CEX.IO COMPASS: Q1 2024

Generative AI and Its Downstream Effects

Greetings fellow crypto enthusiasts,

When we last spoke, 2024 had barely commenced, and our conversation centered around what to expect in the months ahead. _5 Thoughts for the Crypto Space in '24 and Beyond_ saw The CEX.IO Market Research Team set its sights on several key vectors for investigation, and provide in-depth coverage for our curious, global community. Members were empowered to engage with a series of credible resources, and enter the New Year with confidence and clarity. Our commitment to provide trusted insight into pressing trends and topics gave The Team latitude to examine aspects correlated to crypto's success, and draw connections through impartial research. By illustrating the relationships between forces in and outside the sector, participants were presented with a holistic picture of the evolving landscape.

Since then, one development has continued to play an outsized role, not only among industry enthusiasts, but in nearly every corner of the professional world. Even those with a narrow focus on emerging news stories have likely witnessed the rise in reporting on "generative AI," and the many ways it's being implemented for a range of use-cases. Dedicated readers will remember how our prior report urged caution and consideration before assigning machine-learning tools to any aspect of their crypto journey. However, it's become apparent that these solutions are poised to disrupt everyday life in ways unseen since the early days of the Internet. While many are still processing the full ramifications of AI-enabled technology, preparing for all potential outcomes is essential to charting a prudent course.

Throughout Q1 2024, results from integrated chatbots and programs began to show their impacts on industries where leaders thought it wise to deploy these solutions. Already, the sheer magnitude of energy, water, and data required to sustain their function is raising questions about the relative feasibility of applying and perfecting such tools at scale. The voracious appetites for "high-quality" data are revealing early limitations, as revelations that the early rush of machine-generated content may work to stymie the training of subsequent models. In turn, the necessary data processing centers are bumping up against the physical restrictions of the lived environment. Such quantities of power and water, while adequate to a certain extent, often pale in comparison to the requirements for ongoing, consistent usage. This is leading some experts to assert that we may have already reached the apex of AI.

To a certain extent, this could prove a welcoming outcome. As workers and retail participants alike are beginning to encounter the downstream effects of AI-optimized industries, such applications are frequently out-of-step with customer and employee expectations. From increased automation of once human-supplied services, to whether AI tools provide cover to business and government leaders for the negative effects of their decision-making, it's worth examining these relationships. While not all outcomes are equal in their severity, the culmination of these applications at scale is revealing a world that's being reoriented away from human-first considerations.

For crypto enthusiasts, this means an Internet that's harder to navigate, with even greater uncertainty as to what information can be trusted. Where innovation remains a key cornerstone of the digital asset space, seasoned traders know that not all technology can be embraced at face value. Rather, it's incumbent to reexamine the initial promises offered by AI leaders alongside the real-world effects of their creations. Where price slippage can prove advantageous for savvy positions, gulfs between purported goals and hard results make it necessary to determine which parties stand to gain in these scenarios. Thankfully, The CEX.IO Market Research Team has painstakingly assembled a range of quality resources, coupled with historical and contemporary analysis, to help make sense of these confusing times.

In the following pages, readers will discover insight into the current moment, and have the opportunity to delve into the many sources that informed this analysis. While the subject matter strays at times into difficult topics, we felt duty bound to present the full spectrum of AI's myriad effects. By showing courage in the pursuit of truth, we hope this report allows space to digest and take stock of the ways these nascent technologies are being applied to reshape the world. Given unrest in many corners of the Earth, and our personal relationship to some of it, understanding the nuanced applications of AI in light of global conflict reveals how theory can quickly become reality. To this end, we took great care to remain objective in our synthesis of the following information, and hope this document inspires generative considerations among its readership.

True denizens of the crypto space will attest that there's no substitute for thorough research. That building knowledge requires understanding how concepts interact between related disciplines, and embracing new interpretations through careful reflection. Therefore, we hope this *COMPASS* experience expands on our educational foundation, and strengthens community comprehension of AI in favor of grounded, evidence-based assessment. After all, crypto enthusiasts should be well-attuned to sniffing out and avoiding opportunities that appear too-good-to-be-true.

On behalf of The CEX.IO Market Research Team, I hope these pages lend confidence in the days ahead, and may the markets trend in your favor.

Kind regards,

Oleksandr Lutskevych
Founder and CEO, CEX.IO

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Methodology

For this edition of *COMPASS*, The CEX.IO Market Research Team felt it prudent to conduct a contemporaneous assessment of the current discourse surrounding so-called "generative AI" solutions. In taking stock of quarterly progress, this approach was adopted to keep pace with emerging events across an array of correlated markets. Much like developments in the crypto ecosystem, AI's implementation is proving both dizzying and overwhelming for even the most well-attuned enthusiasts. To counteract some of the confusion, the following pages endeavor to present a thorough and meticulously-cited account of the current debate.

