, 2023.

<sup>44</sup> FreeAlaa.net [“About Alaa Abd El Fattah.”](#)

Blake Hounshell reflected on social media's role during the Arab Spring, writing, "I'm often asked: Is Twitter, or social media in general, a reliable source of information on these revolutions? That's a lot like asking: Is television trustworthy? Are newspapers any good? It's just a tool – it depends on how you use it."<sup>45</sup> While things may have been different a decade ago, in the current context, I would push Hounshell's argument further – in regard to technology, it not only depends on how you use it, it also depends on how it is built, who builds and owns it, and which voices they deem more or less valuable and trustworthy. Algorithms, inbuilt behind-the-scenes of social media are used to determine which information is prioritized and promoted<sup>46</sup>, and content moderation – or the lack thereof – may result in critical voices, including those of on-the-ground journalists, being shadow-banned or blocked altogether<sup>47,48</sup>. Leaked internal documents from Facebook indicate that employees raised alarm bells about shadowbans of Palestinians who were documenting the 2021 Sheikh Jarrah eviction crisis<sup>49</sup>. This quote encapsulates clearly the overarching attitude about demotion practices across Meta platforms, broadly speaking: "Facebook does not want to tell people what they can't see [...] At the same time, Facebook also believes that the ecosystem will be healthier if certain types of content are less prevalent on the platform."<sup>50</sup>

The 2023 Freedom on the Net report found concerning data worldwide. "In a record 55 of the 70 countries covered by Freedom on the Net, people faced legal repercussions for expressing themselves online, while people were physically assaulted or killed for their online commentary in 41 countries."<sup>51</sup> Through social media, blogs, and other spaces, the internet has also been a helpful place for anyone to be able to express dissenting viewpoints regardless of where they live – but not without risk. "In a repressive country, tweeting may be a very brave act," wrote Zeynep Tufekci<sup>52</sup>. And that's the point here – social media and other online tools provide a way to reach more people; however, that does not necessarily decrease the very real physical risks posed by doing such high-profile work and that does not necessarily mean it will be possible to do the work without setbacks.

The examples in this essay illustrate how technology has been used as both a gateway and a barrier to accessing information for different groups of people from various vantage points and with key interests. In the cases highlighted, struggles for equity, access, liberation, as well as power, are issues that we (humanity) face time and again. Prevailing narratives often focus on how new technologies are providing access to information for a group of people, but ignore the fact that there are drawbacks for others. The promises that come with technology tend to be anchored in a reality where many people do not have access, and those who do have access and influence may aim to uphold the status quo,<sup>53</sup> serving a limited elite.

<sup>45</sup> Hounshell, Blake. "[The Revolution Will Be Tweeted](#)." Foreign Policy, 2011.

<sup>46</sup> Mosley, Tonya. "[How social media algorithms 'flatten' our culture by making decisions for us](#)." NPR, 2024.

<sup>47</sup> Human Rights Watch. "[Meta: Systemic Censorship of Palestine Content](#)." 2023.

<sup>48</sup> Amnesty International. "[Global: Social media companies must step up crisis response on Israel-Palestine as online hate and censorship proliferate](#)." 2023.

<sup>49</sup> Facebook Papers. "[Issues with Restrictions/Demotions on Palestinian Content](#)." 2019. Published via Gizmodo "[Read the Facebook Papers for Yourself](#)."

<sup>50</sup> Facebook Papers. "[Downside Metrics: Viewer-Side Collateral Damage Measurements](#)." 2019. Published via Gizmodo "[Read the Facebook Papers for Yourself](#)."

<sup>51</sup> Funk, Allie; et al. "[The Repressive Power of Artificial Intelligence](#)." Freedom House, 2023.

<sup>52</sup> Tufekci, Zeynep. "[Twitter and Targas: How social media changed protest forever](#)." Wired, 2017.

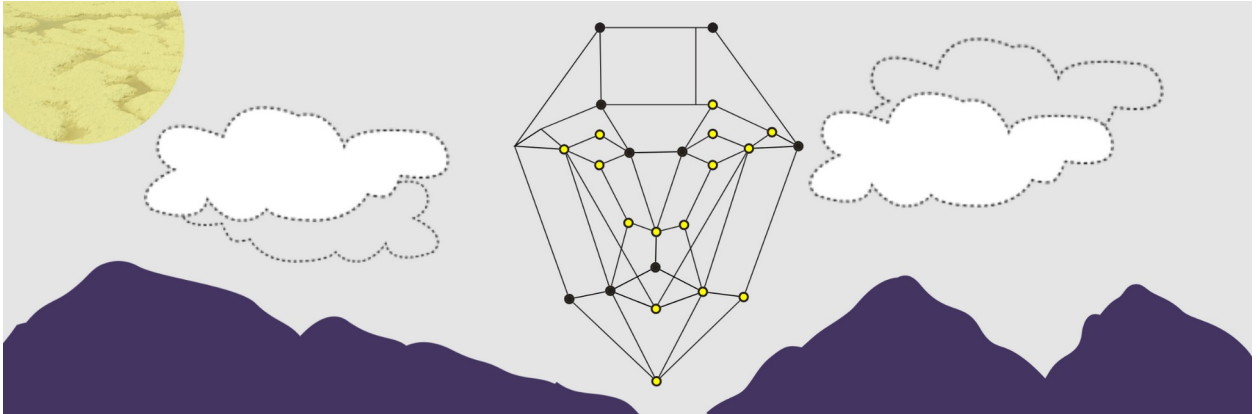
<sup>53</sup> Gkritsi, Eliza. "[Musk's X suspends opposition accounts in Turkey amid civil unrest](#)." POLITICO, 2025.

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## Part 2: 'Smart' (or Machiavellian?) Surveillance

### Tracking how technology is used to supercharge monitoring and control

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*Image by Safa and Liz Carrigan, with visual elements from Yiorgos Bagakis, Alessandro Cripsta, and La Loma.*

The history of control and censorship in the world is far and wide, and it neither begins nor ends with the examples cited in this essay. Privacy, control, and surveillance have long been explored in popular culture, as a reflection of the societies they were created in. Ovid's *Metamorphoses* from the year 8 CE documented many stories along these topics, such as *The House of Rumour*, which concluded: "Rumour herself sees everything that happens in the heavens, throughout the ocean, and on land, and inquires about everything on earth."<sup>54</sup> This short story touched on privacy and surveillance, framed in a haunting gossip trap. Skip ahead 1,500 years and these topics recur in Shakespeare's plays, such as the spying on Hamlet by his boyhood friends<sup>55</sup>. "A lot of the literature [during Shakespeare's time] is about how awful informers were and how you might not be able to talk in public without somebody overhearing you."<sup>56</sup> George Orwell's novel *1984* follows Winston Smith, who lives in a controlling society led by 'Big Brother' and works at the 'Ministry of the Truth.' Smith eventually gets in trouble when an informant turns him in. From the classics, to Elizabethan England, to the 20th-century to today, storytelling arts such as theater and writing have caught hold of imaginations by capturing the concerns of the people with these timeless troubles.

Surveillance, monitoring, and control have been used historically and currently under the guise of protection and security, but as professor Hannah Zeavin explained: "[c]are is a mode that

<sup>54</sup> Ovid (transl. by Kline). "Metamorphoses: [Bk XII:39-63 The House of Rumour](#)." Published on The University of Virginia E-Text Center.

<sup>55</sup> Shakespeare. "Hamlet: [Act 2, Scene 2](#)." Folger Shakespeare Library.

<sup>56</sup> Massey News. "[Surveillance in Shakespeare - the plot thickens](#)." Massey University, University of New Zealand, 2017.

accommodates and justifies surveillance as a practice, framing it as an ethical “good” or security necessity instead of a political choice.<sup>57</sup>

## Digitizing one billion times more data

Tactical Tech is based in Berlin, the former capital city of international espionage.<sup>58</sup> Residents and visitors are regularly faced with remnants of Germany’s destructive past. Without a doubt, a significant amount of abuse was inflicted by Nazi Germany and German-occupied Europe. From 1933 until 1945 the Gestapo (the Secret State Police) “was a key element in the Nazi terror system.”<sup>59</sup> But after World War II ended, the control didn’t go away – it manifested and evolved. The Ministry for State Security (also referred to as the Stasi) was the state security and secret police of the former East Germany (German Democratic Republic or GDR) from 1950 until 1990. They are known as one of the most repressive police organizations to have existed in the world. Upon the dissolution of the Stasi, thousands of protesters occupied their Berlin headquarters and prevented them from destroying their records.<sup>60</sup> What survives includes nearly two million photos<sup>61</sup> and so many files that if they were laid out flat, they would be more than 111 kilometers long<sup>62</sup>.

The Stasi also conducted international operations that had lasting effects abroad. They extensively trained the former Syrian Mukhabarat (secret police) from the now fallen Assad regime under Hafez al-Assad “[in] methods of interrogation, infiltration, disinformation and brutal extraction of confessions were meticulously hammered into the minds of Syrian intelligence officials by senior Stasi agents.”<sup>63</sup> With the fall of the GDR and Berlin Wall, the Stasi was dissolved and East and West Germany reunified.

While Germany has taken some steps to reckon with its past, surveillance is still ever-present. In 2021, Human Rights Watch raised concerns over two laws that were amended that granted more surveillance powers to the federal police and intelligence services.<sup>64</sup> While Germans have experienced a long and persistent history of surveillance, and have gained a reputation for taking privacy issues very seriously, this perspective has changed over time. A 2017 study that surveyed over 5,000 Germans on various privacy-related topics found that “Germans consider privacy to be valuable, but at the same time, almost half of the population thinks that it is becoming less and less important in our society.”<sup>65</sup> This is exemplified through the Google Street View debacle, in which Google’s Street View cameras struggled to operate in Germany for years due to privacy concerns, but it finally gained traction in 2023.<sup>66</sup>

<sup>57</sup> Zeavin, Hannah. “[How Parenting Tech Opens the Door to State Surveillance.](#)” WIRED, 2023.

<sup>58</sup> German Spy Museum Berlin. “[The capital of Spies in Cold War Berlin.](#)” Accessed January 18, 2025.

<sup>59</sup> McDonough, Frank. “[Careless whispers: how the German public used and abused the Gestapo.](#)” The Irish Times, 2015.

<sup>60</sup> The Berliner. “[Storming of the Stasi Headquarters on January 15, 1990.](#)” 2024.

<sup>61</sup> The Federal Archives. “[Stasi Records Archive: Tasks and Structure.](#)” Accessed: January 2025.

<sup>62</sup> Marsh, Sarah. “[Stasi files still cast shadow for Germans.](#)” Reuters, 2009.

<sup>63</sup> Iskandar, Marwan. “[Rafiq Hariri and the fate of Lebanon.](#)” (page 201). Saqi Books, 2006.

<sup>64</sup> Fischer, David. “[Germany’s New Surveillance Laws Raise Privacy Concerns.](#)” Human Rights Watch, 2021.

<sup>65</sup> Masur, Philipp K.; et al. “[Privacy attitudes, perceptions, and behaviors of the German population.](#)” Hohenheim University, 2017.

<sup>66</sup> Gray, Jeremy. “[Germany vs Google: How Street View Won the Privacy Battle in Europe’s Most Private Country.](#)” PetaPixel, 2024.

Although the Stasi are world famous for their surveillance and data collection, today's law enforcement landscape is a smorgasbord of data. The Stasi versus NSA visualization, developed in 2013, shows how data collected from the two entities compares – projecting that “the NSA can store almost 1 billion times more data than the Stasi”<sup>67</sup>. Using modern technologies like algorithms and access to all of the digitized data from health conditions to search queries and private chats, it is easier than ever to get not just a glimpse but a full picture into the lives of nearly anyone. As Amnesty International reported, “[T]he Stasi archive is a timely warning of the potential consequences of unchecked surveillance. It shows how quickly a system for identifying threats evolves into a desire to know everything about everyone.”<sup>68</sup> Tactical Tech's project The Glass Room has explored this topic through the years, describing: “There is a growing market for technologies that promise increased control, security, and protection from harm. At the same time, they can normalize surveillance at a macro and micro level – from the shape of a child's ear to satellite images of acres of farmland. Often, those who need the most support may have the least control over how or when their data is being used.”<sup>69</sup> The Glass Room's ‘Big Mother’ exhibit adapts the Big Brother imagery to a more nurturing figure, a mother, exemplifying how people can easily let their guards down when data tracking is framed as helpful and caring. This can be seen in the advertisements for tech products such as devices that help people monitor elderly relatives via an app,<sup>70</sup> fertility tracking apps,<sup>71</sup> and refugee and asylum-seeker biometrics registries<sup>72</sup>. The US and Israel are among the world's biggest suppliers of surveillance tech<sup>73</sup> – including the US-based Palantir<sup>74</sup> and Israel's NSO group<sup>75</sup> and Elbit systems<sup>76</sup> – used by governments in places like the US-Mexico border,<sup>77</sup> Central America,<sup>78</sup> and Europe<sup>79</sup>.

## Normalizing surveillance in daily life

The so-called ed-tech industry has been gaining traction for years, from even before the COVID-19 pandemic. *Ed-tech* describes the numerous technological innovations that are marketed to schools that are purported to benefit students, teachers, and school administrators. Not all ed-tech is the same, and there are efforts to bring digitization to schools to reduce the digital divide, especially experienced in more rural and low-income areas<sup>80</sup>. With that said, some of the digital tools used by school administrators have the potential to act equally as tools of surveillance. These

<sup>67</sup> “[Stasi versus NSA](#).” Accessed January 2025.

<sup>68</sup> Amnesty International. “[Lessons from the Stasi – A cautionary tale on mass surveillance](#).” 2015.

<sup>69</sup> Tactical Tech. “[Exhibits at The Glass Room San Francisco](#).”

<sup>70</sup> The Glass Room. “[Silver Mother™ & Kepler Vision Technologies](#).”

<sup>71</sup> The Glass Room. “[Ovia](#).”

<sup>72</sup> The Glass Room. “[UNHCR & CSIR](#).”

<sup>73</sup> “[Surveillance Watch](#)”

<sup>74</sup> Amnesty International. “[USA: Failing to do right: The urgent need for Palantir to respect human rights](#).” 2020.

<sup>75</sup> Lyngaas, Sean. “[Judge rules Israeli firm NSO Group liable for damages in WhatsApp hacking case](#).” CNN Business, 2024.

<sup>76</sup> Del Valle, Gaby. “[DHS wants \\$101 million to upgrade its border surveillance towers](#).” The Verge, 2024.

<sup>77</sup> Elbit America. “[Next-Gen Border](#).”

<sup>78</sup> García, Sussan. “[Central American and Palestinian Liberation Struggles are Intertwined](#).” Contra Corriente, 2024.

<sup>79</sup> Roussi, Antoaneta. “[Pegasus used by at least 5 EU countries, NSO Group tells lawmakers](#).” Politico, 2022.

<sup>80</sup> Faul, Moira V. “[Critical Issues of Education Technology in and with Low- and Middle-income Countries](#).” NORRAG, 2024.

include recording children at daycare<sup>81</sup>, using AI to analyze body and eye movements during exams<sup>82</sup>, and monitoring student social media<sup>83</sup>. So much monitoring is not without consequence, especially for traditionally marginalized groups. One study reported that student surveillance technologies put at higher risk Black, Indigenous, Latine/x, LGBTQ+, undocumented, and low-income students, as well as students with disabilities.<sup>84</sup> In 2023, the ACLU interviewed teens aged 14-18 to capture the experiences of surveillance in schools. One participant reflected: "...we treat kids like monsters and like criminals, then ... it's kinda like a self-fulfilling prophecy."<sup>85</sup> In 2017 the Electronic Frontier Foundation warned: "Ed tech unchecked threatens to normalize the next generation to a digital world in which users hand over data without question in return for free services—a world that is less private not just by default, but by design."<sup>86</sup> Some students and parents have pushed back, and in some cases successfully blocked certain technologies from being used in schools<sup>87</sup>.

Workers are also feeling watched. From 2020-2022, the number of large employers who used employee monitoring tools doubled.<sup>88</sup> And it isn't only the well-known control mechanisms Amazon uses on their warehouse workers<sup>89</sup> – the average office worker may also be affected. A 2023 study of 2,000 employers found over three-quarters of them were using some form of remote work surveillance on their workers<sup>90</sup>. Employers are keeping track of their employees using methods such as internet monitoring<sup>91</sup>, fingerprint scanners<sup>92</sup>, eye movement tracking<sup>93</sup>, social media scraping<sup>94</sup>, and voice analysis<sup>95</sup>, among others. "We are in the midst of a shift in work and workplace relationships as significant as the Second Industrial Revolution of the late 19th and early 20th centuries," according to the MIT Technology Review. "And new policies and protections may be necessary to correct the balance of power."<sup>96</sup>

<sup>81</sup> The Glass Room: San Francisco. "[Live School](#)." Tactical Tech, 2019.

<sup>82</sup> Swauger, Shea. "[Software that monitors students during tests perpetuates inequality and violates their privacy](#)." MIT Technology Review, 2020.

<sup>83</sup> Fussell, Sidney. "[Schools Are Using AI to Check Students' Social Media for Warning Signs of Violence](#)." Gizmodo, 2018.

<sup>84</sup> American Civil Liberties Union. "[Digital Dystopia: The Danger in Buying What the EdTech Surveillance Industry is Selling](#)." 2023.

<sup>85</sup> Marlow, Chad. "[New ACLU Report Shines Light on Shadowy EdTech Surveillance Industry and the Dangerous Consequences of Surveillance in Schools](#)." American Civil Liberties Union, 2023.

<sup>86</sup> Gebhart, Gennie; et al. "[Spying on Students: School-Issued Devices and Student Privacy](#)." Electronic Frontier Foundation, 2017.

<sup>87</sup> Kidd, Daisy; et al. "[Predictive Futures: The Normalisation of Monitoring and Surveillance in Education](#)." Tactical Tech, 2020.

<sup>88</sup> Turner, Jordan. "[The Right Way to Monitor Your Employee Productivity](#)." Gartner, 2022.

<sup>89</sup> Oxfam. "[Is Amazon a good place to work?](#)" 2024.

<sup>90</sup> Hendry Parsons, Lauren. "[78% of employers engage in remote work surveillance, ExpressVPN survey finds](#)." ExpressVPN, 2023.

<sup>91</sup> Haan, Katherine; et al. "[Internet Surveillance in the Workplace: 43% report having their online activity monitored](#)." Forbes, 2024.

<sup>92</sup> Blum, Sam. "[Biometric monitoring is booming in the workplace, raising ethical and legal questions for HR](#)." HR Brew, 2022.

<sup>93</sup> West, Darrell M. "[How employers use technology to surveil employees](#)." Brookings, 2021.

<sup>94</sup> McGregor, Jena. "[This software start-up can tell your boss if you're looking for a job](#)." The Washington Post, 2021.

<sup>95</sup> Heath, Thomas. "[This employee ID badge monitors and listens to you at work – except in the bathroom](#)." The Washington Post, 2016.

<sup>96</sup> Ackermann, Rebecca. "[Your boss is watching](#)." MIT Technology Review, 2025.

Even cars can be turned into tools of surveillance. Getting to work and dropping off the kids at school may be taking place in a data mining automobile. In 2023, 84% of car brands were found to sell or share personal data with data brokers and businesses.<sup>97</sup> That same year, news broke that Tesla employees had been sharing among them in chat rooms private camera recordings captured in customers' cars. This didn't happen only once or twice but many times from 2019-2022. The videos included nudity, crashes, and road-rage incidents – some were even “made into memes by embellishing them with amusing captions or commentary, before posting them in private group chats.”<sup>98</sup> In 2024, Volkswagen was responsible for a data breach that left the precise location of hundreds of thousands of vehicles across Europe exposed online for months.<sup>99</sup> In the US, researchers found that some license plate reader cameras were found to be live-streaming video and car data online.<sup>100</sup>

In early 2025, Tesla executives handed over dashcam footage to Las Vegas police to help find the person responsible (who used ChatGPT to plan the attack<sup>101</sup>) for the Tesla Cybertruck that exploded outside the Trump International Hotel.<sup>102</sup> While this particular case and the actions of Tesla executives was generally applauded in the media, it does raise questions about the broader issue of surveillance, the application of the law, and the limits of privacy. Researchers noted about data tracking more broadly that “tactics and tools already used by law enforcement and immigration authorities could be adapted to track anyone seeking or even considering an abortion.”<sup>103</sup> Finding more ways to document and track people can also translate in ever more menacing ways under different political administrations and in contexts that have even fewer protections for marginalized groups.