To provide sound, critical reporting, the information and sources contained within aim to offer a clear, factual picture of the AI landscape. The following explores how various machine-learning tools are being applied, and the downstream effects impacting real-world spaces. To ensure accuracy, research was pulled from an array of sources based on credibility and expertise within the industry. All collected sources were vetted for bias and quality, with those championing a "human-first" framing toward AI usage receiving priority consideration. To that end, readers are encouraged to synthesize written material alongside linked primary sources to arrive at their own conclusions.

Please note that "AI" is often used as shorthand throughout this document to discuss machine-learning solutions, chatbots, image generators, and Large Language Models (LLMs). This was a choice for brevity, but distinctions have been made where appropriate to ensure consistency in the following analysis.

Introduction

Any programmer will concede that, after water, heat is the most corrosive natural phenomena against the success of computer systems. Whether it's the rush of a power surge, or a rising ambient temperature, circuits and processors, like human brains, get foggy and discombobulate when left to bake. And yet, out in the desert, or tucked in some other out of the way place, sprawling data centers increasingly dot the grid.

These massive warehouses containing cloud servers, crypto mining facilities, and waystations for the broader internet, all demand smooth, continued functionality for their end-users. With an ongoing power supply in need of cooling, water's also in high demand. Those who've rushed a wet mobile phone or laptop into a bag of rice may find poetic justice in water finally being made subservient to machines. Unfortunately, the ramifications of this relationship are being made more dire through a confluence of rising trends.

A new epoch appears to be promising an increasing drumbeat of concerning events. From Washington state issuing a drought notice due to decreased snow accumulation, to a hitherto unprecedented mass-bleaching event challenging the success of Australia's Great Barrier Reef, the Earth is under strain. And yet, the levers that allow global commerce to flourish necessitate increasing demands on the planet's ability to regenerate. For even the most gung ho crypto enthusiast, questions of ensuring a sustainable transacting environment are difficult to avoid. While many crypto and tech-minded projects are forward-looking, the menu of possible futures appear to be quickly diminishing. While there are numerous root causes nurturing this decline, at no point is humanity without agency to chart an alternative course.

To this end, the following analysis aims to posit how those who value the agency afforded by decentralized markets can ensure the foundation on which they're built remains intact. In the last issue of *COMPASS*, we discussed Bitcoin's energy demands, and ways the industry could approach its role in keeping global emissions below critical thresholds. In the months since our last investigation, Bitcoin is on track to set a new consumption record in 2024. At a time when land and ocean temperatures are warming faster than initial scientific projections, renewed urgency around ensuring our only planet remains habitable feels of even greater consequence.
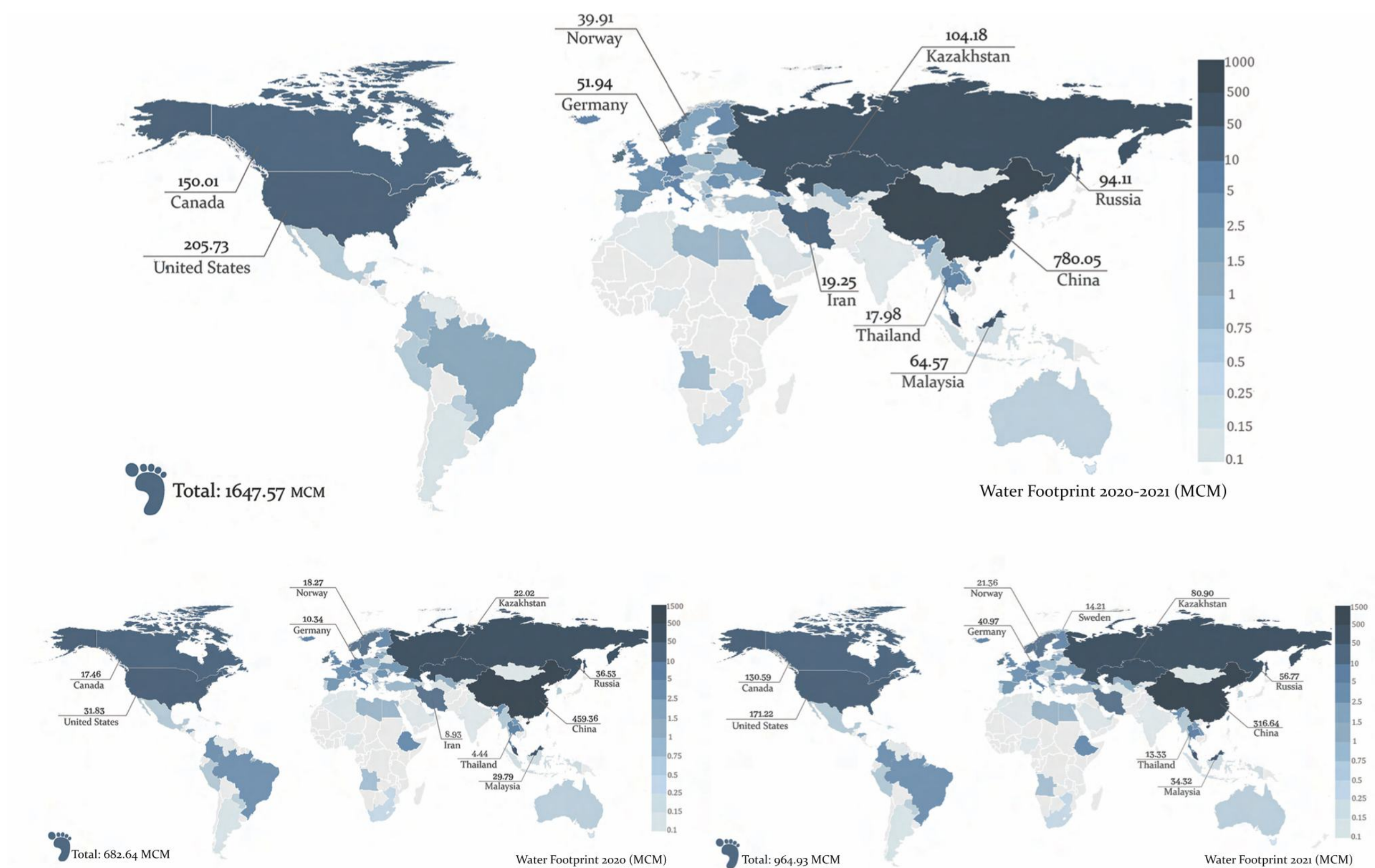
Figure 7. Water Footprint of BTC mining across the world