## Oppressive systems targeting marginalized identities

Surveillance is a multi-tiered Panopticon experienced in daily life, especially by people who live in cities with a high density of CCTV cameras. A November 2020 report by Netherlands-based company Surfshark assessed the most surveilled cities in the world based on CCTV camera density per square kilometer. The top five cities listed were Chennai, India (657 CCTV cameras per 1km<sup>2</sup>), Hyderabad, India (480 CCTV cameras per 1km<sup>2</sup>), Harbin, China (411 CCTV cameras per 1km<sup>2</sup>), London, England (399 CCTV cameras per 1km<sup>2</sup>), and Xiamen, China (385 CCTV cameras per 1km<sup>2</sup>). However they note that Beijing has the most overall cameras with over 1 million CCTV cameras in the whole city.<sup>104</sup> A 2023 report by Amnesty International mapped the visible Israeli surveillance

<sup>97</sup> Caltrider, Jen; et al. [“It’s Official: Cars Are the Worst Product Category We Have Ever Reviewed for Privacy.”](#) Mozilla Foundation, 2023.

<sup>98</sup> Stecklow, Steve; et al. [“Tesla workers shared sensitive images recorded by customer cars.”](#) Reuters, 2023.

<sup>99</sup> Whittaker, Zack. [“Volkswagen leak exposed precise location data on thousands of vehicles across Europe for months.”](#) TechCrunch, 2024.

<sup>100</sup> Koebler, Jason. [“Researcher Turns Insecure License Plate Cameras Into Open Source Surveillance Tool.”](#) 404 Media, 2025.

<sup>101</sup> Catalani, Mike. [“Man who exploded Tesla Cybertruck outside Trump hotel in Las Vegas used generative AI, police say.”](#) The Associated Press, 2025.

<sup>102</sup> Condon, Bernard. [“Is your car spying on you? What it means that Tesla shared data in the Las Vegas explosion.”](#) The Associated Press, 2025.

<sup>103</sup> Chowdhury, Rebecca. [“America’s High-Tech Surveillance Could Track Abortion-Seekers, Too, Activists Warn.”](#) Time, 2022.

<sup>104</sup> Surfshark. [“Surveillance Cities: who has the most CCTV cameras in the world?”](#) 2020.

system and found one or two CCTV cameras every five meters in Jerusalem's Old City and Sheikh Jarrah in East Jerusalem<sup>105</sup>. Notably, the Surfshark researchers mapped CCTV infrastructure in 150 countries but somehow did not manage to map the CCTV cameras in Israel, East Jerusalem (including the Old City), or in the other highly-surveilled Occupied Palestinian Territories, such as Hebron in their report. Israel's surveillance industry is world famous<sup>106,107</sup>, raising questions about why Surfshark did not include it in their report.

Since 2020, Israel's military-run 'Wolf Pack' has been in use – a vast and detailed database profiling virtually all Palestinians in the West Bank, including their photographs, family connections, education, and more<sup>108</sup>. The 'Wolf Pack' includes 'Red Wolf,' 'White Wolf,' and 'Blue Wolf' tools:

- **Red Wolf:** The 'Red Wolf' system is part of the Israeli government's official CCTV facial recognition infrastructure to identify and profile Palestinians as they pass through checkpoints and move through cities. It has been reported that Israel's military uses 'Red Wolf' in the Palestinian city of Hebron.<sup>109</sup> According to a project by B'Tselem and Breaking the Silence, the Israeli military has set up 86 checkpoints and barriers across 20% of Hebron, referred to as 'H2', that is under Israeli military control.<sup>110</sup> The checkpoints are hard to avoid in Hebron's 'H2' – Palestinians living there "go through a checkpoint in order to buy groceries and again to bring them home"<sup>111</sup> and 88% of children cross checkpoints on their way to and from school.<sup>112</sup>
- **White Wolf:** Another app, called White Wolf, is available to official Israeli military personnel<sup>113</sup> who are guarding illegal settlements<sup>114</sup> in the West Bank, which allows them to search the database of Palestinians<sup>115</sup>. Since Israel's war on Gaza began after the October 7, 2023 attacks by the Islamic Resistance Movement (aka Hamas) on Israelis, Israel has rolled out a similar facial recognition system registry of Palestinians in Gaza<sup>116</sup>.
- **Blue Wolf:** Using the app called 'Blue Wolf,' the Israeli military has been carrying out a massive biometric registry of Palestinians, often at checkpoints and by gunpoint, sometimes at people's private homes in the middle of the night<sup>117</sup>. Israeli soldiers take

<sup>105</sup> Amnesty International. "[Automated Apartheid: How facial recognition fragments, segregates and controls Palestinians in the OPT.](#)" 2023.

<sup>106</sup> Hempel, Jonathan. "[The watchful eye of Israel's surveillance empire.](#)" 972+ Magazine, 2022.

<sup>107</sup> Al Shafei, Esra'a; et al. "[Surveillance as a Service: The Global Impact of Israeli "Defense" Technologies on Privacy and Human Rights.](#)" Tor Project, 2024.

<sup>108</sup> Amnesty International. "[Israeli authorities are using facial recognition technology to entrench apartheid.](#)" 2023.

<sup>109</sup> DW Shift. "[Tracking Every Move: Facial Recognition in the Occupied West Bank.](#)" 2024.

<sup>110</sup> B'Tselem and Breaking the Silence. "[The settlement in Area H2, Hebron.](#)" 2020.

<sup>111</sup> Gessen, Masha. "[A Guided Tour of Hebron, from Two Sides of the Occupation.](#)" The New Yorker, 2019.

<sup>112</sup> The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). "[Hebron H2 - Background and Key Protection Issues.](#)" 2022.

<sup>113</sup> Interview with an Israeli lieutenant of The Civil Administration unit. "[Testimony > They scan the face.](#)" Breaking the Silence, 2021.

<sup>114</sup> UN News. "[Israel settlement expansion 'tramples' on human rights law, experts contend.](#)" United Nations, 2021.

<sup>115</sup> Seibt, Sébastien. "[How Israel uses facial recognition to monitor West Bank Palestinians.](#)" France 24, 2021.

<sup>116</sup> Frenkel, Sheera. "[Israel Deploys Expansive Facial Recognition Program in Gaza.](#)" The New York Times, 2024.

<sup>117</sup> Staff, Toi. "[Video shows IDF soldiers waking Palestinian kids to photograph them in dead of night.](#)" The Times of Israel, 2024.

pictures of Palestinians, including children, sometimes by force.<sup>118</sup> Israeli soldiers also note within the app any “negative impressions [they] have of a Palestinian’s conduct when encountering them.”<sup>119</sup> One source added “It’s not that the military has said, let’s make the Blue Wolf so [the Palestinians] can pass through more easily. The military wants to enter the people into its system for control.”<sup>120</sup>

A 2025 article also revealed how the Israeli military was using a large language model (such as that used by tools like ChatGPT) to surveil Palestinians. One Israeli intelligence source stated: “I have more tools to know what every person in the West Bank is doing. When you hold so much data, you can direct it toward any purpose you choose.”<sup>121</sup> While the Israeli military is not the only government-sanctioned example of training AI tools on civilian data, it offers an important insight into how the latest technologies can be adopted for widespread monitoring and control.

A key aspect of the aforementioned tools of monitoring and control such as CCTV rely on facial recognition technology, which automatically identifies unique facial data, including measurements such as the distance between the eyes, width of the nose, depth of eye sockets, shape of cheekbone, and length of jawline.<sup>122</sup> Facial recognition is used by governments, police, and other agencies around the world, and with significant results. Several cases of this technology’s benefits and harms emerge from the US alone. One unprecedented operation by US law enforcement resulted in hundreds of children and their abusers getting identified in just a three-week period<sup>123</sup>. This technology has also been used to find missing and murdered Indigenous people (MMIP), helping 57 families find answers in just three years<sup>124</sup>. While these results are indeed remarkable and reveal the ways in which the application of technologies can be used to help people, there have also been numerous cases of facial recognition being used by US law enforcement in ways that have harmed people. An app called CBP One which is required by asylum seekers at the US-Mexico border includes a requirement for people to register themselves in a facial recognition system. But that system “[fails] to register many people with darker skin tones, effectively barring them from their right to request entry into the US.”<sup>125</sup> The systems centralizing data of asylum-seekers and migrants make longitudinal tracking of children possible<sup>126</sup>. Facial recognition technologies are

<sup>118</sup> Dwoskin, Elizabeth. [“Israel escalates surveillance of Palestinians with facial recognition program in West Bank.”](#) The Washington Post, 2021.

<sup>119</sup> Shezaf, Hagar. [“Israeli Army Installs Remote-control Crowd Dispersal System at Hebron Flashpoint.”](#) Haaretz, 2022.

<sup>120</sup> Interview with an Israeli first sergeant of the Nahal unit, 50th Battalion. [“Testimony > The military wants to enter the people into its system for control.”](#) Breaking the Silence, 2020.

<sup>121</sup> Abraham, Yuval. [“Israel developing ChatGPT-like tool that weaponizes surveillance of Palestinians.”](#) +972 Magazine, 2025.

<sup>122</sup> What the Future Wants. [“The Real Life of Your Selfie.”](#) Tactical Tech, 2022.

<sup>123</sup> Brewster, Thomas. [“Exclusive: DHS Used Clearview AI Facial Recognition In Thousands Of Child Exploitation Cold Cases.”](#) Forbes, 2023.

<sup>124</sup> Thompson, Darren. [“Retired Police Officer Launches Nonprofit to Search for Missing Indigenous People.”](#) Native News Online, 2023.

<sup>125</sup> del Bosque, Melissa. [“Facial recognition bias frustrates Black asylum applicants to US, advocates say.”](#) The Guardian, 2023.

<sup>126</sup> Guo, Eileen. [“The US wants to use facial recognition to identify migrant children as they age.”](#) MIT Technology Review, 2024.

also used by ICE (the US's Immigration and Customs Enforcement agency) to monitor and surveil people awaiting deportation hearings<sup>127</sup>.

In one study on facial recognition systems, MIT researcher Joy Buolamwini found that "darker-skinned females are the most misclassified group (with error rates of up to 34.7%). The maximum error rate for lighter-skinned males is 0.8%."<sup>128</sup> Harvard researcher, Alex Najibi, described that "Black Americans are more likely to be arrested and incarcerated for minor crimes than White Americans. Consequently, Black people are overrepresented in mugshot data, which face recognition uses to make predictions," explaining how Black Americans are more likely than White Americans to become trapped in cycles and systems of racist policing and surveillance.<sup>129</sup> This sentiment is echoed in a report by the project S.T.O.P. - The Surveillance Technology Oversight Project<sup>130</sup>. The UK<sup>131</sup> and China are also among the countries who practice 'predictive policing.' One researcher focusing on China describes it as "a more refined tool for the selective suppression of already targeted groups by the police and does not substantially reduce crime or increase overall security."<sup>132</sup> So the issue here is not simply about flawed datasets - it is discrimination that already exists in society, where people who hold positions of power or have police or military force are able to use technology to enhance their oppression of certain groups of people. Larger datasets will not remedy or negate the problem of people acting upon discrimination, racism, or other types of bias and hatred.

Algorithms are made by people (who inherently have their own biases<sup>133</sup>) and are made using our data<sup>134</sup> ... and the tools that are trained from our data can be used to harm other people. Algorithms are also used by governments, police, and other agencies around the world. Tools and services from Google, Amazon, and Microsoft have all been used by Israel in their war on Gaza<sup>135</sup>. In the United States, algorithms have been used to score risk levels for people who have committed crimes about their likelihood to commit future crimes. But these algorithms have been found by researchers to be "remarkably unreliable" and include a significant amount of bias in their design and implementation<sup>136</sup>. In Spain, an algorithm was used to predict how likely a domestic abuse survivor would be to be abused again, with the intention to distribute support and resources to people who need it most urgently, in an overburdened system. But the algorithm isn't perfect and over-reliance on such flawed tools in high-stakes situations has had dire consequences. In some cases, survivors mislabelled as "low risk" have been murdered by their abusers despite their best

<sup>127</sup> Haskins, Caroline. "[ICE Started Ramping Up Its Surveillance Arsenal Immediately After Donald Trump Won.](#)" Wired, 2024.

<sup>128</sup> Buolamwini, Joy; et al. "[Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification.](#)" MIT, 2018.

<sup>129</sup> Najibi Alex. "[Racial Discrimination in Face Recognition Technology.](#)" Harvard Graduate School of Arts and Sciences, Science in the News, 2020.

<sup>130</sup> Manis, Eleni; et al. "[Seeing is Misbelieving.](#)" S.T.O.P. - The Surveillance Technology Oversight Project, 2024.

<sup>131</sup> Liberty "[Predictive policing.](#)"

<sup>132</sup> Sprick, Daniel. "[Predictive Policing in China: An Authoritarian Dream of Public Security.](#)" NAVEIÑ REET: Nordic Journal of Law and Social Research, 2019.

<sup>133</sup> Turner Lee, Nichol; et al. "[Algorithmic bias detection and mitigation: best practices and policies to reduce consumer harms.](#)" Brookings Institution, 2019.

<sup>134</sup> Morrison, Sara. "[The tricky truth about how generative AI uses your data.](#)" Vox, 2023.

<sup>135</sup> Abraham, Yuval. "[Leaked documents expose deep ties between Israeli army and Microsoft.](#)" +972 Magazine, 2025.

<sup>136</sup> Angwin, Julia; et al. "[Machine Bias.](#)" ProPublica, 2016.

efforts to seek help and report the abuse to authorities<sup>137</sup>. In the Netherlands, tax authorities used an algorithm to help them identify child care benefits fraud, with tens of thousands of lower-income families being penalized, resulting in many falling into poverty and even more than a thousand children wrongfully put into foster care. “Having dual nationality was marked as a big risk indicator, as was a low income [...] having Turkish or Moroccan nationality was a particular focus.”<sup>138</sup> Algorithmic bias has been covered in depth by researchers such as Cathy O’Neil<sup>139</sup>.

Amid all the obscurity, there are some who are trying to shed light. WikiLeaks, founded by Julian Assange<sup>140</sup>, publishes leaked classified documents online<sup>141</sup>. The largest of those leaks and in US history happened over WikiLeaks, including hundreds of thousands military and diplomatic documents shared by Chelsea Manning that exposed serious abuses perpetrated by the US in Iraq and Afghanistan<sup>142</sup>. Frances Haugen exposed thousands of problematic internal Facebook files<sup>143</sup> to The Wall Street Journal and the US Securities and Commission Exchange agency<sup>144</sup>. The Facebook files included internal discussions and reports about how the algorithm used by Facebook was negatively affecting societies around the world<sup>145</sup>. Edward Snowden shared over 1.7 million highly classified files<sup>146</sup> to journalists at The Washington Post and The Guardian that illustrated the extent of which the US NSA spies on their citizens as well as foreign leaders, including US allies such as Germany<sup>147</sup>. Whistleblowers who expose details about the technological companies, agencies, and systems are giving more information to the public about the consequences of these mechanics in our everyday lives and as they impact wider society – but are also met with controversy and debate.

Resources have been developed that document surveillance apparatuses, such as EFF’s Atlas of Surveillance<sup>148</sup> and Decode Surveillance NYC<sup>149</sup>. Guides like EFF’s Surveillance Defense for Campus Protests<sup>150</sup> provides university students with practical tips and an understanding of their legal rights, giving them information as a means of resistance. “Facial recognition for identification is mass surveillance and is incompatible with the rights to privacy, equality, and freedom of assembly [...] Banning facial recognition is a first step toward dismantling racist policing.”<sup>151</sup>

<sup>137</sup> Satariano, Adam; et al. [An Algorithm Told Police She Was Safe. Then Her Husband Killed Her.](#) The New York Times, 2024.

<sup>138</sup> Heikkilä, Melissa. [Dutch scandal serves as a warning for Europe over risks of using algorithms.](#) Politico, 2022.

<sup>139</sup> O’Neil, Cathy. [Do algorithms perpetuate human bias?](#) NPR, 2018.

<sup>140</sup> BBC. [Who is Wikileaks' Julian Assange and what did he do?](#) 2024.

<sup>141</sup> [WikiLeaks.](#)

<sup>142</sup> Martínez, Alonso. [Chelsea Manning 10 years after her sentence: what happened to the whistleblower?](#) EL PAÍS, 2023.

<sup>143</sup> [Facebook Papers.](#)

<sup>144</sup> Allyn, Bobby. [Here are 4 key points from the Facebook whistleblower's testimony on Capitol Hill.](#) NPR, 2021.

<sup>145</sup> Hao, Karen. [The Facebook whistleblower says its algorithms are dangerous. Here's why.](#) MIT Technology Review, 2021.

<sup>146</sup> Zakaria, Tabassum. [Exclusive: After 'cataclysmic' Snowden affair, NSA faces winds of change.](#) Reuters, 2013.

<sup>147</sup> Reuters. [U.S. spy agency tapped German chancellery for decades: WikiLeaks.](#) 2015.

<sup>148</sup> Electronic Frontier Foundation (EFF). [Atlas of Surveillance.](#) Accessed March 1, 2025.

<sup>149</sup> Amnesty International. [Digital volunteers to expose scale of facial recognition technology in New York City.](#) 2021.

<sup>150</sup> Mir, Rory; et al. [Surveillance Defense for Campus Protests.](#) Electronic Frontier Foundation, 2024.

<sup>151</sup> Amnesty International. [Inside the NYPD's Surveillance Machine.](#) Accessed March 1, 2025.

The terms that are used to describe technology can shape how we think about them. The word “smart” has a positive connotation, in most cases – but when it comes to technology, “smart” is usually interchangeably used with “efficient”. Imagine if instead of calling systems of surveillance “smart”, we called them “machiavellian” – how might that change our discourse, acceptance, and adoption of them? As researcher Carlos Delclós said: “Privacy is not merely invaded; it is obliterated, as human lives are fragmented into datasets optimised for corporate gain,”<sup>152</sup> and the same message can be extended to political gain. Regardless of whether we call technology by positive or negative terms, at the end of the day, the technology itself cannot be separated from the operators (i.e. the humans) who deploy it. If the people who use these technologies are also inhabiting societies and working within systems that have documented concerns of discrimination and/or of control, it seems quite possible that the tech will be used to cause harm. We don’t even need to imagine it. We can simply look around with both eyes open.

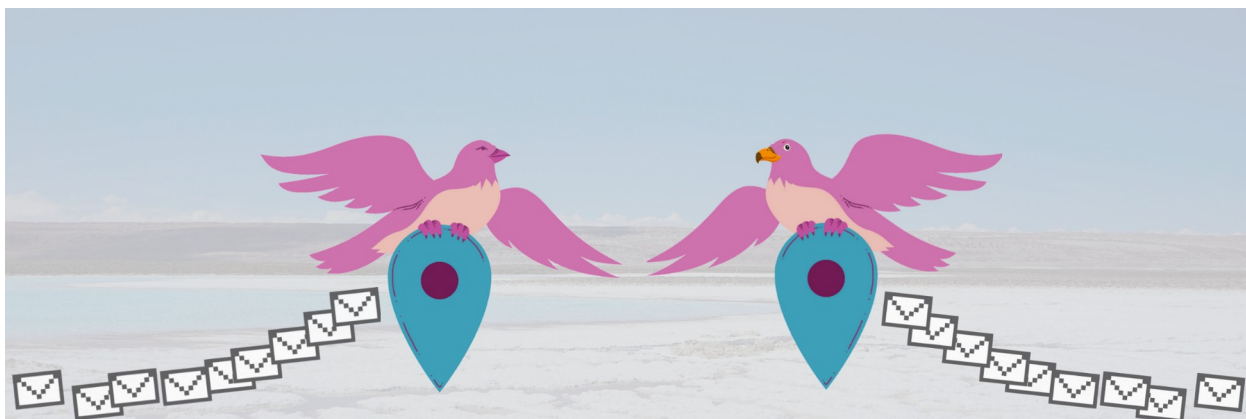
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<sup>152</sup> Delclós, Carlos. “[Countering Digital Colonialism](#).” CCCB LAB, 2025.

## Part 3: Do You Follow?

### Exposing how technology can exacerbate information disorder

*This essay is part of “Digitized Divides”, a multi-part series about technology and crisis. This part was written by Safa, and co-developed through discussions, research, framing, and editing by Safa, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderlyse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Alessandro Cripsta.*

Apps, websites, and online media can be essential for accessing news, services, and information. But amid all that content, it can be challenging to find reliable sources while navigating through the distractions, advertisements, and false information – especially shocking headlines and altered photos or videos that can convince you of a completely different reality. What we see online is not always what it seems.

Social media has been a key tool of information and connection for people who are part of traditionally marginalized communities. Young people access important communities they may not be able to access in real life, such as LGBTQ+ friendly spaces<sup>153</sup>. In the words of one teen: “Throughout my entire life, I have been bullied relentlessly. However, when I’m online, I find that it is easier to make friends... [...] Without it, I wouldn’t be here today.”<sup>154</sup> But experts are saying that social media has been “both the best thing [...] and it’s also the worst” to happen to the trans community, with hate speech and verbal abuse resulting in tragic real life consequences.<sup>155</sup> “Research to date suggests that social media experiences may be a double-edged sword for LGBTQ+ youth that can protect against or increase mental health and substance use risk.”<sup>156</sup>

In January 2025, Mark Zuckerberg announced that Meta (including Facebook and Instagram) would end their third-party fact-checking program in favor of the model of ‘community notes’ on X

<sup>153</sup> Soto, Jose. “[LGBTQ+ Youth in Digital Spaces](#).” Human Rights Campaign, 2021.

<sup>154</sup> Price, Dr. Myeshia; et al. “[“Without It, I Wouldn’t Be Here Today”: LGBTQ+ Young People’s Experiences in Online Spaces](#).” HopeLab, 2025.

<sup>155</sup> Compton, Julie. “[‘Frightening’ online transphobia has real-life consequences, advocates say](#).” NBC News, 2019.

<sup>156</sup> Fisher, Celia B.; et al. “[Social media: A double-edged sword for LGBTQ+ youth](#).” ScienceDirect, 2024.

(formerly Twitter).<sup>157</sup> Meta's decision includes ending policies that protect LGBTQ+ users.<sup>158</sup> Misinformation is an ongoing issue across social media platforms, reinforced and boosted by the design of the apps with the most clicks and likes getting the most rewards – whether they be rewards of attention or money. Research found that “the 15% most habitual Facebook users were responsible for 37% of the false headlines shared in the study, suggesting that a relatively small number of people can have an outsized impact on the information ecosystem.”<sup>159</sup>

Meta's pledge of removing their third-party fact-checking program has raised alarm bells of journalists, human rights organizations, and researchers. The UN's High Commissioner for Human Rights, Volker Türk, said in response: “Allowing hate speech and harmful content online has real world consequences.”<sup>160</sup> Meta has been implicated in or accused of supercharging the genocide of the Rohingya in Myanmar,<sup>161</sup> as well as fueling ethnic violence in Kenya,<sup>162</sup> Ethiopia,<sup>163</sup> and in Nigeria<sup>164</sup> at least in part due to the rampant misinformation on its platform. “We have evidence from a variety of sources that hate speech, divisive political speech, and misinformation on Facebook... are affecting societies around the world,” said one leaked internal Facebook report from 2019; “We also have compelling evidence that our core product mechanics, such as virality, recommendations, and optimizing for engagement, are a significant part of why these types of speech flourish on the platform.”<sup>165</sup> The International Fact-Checking Network responded to the end of the nine-year fact-checking program in an open letter shortly after Zuckerberg's 2025 announcement, stating: “the decision to end Meta's third-party fact-checking program is a step backward for those who want to see an internet that prioritizes accurate and trustworthy information.”<sup>166</sup>

## Unverifiable posts, disordered feeds

The algorithms behind social media platforms control which information is prioritized, repeated, and recommended to people in their feeds and in search results. But even with several reports, studies, and shifting user behaviors, the companies themselves have not done much to adapt their user interface designs to catch up to the more modern ways of interaction and facilitate meaningful user fact-checking.

Because social media feeds, such as Instagram's feed and “For You” page, mix information, it

<sup>157</sup> Parry, Hannah. “[Mark Zuckerberg Ends Meta Fact-Checking as Donald Trump Takes Office](#).” Newsweek, 2025.

<sup>158</sup> Conger, Kate. “[Meta Drops Rules Protecting LGBTQ Community as Part of Content Moderation Overhaul](#).” The New York Times, 2025.

<sup>159</sup> Ceylan, Gizem; et al. “[How Social Media Rewards Misinformation](#).” Yale Insights, 2023.

<sup>160</sup> UN News. “[It's not censorship to stop hateful online content, insists UN rights chief](#).” United Nations, 2025.

<sup>161</sup> Amnesty International. “[Myanmar: Facebook's systems promoted violence against Rohingya; Meta owes reparations – new report](#).” 2022.

<sup>162</sup> Amnesty International. “[META Sued in Kenya For Fueling Ethiopian Ethnic Violence](#).” Genocide Watch, 2022.

<sup>163</sup> Mackintosh, Eliza. “[Facebook knew it was being used to incite violence in Ethiopia. It did little to stop the spread, documents show](#).” CNN Business, 2021.

<sup>164</sup> Adegoke, Yemisi; et al. “[Like. Share. Kill. Nigerian police say false information on Facebook is killing people](#).” BBC, 2018.

<sup>165</sup> Cranz, Alex; et al. “[Facebook encourages hate speech for profit, says whistleblower](#).” The Verge, 2021.

<sup>166</sup> The International Fact-Checking Network. “[An open letter to Mark Zuckerberg from the world's fact-checkers, nine years later](#).” Poynter Institute, 2025.

becomes difficult for readers to distinguish whether a post, photo, or video is one minute, one day, or one week old, sometimes prioritizing older stories which have received more likes, shares, and comments ahead of the most recent information. This might be fine for seeing the most popular cat memes, but is a counterintuitive way to organize the news and does not facilitate people in documenting and tracking crises. Instagram has an option to temporarily change the feed between “Favorites” and “Following,” where the latter would show the latest posts first.<sup>167</sup> However, the naming and design are not intuitive and work in contrast with consistent and long-term needs for chronology that journalists and people in war or crisis situations may experience.

Additionally, on certain platforms such as Instagram, it is difficult to fact-check outside of the platform because the app doesn’t allow for hyperlinking in post and reel captions. This means if someone were to add a URL into a post’s or reel’s caption, the user would need to copy and paste it into a browser, but copying text is not possible on the mobile app. Without a special type of business account, it is not possible for typical users to add hyperlinks. To bypass this, most news agencies, influencers, and individuals will include a link in their bio which tries to organize the information they’ve recently been posting about. These extra steps or obstacles in order to look into and verify information could be a barrier or easily missed by users, especially those with less digital and media literacy training.

With all of this context about social media platforms not including design patterns that encourage and promote verification, fact-checking, citations, and sourcing of information, it is no wonder that mis- and disinformation spread rapidly<sup>168</sup>. Even when media outlets publish corrections to false information and any unsubstantiated claims they perpetuate, it isn’t enough to reverse the damage. As described by First Draft News: “it is very, very difficult to dislodge [misinformation] from your brain.”<sup>169</sup> When false information is published online or in the news and begins circulating, even if it is removed within minutes or hours, the ‘damage is done’ so-to-say. Corrections and clarifying statements rarely get as much attention as the original piece of false information and even if they are seen, they may not be internalized.

Algorithms are so prevalent that at first glance they may seem trivial, but are actually deeply significant. Well-known cases like the father who found out his daughter was pregnant through what was essentially an algorithm<sup>170</sup>, and another father whose Facebook “Year in Review” ‘celebrated’ the death of his daughter<sup>171</sup>, illustrate how the creators, developers, and designers of algorithmically curated content should be considerate of worst-case-scenarios. Edge-cases, although rare, are significant and warrant inspection and mitigation.

Furthering audiences down the rabbit hole, there have been a multitude of reports and studies that have found how recommendation algorithms across social media can radicalize audiences based on the content they prioritize and serve. “Moral outrage, specifically, is probably the most powerful

<sup>167</sup> Mosseri, Adam. [“Control your Instagram Feed with Favorites and Following.”](#) Instagram Blog, 2022.

<sup>168</sup> Oxford Internet Institute. [“Social media manipulation by political actors an industrial scale problem - Oxford report.”](#) 2021.

<sup>169</sup> Shane, Tommy. [“The psychology of misinformation: Why it’s so hard to correct.”](#) First Draft, 2020.

<sup>170</sup> Duhigg, Charles. [“How Companies Learn Your Secrets.”](#) The New York Times, 2012.

<sup>171</sup> Meyer, Eric A. [“My Year Was Tragic. Facebook Ambushed Me With a Painful Reminder.”](#) Slate, 2014.

form of content online.<sup>172</sup> A 2021 study found that TikTok’s algorithm led viewers from transphobic videos to violent far-right content, including racist, misogynistic, and ableist messaging. “Our research suggests that transphobia can be a gateway prejudice, leading to further far-right radicalization.”<sup>173</sup> YouTube was also once dubbed the “radicalization engine”<sup>174</sup>, and still seems to be struggling with its recommendation algorithms, such as the more recent report of YouTube Kids sending young viewers down eating disorder rabbit holes<sup>175</sup>. Ahead of German elections in 2025, researchers found that social media feeds across platforms, but especially on TikTok skewed right-wing<sup>176</sup>.

## An erosion of credibility

People are increasingly looking for their information in different ways, beyond traditional news media outlets. A 2019 report found that teens were getting most of their news from social media.<sup>177</sup> A 2022 article explained how many teens are using TikTok more than Google to find information.<sup>178</sup> That same year a study explored how adults under 30 trust information from social media almost as much as national news outlets.<sup>179</sup> A 2023 multi-country report found that less than half (40%) of total respondents “trust news most of the time.”<sup>180</sup> Researchers warned the trajectory of information disorder could result in governments steadily taking more control of information, adding “access to highly concentrated tech stacks will become an even more critical component of soft power for major powers to cement their influence.”<sup>181</sup>

Indonesia’s 2024 elections saw the use of AI-generated digital avatars take center stage, especially in capturing the attention of young voters. Former candidate, now President Prabowo Subianto used a cute digital avatar created by generative AI across social media platforms like TikTok, and was able to completely rebrand his public image and win the presidency – distracting from the accusations against him of committing major human rights abuses.<sup>182</sup> Generative AI, including chatbots like ChatGPT<sup>183</sup>, is also a key player in information disorder because of how realistic and convincing the texts and images produced by it can be. Even seemingly harmless content on spam pages like ‘Shrimp Jesus,’ can result in real-world consequences such as the erosion of trust, falling for scams, and breaching one’s data to brokers who feed that information

<sup>172</sup> Shapiro, Ari; et al. [“How the polarizing effect of social media is speeding up.”](#) NPR, 2022.

<sup>173</sup> Little, Olivia; et al. [“TikTok’s algorithm leads users from transphobic videos to far-right rabbit holes.”](#) Media Matters for America, 2021.

<sup>174</sup> Ingram, Mathew. [“The YouTube ‘radicalization engine’ debate continues.”](#) Columbia Journalism Review, 2020.

<sup>175</sup> Germain, Thomas. [“YouTube Wants to Stop Sending Kids Down the Rabbit Hole of Eating Disorder Videos.”](#) Gizmodo, 2023.

<sup>176</sup> Global Witness. [“X and TikTok algorithms push pro-AfD content to non-partisan German users - new analysis.”](#) 2025.

<sup>177</sup> Common Sense Media. [“New Survey Reveals Teens Get Their News from Social Media and YouTube.”](#) 2019.

<sup>178</sup> Huang, Kalley. [“For Gen Z, TikTok Is the New Search Engine.”](#) The New York Times, 2022.

<sup>179</sup> Eddy, Kirsten. [“Republicans, young adults now nearly as likely to trust info from social media as from national news outlets.”](#) Pew Research Center, 2024.

<sup>180</sup> Newman, Nic; et al. [“Reuters Institute Digital News Report 2023.”](#) (page 10) Reuters Institute for the Study of Journalism, 2023.

<sup>181</sup> Cavaciuti-Wishart, Ellissa; et al. [“Global Risks Report 2024.”](#) World Economic Forum, 2024.

<sup>182</sup> Burgess, Annika; et al. [“Dancing, cats and Hunger Games. Indonesia’s presidential candidates take social media campaigning to a ‘whole new level’.”](#) ABC News, 2023.

<sup>183</sup> Hsu, Tiffany. [“Disinformation Researchers Raise Alarms About A.I. Chatbots.”](#) The New York Times, 2023.

back into systems fueling digital influence.<sup>184</sup> Furthermore, the outputs of generative AI may be highly controlled. “Automated systems have enabled governments to conduct more precise and subtle forms of online censorship,” according to a 2023 Freedom House report. “Purveyors of disinformation are employing AI-generated images, audio, and text, making the truth easier to distort and harder to discern.”<sup>185</sup>

One tool used in digital influencing is psychometric profiling<sup>186</sup>, which sometimes relies on the so-called OCEAN model (which claims to measure and assess a person’s openness, conscientiousness, empathy, agreeableness, and neuroticism) in order to help predict what kinds of messages they’ll be most likely to respond to. One individual user can be profiled and categorized into larger groups of thousands or millions of users, based on what similarly provokes and motivates them. It becomes much simpler to serve up specific advertisements and prioritize certain content in peoples’ feeds and search results that get them to click and engage. Psychometric profiling was one of the methods used by Cambridge Analytica for years, and which was exposed in 2017.<sup>187</sup> But Cambridge Analytica was far from the only business working in this way, as there are documented to be over 500 companies in the so-called “influence industry” that use personal data for political profiling.<sup>188</sup> The proliferation of AI tools has made the influence industry less transparent and more difficult to regulate than it was in the pre-internet era. With the rise of AI, these mass models of profiling have become easier and faster than ever for anyone with the resources to do it.

As has been echoed time and again throughout this series, technology is neither good, nor bad – it depends on for what purpose it is used. “Technology inherits the politics of its authors, but almost all technology can be harnessed in ways that transcend these frameworks.”<sup>189</sup> These various use cases and comparisons can be useful when discussing specific tools and methods, but only at a superficial level – for instance in regards to digital avatars which were mentioned in this piece. One key example comes from Venezuela, where the media landscape is rife with AI-generated pro-government messages<sup>190</sup> and people working in journalism face threats of imprisonment. In response journalists have harnessed and leveraged digital avatars to help protect their identities and maintain privacy.<sup>191</sup> This is indeed a story of resilience, but it sits within a larger and more nefarious context of power and punishment. While any individual tool can reveal both benefits and drawbacks in their use cases, zooming out and looking at the bigger picture reveals power systems and structures that put people at risk and the trade-offs of technology are simply not symmetrical.

<sup>184</sup> DiResta, Renee; et al. “[How Spammers, Scammers and Creators Leverage AI-Generated Images on Facebook for Audience Growth.](#)” Stanford Cyber Policy Center, 2024.

<sup>185</sup> Funk, Allie; et al. “[The Repressive Power of Artificial Intelligence.](#)” Freedom House, 2023.

<sup>186</sup> Bashyarkar, Varoon; et al. “[Personal Data: Political Persuasion - The Guidebook and Visual Gallery.](#)” Data and Politics, Tactical Tech, 2019.

<sup>187</sup> Chang, Alvin. “[The Facebook and Cambridge Analytica scandal, explained with a simple diagram.](#)” Vox, 2018.

<sup>188</sup> Macintyre, Amber; et al. “[The Influence Industry Explorer.](#)” The Influence Industry Project, Tactical Tech. Accessed February 6, 2025.

<sup>189</sup> Cade; et al. “[On Weaponised Design.](#)” Our Data Our Selves, Tactical Tech, 2018.

<sup>190</sup> Ryan-Mosley, Tate. “[How generative AI is boosting the spread of disinformation and propaganda.](#)” MIT Technology Review, 2023.

<sup>191</sup> Rueda, Manuel. “[Venezuelan journalists use AI to avoid government scrutiny.](#)” All Things Considered on NPR, 2024.

Two truths can exist at the same time, and the fact that technology is used for harnessing strength and is used for harming and oppressing people is significant.

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## Part 4: Systematized Supremacy

### Witnessing how tech is used to conquer and destroy

*This essay is part of "Digitized Divides", a multi-part series about technology and crisis. This part was written by Safa, and co-developed through discussions, research, framing, and editing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Yiorgos Bagakis and La Loma.*

The aggregation of personal data of wide groups of people can be used to provide benefits to individuals and society, such as in early cancer detection using machine learning<sup>192</sup>, wastewater monitoring to detect broad levels of COVID transmissions in a certain area before hospitals get overloaded,<sup>193</sup> and satellite radar data being used to monitor illegal logging and support in forest conservation efforts<sup>194</sup>. But there have also been significant cases of personal data used under the guise of 'safety and security' that inform actions and policies resulting in widespread oppression and harm. Data, and the tools it feeds, in and of itself isn't good or bad, helpful or harmful – it depends on who is collecting it, what is being collected, how it is being collected, and how the information and results are used. Technology can be used to help people, to harm people, but it also isn't necessarily an either/or situation – it can be used simultaneously for the benefit of one person or group while harming another person or group.

While some may ask whether the benefits of using personal data to implement widespread policies and actions outweigh the harms, this piece posits that comparing the benefits and harms in this balanced, binary, two-sided approach is a misguided way of critical assessment, especially when the harms include violence against civilians. After all, human suffering is never justified and there are no ways to sugarcoat negative repercussions in good faith. Technological bothsidesism makes an attempt at determining the 'goodness' or 'brownie points' of technology, which is a distraction, because technology itself isn't good or bad, it is about the humans behind it – the owners and operators behind the machines. Depending on the intentions and aims of those people, technology can be used for a wide variety of purposes.

<sup>192</sup> Hunter, Benjamin; et al. "[The Role of Artificial Intelligence in Early Cancer Diagnosis.](#)" *Cancers* (Basel). 2022 Mar 16;14(6):1524.

<sup>193</sup> U.S. Centers for Disease Control and Prevention. "[National Wastewater Surveillance System.](#)" 2025.

<sup>194</sup> Weisse, Mikaela. "[New Radar Alerts Monitor Forests Through the Clouds.](#)" *Global Forest Watch Blog*, 2021.

In the 1985 novel “Ender’s Game”, the young protagonist Ender is recruited to Battle School to train as a child soldier in the fight against what appears to be an insect-like race through what are explained as virtual simulation fights. But the big twist is that there were actually no *simulations* and the “enemy” within the game was a real-life group who were ultimately not the aggressors and were actually systematically dehumanized which in turn facilitated Ender and his people to commit technologically-assisted annihilation of them. In this story, the people with the technology and oversight were well-aware of what they were doing and regardless of the facts, used their own biases to develop propaganda that radicalized generations of people with the tools to commit atrocious acts. The technology in Ender’s Game caused a distraction, diverting the readers away from the real issues until the end, when it was too late. Humanity has been living in this reality in one way or another for some time – and for the past few years it has been supercharged by AI.

## Lucrative and lethal

Israel uses data collected from Palestinians to train AI-powered automated tools,<sup>195</sup> including those which have been co-produced by international firms, like the collaboration between Israel’s Elbit Systems and India’s Adani Defence and Aerospace<sup>196</sup>, that have been deployed in Gaza<sup>197</sup> and across the West Bank<sup>198</sup>. Israeli AI-supercharged surveillance<sup>199</sup> tools and spyware<sup>200</sup> – including Pegasus<sup>201</sup>, Paragon<sup>202</sup>, QuaDream<sup>203</sup>, Candiru<sup>204</sup>, Cellebrite<sup>205</sup> as well as AI weaponry including the Smart Shooter<sup>206</sup> and Lavender<sup>207</sup> – have received both condemnation from human rights groups<sup>208</sup> and interest from governments worldwide<sup>209</sup>. Graduates of the Israeli military’s elite intelligence unit, Unit 8200, are so coveted by surveillance and military tech companies that there is a term “8200-

<sup>195</sup> [Killer AI](#)

<sup>196</sup> Paul, Roy. “[Adani Defence And Aerospace And Elbit Systems Inaugurate India First Private Uav Manufacturing](#).” Adani Newsroom, 2018.

<sup>197</sup> Human Rights Watch. “[Questions and Answers: Israeli Military’s Use of Digital Tools in Gaza](#).” 2024.

<sup>198</sup> Bennett, Tom. “[Intensified Israeli Surveillance Has Put the West Bank on Lockdown](#).” Wired, 2023.

<sup>199</sup> [Surveillance Watch](#)

<sup>200</sup> Priest, Dana; et al. “[Private Israeli spyware used to hack cellphones of journalists, activists worldwide](#).” The Washington Post, 2021.

<sup>201</sup> Geybullayeva, Arzu. “[New report uncovers the first documented case of Pegasus spyware used in an international war context](#).” Global Voices, 2023.

<sup>202</sup> Satter, Raphael. “[Meta’s WhatsApp says spyware company Paragon targeted users in two dozen countries](#).” Reuters, 2025.

<sup>203</sup> Marczak, Bill; et al. “[A First Look at Spyware Vendor QuaDream’s Exploits, Victims, and Customers](#).” The Citizen Lab, 2023.

<sup>204</sup> Marczak, Bill; et al. “[Hooking Candiru: Another Mercenary Spyware Vendor Comes into Focus](#).” The Citizen Lab, 2021.