Image Source: Sanaz Chamanara and Kaveh Madani; <u>United Nations University Institute for Water, Environment and Health</u>; 2023.

A <u>report</u> published in October 2023 from the United Nations University Institute of Water, Environment and Health shared conclusions on the consumption patterns of Bitcoin mining. While touched on briefly in the previous edition of *COMPASS*, there's cause to revisit these results in light of BTC's recent price increase and halving event. Whether through the common peaks that accompany these milestones, or the growing interest of large asset managers in Bitcoin ETFs, it's important to remember the <u>feedback loop</u>: when the BTC price goes up, so do network requirements.

Maintaining a competitive, steady flow of cryptographic guesswork requires uninterrupted computation. The incentive to harness readily-available resources, such as fossil fuels to power mining rigs, and natural waterways to cool them, is well-documented. This pattern, likened to <u>a digital gold rush</u> as far back as 2018, has continued to leapfrog globally as market conditions motivate a search for cheap power and accessible water. On paper, this is Economics 101. However, the tendency to downplay or obscure negative effects when discussing such ventures remains the discipline's greatest omission. Much like the revelations around <u>plastic recycling</u>, <u>forever chemicals</u>, and <u>fossil fuels</u>, economic incentive has a deep history of disregarding human and global health.

While much consternation exists within crypto over singling out Bitcoin's role in climate change, the harsher reality is that this problem extends beyond the digital asset space. A new leviathan has the potential to engulf crypto completely through an ironic mixture of over-consumption, erroneous processing, bountiful misinformation, and rising threats of inflated promise. One with energy requirements that necessitate an even greater thirst; that in return could threaten worker dignity, and topple the most monumental information repository since the Library of Alexandria.

Avid readers of the series have likely intuited we're speaking of Large Language Models (LLMs) and imaging tools, conveniently bundled into the Sci-Fi market speak: generative AI. As was painstakingly articulated in the previous document, and succinctly by journalist Jacob Silverman in his April 2024 profile of Sam Bankman-Fried for *The Nation*, AI doesn't "know" anything. Rather, these programs have been instructed by their programmers to scrape massive amounts of data, often copyrighted material, to suss out patterns and configurations for later replication. From there, the language or image models populate fields, textual or visual, in ways that respond to prompts in the fashion of Mad Libs or an exquisite corpse. Critics have proposed plausible limitations due to "fluent-reading" or passable content, and the breadth of uncanny renderings derived from composite information. Those who remember the ELIZA effect are right to question the actual machinations taking place under the hood.

Recent events have made it incumbent to once again discuss AI, its ethical nature, and what could lie ahead for humanity if it's applied at scale. This includes the potential decimation of certain jobs, the slow degradation of online services, and grave implications for surveillance and wartime applications. Coupled with its immense demand for the Earth's limited resources, AI's potential consequences are myriad. And yet, by playing on some of humanity's greatest weaknesses, some entities are finding clever ways to Trojan Horse AI-enabled systems into everyday life. In an effort toward clear-eyed reporting and analysis, The CEX.IO Market Research Team is once again directing its vigilance toward preparing readers for the road ahead.

Crypto enthusiasts are uniquely suited to supplant the threats posed by AI through their battled-hardened experiences in the digital economy. Those who've been burned by too-good-to-be-true assertions in the crypto space have just cause to eye AI coolly, and demand receipts that corroborate corporate testimony. However, the reality remains that AI is poised to impact elements of the digital asset ecosystem from both top-down and emergent vectors. Misinformation produced and circulated by bots, AI-derived trading strategies, and even tokens built by AI-enhance tools are all poised to muddy the waters. Individually, each element has the ability to heavily influence the status quo; but combined they have a near inexhaustible potential to subvert established norms. But first, let's set the table.