<sup>205</sup> Dowsett, James. “[Amid Protests, Georgia Plans to Purchase Israeli Data Extraction Tech](#).” Organized Crime and Corruption Reporting Project (OCCRP), 2025.

<sup>206</sup> Gault, Matthew. “[Israel Deploys AI-Powered Turret in the West Bank](#).” Vice, 2022.

<sup>207</sup> Pascual, Manuel G. “[Lavender, Israel’s artificial intelligence system that decides who to bomb in Gaza](#).” EL PAÍS, 2024.

<sup>208</sup> Pratt, Simon Frankel. “[When AI Decides Who Lives and Dies](#).” Foreign Policy, 2024.

<sup>209</sup> Tidy, Joe. “[Pegasus: Spyware sold to governments 'targets activists'](#).” BBC, 2021.

to-tech pipeline<sup>210</sup>. Israeli surveillance is world famous and exported to many places, including South Sudan<sup>211</sup> and the United States<sup>212</sup>.

The United States is also looking into ways to use home-made and imported facial recognition technologies at the US-Mexico border to track the identities of migrant children, collecting data they can use over time. Eileen Guo of MIT Technology Review wrote: “That this technology would target people who are offered fewer privacy protections than would be afforded to US citizens is just part of the wider trend of using people from the developing world, whether they are migrants coming to the border or civilians in war zones, to help improve new technologies.”<sup>213</sup> In addition to facial recognition, the United States is also collecting DNA samples of immigrants for a mass registry with the FBI<sup>214</sup>.

In 2021, US-headquartered companies Google and Amazon jointly signed an exclusive billion-dollar contract with the Israeli government to develop ‘Project Nimbus’, which was meant to advance technologies in facial detection, automated image categorization, object tracking, and sentiment analysis for military use – a move that was condemned by hundreds of Google and Amazon employees<sup>215</sup> in a coalition called No Tech for Apartheid<sup>216</sup>. One AI-powered system called “Where’s Daddy” identifies targets based on various criteria, one of which is whether the person is in a WhatsApp group with another suspected individual.<sup>217</sup> AI-powered systems, ‘Lavender’ and ‘The Gospel’ (‘Hasbora’), have been referred to as a “mass assassination factory” in Gaza with minimal human oversight where “emphasis is on quantity and not on quality”.<sup>218</sup> The Israeli army also has ties with Microsoft<sup>219</sup> for machine learning tools and cloud storage<sup>220</sup>. These examples are brought in here to show the imbalance of power within the greater systems of oppression at play. These tools and corporate-ties are not accessible to all potential benefactors – it would be inconceivable for Google, Amazon, and Microsoft to sign these same contracts with, say, the Islamic Resistance Movement.

<sup>210</sup> Barshad, Amos. [“Inside Israel’s lucrative – and secretive – cybersurveillance industry.”](#) Rest of World, 2021.

<sup>211</sup> Mack, Eitay; et al. [“For Israeli press, surveillance is only a problem when targeting Jewish citizens.”](#) +972 Magazine, 2020.

<sup>212</sup> Feldstein, Steven. [“Governments Are Using Spyware on Citizens. Can They Be Stopped?”](#) Carnegie Endowment for International Peace, 2021.

<sup>213</sup> Guo, Eileen. [“The US wants to use facial recognition to identify migrant children as they age.”](#) MIT Technology Review, 2024.

<sup>214</sup> Glaberson, Stevie; et al. [“Raiding the Genome: How the United States Government Is Abusing Its Immigration Powers to Amass DNA for Future Policing.”](#) Georgetown Law, 2024.

<sup>215</sup> Anonymous Google and Amazon workers. [“We are Google and Amazon workers. We condemn Project Nimbus.”](#) The Guardian, 2021.

<sup>216</sup> [“No Tech for Apartheid.”](#)

<sup>217</sup> Abraham, Yuval. [“‘Lavender’: The AI machine directing Israel’s bombing spree in Gaza.”](#) +972 Magazine, 2024.

<sup>218</sup> Abraham, Yuval. [“‘A mass assassination factory’: Inside Israel’s calculated bombing of Gaza.”](#) +972 Magazine, 2023.

<sup>219</sup> Abraham, Yuval. [“Leaked documents expose deep ties between Israeli army and Microsoft.”](#) +972 Magazine, 2025.

<sup>220</sup> Davies, Harry; et al. [“Revealed: Microsoft deepened ties with Israeli military to provide tech support during Gaza war.”](#) The Guardian, 2025.

## 'Smart' weapons, nightmare fuel

Former US President, Barack Obama is credited for normalizing the use of armed drones in non-battlefield settings.<sup>221</sup> The Obama administration described drone strikes as “surgical” and “precise,”<sup>222</sup> at times even claiming that the use of armed drones resulted in not “a single collateral death,”<sup>223</sup> when that was patently false.<sup>224</sup> Since Obama took office in 2009, drone strikes became commonplace and even expanded in US international actions (in battlefield and non-battlefield settings) of the subsequent administrations.<sup>225</sup> Critics say the use of drones in warfare gives governments the power to “act as judge, jury, and executioner from thousands of miles away” and that civilians “disproportionately suffer” in “an urgent threat to the right to life”.<sup>226</sup> In one example, the BBC described Russian drones as “hunting” Ukrainian civilians<sup>227</sup>.

In 2009, Human Rights Watch reported on Israel’s use of armed drones in Gaza<sup>228</sup> – although drone use was considered a “well-known secret” in Israeli society until more recently<sup>229</sup>. In 2021, Israel started deploying “drone swarms” in Gaza to locate and monitor targets.<sup>230</sup> In 2022, Omri Dor, commander of Palmachim Airbase, said, “The whole of Gaza is ‘covered’ with UAVs that collect intelligence 24 hours a day.”<sup>231</sup> In Gaza, drone technology has played a major role in increasing damage and targets, including hybrid drones such as “The Rooster”<sup>232</sup> and “Robodogs”<sup>233</sup> that can fly, hover, roll, and climb uneven terrain. Machine gun rovers have been used to replace on-the-ground troops.<sup>234</sup>

The AI-powered Smart Shooter whose slogan is “one-shot, one-hit” boasts a high-degree of accuracy. “The system locks in on the target and follows it using artificial intelligence to process the image in real-time. The bullet exits the gun only when a hit is ensured.”<sup>235</sup> The Smart Shooter was installed during its pilot stage in 2022 at a Hebron checkpoint, where it remains active to this

<sup>221</sup> Zenko, Micah. “[Obama’s Final Drone Strike Data](#).” Council on Foreign Relations, 2017.

<sup>222</sup> Brady, James S. “[Press Briefing by Press Secretary Jay Carney, 1/31/12](#).” White House, 2012.

<sup>223</sup> Woods, Chris. “[New questions over CIA nominee Brennan’s denial of civilian drone deaths](#).” The Bureau of Investigative Journalism, 2013.

<sup>224</sup> Purkiss, Jessica; et al. “[Obama’s covert drone war in numbers: ten times more strikes than Bush](#).” The Bureau of Investigative Journalism, 2017.

<sup>225</sup> Wargaski, Robert. “[U.S. Drone Warfare and Civilian Casualties](#).” Eagleton Political Journal, Rutgers University-New Brunswick, 2022.

<sup>226</sup> Doyle, Adriana. “[Drone Warfare is Eroding the Right to Life](#).” Berkeley Political Review, 2024.

<sup>227</sup> Limaye, Yogita. “[Drone strikes on civilians suggest new Russian terror tactic in Ukraine](#).” BBC, 2024.

<sup>228</sup> Human Rights Watch. “[Precisely Wrong: Gaza Civilians Killed by Israeli Drone-Launched Missiles](#).” 2009.

<sup>229</sup> Bob, Yonah Jeremy. “[IDF general: Drones crucial in almost all Israeli missions](#).” The Jerusalem Post, 2022.

<sup>230</sup> Gross, Judah Ari. “[In apparent world first, IDF deployed drone swarms in Gaza fighting](#).” The Times of Israel, 2021.

<sup>231</sup> Fabian, Emanuel. “[Armed drones gave IDF ‘surgical’ precision during recent Gaza fighting, officers say](#).” The Times of Israel, 2022.

<sup>232</sup> Boguslavsky, Eyal. “[Meet the Rooster, Robotican’s New Hybrid Robotic Drone Employed by the IDF in Gaza](#).” Israel Defense, 2024.

<sup>233</sup> Gilead, Assaf. “[Israel recruits robot dogs for Gaza fighting](#).” Globes, 2023.

<sup>234</sup> Ali, Taz. “[Robodogs and machine gun rovers replacing troops in Gaza war](#).” The iPaper, 2024.

<sup>235</sup> Sasson, Assa. “[This Israeli Startup Makes Sure Every Soldier’s Bullet Hits Its Target](#).” Haaretz, 2021.

day. Israel also employs 'smart' missiles, like the SPICE 2000<sup>236</sup> which was used in October 2024 to bomb a Beirut high-rise apartment building<sup>237</sup>.

The Israeli military is considered to be in the top 20 most powerful military forces in the world<sup>238</sup> with a military budget second only to Ukraine<sup>239</sup>. Israel has claimed that it conducts "precision strikes" and does not target civilians<sup>240</sup>, but civilian harm expert Larry Lewis has said Israel's civilian harm mitigation strategies have been insufficient, with their campaigns seemingly designed to create risk to civilians.<sup>241</sup> The aforementioned technologies employed by Israel have helped their military use disproportionate force<sup>242</sup> to kill Palestinians in Gaza en masse, as an IDF spokesperson described: "we're focused on what causes maximum damage."<sup>243</sup> While AI-powered technologies reduce boots on-the-ground and therefore potential injuries and casualties of the military who deploys them, they greatly increase casualties of those being targeted. The Israeli military claims AI-powered systems "have minimized collateral damage and raised the accuracy of the human-led process,"<sup>244</sup> but the documented results tell a different story. According to the UN Office for Coordinated Affairs in the Occupied Palestinian Territories, from October 7th, 2023 until May 7th, 2025, Israel has killed 52,653 Palestinians and injured another 118,897 people.<sup>245</sup> Documentation reveals that at least 13,319 of the Palestinian who were killed were babies and children between 0 and 12 years of age.<sup>246</sup> The UN's reports of Palestinian casualties are said to be conservative by researchers, who estimate the true death toll to be double<sup>247</sup> or even more than triple<sup>248</sup>. According to one report: "So-called 'smart systems' may determine the target, but the bombing is carried out with unguided and imprecise 'dumb' ammunition because the army doesn't want to use expensive bombs on what one intelligence officer described as 'garbage targets.'"<sup>249</sup> Furthermore, 92% of housing units were destroyed in Gaza, as well as 88% of school buildings, and 69% of overall structures across Gaza have been destroyed or damaged.<sup>250</sup>

<sup>236</sup> Schreck, Adam. "[Israeli weapon seen in rare AP photos of Beirut airstrike appears to be a powerful smart bomb.](#)" The Associated Press, 2024.

<sup>237</sup> Hussein, Bilal. "[Images capture the exact moments an Israeli bomb strikes a building in Beirut.](#)" The Associated Press, 2024.

<sup>238</sup> Koronka, Poppy. "[The 20 Most Powerful Military Forces in the World.](#)" Newsweek, 2021.

<sup>239</sup> Elmas, Dan Shmuel. "[Second only to Ukraine: The cost of Israel's defense burden.](#)" The Jerusalem Post, 2024.

<sup>240</sup> Abdulrahim, Raja. "[Israel Called Them 'Precision' Strikes. But Civilian Homes Were Hit, Too.](#)" The New York Times, 2023.

<sup>241</sup> Lewis, Larry. "[Israeli Civilian Harm Mitigation in Gaza: Gold Standard or Fool's Gold?](#)" Just Security, 2024.

<sup>242</sup> Rogers, Paul. "[Israel's use of disproportionate force is a long-established tactic – with a clear aim.](#)" The Guardian, 2023.

<sup>243</sup> McKernan, Bethan; et al. "['We're focused on maximum damage': ground offensive into Gaza seems imminent.](#)" The Guardian, 2023.

<sup>244</sup> Ynet. "['Man replaced by machine': Is the use of AI undermining the IDF's intelligence capabilities?](#)" 2024.

<sup>245</sup> UN Office for Coordinated Affairs in the Occupied Palestinian Territories. "[Reported impact snapshot | Gaza Strip \(7 May 2025\).](#)" 2025.

<sup>246</sup> Palestine Datasets. "[Killed in Gaza.](#)" Accessed January 2025.

<sup>247</sup> The Economist. "[How many people have died in Gaza?](#)" 2025.

<sup>248</sup> Khatib, Rasha; et al. "[Counting the dead in Gaza: difficult but essential.](#)" The Lancet, 2024.

<sup>249</sup> Goodfriend, Sophia. "[Why human agency is still central to Israel's AI-powered warfare.](#)" +972 Magazine, 2024.

<sup>250</sup> UN Office for Coordinated Affairs in the Occupied Palestinian Territories. "[Reported impact snapshot | Gaza Strip \(11 March 2025\).](#)"

In 2024, UN experts deplored<sup>251</sup> Israel's use of AI to commit crimes against humanity in Gaza. Regardless of all of the aforementioned information, that same year, Israel signed a global treaty on AI<sup>252</sup> developed by the Council of Europe for safeguarding human rights. Seeing how Israel has killed such a large number of Palestinians using AI-powered tools, and connected to technologies which are used in daily life, such as WhatsApp, is seen by some as a warning sign of what is possible to befall them one day, but is seen by others as a blueprint for efficiently systematizing supremacy and control.

This piece positions that it isn't just about the lack of human oversight with data and AI tools that is the issue – actually, *who* collects, owns, controls, and interprets the data and what their biases are (whether implicit or explicit) is a key part in understanding the actual and potential for harm and abuse. Furthermore, focusing exclusively on technology in Israel's war on Gaza, or any war for that matter, could risk a major mistake: absolving the perpetrator's responsibility of crimes they commit using technology. When over-emphasizing the tools, it can become all-too-easy to redefine intentional abuses as machine-made mistakes.

When looking at technology's use in geopolitics and warfare, understanding the power structures is key to gaining a clear overview. Finding the 'goodness' in ultra specific uses of technology does little in the attempt to offset the 'bad'. For the human beings whose lives have been made more challenging and conditions dire as a result of the implementation of technology in domination, warfare, and systems of supremacy, there is not much that can be rationalized for the better. And the same can be said of other entities who use advantages (geopolitical, technological, or otherwise) in order to assert control over others who are in relatively more disadvantaged and vulnerable positions. To divorce the helpful and harmful applications of technology is to lose oversight of the bigger picture of not only how tech could be used one day, but how it is actually being used right now.

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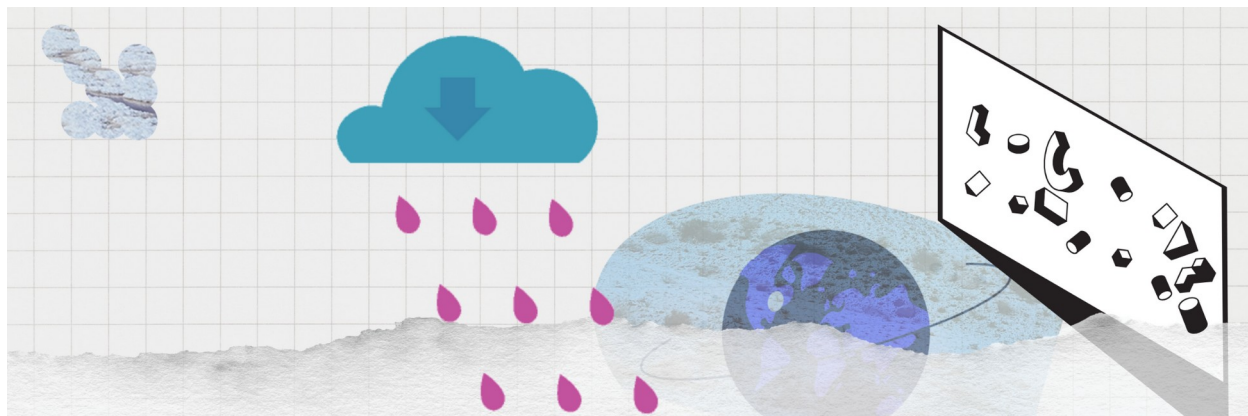
<sup>251</sup> Rajagopal, Balakrishnan; et al. "[Gaza: UN experts deplore use of purported AI to commit 'domicide' in Gaza, call for reparative approach to rebuilding.](#)" OHCHR, 2024.

<sup>252</sup> gov.il. "[Israel Signs Groundbreaking Global AI Treaty.](#)" 2024.

## Part 5: Tactile Tech

### Uncovering the materiality of internet infrastructures

*This essay is part of “Digitized Divides”, a multi-part series about technology and crisis. This part was written by Louise Hisayasu with support from Safa, and co-developed through discussions, research, and framing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Yiorgos Bagakis and Alessandro Cripsta.*

It’s easy to think about digital stuff: photos, videos, websites, e-books, messaging apps and backups like they are weightless and ethereal – especially when that’s how they are advertised with product names that use nature-related or diminutive words like *streaming*, the *cloud*, *Mini*<sup>253</sup>, *Nano*<sup>254</sup>, and *Air*<sup>255</sup>. In reality, the systems behind them are heavy, noisy, and consume a great deal of energy and water. Global emissions from cloud computing alone are now higher than those of commercial flights<sup>256</sup>.

But while many people are connected to the latest technology and high-speed internet, a third of the world’s population is still not connected.<sup>257</sup> The material infrastructure of technology is deeply entangled with historical and ongoing structures of colonialism, capitalism, and global inequality. The statistics reflect a disparity between high- and low-income countries, with 93% of individuals with internet access versus 27%, respectively.<sup>258</sup> Submarine cables have been laid almost exactly over historic transatlantic slavery routes and over the copper telegraph network essential to the British empire in the 1800s.<sup>259</sup> The global internet is dependent on these cables, which are owned and controlled by tech giants and corporations – mostly those who are headquartered in the United States and Europe. The owners of these cables dictate the flow of data, pricing, and access – reinforcing economic dominance and control maintained after centuries of exploitation.

<sup>253</sup> Apple Press Info. “[Apple Introduces iPod Mini.](#)” 2004.

<sup>254</sup> Apple Press Info. “[Apple Introduces iPod Nano.](#)” 2005.

<sup>255</sup> Apple News Room. “[Apple introduces the 15-inch MacBook Air.](#)” 2023.

<sup>256</sup> Lavi, Hessam. “[Measuring greenhouse gas emissions in data centres: the environmental impact of cloud computing.](#)” *climatiq*, 2023.

<sup>257</sup> Filipenco, Danlil. “[Internet access and digital divide: global statistics.](#)” DevelopmentAid, 2024.

<sup>258</sup> Filipenco, Danlil. “[Internet access and digital divide: global statistics.](#)” DevelopmentAid, 2024.

<sup>259</sup> Auerbach Jahajeeah, Jess. “[Undersea cables for Africa’s internet retrace history and leave digital gaps as they connect continents.](#)” *The Conversation*, 2024.

With the development and proliferation of AI, understanding infrastructures that are essential for the internet and technology is more important than ever. It is hypothesized that by 2030 the air pollution from AI, in particular from data centers, could result in a public health burden that is double that of the US steelmaking industry.<sup>260</sup> When people use the internet they are making use of a massive physical infrastructure of underground cables, radio towers, ports, underwater sea cables, and servers. These systems are what make it possible to use artificial intelligence, stream videos and games, and connect to 5G.

## Thousands of massive concrete buildings

Data centers store much of our data, as well as process it and connect it between servers or devices. Everytime you check your email, go on Instagram, or fill up a virtual shopping cart, you're being shown information that is stored on a server in a data center. These are necessary physical structures that are vital for communication, work, entertainment, and so much more. The internet relies on the over 8,000 data centers around the world<sup>261</sup> which virtually process, sort, store, and ship data in the blink of an eye.

Data centers are giant concrete warehouse-like buildings filled with servers that process and store the internet's data, but produce a large amount of heat in the process. Air conditioners are on around the clock and chilled water passed through pipes are necessary to avoid centers setting on fire. Cooling accounts for over 40% of the electricity used in data centers<sup>262</sup>. A single data center uses several million gallons of water per day.<sup>263</sup> In Oregon, one local newspaper went to court in order to access information revealing that a Google data center used over a quarter of the water in one riverfront town<sup>264</sup>. One particular data center in Utah, part of the US's National Security Agency (NSA), uses seven million gallons of water per day<sup>265</sup> - revealing the environmental cost of surveillance. Data centers also drain electricity from the local towns, often vulnerable communities such as on Navajo land, and affecting Black Americans; According to the Washington Post, "Arizona Public Service, the state's largest utility provider, estimates 55 percent of its future electricity needs will be caused by data centers, according to planning documents reviewed by The Post."<sup>266</sup> Since servers and cooling machines are working around the clock, they also produce constant noise pollution, which can be harmful to the emotional and physical health of workers and inhabitants living nearby.<sup>267</sup> Near one data center, residents complained about the constant, inescapable noise, describing it as "sounding like a propeller, a 'loud drone hovering above 24/7,' a 'big fan,' a construction site, a 'low-frequency sound,' an airplane engine, a helicopter, a freight train, a leaf blower, and a lawn mower."<sup>268</sup>

<sup>260</sup> Upton-Clarke, Eve. "[Air pollution from AI could surpass that of all the cars in California.](#)" Fast Company, 2024.

<sup>261</sup> International Energy Agency. "[Electricity 2024: Analysis and forecast to 2026.](#)" 2024.

<sup>262</sup> Monserrate, Steven Gonzalez. "[The Staggering Ecological Impacts of Computation and the Cloud.](#)" Scientific American, 2022.

<sup>263</sup> Zhang, Mary. "[Data Center Water Usage: A Comprehensive Guide.](#)" Dgtl Infra, 2024.

<sup>264</sup> Rogoway, Mike. "[Google's water use is soaring in The Dalles, records show, with two more data centers to come.](#)" The Oregonian, 2023.

<sup>265</sup> Monserrate, Steven Gonzalez. "[The Cloud Is Material: On the Environmental Impacts of Computation and Data Storage.](#)" MIT Schwarzmann College of Computing, 2022.

<sup>266</sup> Verma, Pranshu. "[Amid Arizona's data center boom, many Native Americans live without power.](#)" The Washington Post, 2024.

<sup>267</sup> Richardson, Kelly. "[Understanding the impact of data center noise pollution.](#)" TechTarget, 2024.

A lesser known fact is that data centers are made to be hyper-redundant. That means that to meet the demand for the cloud and data being available any time of the day (i.e. online banking or businesses relying on their websites being operational to meet the demands); various back-up systems need to be running and ready to take over at any moment. Energy is also consumed in this process. "In some cases, only 6 to 12 percent of energy consumed is devoted to active computational processes," according to an article in Scientific American. "The remainder is allocated to cooling and maintaining chains upon chains of redundant fail-safes to prevent costly downtime."<sup>269</sup> This means that only a small fraction of energy used by data centers is actually for processing data. Most of it is used to cool and maintain back-ups of back-ups to make sure that if one computer fails, another is ready to take its place.

## From the depths of the sea to outer space

Ever wondered how your instant messages arrive so instantly? There are around 1.4 million kilometers<sup>270</sup> of cables laying on the ocean floor transmitting data from one continent to another. For the most part, the cables are as wide as a garden hose. Inside, the strings that carry fibre optic signals are as thin as human hairs. These strings are wrapped with layers of protection to make them waterproof and to protect them from things like shark bites, natural disasters, and boat anchors. Today, there are over 600 active and planned cables that transmit more than 95% of the world's data.<sup>271</sup> Almost every country that has a coastline is connected to multiple cables to ensure reliable connection. Most of the cables are concentrated at the coastlines of populated countries, but there are fewer connections for people living in remote places. Undersea cables are vulnerable to natural disasters, human accidents, and intentional tampering – the repair of one cable is estimated to cost \$2 million USD.<sup>272</sup>

Cables used to be owned by telecommunications companies that formed consortia of parties interested in using the cable. In the 1990s, an influx of entrepreneurial companies built private cables and sold them off to users. Both of these models still exist and operate today. However, more recently, the biggest change is that Big Tech companies like Google, Facebook, Microsoft and Amazon are building their own cables. As of 2019, these four companies owned or leased more than half of the Internet's underwater bandwidth<sup>273</sup>.

Not all bandwidth is divided equally; in one study, researchers found that while the U.S. was using 4,960,388 Mbps of international bandwidth, India (which is four times more populous) only used a fraction of it – 4,977 Mbps – that same year.<sup>274</sup> Surveillance is also a major factor in undersea cable interest, such as monitoring by the US National Security Agency (NSA)<sup>275</sup> and the UK's Government

<sup>268</sup> Chan, Rosalie. "[Virginia's 'Data Center Alley' residents say an eerie hum is keeping them up at night.](#)" Business Insider, 2023.

<sup>269</sup> Monserrate, Steven Gonzalez. "[The Staggering Ecological Impacts of Computation and the Cloud.](#)" Scientific American, 2022.

<sup>270</sup> Gray, Alex. "[How the Internet travels under the sea in super-fast cables.](#)" World Economic Forum, 2017.

<sup>271</sup> TeleGeography. "[Submarine Cable Frequently Asked Questions.](#)" 2024.

<sup>272</sup> Munga, Jane. "[Beneath the Waves: Addressing Vulnerabilities in Africa's Undersea Digital Infrastructure.](#)" Carnegie Endowment for International Peace, 2025.

<sup>273</sup> Satariano, Adam. "[How the Internet Travels Across Oceans.](#)" The New York Times, 2019.

<sup>274</sup> Cooper, Tyler. "[Google and other tech giants are quietly buying up the most important part of the internet.](#)" Venture Beat, 2019.

<sup>275</sup> Timberg, Craig. "[NSA slide shows surveillance of undersea cables.](#)" The Washington Post, 2013.

Communications Headquarters (GCHQ)<sup>276</sup>. According to the 2019 Mozilla Internet Health Report: “[T]he corporate and political powers that influence and control the infrastructure can have significant global social and security implications. In this context, physical ownership of undersea infrastructure to mitigate the risk of surveillance is emerging as an investment motivation.”<sup>277</sup>

The physical infrastructures that support the internet aren’t just present on land. When gazing at the stars, you might notice bright dots of light moving steadily through the sky. These are most likely satellites. Satellite dishes, installed to the exterior of homes, receive signals from satellites in space connecting Wi-Fi routers to the internet. As of January 2025, there are nearly 7,000 Starlink internet satellites in orbit<sup>278</sup>. In addition, prototype satellites from Project Kuiper, a new initiative from Amazon, have also been launched to space, with more than 3,000 satellites planned.<sup>279</sup> The current lifespan of satellites of this kind is five years, at which point, they are deorbited, causing them to burn up when entering Earth’s atmosphere. Experts fear this could trigger unpredictable changes to our climate systems.<sup>280</sup> SpaceX already has plans to launch more than 40,000 Starlink satellites<sup>281</sup>. Although the odds of getting hit by space debris on Earth is very low<sup>282</sup>, when it happens, it can be dangerous – as one home-owner in Florida experienced when a two-pound space junk object smashed through his roof and put another hole in the floor<sup>283</sup>. Over 25,000 pieces of trackable human-made junk larger than 10 centimeters orbit the Earth, and with each passing year, that number increases<sup>284</sup>.

The goal of many of these satellites is to provide internet to people living in areas with low connectivity. But who is benefitting? In one case in the north of Brazil, Starlink satellites are used in the Amazon region by remote Indigenous communities and research centers, as well as by illegal mining groups, showing that there are two sides of the coin when it comes to connections for endangered areas like these<sup>285</sup>. There’s a debate on how overdependence on Musk’s technology will have political implications in Brazil and could make mineral-rich centers more vulnerable, with one local expert stating: “A company like Starlink might right now know more about the Amazon and the occupation of the Amazon by human activity than the Brazilian government actually does.”<sup>286</sup>

To omit the political nature of connectivity would be neglectful. Internet access is so critical and central to the functionality of essential services that it is considered a lifeline.<sup>287</sup> Access Now’s campaign #KeepItOn documents internet shutdowns around the world<sup>288</sup> and has found a

<sup>276</sup> Amnesty International and Privacy International. “[Two Years After Snowden](#).” 2015.

<sup>277</sup> The Internet Health Report. “[The new investors in underwater sea cables](#).” Mozilla, 2019.

<sup>278</sup> Pultarova, Tereza; et al. “[Starlink satellites: Facts, tracking and impact on astronomy](#).” Space, 2025.

<sup>279</sup> [Pequeño IV, Antonio](#). “[Amazon Launches Internet Satellite Prototypes—Looks To Compete With Starlink](#).” Forbes, 2023.

<sup>280</sup> Clery, Daniel. “[Burned-up satellites are polluting the atmosphere](#).” Science.org, 2024.

<sup>281</sup> Haworth, Tom. “[SpaceX Falcon 9 Starlink Mission Finally Launches After Failed Attempts](#).” Newsweek, 2024.

<sup>282</sup> Wei-Haas, Maya. “[Space junk is a huge problem—and it’s only getting bigger](#).” National Geographic, 2019.

<sup>283</sup> David, Leonard. “[Space-Junk Strike in Florida Signals New Era of Orbital Debris](#).” Scientific American, 2024.

<sup>284</sup> Jah, Moriba. “[Why We Need to Reduce, Reuse and Recycle in Space](#).” Scientific American, 2025.

<sup>285</sup> Maisonave, Fabiano. “[Musk brought internet to Brazil’s Amazon. Criminals love it](#).” AP News, 2023.

<sup>286</sup> Phillips, Tom; et al. “[Can’t live without it’: alarm at Musk’s Starlink dominance in Brazil’s Amazon](#).” The Guardian, 2024.

<sup>287</sup> Hankey, Stephanie; et al. “[Smartphone as Lifeline: Designing technology for a changing world](#).” Tactical Tech, 2020.

<sup>288</sup> Access Now. “[#KeepItOn: fighting internet shutdowns around the world](#).” Accessed March 24, 2025.

prevalence of internet shutdowns before, during, and after elections in several countries: “Election-related internet shutdowns empower incumbent regimes to control information flows and silence opposing voices and narratives.”<sup>289</sup> Connection is also central to modern warfare. Starlink has been involved in controversies with limiting access to Ukraine as they fight Russia’s invasion.<sup>290,291</sup> “There is little precedent for a civilian’s becoming the arbiter of a war between nations in such a granular way,” according to an article in *The New Yorker*, “or for the degree of dependency that the U.S. now has on Musk in a variety of fields, from the future of energy and transportation to the exploration of space.”<sup>292</sup> This kind of power extends beyond virtual and becomes material and geo-political, in line with competition and control. China’s Digital Silk Road is a clear example of this type of opportunistic influence. “This Silk Road is not merely about laying fibre-optic cables or launching satellites. Ultimately, the Digital Silk Road is poised to generate infrastructural dependency,” as CCCB Lab found. “Chinese firms [...] export a model of digital development that fuses market expansion with state control, embedding a distinct political economy of the internet into the data centres, cloud infrastructures and e-commerce platforms of the Global South.”<sup>293</sup> Undeniably, individuals and societies in the Global Majority will reap benefits from becoming more connected, however the question of “At what cost or consequence?” remains.<sup>294</sup>

When the technological tools created are weapons of destruction – such as those employed by Israel in Gaza – the environmental footprint becomes exponentially multiplied. “[T]he climate cost of the first 60 days of Israel’s military response [in Gaza] was equivalent to burning at least 150,000 tonnes of coal.”<sup>295</sup> The United Nations Environment Programme’s December 2024 assessment of Israel’s war on Gaza stated that “debris generated by the current conflict is 17 times more than the combined sum of all debris generated by other conflicts since 2008.”<sup>296</sup> Humans have shaped our environment from below our oceans’ floor to high in the sky. Submarine cables, data centers, and satellites are just a few examples of the material infrastructures powering the internet, and we’ve only just scratched the surface. The fantasy of technology being flawless, optimized, and perpetual is actually a myth that’s upheld by an apparatus that guzzles natural resources regardless of the consequences.

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<sup>289</sup> Access Now. “[2025 elections and internet shutdowns watch](#).” Accessed March 24, 2025.

<sup>290</sup> Sabbagh, Dan. “[Fury in Ukraine as Elon Musk’s SpaceX limits Starlink use for drones](#).” *The Guardian*, 2022.

<sup>291</sup> Roulette, Joey. “[SpaceX curbed Ukraine’s use of Starlink internet for drones -company president](#).” Reuters, 2023.

<sup>292</sup> Farrow, Ronan. “[Elon Musk’s Shadow Rule](#).” *The New Yorker*, 2023.

<sup>293</sup> Delclós, Carlos. “[Countering Digital Colonialism](#).” CCCB LAB, 2025.

<sup>294</sup> Kurlantzick, Joshua; et al. “[Assessing China’s Digital Silk Road Initiative](#).” Council on Foreign Relations, 2020.

<sup>295</sup> Lakhani, Nina. “[Emissions from Israel’s war in Gaza have ‘immense’ effect on climate catastrophe](#).” *The Guardian*, 2024.

<sup>296</sup> United Nations Environment Programme. “[Gaza Strip – Preliminary Debris Quantification: Damage Assessment Analysis: 1 December 2024](#).”

## Part 6: The Green Transition's Barren Footprint

### Reckoning with the reality of rare-earth mining

*This essay is part of "Digitized Divides", a multi-part series about technology and crisis. This part was written by Liz Carrigan with support from Safa, and co-developed through discussions, research, framing, and editing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderlyse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Alessandro Cripsta.*

Climate change has been documented by scientists in one way or another for centuries. Already in the early 1800s, French physicist Joseph Fourier argued that human-made greenhouse emissions could change the climate<sup>297</sup>. As with most scientific advancements, scientists continue to test and challenge earlier theories and bring forth emerging hypotheses over time. Since Fourier's initial arguments, scientists in the past 200 years have expanded upon his work as the Earth's climate condition has become more dire and urgent, but the greenhouse effect in particular, has not been discredited. Researchers in the 2024 'State of the Climate Report' warned: "We are on the brink of an irreversible climate disaster. This is a global emergency beyond any doubt. Much of the very fabric of life on Earth is imperiled. We are stepping into a critical and unpredictable new phase of the climate crisis."<sup>298</sup>

To mitigate the escalating impacts of climate change, it is crucial to cut down on greenhouse gas emissions, and quickly. This requires a shift in energy production, moving away from fossil fuels toward sustainable energy. Lithium-ion batteries have been determined to be central to the 'green energy' transformation<sup>299</sup>, as they reduce emissions in both the transportation and energy industries. Mining plays a vital role in this shift to renewable energy, supplying raw materials for various technologies, from batteries for devices to electric vehicles. China is considered the undisputed leader of rare-mineral mining, which has even shifted from land to deep-sea mining.<sup>300</sup>

<sup>297</sup> Fourier, Joseph. "[Remarques Générales Sur Les Températures Du Globe Terrestre Et Des Espaces Planétaires.](#)" *Annales de chimie et de physique*, Volume 27, 1824.

<sup>298</sup> Ripple, William J.; et al. "[2024 state of the climate report: Perilous times on planet Earth.](#)" *BioScience*, Oxford Academic, 2024.

<sup>299</sup> Wagner, Gernot; et al. "[The Future of Energy Storage: Five Key Insights on Battery Innovation and the Clean Energy Shift.](#)" *Columbia Business School*, 2025.

<sup>300</sup> Vardar, Serdar; et al. "[China leads in deep sea mining for rare earths. Can the US catch up?](#)" *DW News*, 2025.

While the most urgent reason for transitioning to renewable energy is the survival of all species on this planet, there is also an economic dimension. In the face of increasing wars and low private-sector investment, countries like Germany have entered recession. The acceleration of the renewable energy transition is, in part, an attempt to address these economic crises.<sup>301</sup> As with copper, lithium is another mineral critical to the transition away from a fossil fuel-based economy.

## Extracting lithium... and land

The distinction between traditional and renewable energy sectors is not yet clear-cut. While there is significant variation among producers,<sup>302</sup> mineral extraction still relies on fossil fuels, especially as deposits are found in increasingly remote and deeper locations. As Martín Arboleda highlights in *Planetary Mine*, mining continues to depend heavily on traditional energy sources,<sup>303</sup> a dependency that is only expected to grow. A 2024 UN report predicts that global mining of raw materials will increase by 60% by 2060.<sup>304</sup> To give an idea of the material requirements of electric cars, the same report suggests that the mineral requirements of electric vehicles are between 6 and 10 times those of combustion engines.

It is no coincidence that most of the world's lithium production, except in Australia and Portugal, takes place in the countries of the Global Majority. Latin America has a long history of resource extraction. With over 80% of lithium projects and more than half of copper, zinc, and nickel projects located on Indigenous peoples' lands, it is crucial to consider human rights in the context of the "green" transition. Over a decade, the Business and Human Rights Resource Centre recorded over 600 alleged human rights abuses directly linked to extracting transition materials<sup>305</sup>, most of them occurring in Africa, and Central and South America. Researchers wrote that "despite its framing, the language of green transition is also being used to hide and 'greenwash' intensified militarism, including on Europe's borders, with so called critical 'green' raw materials ending up servicing the needs of the booming arms and security industry."<sup>306</sup> Just like the traditional energy sector, mining renewable energy materials is not without human rights violations and environmental problems. While most people can pinpoint the social and environmental harms of fossil fuels (both at the site of extraction and at the point of combustion), there is growing concern over mining for renewable energy materials.

In northern Chile lies the Salar de Atacama, a delicate desert ecosystem that is home to unique species found nowhere else on Earth – a biodiversity hotspot<sup>307</sup>. Indigenous communities, such as the Lickanantay people have also inhabited Atacama for more than 11,000 years.<sup>308</sup> Chile is the

<sup>301</sup> Müller, Bettina; et al. "[The Raw Materials Rush](#)." Transnational Institute (TNI), 2024.

<sup>302</sup> Kim, Tae-Yoon; et al. "[The Role of Critical Minerals in Clean Energy Transitions](#)." International Energy Agency (IEA), 2021.

<sup>303</sup> Arboleda, Martín. "[Planetary Mine: Territories of Extraction Under Late Capitalism](#)." Verso Books, 2020.

<sup>304</sup> United Nations Environment Programme (UNEP), International Resource Panel (IRP). "[Global Resource Outlook 2024](#)." 2024.

<sup>305</sup> Business & Human Rights Resource Centre. "[Transition Minerals Tracker](#)." Accessed March 13, 2025.

<sup>306</sup> Müller, Bettina; et al. "[The Raw Materials Rush](#)." Transnational Institute (TNI), 2024.

<sup>307</sup> Gómez-Silva, Benito; et al. "[The Atacama Desert: A Biodiversity Hotspot and Not Just a Mineral-Rich Region](#)." Front Microbiol, 2022.

<sup>308</sup> Bartlett, John. "[In Chile a language on the verge of extinction, stirs into life](#)." NPR, 2024.

world's second-largest lithium producer.<sup>309</sup> In particular within Atacama, the lithium extraction, with its immense demand for water, is profoundly transforming the landscape. Brine is drawn from beneath the desert alongside fresh water, placing increasing strain on the salt flats and the fragile ecosystem. Over time, local communities have witnessed the toll this extraction has taken, with satellite images now revealing a sinking landscape. While deserts are often depicted as barren and devoid of water, it is not only essential for the survival of inhabitants and the environment but also deeply woven into the cultural and spiritual life of the Lickanantay people.<sup>310</sup> "It's the richness of the culture and community spirit that's disappearing. It's not like it was before, and it'll never be like it used to be. I don't see such a bright future anymore," said a 72-year old member of the Indigenous community.<sup>311</sup> Concerns about the sharing of natural resources even prompted Chileans to rethink their economic model, leading to a national referendum on whether this issue should be written into the constitution.<sup>312</sup>

## Is an immaterial tech utopia really possible?

Just as AI and other digital technologies are portrayed as immaterial, the sheer volume and scale of mining required for the renewable energy transition and its environmental impact are often minimised or overshadowed by hype, and promises of sustainability, without paying attention to who benefits and who loses out. Those who own multiple gadgets and drive electric cars are a very different group of people from the communities that live (or used to live) where mines are situated.

When it comes to the finished product, the benefits of these technologies are far from equally shared. Communities living near mines often bear the brunt of pollution, environmental degradation, and the economic instability brought by boom-and-bust cycles, while end-users and proprietors enjoy the economic and environmental gains. In 2025, a dam holding acidic waste from a Chinese-owned copper mine in Zambia collapsed, with disastrous consequences. The stream, which links to a significant river providing water to five million people, was contaminated – local wildlife, including fish and birds died.<sup>313</sup> Nickel mining in Indonesia has left local communities in Bahodopi struggling to sustain themselves and fighting off widespread respiratory infections<sup>314</sup>. Human Rights Watch's declaration for COP26 highlights how lithium mining is frequently linked to environmental destruction, freshwater contamination, and the loss of livelihoods for local communities. "A truly clean, just and equitable energy economy will require [...] that the move to clean energy doesn't recreate the same systems it aims to destroy and helps to build climate change solutions that put communities, workers and the environment first."<sup>315</sup>

Similarly, in another publication by Human Rights Watch "*If Electric Cars are the Future, Let's Make Them Responsibly*," researcher Jim Wormington calls for stricter regulations to prevent human rights abuses, such as land displacement and environmental harm, in lithium-rich regions. "Car

<sup>309</sup> Jaskula, Brian W. "[Mineral Commodity Summaries 2024: Lithium](#)." U.S. Geological Survey, 2024.