How did we get here?

"Oh I laid down your railroads, every mile of track
With the muscles on my arm and the sweat upon my back
And now the trains are rolling, they roll to every shore
You tell me that my job is through, there ain't no work no more."

- Phil Ochs, "Automation Song," *All the News That's Fit to Sing*, 1964.

History is littered with attempts to replicate humanity for all manner of ends. From the Mechanical Turk and animatronics, to Science Fiction's run of robots, droids, and replicants, we've long aspired for company when left to ponder the void. However, the darker side of this long sought endeavor is rooted in the earliest, often most destructive economic incentive: cheap labor. The impact of labor market forces can have profound effects on the social fabric, with many events throughout history still reverberating to this day. From chattel slavery to Frederick Taylor's practice of scientific management sharpening worker actions toward mounting precision, the desire to master ourselves too often contains elements of exploitation.

Broadly speaking, advancements in farming and production techniques drove workers from fields into factories, which in 1913 saw their capacity increase dramatically following the introduction of the assembly line. Henry Ford's innovative approach to car manufacturing took Taylor's thinking into overdrive by allowing industrialists the added means to control for time. Where interchangeable parts and repetitive labor were once the two main levers employers could manipulate to increase profits, time added a whole new dimension to this calculus.

From here, the pace at which workers built cars could be measured and accounted for, allowing for unprecedented accuracy in output, known as mass production. This gave Ford the advantage to both price his motorcars at a lower rate, and meet rising consumer demand, which allowed for quick market dominance. Despite raising a major cross-section of the population toward a higher standard of living, increased workplace demands often led to worker exhaustion, resistance, and an array of strike behavior.

Overtime, the quest for even cheaper labor produced a sequence of events that dovetailed to exacerbate the negative impacts of each. Advanced robotics allowed for more expedient and proficient assembly, which decimated successive groups of specialized workforces. In turn, macro-level policies, such as the North American Free Trade Agreement (NAFTA), and the creation of various special economic zones, reconfigured global supply chains to the advantage of employers. Many areas, such as the Rust Belt in the United States, are visual representations of deindustrialization, and the eradication of countless domestic jobs.

This was accompanied by a period of <u>deregulation</u> which worked to erode environmental, labor, and production protections that kept opportunistic manufacturers in check. As such, profit-seeking enterprises were incentivized to <u>glut markets</u>, skirt regulation, and undermine labor practices wherever possible, encouraging a race to the bottom for the greatest return on investment.

Simultaneously, the rise of the so-called <u>Information Age</u> shifted the dominant sector of employment towards that of a <u>service economy</u>. This umbrella term captures both the labor performed in retail and hospitality, as well as office, or white collar jobs. While this label can obscure worker hierarchies within these groups, it's helpful to denote jobs where human-ness functions as the product, rather than the means to one. Despite the semantic minefield that can open in the many iterations of restaurant work, these are the corners of society that saw changes in infrastructure while people remained at the center. Computers replaced typewriters, server pads became handheld devices, but the momentum of work still required a human presence. It's at this juncture of tech-fueled Taylorism that AI enters the scene, poised to again invert worker/employer relationships.

This pivot resembles prior instances of tech replacing human workers, but with an essential difference. Where the automation that introduced robotic arms to assembly lines sped up product production, AI tools seek to become the product. This differs from self-checkout lanes at the grocery store, or parking garages with automated windows. In both these scenarios, corporations have shifted the onus to complete these tasks onto the consumer, while saving money on the salaries of workers whose jobs become automated. For AI enthusiasts, the implementation of these tools aims to replace distinctly human-derived services with an AI-generated experience.

In such an economy, this translates to replacing a genuine service with an inauthentic, or authentic-seeming one. Retail and other types of companies may now choose, instead of employing a real person, to deploy AI "tools" to carry out what were previously considered professional or creative tasks. Where the assembly line allowed for control over the pace of production, machine-learning solutions propose to accelerate professional or creative tasks, perhaps replacing employees entirely. In his analysis of how various institutions train so-called "white collar" workers, physicist Jeff Schmidt's 2000 book *Disciplined Minds* offers prescient insight for our current AI moment :

> *"The same economic forces that drive employers to replace nonprofessionals with machines (which initially brings higher profits) also drive them to reduce the discretion of professionals by standardizing the work procedure, or even by introducing 'expert' computer systems. In each workplace the bosses push for more and more detailed job descriptions and work guidelines, which transform the employee's decision-making into a routine or rote activity and tend to strip the work-result of any imprint of the employee's own thinking."*

Schmidt's analysis of "'expert' computer systems" mechanizing "professional" work provides a gateway to understanding how AI solutions are being made to become the employees themselves. In hindsight, this evolution towards professional automation has been a long term goal that present-day Henry Fords and Taylorists could be rushing to embrace. At the time of this writing, attempts have been made to replace human professionals with bots in fields spanning mental healthcare, finance, translation, and technology, often without thought given to the long-term effectiveness of such a move. The real unknown is where notions of "optimization" will leave workforces and the general public once AI has more fully penetrated service sector employment. If these tools become endemic, an untold number of workers across numerous industries could slip into precarity. As market forces dictate: there's no cheaper workforce than free labor.