<sup>310</sup> Montoya, Barinia. "[As Lithium Mining Bleeds Atacama Salt Flat Dry, Indigenous Communities Hit Back](#)." Mongabay, 2024.

<sup>311</sup> Bartlett, John. "[How one community in Chile is blessed and cursed with lithium](#)." NPR, 2025.

<sup>312</sup> Tabuchi, Hiroko. "[This Vast Mine in Chile Is Where the World Gets Its Lithium](#)." The New York Times, 2022.

<sup>313</sup> Kille, Richard; et al. "[A river 'died' overnight in Zambia after an acidic waste spill at a Chinese-owned mine](#)." TheAssociated Press, 2025.

<sup>314</sup> Nindita, Hasya; et al. "[How China's investment in Indonesia's nickel industry is impacting local communities](#)." Global Voices, 2025.

<sup>315</sup> Human Rights Watch. "[Declaration on Mining and the Energy Transition for COP26](#)." 2021.

companies should be required to map and disclose the mines and refineries in their supply chain, conduct and review rigorous third-party assessments of mines and refineries' respect for human rights and the environment, and ensure that they take corrective action to respond to abuses."<sup>316</sup>

These examples underline a troubling global trend: while resource extraction fuels technological progress and profits for distant stakeholders, the burden is disproportionately borne by those living closest to the mines.

To complicate things even further, not only does the production phase of electric cars create high emissions, but companies such as Tesla generate profits through selling carbon emissions credits. Regulatory incentives allow companies like Tesla to acquire and sell offset credits they receive but do not need. Carbon offsets are theoretically one way that you can "offset" the carbon used in one activity, (like flying) by purchasing credits to have emissions reduced somewhere else. They usually take the form of tree-planting projects or renewable energy projects. Using the benchmark EU Emissions Trading System's carbon price, this implies that each of the 500,000 Teslas sold could have indirectly contributed to the equivalent of 28 years of emissions from a fuel-powered car<sup>317</sup>. At the same time, this scenario is generating immense wealth for tech companies, who are seen undermining democratic elections worldwide to consolidate power.

It has been shown that many of these "climate-positive" offsetting projects have removed Indigenous people from their lands. "41 percent of Cambodia's surface has nature reserve status, but the country boasts one of the highest deforestation rates in the world [exemplifying] how protected areas that are not community-led fail to benefit either people or nature."<sup>318</sup> Often framed as "conservation" efforts, these initiatives frequently rely on narratives that depict certain lands as empty or 'sparsely populated,' justifying their use for "green" energy projects while ignoring the existing communities, cultures, and ecosystems already present. The reality of rare-earth minerals and the means of mining for it, results in massive barren footprints that our planet may not recover from.

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<sup>316</sup> Wormington, Jim; et al. "[If Electric Cars are the Future, Let's Make them Responsibly](#)." Human Rights Watch, 2022.

<sup>317</sup> DeLay, Tad. "[The Guilted Age of Carbon](#)." Protean Magazine, 2023.

<sup>318</sup> Téllez Chávez, Luciana; et al. "[Carbon Offsetting's Casualties: Violations of Chong Indigenous People's Rights in Cambodia's Southern Cardamom REDD+ Project](#)." Human Rights Watch, 2024.

## Part 7: 'Artisanal' Mining and 'Natural' Technology

### Revealing the costs of cobalt's commodified extractivism

*This essay is part of "Digitized Divides", a multi-part series about technology and crisis. This part was written by Safa with support by Liz Carrigan, and co-developed through discussions, research, framing, and editing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Yiorgos Bagakis, Alessandro Cripsta, and La Loma.*

When people talk about “natural” versus “artificial”, there is an assumption that technology sits on the artificial side, but the elements and materials it is made from come from the Earth and are handled by many people. What really is “natural” after all? “It is impossible to talk about a green energy transitioning world without these minerals,” said leader and speaker Kave Bulambo in a 2024 speech. She continued, “when you start to dig deep to try and understand this equation, you realize that under this shiny Big Tech movement lies a world of exploitation for men, women, and even children laboring in cobalt mines in the [Democratic Republic of] Congo.”<sup>319</sup>

It would be disingenuous to attempt to disentangle the human rights abuses connected to creating technologies from their environmental impacts. Siddarth Kara, a researcher of modern-day slavery, discussed the environmental impacts of cobalt mining: “Millions of trees have been cut down, the air around mines is hazy with dust and grit, and the water has been contaminated with toxic effluents from the mining processing.”<sup>320</sup>

### Cobalt and ‘green’ energy

Cobalt is a stone that has an almost eerie blue color – for centuries it has been used in the arts<sup>321</sup>. It has also become essential for the manufacturing of rechargeable batteries – like those that enable smartphones, laptops, electric cars, and more. Cobalt is just one of the natural resources powering the ‘green energy revolution’.<sup>322</sup> But this important stone can be toxic to touch and breathe, especially in high doses.

<sup>319</sup> Bulambo, Kave. “[Why ethics must be a consideration in your tech use.](#)” TEDxSchlossplatz, 2024.

<sup>320</sup> Gross, Terry. “[How 'modern-day slavery' in the Congo powers the rechargeable battery economy.](#)” NPR, 2023.

<sup>321</sup> Zhang, Yun; et al. “[The archaeological and scientific analysis of blue-decorated ceramics in the Tang and Song dynasties.](#)” *Archaeometry*, 64(6), 1394–1410, 2022.

To understand the harmful effects of cobalt mining in the DRC, it is essential to consider its colonial history. Continued exploitation of the country's resources persisted, even after gaining formal independence in 1960, and is a legacy that continues to shape the country's mining sector today.<sup>323</sup> Kolwezi, a city in the DRC, was built by Belgium under an apartheid-style system of urban segregation, and now has many large open-pit mines situated in and around its periphery.<sup>324</sup> Large deposits of cobalt have been found in the DRC, accounting for over 70% of the world's reserves.<sup>325</sup>

Both multinational companies with concessions and artisanal miners are involved in cobalt mining in the DRC, though industrial mines now dominate the region. Artisanal and Small-Scale Mining (ASM) remains widespread, with thousands of informal miners working in dangerous conditions to extract cobalt by hand. Kara described how so-called 'artisanal miners' – including children – are digging for cobalt, saying: "The bottom of the supply chain, where almost all the world's cobalt is coming from, is a horror show."<sup>326</sup>

What comes to mind when you think of something *artisanal*? It is probably not informal workers digging in hazardous, often toxic conditions, either earning a subsistence income for their families or working in small groups to extract minerals for commercial sale. 'Artisanal' has a meaning of small-scale and handmade, which is true in a sense for the work of 'artisanal miners'. But the term 'artisanal' is evocative of a quaint neighborhood farmers market or traditional handmade cheese or soap – not often thought of as children and adults digging toxic stones from the ground with their bare hands. The term partly comes from its low-tech nature, as it involves individuals mining deposits that are either unprofitable, unsafe, or otherwise unsuitable for large-scale mining companies. Yet, artisanal mining is far from small-scale. Over 100 million people worldwide are engaged in or rely on the income it generates.<sup>327</sup> While it may seem more wholesome than industrial mining, an industry with one of the worst track records for human rights abuses,<sup>328</sup> artisanal mining often lacks environmental and worker safeguards, as well as protections for women's and children's rights.<sup>329</sup>

This form of mining is common in Kolwezi in the DRC, especially in areas where people have been displaced by large-scale mining projects.<sup>330</sup> Despite attempts to formalise the sector, informal mining persists, with reports of "*Creuseurs*" (translated as "diggers", as they are known locally) continuing to dig under their homes or in newly 'illegal' sites outside the formal mine boundaries.

<sup>322</sup> Nogrady, Bianca. "[Cobalt is critical to the renewable energy transition. How can we minimize its social and environmental cost?](#)" *Ensia*, 2020.

<sup>323</sup> Dr Bokamba, Eyamba ; et al. "[The Re-Conquest of the Congo.](#)" *Tricontinental: Institute for Social Research*, Dossier No. 77, 2024.

<sup>324</sup> Mthembu-Salter, Gregory. "[Occasional Paper 35: The Geopolitics of the Global Energy Transition: The Impact on Africa.](#)" *South African Institute of International Affairs*, 2009.

<sup>325</sup> Baker, Bruce. "[Why Cobalt Mining in the DRC Needs Urgent Attention.](#)" *Council on Foreign Relations*, 2022.

<sup>326</sup> Gross, Terry. "[How 'modern-day slavery' in the Congo powers the rechargeable battery economy.](#)" *NPR*, 2023.

<sup>327</sup> German Federal Ministry for Economic Cooperation and Development. "[Artisanal and Small-Scale Mining \(ASM\).](#)" Accessed February 24, 2025.

<sup>328</sup> Hodgkins, Chelsea. "[The False Promise of Responsible Mining.](#)" *Heinrich Böll Foundation*, 2025.

<sup>329</sup> Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF). "[Artisanal and Small-Scale Mining.](#)" Accessed February 24, 2025.

<sup>330</sup> Amnesty International & Afrewatch. "[This is What We Die For: Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt.](#)" 2016.

As one miner Edmond Kalenga, put it: “The minerals are like a snake moving through the village. You just followed the snake”.<sup>331</sup>

## Blood diamonds cobalt

A 2022 Amnesty International report detailed several case studies of human rights abuses at three sites where they used documentary evidence, satellite images, and interviews with former residents to determine that people had been forcibly evicted from their homes, in the name of energy transition mining.<sup>332</sup> Forced evictions constitute a fundamental breach of human rights, and lead to loss of livelihood, and the loss of other human rights such as access to basic services including health and education.<sup>333</sup> The forced evictions occurred as part of the government's efforts to formalise the mining sector, carried out in collaboration with mining companies.<sup>334</sup> People living close to polluted mines are subjected to severe health problems. The DRC mining region is one of the ten most polluted areas worldwide.<sup>335</sup> Research suggests a correlation between exposure to heavy metals such as cobalt and birth defects,<sup>336</sup> and children have been found with a high concentration of cobalt in their urine.<sup>337</sup>

As well as the human rights violations already mentioned, the innumerable environmental and health costs are connected, with issues like biodiversity loss, pollution (air, soil, water), and the socio-economic consequences of job insecurity, violence, and loss of livelihoods. These impacts not only exacerbate one another but also lead to further challenges, including displacement, gender-based violence, and the erosion of cultural knowledge.<sup>338</sup> Diamonds are not the only conflict mineral – as you can see, cobalt is among the many minerals which are extracted through degrading means with devastating results.

Companies that make lithium batteries, such as Tesla, occasionally respond to public calls for supply chain transparency,<sup>339</sup> however, as demand for cobalt grows, businesses involved in battery manufacturing must pay attention to ethical and human rights issues along the entire supply chain. Alphabet (Google's parent company), Apple, Dell, Microsoft, and Tesla have all been accused of purchasing cobalt which was gathered by means of forced labor, and deliberately obscuring their dependence on child labor – including those in extreme poverty. While the US court found that companies purchasing from suppliers were not responsible for the practices of suppliers<sup>340</sup>,

<sup>331</sup> Electronics Watch. "[The 'Creuseurs' \('diggers'\), at the Centre of the World's Push for EVs, Are in Peril.](#)" Electronics Watch, 2023.

<sup>332</sup> Amnesty International. "[DR Congo: 'We Live in Fear': How the Cobalt Supply Chain Fuels Human Rights Abuses in the DRC.](#)" 2023.

<sup>333</sup> United Nations Office of the High Commissioner for Human Rights. "[Forced Evictions.](#)" OHCHR, 2024.

<sup>334</sup> Rapoza, Kenneth. "[Never Mind the Mines in Congo, There's Cobalt Under the House.](#)" Bloomberg, 2018.

<sup>335</sup> Kashyap, Rajesh; et al. "[Metal Mining and Birth Defects: A Case-Control Study in Lubumbashi, Democratic Republic of the Congo.](#)" The Lancet Planetary Health, 2020.

<sup>336</sup> Vega, Renzo; et al. "[Current exposure to environmental pollutants in the general adult population of Kinshasa, Democratic Republic of Congo \(DRC\): A cross-sectional study.](#)" The Lancet Public Health, 2025.

<sup>337</sup> KU Leuven. "[Hidden Costs of Cobalt Mining in DR Congo.](#)" ScienceDaily, 2018.

<sup>338</sup> Environmental Justice Atlas. "[Kolwezi Ecological and Sanitary Disaster.](#)" EJAtlas, 2024

<sup>339</sup> Business & Human Rights Resource Centre. "[Tesla Secures Cobalt Sourcing Deal with Glencore Despite Human Rights Concerns Linked to Cobalt Mining.](#)" Business & Human Rights Resource Centre, 2020.

<sup>340</sup> Stempel, Jonathan. "[US court sides with Apple, Tesla, other tech companies over child labor in Africa.](#)" Reuters, 2024.

further doubts have already been raised against Apple<sup>341</sup>. “It is a major paradox of the digital era that some of the world’s richest, most innovative companies are able to market incredibly sophisticated devices without being required to show where they source raw materials for their components,” said Emmanuel Umpula, Executive Director of Afreewatch (Africa Resources Watch).<sup>342</sup>

The European Parliament has voted in a law that large companies are obliged to conduct human rights and environmental due diligence<sup>343</sup> – a step towards holding corporations accountable for rights violations of their suppliers. But supply chains themselves are not necessarily reliable narrators. In the case of cobalt, suppliers may put the child-labor cobalt together with the child-labor free cobalt in refineries, making it difficult or even impossible to trace<sup>344</sup>. Furthermore, child-labor free cobalt does not necessarily mean it is free of human exploitation and jarring conditions. For more in-depth information on due diligence and accountability in the DRC’s mining sector, the Carter Center highlights several key recommendations.<sup>345</sup>

Our energy consumption will only continue to increase with developments like ChatGPT, cryptocurrencies, and faster internet. One researcher found that using generative AI to create one image uses as much energy as charging a smartphone<sup>346</sup>. A report by Goldman Sachs, a multinational investment firm, found that one AI-powered search used 10 times more electricity than a regular search<sup>347</sup>. Both Google and Microsoft have self-reported that their carbon emissions have grown as a result of AI.<sup>348</sup> With water and food scarcity being a real-world threat, and an ever-warming climate, how long will the planet be able to sustain these systems? When we finally take a critical look at the nature that’s powering our screens, we may see its poisonous impacts on people and the planet.

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<sup>341</sup> Reuters. “[DR Congo presses Apple over minerals supply chain, lawyers say](#).” 2024.

<sup>342</sup> Amnesty International. “[This is what we die for: Human rights abuses in the Democratic Republic of the Congo power the global trade in cobalt](#).” 2016.

<sup>343</sup> Human Rights Watch. “[EU Parliament Approves Supply Chain Law](#).” 2024.

<sup>344</sup> Davie, Michael; et al. “[Blood Cobalt: The Congo’s Dangerous and Deadly Green Energy Mines](#).” ABC News In-depth published on YouTube, 2022.

<sup>345</sup> Carter Center. “[Congo: Governance and Accountability in the Mining Sector](#).” Carter Center, 2017.

<sup>346</sup> Heikkilä, Melissa. “[Making an image with generative AI uses as much energy as charging your phone](#).” MIT Technology Review, 2023.

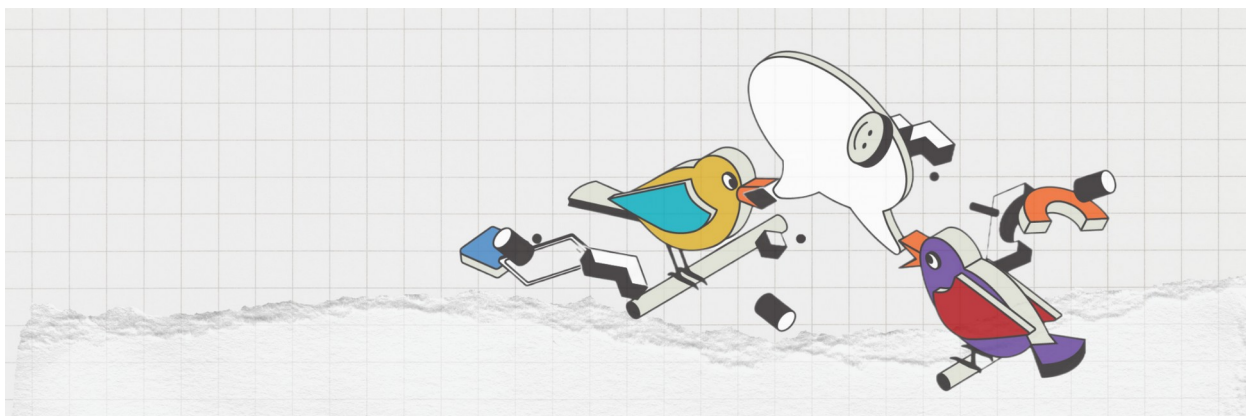
<sup>347</sup> Goldman Sachs. “[AI is poised to drive 160% increase in data center power demand](#).” 2024.

<sup>348</sup> Kerr, Dara. “[AI brings soaring emissions for Google and Microsoft, a major contributor to climate change](#).” NPR, 2024.

## Part 8: The Illusion of AI

### Spotlighting 'invisible' tech laborers in factories, warehouses, and gig and click work

*This essay is part of "Digitized Divides", a multi-part series about technology and crisis. This part was written by Safa, and co-developed through discussions, research, framing, and editing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderyse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from La Loma.*

From mineral extraction to manufacturing, delivery to waste, there are hundreds of millions of laborers<sup>349</sup>. And when you consider that AI technologies such as algorithms are trained from huge amounts of user data<sup>350</sup>, we also have to consider the billions of people online whose data is necessary for these tools to work.<sup>351</sup> People whose data is mined are not compensated and oftentimes don't even realize their contributions, which have even included private messages over LinkedIn<sup>352</sup>. "[P]eople are not just users or citizens; they are data points, commodities and, ultimately, labourers whose activity generates profit but not recognition."<sup>353</sup> To most people, these millions or billions of workers – a significant number of whom earn low wages and deal with poor labor conditions – are essentially invisible and unacknowledged. Moreover, the constant demands of efficiency and economics come with consequences. When people are expected to work like machines, it leaves little space for care and comfort. Having everything available at the touch of a screen may seem nice – but what is the human cost?

There is no single report documenting workers in all areas of technology, from mining and extraction of minerals, to production and assembly of hardware to development of software, infrastructures needed to make the internet function, distribution and delivery, and e-waste management. However reports in each of those areas already point to the total being hundreds-of-millions of workers in just a few parts of the lifecycle of tech – a 2023 report estimated up to 435

<sup>349</sup> Hussein, Fatima. "[Online gig work is growing rapidly, but workers lack job protections, a World Bank report says](#)." Associated Press, 2023.

<sup>350</sup> Paul, Katie; et al. "[Inside Big Tech's underground race to buy AI training data](#)." Reuters, 2024.

<sup>351</sup> Porter, Eduardo. "[Your Data Is Crucial to a Robotic Age. Shouldn't You Be Paid for It?](#)" The New York Times, 2018.

<sup>352</sup> da Silva, João. "[LinkedIn accused of using private messages to train AI](#)." BBC, 2025.

<sup>353</sup> Delclós, Carlos. "[Countering Digital Colonialism](#)." CCCB LAB, 2025.

million online gig workers<sup>354</sup>; one 2011 report noted a 100,000 person factory in China whose sole product was the Apple iPad,<sup>355</sup> and another 2017 report noted 411,000 electronics industry workers in Vietnam alone where 80% were women working on assembly lines<sup>356</sup>.

The sheer mass of people needed to create and maintain the internet and internet-connected technologies cannot be overstated, and the conditions of those laborers is important to look into. There is very little documented about working conditions, proportionate to the numbers of laborers, but what is known does more than simply raise eyebrows.