Recent reporting from *The Wall Street Journal* identified how these tensions are playing out in various aspects of the fast-food industry. An interview with Joe Park, Chief Digital and Technology Officer for Yum Brands, highlighted how the company is seeking to champion "'AI-powered' fast-food" at their Taco Bell, Pizza Hut, and KFC locations. While Park touted Yum Brand's "AI-first" approach as a means to "drive sales and help lower costs," the article points out how these pivots are also in response to higher minimum wage requirements being mandated across the United States. In turn, similar technologies have already been deployed to replace drive-through workers.

Simultaneously, fast-food companies have also been experimenting with ways to target customers with "AI-enhanced" experiences, most notably around "dynamic" pricing. Wendy's faced near-instantaneous blowback following the announcement of "surge pricing" akin to ride-share services that deploy a similar practice. After peeling back the business-speak, such tactics appear to represent the basic law of supply and demand: when demand is at its peak, prices go up relative to the diminished supply. While it's one thing to place a premium on Lyft rides after bar close, it's another to gouge customers at its fast-food equivalent: meal times. For context, such usage could equal crypto exchanges automatically adjusting fees to account for increased activity beyond what's already common practice. Such adoption of AI-pricing would have the potential to invariably inconvenience traders at the moments when they most rely on these services.

Much like the Rust Belt example above, a physical manifestation of AI-automated services is perhaps best understood through the process of "enshittification," coined by Cory Doctorow in November 2022. While initially used to describe the erosion of online spaces, it evolved into a catchall for the late-capitalist phenomenon of consumers being made to absorb the downstream effects of corporate profit pursuit. Now, the term can be applied to explain worsening conditions on App-based platforms, faulty airplanes, and as this article suggests, perhaps even everything. For memecoin enthusiasts, it seems some of those chickens have already come home to roost.

A recent report from *Cointelegraph* uncovered how this process has been manifesting in memecoin markets. The Ethereum Network's recent Dencun upgrade, which aimed to provide greater tools for builders to more efficiently deploy dApps and smart contracts, has enabled Coinbase's decentralized rollup Base to swell in popularity. To test the transacting climate of the platform, *Magazine* conducted a blind study of 1000 recently issued memecoins for three key threat components: locked liquidity, verified contracts, and its potential to function as a "honeypot" scam. This random sampling of memecoins issued between March 19 and 25, 2024, revealed that "908 projects, or 90.8% of the sampled tokens, failed at least one of these security conditions." The piece quotes David Schwed, chief operating officer at security firm Halborn, who identified that when "projects [are] forks of existing projects or generated through AI means they often inherit vulnerabilities or introduce new ones."

Overview of common security vulnerabilities in new Base coins

At least 1 security vulnerability	908	90.80%
No locked liquidity	905	90.50%
Unverified contracts	232	23.20%
Honeypot	121	12.10%
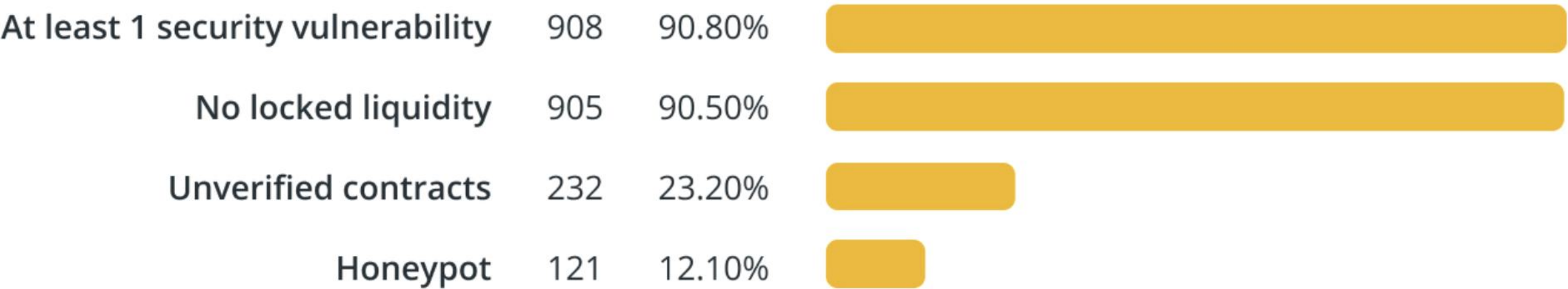
cointelegraph.com

source: **DEXTOOLS**

Image Source: Yohan Yun, Cointelegraph, 2024.

This question took another interesting turn with the emergence of ERC-404 tokens in February 2024, which sought to expand functionality of fractionalized NFT trading on the Ethereum Network. This thread helps breakdown the origin story, but in short, a project called "Emerald" aimed to combine elements of ERC-20 and ERC-721 tokens to create NFTs that could have relative fungibility depending on the parameters of their deployment. However, it was later revealed that the project developer understood little of the nuances behind these tokens, and had relied heavily on ChatGPT to provide much of the internal programming for the project. As a result, Emerald inherited weaknesses from its AI-generated origin, which were left intact after launch due to limited understanding on the part of the project's developers. In the end, these overlooked vulnerabilities were exploited to the tune of participant value. One of the developers, ctrl, took to Twitter to help explain Emerald's ruinous outcome. While the desire to cut corners resulted in calamity for some participants, it also yielded a curious new potential that developers are now working to fine-tune into a functional enhancement for NFT trading.

There's no question speed and efficiency can help boost the introduction of new products and services. In turn, the ability for aspiring builders to explore ideas through a range of tools can lower barriers of entry for a greater swath of would-be innovators, and even spark creativity. However, there's no replacement for cultivating a true understanding of decentralized services, and how they can be strengthened to protect participants at every stage of their transacting experience. By attempting to side-step thoughtful applications, programmers can inadvertently open the door to increased security risks and the potential for fraud. To this end, it would behoove the crypto space to think more thoughtfully about how new projects are vetted, and the level of risk exposure platforms are allowed to introduce for their users. Such results as those above should make it clear there's ample room for improvement toward a participant-first approach. For some, this outcome was evident from the jump.

Back in January, _Blockworks_ spoke with leaders from crypto trading platform Bullish to discuss how AI-enabled systems are impacting the digital asset space. Matt Presson, Bullish chief information security officer for the Americas, acknowledged that, while many of these solutions are capable of producing impressive results, their limitations must be taken into account. From Presson's perspective, security risks in the memecoin market were gathering on the AI horizon:

> _"The majority of these AI tools are based on neural network models. A critical piece to understand here is that these models may not have been trained on the latest information on a subject and may even make conclusions based on incomplete information (this is called inference). As a result, these models can't always be trusted to always give the correct output, meaning that their outputs need to be verified before being introduced into live code or as proof of some analysis."_

This puts notions of AI adoption into a sticky position. On the one hand, AI-enabled tools offer the potential to increase output capacity across a range of metrics. On the other hand, if programmers or project leaders are unfamiliar with the coding languages or systems they're hoping to have AI help create, this can spell potential turbulence for crypto participants. While intentionality plays a major role in determining a project's relative malfeasance, applying AI tools haphazardly in an effort to "fasttrack" a coin to market can also have significant downsides. Whether by providing openings for opportunistic bad actors, or simply creating a faulty network, there's just cause to test all outputs from AI programs, no matter their pedigree.

Taken together, these examples reveal that a downward spiral toward increasingly mid-tier products and services is potentially intensifying due to a mixture of AI-enabled functionality and cavalier human behavior. If the above examples are any indication, this problem could already be scaling at a rate that neither regulators, platforms, or crypto media can accurately depict. While it's unclear if this is due to the intrinsic shortcomings of some AI models, the sector's overall approach to efficiency could provide some helpful insight.

The "AI" Efficiency Problem

"We know what is best for you
Run just one more test for you
We know what we're doing don't we?
We know what we're doing don't we?"

- Oppenheimer Analysis, "Men In White Coats," *New Mexico*, 1982.

Despite the controversial status of data scientist and *Digiconomist* founder Alex de Vries among crypto enthusiasts, their quotes in the *MIT Technology Review* are helpful when discussing AI's real-time functionality. In a piece about Bitcoin mining in Kazakhstan, de Vries laments the use of fossil fuels to power "the world's biggest random-number generator[s]," a cynical, if somewhat accurate description of the process. While de Vries has caught the ire of industry publications, Bitcoin mining facilities provide a helpful analogy to the relative success of AI programs, which also generate a ton of wrong answers, but at a much slower rate. At a time where coal-fired power plants are being resuscitated to accommodate internet data centers, as *The Washington Post* recently reported, it's worth considering the ramifications of such a trade-off.

Just like Bitcoin's proof of work consensus mechanism, AI programs are also attempting to solve a problem. Where mining rigs race to complete complex cryptographic puzzles, AI programs synthesize prompts and winnow down possible information before regurgitating an answer. However, where Bitcoin's brute force computing allows for rapid, successive attempts, most AI programs require a turn-based response for each request. Think fluid gameplay versus tabletop RPG rules, if that's helpful. As attested to by numerous experiments exploring their limitations, initial AI results can skew abstract, nightmarish, or historically incongruous, and are often discarded by the requestor. In practice, this creates problems on two critical fronts that undermine AI's overall efficiency.