## Many people are behind the scenes of AI

AI, when functioning well, requires a lot of work to train – datasets that are built and codified by people<sup>357</sup>. Digital labor platforms centralize and distribute work at the click of a button – popular platforms include Clickworker, Appen, and Amazon's Mechanical Turk. These websites make it possible for annotation tasks to be quickly distributed 24/7 to a huge amount of workers around the world – most tasks only earning a few cents per assignment. The data is compiled into valuable datasets used to train AI models.<sup>358</sup>

The name “Mechanical Turk” refers to an automated chess-playing device in the 18th century, where challengers would fall for the illusion that they were competing against a machine, but in fact an actual person was hiding inside the machine, making the decisions and doing the real work<sup>359</sup>. The concept is reminiscent of the story “The Wonderful Wizard of Oz” when the illusion of ‘The Great and Powerful Oz’ is accidentally revealed to be an ordinary man hiding behind the mystical persona. “[...] Toto jumped away [...] and tipped over the screen that stood in a corner. As it fell with a crash they looked that way, and the next moment all of them were filled with wonder. For they saw, standing in just the spot the screen had hidden, a little old man, with a bald head and a wrinkled face, who seemed to be as much surprised as they were.”<sup>360</sup> In the same vein, AI has been given the mythology that it is like-magic, but behind the scenes, ordinary people are doing the work. “These workers are kept hidden for a reason. They say if slaughterhouses had glass walls, the world would stop eating meat. And if tech companies were to reveal what they make these digital workers do, day in and day out, perhaps the world would stop using their platforms.”<sup>361</sup>

Some reports claim that up to a third of the tasks on digital labor platforms, such as Amazon's Mechanical Turk, are unpaid<sup>362</sup> because the ‘requesters’ “can simply refuse payment to workers if they are dissatisfied with the job – and it is not worth the annotator's time chasing a few unpaid

<sup>354</sup> Datta, Namita; et al. [“Publication: Working Without Borders: The Promise and Peril of Online Gig Work.”](#) World Bank, 2023.

<sup>355</sup> Cheng, Sophia. [“The deadly labor behind our phones, laptops and consumer gadgets.”](#) Colorlines, 2011.

<sup>356</sup> IPEN. [“Stories of women workers in Vietnam's electronics industry.”](#) 2017.

<sup>357</sup> Dzieza, Josh. [“AI Is a Lot of Work.”](#) The Verge, 2023.

<sup>358</sup> Pontin, David. [“Artificial Intelligence, With Help From the Humans.”](#) The New York Times, 2007.

<sup>359</sup> Hitlin, Paul. [“Research in the Crowdsourcing Age, a Case Study: What is Mechanical Turk?”](#) Pew Research Center, 2016.

<sup>360</sup> Baum, L. Frank. [“The Wonderful Wizard of Oz.”](#) Originally published in 1900 by George M. Hill Company. Re-published under an open license on Project Gutenberg in 1993.

<sup>361</sup> Cockerell, Isobel. [“In Kenya's slums, they're doing our digital dirty work.”](#) Coda Story, 2025.

<sup>362</sup> Gray, Mary L.; et al. [“Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass.”](#) Harper Business, 2019.

cents.<sup>363</sup> Doing click work and data annotation might be a simple way to make a quick dime, but it is not sustainable. According to researcher Julian Posada: “social reproduction when labor is commodified is unsustainable because it depends on a normative embeddedness that negatively affects the livelihoods of workers, creates dependencies, and contributes little to the long term development of local communities.”<sup>364</sup> There is an assumption that click work is easy, but that is not necessarily the case. Researcher Milagros Miceli expressed that labelling satellite imagery was “extremely challenging [...] strenuous on the eyes and hands.” One worker expressed concern to Miceli, “I hope this isn’t for weapons.”<sup>365</sup>

From virtual information ‘factories’ to physical concrete-building factories, productivity is maximized, and not uncommonly to the detriment of the workers. Kate Crawford, AI researcher warned: “There’s the concern that robots are replacing us, but actually what’s happening is that we’re being treated more and more like robots.”<sup>366</sup>

## Under pressure... and duress

Extensive commuting, pressure to reach daily targets, psychological stress, dangerous workspaces, low salaries, short contracts, and monitoring and surveillance, are just a few of the inhumane conditions facing factory workers.<sup>367</sup>

One report from 2011 about a tech hardware-production factory company in China said: “Talking and stretching are forbidden on the assembly line, and clocking in five minutes late may result in the loss of half a day’s wages. Bathroom use is limited to 10 minutes, which is strictly enforced by an electronic key card.”<sup>368</sup> A decade later, in 2021, it was reported that one factory worker in China died after working 380 hours per month<sup>369</sup>—this would equate to two or two-and-a-half-times the legal maximum working hours in Germany. It isn’t just China – a study of Vietnam’s female factory workers described how they worked “alternating day and night shifts for periods of 4 days; standing for the entire 9 – 12-hour shift.”<sup>370</sup> The UN reported further about the factory worker conditions in Vietnam: “Some of the surveyed women reported adverse health consequences associated with unhealthy working conditions including miscarriages, extreme fatigue and fainting.”<sup>371</sup>

Beyond factory workers, warehouse workers and delivery drivers at centers distributing and shipping to shops and directly to consumers also deal with notoriously inhumane working conditions. One undercover investigation in the UK found that Amazon warehouse workers and delivery drivers were urinating in trash cans, and defecating in cars to meet their strict quotas.<sup>372</sup> Another study on Amazon warehouses in the UK found that ambulances were called 600 times in

<sup>363</sup> Cant, Callum; et al. “[Feeding the Machine: The hidden human labour powering A.I.](#)” Bloomsbury, 2024.

<sup>364</sup> Posada, Julian. “[Embedded Reproduction in Platform Data Work.](#)” Information, Communication & Society, 2022.

<sup>365</sup> Miceli, Milagros. “[I hope this isn’t for weapons.](#)” How Syrian data workers train AI.” Untold Mag, 2024.

<sup>366</sup> Crawford, Kate. “[Digital Talk ‘Living with Artificial Intelligence’ with Kate Crawford and Guy Hoffman.](#)” (at 21:30) Vitra Design Museum, 2023.

<sup>367</sup> Cant, Callum; et al. “[Feeding the Machine: The hidden human labour powering A.I.](#)” Bloomsbury, 2024.

<sup>368</sup> Cheng, Sophia. “[The deadly labor behind our phones, laptops and consumer gadgets.](#)” Colorlines, 2011.

<sup>369</sup> Feng, Emily. “[Scandals in China bring calls for more regulation over tech companies.](#)” NPR, 2021.

<sup>370</sup> IPEN. “[Stories of women workers in Vietnam’s electronics industry.](#)” 2017.

<sup>371</sup> OHCHR. “[Vietnam: UN experts concerned by threats against factory workers and labour activists.](#)” 2018.

three years.<sup>373</sup> Amnesty International stated that Amazon warehouse worker conditions in Saudi Arabia were equivalent to those of human trafficking. “In Saudi Arabia, the [Amazon warehouse] workers were mostly housed, for months, in dirty and overcrowded accommodation, sometimes infested with bed bugs. They were put to work in Amazon warehouses, but the contractors often withheld part of their salaries and/or food allowances without explanation, and underpaid overtime.”<sup>374</sup> At one point, Amazon attempted to patent a cage for warehouse workers.<sup>375</sup>

In recent years, a number of exposes looking into the working conditions of gig workers<sup>376</sup> and content moderators have come to light. In 2023, “Silicone Savanna” looked into social media’s content moderator working conditions in Kenya – a decade-old booming industry, employing approximately 100,000 people worldwide through third-party outsourcing companies, and estimated to be valued at \$40 billion USD by 2032. “[Despite] what some of Silicon Valley’s other biggest names tell us, artificial intelligence systems are insufficient moderators. So it falls on real people to do the work.” Workers are exposed to psychologically harmful content from hate speech to child exploitation to mass murders for less than two dollars per hour, and are expected to maintain a high quota each shift. “The word evil is not equal to what we saw,” said one content moderator working for a third-party company in Kenya that was contracted by Facebook. Another remarked of her four years on the job, “I don’t even know how I survived. It was the worst time of my life.”<sup>377</sup> Click workers and data labellers who are making next to nothing<sup>378</sup>, conduct their work using mandatory automated tools experience surveillance<sup>379</sup> and punishment when they deviate from the expected fast pace<sup>380</sup>.

These stories are in abundance, and for the billions of people who use social media, the working conditions are inconceivable. A content moderator aptly noted “I feel like it’s modern slavery, like neo-colonialism.”<sup>381</sup> Neo-colonialism typically refers to one state taking power over another, and this is a very modern capitalistic example of neo-colonialism, where the companies for which the content moderators are moderating are based in the United States and bringing the billions of dollars of net worth back to that country. The net worth is not finding its way to Kenya, or anywhere else the content moderation is happening. “What emerges is a new kind of dependency, where digital infrastructures replicate the old colonial logics: extraction without redistribution, occupation without direct governance, dominance without accountability.”<sup>382</sup> A term has even emerged to refer to this phenomenon: digital colonialism.<sup>383</sup>

<sup>372</sup> Godlewski, Nina. “[Amazon working conditions: urinating in trash cans, shamed to work injured, list of employee complaints](#).” Newsweek, 2018.

<sup>373</sup> Wilding, Mark. “[Ambulances were called to Amazon warehouses 600 times in three years](#).” VICE, 2018.

<sup>374</sup> “[Saudi Arabia: Migrants workers who toiled in Amazon warehouses were deceived and exploited](#).” Amnesty International, 2023.

<sup>375</sup> Picchi, Aimee. “[Amazon's patent for caging workers was "bad" idea, exec admits](#).” CBS News, 2018.

<sup>376</sup> Rest of World. “[The Graying Gig Workers](#) series.”

<sup>377</sup> Hellerstein, Erica. “[Silicon Savanna: The workers taking on Africa’s digital sweatshops](#).” Coda Story, 2023.

<sup>378</sup> Rowe, Niahm. “[Millions of Workers Are Training AI Models for Pennies](#).” Wired, 2023.

<sup>379</sup> Privacy International. “[Humans in the AI loop: the data labelers behind some of the most powerful LLMs' training datasets](#).” 2024.

<sup>380</sup> Williams, Adrienne. “[The Exploited Labor Behind Artificial Intelligence](#).” Noema, 2022.

<sup>381</sup> Perrigo, Billy. “[Inside Facebook’s African Sweatshop](#).” Time, 2022.

<sup>382</sup> Delclós, Carlos. “[Countering Digital Colonialism](#).” CCCB LAB, 2025.

<sup>383</sup> Okinyi, Mophat. “[African Digital Colonialism is the New Face of Worker Exploitation](#).” ICTworks, 2025.

Although labor rights are demanded as a basic requirement of this kind of set-up, rights alone would not resolve this exploitative system which uses the labor of people in countries of the so-called 'Global Majority' to ultimately and significantly benefit the companies based across Europe and headquartered in the United States, which is, by far, the wealthiest nation on Earth. Because the work is divided into such small tasks, which can be done by almost anyone, the knowledge about the system as a whole cannot be decentralized. That's why people are easily replaceable with cheaper, faster and 'non problematic' workers.

"[T]asks are distributed across a global workforce, with the most stable, well-paid and desirable jobs located in key cities in the US, and the most precarious, low-paid and dangerous work exported to workers in peripheral locations in the Global South [continuing] colonial patterns of Western countries leveraging their economic dominance and growing rich off extracting minerals and labour from peripheral territories."<sup>384</sup>

These are power structures that run deep. One example noted that India supplies a quarter of the world's web-based work, but only receives 3% of the global revenue from online labor platforms.<sup>385</sup>

## Collective efforts for change

Labor unions are formalized groups formed by workers in a common sector, field, or company, in order to unify and advocate for better working conditions, higher wages, etc. Using methods like collective bargaining, labor unions make the demands stronger as a collective, rather than as individuals behind closed doors. Each country and context has different laws and attitudes toward labor unions. In the United States, for example, although the federal law technically prohibits employers from taking action against employees who are forming a union, in practice companies may dismiss those workers anyway, since the penalties are low.<sup>386</sup> While it may seem like there is a lot of buzz around labor unions, actually only 10% of American workers belong to one<sup>387</sup> – although 60 million workers in the US would like to join one but cannot<sup>388</sup>. But the tide is turning.

Around the world are hopeful stories of laborers fighting for their rights. Mercy Mutemi is a litigation lawyer in Kenya who is at the forefront of worker protection suits against Big Tech companies and their third-party subcontractor companies. Mutemi sets the issue at hand in clear terms: "I think when you give people work for a period of time and those people can't work again because their mental health is destroyed, that doesn't look like lifting people out of poverty to me. That looks like entrenching the problem further".<sup>389</sup>

WhatsApp content moderators in Texas sued Meta for proper compensation for the difficult work they had been subjected to<sup>390</sup>. In Kenya, one whistleblower, Daniel Motaung, sued Meta for

<sup>384</sup> Cant, Callum; et al. "[Feeding the Machine: The hidden human labour powering A.I.](#)" Bloomsbury, 2024.

<sup>385</sup> Pearson, Tamara. "[How companies in the Global North use online gig work to exploit Global South workers.](#)" The Real News Network, 2023.

<sup>386</sup> Hertel-Fernandez, Alexander. "[Labor law makes it too hard to start unions. Workers deserve a bigger voice.](#)" CNN Business, 2020.

<sup>387</sup> Podhorzer, Michal. "[The Paradox of the American Labor Movement.](#)" The Atlantic, 2024.

<sup>388</sup> Shierholz, Heidi; et al. "[Workers want unions, but the latest data point to obstacles in their path.](#)" Economic Policy Institute, 2024.

<sup>389</sup> Cockerell, Isobell. "[Legendary Kenyan lawyer takes on Meta and Chat GPT.](#)" Coda Story, 2024.

<sup>390</sup> Perrigo, Billy. "[WhatsApp Content Moderators Review the Worst Material on the Internet. Now They're Alleging Pay Discrimination.](#)" Time, 2021.

exploitation and union busting while another active case includes 185 content moderators from across Africa who were working for a Kenya-based Meta contractor, Sama, who are seeking \$1.6 billion in compensation.<sup>391</sup> In 2023, an Indian startup garnered attention for compensating AI language trainers at a rate that relative to the local market was considered fair.<sup>392</sup>

After working for Amazon for years, during the COVID-19 pandemic, Chris Smalls realized that worker protections were not in place at his warehouse and the situation was becoming ever more dire.<sup>393</sup> Colleagues were coming in to work sick, and Smalls was getting worried about his and his colleagues' wellbeing. "My job description says 'have a high school diploma and lift fifty pounds'. It doesn't say 'risk my life working during a pandemic'."<sup>394</sup> He started organizing a labor union. This was risky, as he could have gotten fired for doing so. It was far from easy, and took a lot of grassroots organizing and face-to-face conversations with colleagues. Smalls started first in his own warehouse, talking to his co-workers on breaks and on the way to work. "We would speak everywhere – in the staircase, in the elevator, in the parking lot, in front of the building, on the bus, at St George Ferry Terminal".<sup>395</sup> In 2022, after a great deal of engaged and active participation, he and his colleagues were the first Amazon workers to be recognized by the US National Labor Relations Board.<sup>396</sup> Later, the movement grew until the Amazon Labor Union<sup>397</sup> was formed across warehouses in the country.

While much of the data, anecdotes, and footage of 'invisible labor' is bleak, this essay ends on a hopeful note, best encapsulated in a quote by Smalls: "The young generation is paying attention now. The uprising of all these different movements that's being led by younger adults. You know, Amazon being a trillion dollar company, all the odds were against us. But we've proven that no amount of money in the world can amount to the power of people."<sup>398</sup>

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<sup>391</sup> Musambi, Evelyne. "[Facebook loses jurisdiction appeal in Kenyan court paving the way for moderators' case to proceed](#)." The Independent, 2024.

<sup>392</sup> Perrigo, Billy. "[The Workers Behind AI Rarely See Its Rewards. This Indian Startup Wants to Fix That](#)." Time, 2023.

<sup>393</sup> Yohannes, Aron. "[Chris Smalls, Amazon Labor Union Founder, On Digital Activism](#)." The Mozilla Blog, 2024.

<sup>394</sup> Day, Meagan. "[Amazon Is a Breeding Ground](#)." Jacobin, 2020.

<sup>395</sup> Blanc, Eric; et al. "[The Workers Behind Amazon's Historic First Union Explain How They Did It](#)." Jacobin, 2022.

<sup>396</sup> O'Brien, Sara Ashley. "[Amazon workers at New York warehouse vote to form company's first US union](#)." CNN Business, 2022.

<sup>397</sup> [Amazon Labor Union](#).

<sup>398</sup> Rise25. "[How Chris Smalls took on Amazon and made history](#)." Mozilla (published on YouTube), 2024.

## Part 9: The Humanity Behind Our Tools

### Recognizing the harsh conditions that mining and e-waste workers face

*This essay is part of "Digitized Divides", a multi-part series about technology and crisis. This part was written by Safa with portions borrowed and adapted from the What the Future Wants: Debut Exhibition poster set called "[Out of Hand](#)" which was created by Daisy Kidd and Dominika Knoblochová in 2022 as well as the Data Detox Kit guide "[Repairing Is Caring](#)" written by Louise Hisayasu in 2023. This essay was also co-developed through discussions, research, framing, and editing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderlyse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Yiorgos Bagakis, Alessandro Cripsta, and La Loma.*

Getting the newest smartphone can be quite appealing, with its crystal clear camera, longer lasting battery, and more storage space than ever before. Mobile phones get smarter, faster, and more dynamic with each new model. But how often do you stop to think about the many people who handle your device before you own it and after you discard it?

The start and the end of the lifecycle of technological devices connects us back to people and the planet. The 'smart' in smartphone comes from over 60 elements<sup>399</sup> that are extracted or mined. Smartphones contain around 80% of the elements found in the periodic table<sup>400</sup>. Some of these are common metals such as copper and zinc; some are precious metals such as gold and platinum; and some are rare earth elements such as dysprosium, praseodymium, and neodymium that make features like the colorful screen, microphone and speaker. Most smartphones contain 'conflict minerals' which are mined in regions where their extraction contributes to violence and disruption<sup>401</sup>. Mining is often associated with dangerous working conditions, pollution, draining of resources, and environmental damage. Villagers living downstream from one mine in China reported their teeth falling out and hair turning white pre-maturely due to the toxicity that resulted from the mining process.<sup>402</sup>

<sup>399</sup> Davies, Emma. "[Getting the metals out of old phones.](#)" Chemistry World, 2017.

<sup>400</sup> Venditti, Bruno. "[Visualizing the Critical Metals in a Smartphone.](#)" Visual Capitalist, 2021.

<sup>401</sup> Brigham, Katie. "[How conflict minerals make it into our phones.](#)" CNBC, 2023.

<sup>402</sup> Greene, Jay. "[Digging for rare earths: the mines where iPhones are born.](#)" CNET, 2012.

And where do smartphones go when we do not need them anymore? In countries like the US and Germany, people only keep their smartphones for two to three years<sup>403</sup>, even though the devices are still functional and could be used for longer. When compared to household appliances of a similar price, that's a relatively short lifespan. The fact is that many companies pre-plan short lifespans for electronics (also known as "planned obsolescence"<sup>404</sup>) by purposely designing them to become useless, broken, or out-of-date more quickly than they need to be. With hard-to-fix machines and a mounting pile of e-waste, it can be incredibly frustrating when the choice to buy a new product is out of your hands.

## Let's not sugar-coat what's going on

Rare-earth minerals can be found in many places on Earth, but there are fewer densely concentrated reserves. For example cobalt is found in greatest quantities in the Democratic Republic of Congo (DRC). Community leader and speaker, Kave Bulambo said "I come from a country that holds the largest reserves of [cobalt] and this is supposed to be good news for us, right? [...] Combined in this moment, the [DRC] supplies 70% of the world's cobalt demand but yet we're listed as one of the poorest countries in the world. How do you correlate the greatest tech inventions with extreme poverty?"<sup>405</sup> According to the World Bank Group, the DRC is one of the five poorest nations on Earth, with about three-quarters of people in the DRC living on less than two dollars per day. In fact, of the people living in extreme poverty in Sub-Saharan Africa, one out of every six lives in DRC.<sup>406</sup> The cobalt supply chains in DRC are uniquely dominated by China<sup>407</sup>, while US-based tech giants such as Apple rely on DRC cobalt supplies to meet their production demands<sup>408</sup>.

Unfortunately, drawing the parallel between rare earth mineral laborers, also known as 'artisanal miners' in places like the DRC to experiencing what is akin to modern-day slavery is not an over-dramatization. Siddharth Kara, who focuses his over two-decades of research, lectures, and publications on modern-day slavery, human trafficking, and child labor calls it just that. He spells it out in unambiguous terms:

"[...] you have people with no alternative, no other source of income, no livelihood. Now, add to that the menace in many cases of armed forces pressuring people to dig, parents [...] bringing all their kids into these toxic pits to dig just to earn that extra fifty cents or a dollar a day, that could mean the difference between eating or not. So in the 21st century, this is modern-day slavery. It's not chattel slavery from the 18th century where you can buy and trade people and own title over a person like property. But the level of degradation, the level of exploitation is on par with old-world slavery."<sup>409</sup>

<sup>403</sup> Statista "[U.S.: smartphones replacement cycle 2013-2027](#)." Accessed March 14, 2025.