For one, each roll of the dice requires power and water to generate. There's no question that the strength of the program and the relative difficulty of the prompt can affect the amount of resources consumed. However, the emphasis should remain on the waste created by the subsequent trials often required to fine-tune a desired result. It also challenges the carefree atmosphere encouraged by the rollout of each successive AI product. Reporting from *Futurism* in late-2023 revealed the natural resource requirements for generative AI, uncovering the hidden costs behind the screen:

"[E]xtrapolating the data to a global scale reveals an even uglier truth. Companies like OpenAI and Google are already facing rapidly growing energy bills as they attempt to keep their generative AI tools online. Recent estimations suggest AI servers on a global scale use the equivalent of <u>what an entire country like Argentina</u> uses in a year. Just cooling these servers alone has an astonishing environmental footprint. According to Google's <u>2023 Environmental Report</u>, the company used an <u>astronomical 5.6 billion gallons of water</u> last year, a 20 percent increase over its 2021 usage. In short, the AI industry's carbon footprint will <u>continue to be a big problem</u>, especially as the world creeps ever closer to a climate catastrophe."

Even wearing rose-tinted glasses, these numbers are staggering. And what often gets overlooked when weighing the enormity of such volume, is that these figures are in addition to existing resource demands before AI entered the market. In other words, AI resource usage is occurring on top of what was already transpiring, nudging consumption even further into the red.

To echo de Vries' sentiments about Bitcoin mining above, it's correct to feel concerned that 5.6 billion gallons of water are being applied to cool servers rather than toward real world human consumption. Remember, the UN issued dire projections on water needs as recently as October 2023, which suggests any attempts to remedy this scenario are moving in the wrong direction. This is especially frustrating given that *The New York Times* discovered Google's first generation LLM, PaLM, provided "hallucinated" answers in 27% of responses. However, these realities are doing little to discourage the expansion of infrastructure required to support these services.

Image source: ElSweavoArt, <u>Bluesky</u>, April 2024.

While some are finding inspiration from these factual anomalies, there's no question that the proliferation of AI tools is increasing the amount of inaccurate or false information online. One yet-to-be-peer-reviewed study by Amazon Web Services found that roughly 57% of all online content has been translated into one or more languages using "Machine Translation." This AI-adjacent service, while an essential shortcut to breaking down cross-cultural barriers, often yields texts that are below fluency levels when compared to those of native speakers. Not only does this help reinforce notions that AI chatbots are biased against non-English speakers, but it could impact the success of future AI programs trained on these outputs. This brings us to the second major problem of AI efficiency, which is that "wrong answers" run the risk of impairing the accuracy of next generation models.

The phrase "garbage in, garbage out" is useful for understanding how AI models trained on AI-generated results, or "synthetic data," can only hope to propagate increasingly diminished returns. This timelapse of a text and image tool in conversation provides a quick glimpse into what some tech critics have referred to as "Habsburg AI." Taking its namesake from the titled bloodline famously plagued by a lack of genetic diversity, the term applies equally to systems trained on too much "low-quality" data. By relying on "copies," or data that's already been run through machine-learning programs, the information and connections established by subsequent systems undergo a similar integral breakdown.

To this end, "high-quality" data has become yet another premium resource that AI companies are hoovering up at alarming rates. This data scarcity has encouraged companies to hire part-time gig workers to write essays to train AI models, as reported by _The New York Times_. Technology critic Edward Zitron summarized the current irony AI companies face in a blog post from April 4, 2024:

> "AI companies face a kafkaesque bind where they can't improve a tool for automating the creation of content without human beings creating more content than they've ever created before. Paying publishers to license their content doesn't actually fix the problem, because it doesn't increase the amount of content that they create, but rather helps line the pockets of executives and shareholders. Ironically, OpenAI's best hope for survival would be to fund as many news outlets as possible and directly incentivize them to do in-depth reporting, rather than proliferating a tech that unquestionably harms the media industry."

The notion that we've already hit "peak AI" is another subject Zitron previously explored, where he highlighted the numerous ways the emerging AI sector is already under-performing. In fact, _The Harvard Business Review_ came to a similar conclusion back in November 2023. Zitron points to recent reporting by _The Information_ which uncovered how the industry's loudest voices who once touted AI's sky-high potential are beginning to "tamper expectations" around their solutions. This is a noteworthy sea change from the breathless coverage AI received initially, where their boundless capabilities were presented at face value. Now, in a more sober light, it seems many of those early claims were aspirational, if not outright hyperbolic.

Thankfully, blockchain technology could provide a critical breakthrough in the future training of AI models. At the World Economic Forum in Davos, Switzerland, crypto leaders identified how the "black box" nature of AI could be illuminated by placing all training data on blockchain ledgers to increase transparency. In January, _CNBC_ reported how Casper Labs, in a partnership with IBM, is working to apply this use-case at scale to help course correct the nascent AI sector.

According to Medha Parlikar, chief technology officer and co-founder of Casper Labs, the product they're developing would help ensure "datasets are actually checkpointed and stored on the blockchain," providing critical insight into how AI models are trained. This could help establish ironclad repositories of data protected by blockchain's immutable ledger, and provide an essential record to pinpoint faulty inputs that trigger downstream hallucinations. Parlikar referred to this as "rolling-back the AI" to a previous version that removes these on-chain anomalies, while preserving the integrity of the underlying system.