<sup>404</sup> Chung, Emily. "[How to make technology greener? End planned obsolescence](#)." CBC, 2020.

<sup>405</sup> Bulambo, Kave. "[Why ethics must be a consideration in your tech use](#)." TEDxSchlossplatz, 2024.

<sup>406</sup> World Bank Group. "[Democratic Republic of Congo Overview: Development news, research, data](#)." 2024.

<sup>407</sup> Gregory, Farrell; et al. "[China in the Democratic Republic of the Congo: A New Dynamic in Critical Mineral Procurement](#)." Strategic Studies Institute, 2024.

<sup>408</sup> Carter, Sarah. "[African nation threatens Apple with legal action over alleged 'blood minerals' in its gadgets](#)." CBS News, 2024.

<sup>409</sup> Quote from Siddharth Kara from the article: Gross, Terry. "[How 'modern-day slavery' in the Congo powers the rechargeable battery economy](#)." NPR, 2023.

In this particular quote, Kara was discussing cobalt mining conditions in the DRC. Major exploitation can be seen in other parts of the world when rare earth mineral mines are found and local people are living in low-income conditions or there is a major income disparity in the population, resulting in the powerful taking advantage of the vulnerable, but the DRC has some of the most well-documented reports, photos, and videos of the extreme conditions. The conditions are dangerous and inhumane for adults, working without safety equipment, barefoot and bare-handed, quickly, and in the rain or sun – but children are also working in these mines, under the same conditions. Children working 12 hours at cobalt mines in the DRC earn the equivalent of one British Pound; the youngest children (as little as four years old) earning just pennies. Concerns for the health of people exposed to cobalt are severe – tumors, infections, and one woman told Sky News “we think the mine is toxic and destroys the babies inside us.”<sup>410</sup>

## Tech’s afterlife

The afterlife of your smartphone may be in a drawer in your bedroom, or it might end up somewhere on the other side of the world. Around 62 million tons of e-waste was generated in 2022<sup>411</sup>. Most of this e-waste ends up in countries such as China, Ghana, Nigeria, India, Vietnam, and Pakistan<sup>412</sup>, where there are fewer environmental protections. Precious metals are sometimes dangerously or illegally extracted from the phones, but the majority of phone debris is burned by young workers, releasing toxic chemicals into the air<sup>413</sup>.

Electronics contain some highly toxic chemicals. An average CRT computer screen contains 250-360 grams of lead. E-wastes account for 70% of our toxic waste stream<sup>414</sup>. Heavy metals such as zinc and copper are found at dangerous levels in the soil and water sources of those who live near dump-sites; putting people at risk of cancer, developmental disorders, and DNA damage. For this reason, protocols exist for them to be safely discarded, but according to the UN, in 2019, under 18% of e-waste was appropriately collected and recycled<sup>415</sup>.

The majority of e-waste (82%) is not collected and recycled in a formal manner, often being dumped, traded or recycled in ways which are not environmentally sound. For some countries, it is often cheaper to export e-waste than to manage it domestically. The receiving countries often do not have appropriate infrastructure in place for processing the hazardous materials. In 2019 alone, 53.6 million tons of e-waste was produced globally. That’s like throwing away 681 laptops every second. Going by our current disposal trends, this number is expected to climb to 74.7 million tons by 2030. This is a result of devices having shorter life cycles, not enough infrastructure to process the waste and lack of legislation to manage it. Keep in mind, that each year we don’t start with a clean slate, the e-waste mountain accumulates more and more.

<sup>410</sup> Sky News. “[Special report: Inside the Congo cobalt mines that exploit children.](#)” Published on YouTube, 2017.

<sup>411</sup> World Health Organization (WHO). “[Electronic waste \(e-waste\).](#)” 2024.

<sup>412</sup> ERI. “[Why Is E-waste Being Shipped To Developing Countries?](#)” 2017.

<sup>413</sup> Bradley, Laura. “[E-Waste in Developing Countries Endangers Environment, Locals.](#)” U.S. News and World Report, 2014.

<sup>414</sup> Bruun, Donald A.; et al. “[The toxicological implications of e-waste.](#)” Open Access Government, 2023.

<sup>415</sup> World Health Organization (WHO). “[Digital dumpsites’ study highlights growing threat to children.](#)” UN News, 2021.

Just because it has “waste” in its name, doesn’t mean it’s worthless. It’s estimated that the value of raw materials extracted from e-waste in 2019 alone could be worth as much as 57 billion US dollars. Large amounts of precious metals such as copper, gold and silver are disposed of in e-waste. With our current rate of recycling, at 18%, only 10 billion USD was recovered.<sup>416</sup>

## People over profit

Researcher Adio Dinika posed provoking and compassionate questions in light of this data: “In our relentless pursuit of technological advancement, we must ask: What price are we willing to pay for our digital convenience? And in this race towards an automated future, are we leaving our humanity in the dust?”<sup>417</sup> We would further interrogate the policies in place (or rather missing) which allow such powerful multi-national systems of exploitation to thrive: How much power, independence, or autonomy are policy-makers and elected leaders willing to allow Big Tech companies to take from people, especially those who may be in more vulnerable situations? What has to happen in order for us to stop tolerating the conditions in which the tech world is operating? Although people may be walking to these jobs, we do not believe the onus should fall onto people who are working to make ends meet in impoverished and fractured systems. The onus should fall on the Big Tech companies, as well as regulators, and policy- and law-makers who allow this type of dysfunctional system to fester.

These situations may have glimmers of hope. The government of the DRC filed criminal complaints against tech giants including Apple, Google, and Tesla first in the United States<sup>418</sup> focused on child labor – but a judge threw out the case. But then the DRC popped up with another lawsuit toward Apple in France and Belgium.<sup>419</sup> The suit includes accusations that the company handles stolen goods (namely the ‘conflict minerals’) and covers up war crimes (connected to the armed rebel groups who own the mines). Furthermore, the mining conditions in the DRC are becoming more exposed and talked about. A 2022 documentary called Blood Cobalt has had over one million views on YouTube<sup>420</sup> – a play on words of the 2006 film Blood Diamond<sup>421</sup>. One 2023 video on Instagram of people digging each other out of a collapsed cobalt mine in the DRC got 170,000 views and was shared over 70,000 times.<sup>422</sup> One can hope that the more people know about the deplorable situations in which products are made, and the more difficult it becomes to avoid and ignore the monstrosities that people endure in order to extract these minerals, that eventually something will change, whether it be public perception, or purchasing habits, or transparency demands, or policy and laws, or all of the above.

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<sup>416</sup> Forti, Vanessa; et al. “[The Global E-waste Monitor 2020](#).” United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR), 2020.

<sup>417</sup> Dinika, Adio. “[The Human Cost Of Our AI-Driven Future](#).” Noema, 2024.

<sup>418</sup> Devan, Cole. “[Federal appeals court throws out lawsuit against Apple, Google, Tesla and other tech giants over alleged child labor in Congo](#).” CNN Business, 2024.

<sup>419</sup> The Africa Report. “[Why is Congo taking Apple to court over conflict minerals?](#)” 2025.

<sup>420</sup> ABC News In-Depth. “[Blood Cobalt](#).” Published on YouTube, 2022.

<sup>421</sup> Zwick, Edward. “[Blood Diamond](#).” Warner Bros, 2006.

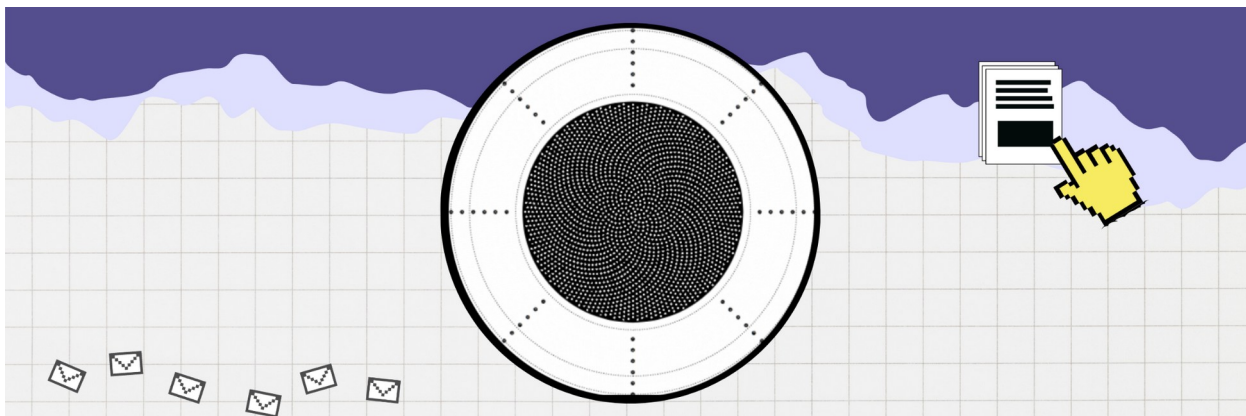
<sup>422</sup> outdoorskie. “[The Brutal Side of Nature](#).” Published on Instagram, 2023.



## Part 10: It's All Downhill From Here

### What is technology *actually* facilitating?

*This essay is part of "Digitized Divides", a multi-part series about technology and crisis. This part was written by Safa, and co-developed through discussions, research, framing, and editing by Safa, Liz Carrigan, Louise Hisayasu, Dominika Knoblochová, Christy Lange, Mo R., Helderse Rendall, and Marek Tuszynski.*



*Image by Liz Carrigan and Safa, with visual elements from Yiorgos Bagakis, Alessandro Cripsta, and Szeto Yuming.*

Apple's iPad Pro May 2024 advertisement showed a steel hydraulic press smash music and art. Paints, lights, and screens explode, as well as humanistic figures like an emoji whose eyes popped out of its head from the untenable pressure, opening again to reveal nothing but a shiny new device. Throughout, the Sonny and Cher song "All I Ever Need Is You" plays in the background.<sup>423</sup> Many saw the destruction shown in the advertisement unsettling<sup>424</sup>, including Wall Street Journal reporter Katie Deighton who wrote: "This ad perfectly encapsulates the insight that people think technology is killing everything we ever found joy in. And then presents that as a good thing."<sup>425</sup> Apple's advertising sits within a wider context where promises of technology's positive impacts on society have long experienced a dissonance between the way it is marketed to mainstream audiences and the reality of the consequences caused by it.

We should retire notions of techno-solutionism – technology will not save us from ourselves because everything we create comes from the limitations of our own minds and muscle memory. We need to look frankly at the consequences of technology as environmentally and socially harmful physical infrastructures. We also need to face the ways in which our collective data is being used for purposes that harm individuals and society. Is this really the reality we want for ourselves? At the same time, it is senseless to demonize technology in and of itself. We haven't yet reached a futuristic reality where killer robots are rolling around without the aid of human beings to build, program, and implement them, as well as to charge their batteries and service their systems. We keep coming back to the same key point: human beings are ultimately responsible for the harms inflicted upon the environment and humanity.

<sup>423</sup> Apple. "[Crush! | iPad Pro.](#)" Published on YouTube, 2024.

<sup>424</sup> Mueller, Saira. "[A new Apple ad is sparking backlash from viewers who say it hits the wrong note.](#)" CNN Business, 2024.

<sup>425</sup> Deighton, Katie. "[This ad perfectly...](#)" X (formerly Twitter), 2024.

## The power of digital influencers

Since the dotcom boom of the 90s, tech companies, and more specifically the founders and owners of tech startups, have garnered attention and notoriety. “Tech culture increasingly gave the star treatment to young entrepreneurs whose success boiled down to a few thousand lines of computer code.” Critics in the 90s raised concerns of the possibility of ‘technofascism,’<sup>426</sup> a term which has resurfaced today. Notably, researching the term ‘technofascism,’ raises more questions than it answers and the lines between far left and far right become blurry. Another buzzword since US President Trump’s 2025 inauguration is “broligarchy” which blends the concept of “bros” or “tech bros” (very specifically: a small group of wealthy and well-connected men) with oligarchs. One article noted, “the rise of the ‘broligarchy’ carries a bit of irony too because men, overall, are not doing too well right now. [...] Many are struggling economically. Many feel disenfranchised.”<sup>427</sup> ‘Broligarchs’ illustrate how much power and influence owners of tech companies have on politics and the inverse – how politics in the United States is more steadily harnessing technological power to fulfill their visions.

Depending on who holds positions of power over people in vulnerable situations, what information they are collecting and how they are collecting it, as well as the consequences of that information can cause grievous harm. Data can be used as a force for good or for heinous crimes against humanity depending on who is behind the steering wheel. “As in many cases, tech is neither good nor bad here: technology is stupid but never neutral. It all depends [on] what the intentions are of those who use it.”<sup>428</sup> *Digitized Divides* has explored just some of the places who are concentrating technological systems of power, namely the United States, Israel, and Europe – all of which have seen a sharp rise of the far-right in recent years<sup>429,430,431</sup>.

According to a survey of over 120,000 United States voters, more than 50% of men under the age of 30 supported Trump during the 2024 presidential election<sup>432</sup>. A 2024 Pew Research Center study found that nearly 80% of people under the age of 30 in the US are Instagram users and 93% use YouTube – overall, 75% of under 30s adults use at least five of the social media platforms they were asked about.<sup>433</sup> At the same time, the right-wing social media influencer landscape is booming; researchers described that in the past couple of years, young men are increasingly relying on podcasters and live streamers as a primary source of information, and those influencers are not uncommonly platforming and promoting far-right political leanings.<sup>434</sup> At the same time, the US Democratic party has not strategically harnessed the internet and digital influencer power in the same way. Activist Matt Bernstein discussed this topic with commentator and journalist Taylor

<sup>426</sup> Lewis, Becca. “[Headed for technofascism: the rightwing roots of Silicon Valley.](#)” The Guardian, 2025.

<sup>427</sup> Trepany, Charles. “[Trump's 'broligarchy' turned heads at the inauguration. It sends a powerful message.](#)” USA Today, 2025.

<sup>428</sup> Tuszynski, Marek; et al. “[“Technology is Stupid”: How to Choose Tech for Remote Working.](#)” Tactical Tech, 2020.

<sup>429</sup> Leal, Nicholas Dale. “[The American far right is emboldened by the return of Donald Trump.](#)” EL PAÍS, 2024.

<sup>430</sup> Haaretz. “[Far-right Israel Explained | What You Need to Know About Netanyahu's Radical New Government.](#)” 2022.

<sup>431</sup> Coi, Giovanna. “[Mapped: Europe's rapidly rising right.](#)” Politico, 2024.

<sup>432</sup> Brown, Matt. “[Young men swung to the right for Trump after a campaign dominated by masculine appeals.](#)” The Associated Press, 2024.

<sup>433</sup> Pew Research Center. “[How Americans Use Social Media.](#)” 2024.

<sup>434</sup> Alba, Davey; et al. “[The Second Trump Presidency, Brought to You by YouTubers.](#)” Bloomberg Technology, 2025.

Lorenz, stating: “Democrats don't respect the internet,” as they explored missed opportunities to connect with Gen Z in the run-up to the 2024 US presidential elections.<sup>435</sup>

## Hard-coding violence against women

People are hurting other people and the planet using technology as a means to exploit and extract with mass efficiency. One key example is that AI tools are not inventing sexual harassment, rather, they are making the existing societal problem of sexual harassment even more pervasive, such as through the creation and sharing of non-consensual intimate imagery (NCII – these are intimate photos or videos, including nudity, or sexually suggestive or explicit images exposing someone's real or AI-generated body, shared without their permission). According to a 2021 Pew Research Center study, 41% of over 10,000 survey respondents in the US said that they had personally experienced a form of online harassment. Of the respondents under 35 years old, 33% of women and 11% of men said they had specifically experienced sexual harassment online.<sup>436</sup> A 2023 analysis of over 95,000 deepfake videos found that up to 98% of them were deepfake pornography – and of those, 99% of the individuals targeted were women. Other vulnerable groups, such as minors and LGBTQ+ people, are also disproportionately victims of online sexual harassment.<sup>437</sup> There are increasing concerns about the growing use of AI in sextortion schemes.<sup>438</sup> Violence against women is deeply rooted in systems and societies around the world and this common thread is seen throughout history.

While some of the pieces in this series brought up extraordinary examples of recent advances in medicine and medical technology, it is important to acknowledge that data to advance medical knowledge has historically and recently included significant instances of discriminatory, racist, and inhumane practices. People have committed terrible acts, and they were not even considered illegal most of the time. For example, in the United States, Black women have endured a brutal history of institutional practice such as forced sterilisation<sup>439</sup>. The racism and bias still reverberates today, resulting in less trust in medicine and reduced health outcomes among Black women in the United States<sup>440</sup>. In the United States, forced sterilization was also historically targeted at People with Disabilities, low-income people, People of Color,<sup>441</sup> and Indigenous people<sup>442</sup>. Other cases in the West's not-too-distant history of forced sterilisation also include Canada perpetuating these crimes against Indigenous women<sup>443</sup> and significantly, Nazi Germany targeting Jewish people and People with Disabilities, and every other group they deemed as

<sup>435</sup> Bernstein, Matt; et al. “[How the Right is Winning Young Men](#).” A Bit Fruity Podcast published on YouTube, 2024.

<sup>436</sup> Vogels, Emily A. “[The State of Online Harassment](#).” Pew Research Center, 2021.

<sup>437</sup> Security Hero. “[2023 State Of Deepfakes: Realities, Threats, And Impact](#).” 2023.

<sup>438</sup> Goodin, Dan. “[FBI warns of increasing use of AI-generated deepfakes in sextortion schemes](#).” Ars Technica, 2023.

<sup>439</sup> Murphy, Michael. “[The Troubling Past of Forced Sterilization of Black Women and Girls in Mississippi and the South](#).” Mississippi Free Press, 2021.

<sup>440</sup> Cox, Kiana. “[Black Americans and mistrust of the U.S. health care system and medical research](#).” Pew Research Institute, 2024.

<sup>441</sup> Ko, Lisa. “[Unwanted: Forced sterilization and eugenics projects in the United States](#).” PBS, 2019.

<sup>442</sup> Blakemore, Erin. “[The Little-Known History of the Forced Sterilization of Native American Women](#).” JSTOR Daily, 2016.

<sup>443</sup> Cheng, Maria. “[Indigenous women in Canada forcibly sterilized decades after other rich countries stopped](#).” The Associated Press, 2023.

undesirable such as Roma and Sinti<sup>444</sup>. In 2020, reports broke that US border guards committed forced sterilization against immigrant women at the US-Mexico border detention facilities<sup>445</sup>. Unfortunately, there are countless other examples worldwide just from the last one-to-two generations cyclically perpetuating these harms onto women. It is no wonder that researchers have been wary of the health data collected by cycle-tracking apps<sup>446</sup>.

These heinous examples are brought up in order to illustrate how an act such as forced sterilization which is so clearly a violation of human rights persistently shows up time and time again. If societies and humanity cannot commit to stopping such clear violations, there is a concern we are doomed to continue repeating such harms – and with modern developments, they may be done with the assistance of technology to be faster, more efficient, and far reaching.

Researcher Carlos Delclós aptly noted: “Through its embedded biases, structural logic and alignment with corporate and state imperatives, AI operates as both a mirror and amplifier of existing inequalities [ ... ] AI systems, trained on historical datasets and programmed by imperfect logics, embed systemic prejudices into their automated decisions.”<sup>447</sup> Ultimately, technology mirrors the problems we grapple with in our physical world and these are reflected in our digital systems. Exploitation, dispossession, and subjugation of people is something that should not have a place in modern times – but these injustices also continue to be committed. We need to stop pointing our fingers elsewhere, and take a long hard look in the mirror at ourselves.

The popular marketing of technologies such as AI tend to repeat terms like “efficiency”... but what are we actually facilitating when we use technology? If we look together at the cases presented in *Digitized Divides*, what is being facilitated is (more often than not) human and environmental harm. It doesn't have to remain this way, but how long will it take to make a change? And what will be lost along the way? A robot-lead reality is unlikely, but a reality where we accept violence as the status quo is already here.

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<sup>444</sup> Roelcke, Prof Volker. “[Nazi medicine and research on human beings](#).” The Lancet, 2004.

<sup>445</sup> Manian, Maya. “[Immigration Detention and Coerced Sterilization: History Tragically Repeats Itself](#).” ACLU, 2020.

<sup>446</sup> Felsberger, Stefanie; et al. “[Cycles of Control: Private Companies and the Surveillance of Reproductive Health](#).” Tactical Tech, 2022.

<sup>447</sup> Delclós, Carlos. “[The Internet Regime](#).” CCCB LAB, 2025.