As critics have pointed out, the current path of AI development is enabling the proliferation of questionable content with no clear understanding of how the content is ultimately produced. However, blockchain-backed AI models could allow builders to follow digital breadcrumbs to remedy these problems at their source. While still in its early stages, such a core pivot could have the potential to subvert the so-called "AI peak" to soar toward new heights. In the interim, it could be incumbent on crypto enthusiasts to do their part to help close the gulf between efficiency and mediocrity. However, curtailing the dubious effects of errant AI usage remains a key threat vector for crypto market participants and nation states alike.

The Risks of "AI"

"When the piper come, you people best pay him.
For God's sake, you best pray to him
You best say the hymn,
You not worried 'bout swimmin', you know it won't be water again."

- billy woods, "Long Grass," _Terror Management_, 2019.

On July 24, 2023, OpenAI offshoot Worldcoin (WLD) debuted with a novel consensus mechanism that linked personal biometric data to value stored on-chain. Dubbed Proof of Personhood, or PoP, this bold new endeavor has gone on to boast 10 millions users across 120 countries, as of this writing. Rather than solving complex cryptography problems, or requiring a store of value, Worldcoin allows anyone to simply share their biometric data, typically iris scans, to participate in the network. While the Worldcoin white paper acknowledges that Proof of Personhood remains an "unsolved problem," CEO Sam Altman believes PoP is an essential component of an AI-enhanced landscape. With potentially paradigm-shifting changes coming for financial, employment, and technological systems in the form of AI enhancement, such thinking demands that society recalibrate to accommodate these changes.

In a blog post published on the day of Worldcoin's launch, Ethereum Co-Founder Vitalik Buterin summarized Altman's vision for the digital currency as follows:

> The _philosophy behind the project_ is simple: AI is going to create a lot of abundance and wealth for humanity, but it also may kill very many people's _jobs_ and make it almost impossible to tell who even is a human and not a bot, and so we need to plug that hole by (i) creating a really good proof-of-personhood system so that humans can prove that they actually are humans, and (ii) giving everyone a UBI. Worldcoin is unique in that it relies on highly sophisticated biometrics, scanning each user's _iris_ using a piece of specialized hardware called "the Orb":

Image source: _Vitalik Buterin's website_, 2023.

As is outlined above, the "hole" caused by rapid AI integration is already demonstrating an inclination toward the application of additional AI systems. This is enabling the fast replication of human-seeming services, spurring a Cambrian explosion of webpages and bots, with the knock-on effect of encouraging adjacent industries to follow suit. The impact this is having on the broader internet will be explored in greater detail below. Additionally, crypto platforms are finding themselves in the tough position of requiring even more stringent KYC/AML procedures to remain compliant under evolving conditions.

On February 20, 2024, _Cointelegraph_ reported that a viral social media post was instructing users how to circumvent KYC/AML parameters with the help of AI-image generator, Stable Diffusion. Using a combination of successive prompts and Photoshop enhancements, the post's author outlined how these services could be used to produce an array of authentic-seeming, state-issued documents. Not only does this run the risk of undermining the integrity of crypto platforms, but it puts an array of financial crimes within reach for aspiring bad actors. According to OpenAI, Worldcoin, with a fully-functional PoP consensus mechanism, could help solve this problem.

However, some in the crypto community are finding the notion of stockpiling biometric data to be antithetical to the core ethos of the space. Not only does it require more personal KYC procedures in the form of an iris scan, but it creates a data cache that could have enormous implications if it fell into the wrong hands. Additionally, it introduces the thorny issue of surveillance by requiring market participants to acquiesce to digital monitoring in exchange for participation in the Worldcoin economy. In essence, the proposal for solving an AI-enabled problem is an ouroboros of more AI. On a macro level, this has been flagged by industry leaders and think tanks as a potential liability that transcends the crypto ecosystem.

In a June 2022 Foreign Policy Brief by The Brookings Institution titled "Geopolitical Implications of AI and Digital Surveillance Adoption," authors Dahlia Peterson and Samantha Hoffman explored the potential impacts AI could have on a global scale. The report looks at the ways these tools are being developed and deployed, with specific examples that cut across democratic and more authoritarian-leaning countries. In practice, AI-enabled systems can aid law enforcement in the apprehension of criminals, and offer greater peace of mind to the social health of communities. However, the authors of the report highlight how even well-meaning development, when misused, can have concerning consequences:

> _"Even if an end user only aims to use surveillance technology for the greater good (from a liberal democratic perspective), it does not mean that no harm will be done. An end user isn't fully in control of how the data generated or stored are used by actors with downstream data access. This means that if suppliers are not monitored, the data from systems deployed overseas can advance authoritarian interests elsewhere. There are also issues associated with the standards that a technology carries with it and how these standards are set globally through market penetration."_

The policy brief takes a bird's eye view of the potential vulnerabilities, and maps the subsequent places biometric data could be compromised if bad actors discover flaws in system programming. From hardware devices, to cloud servers, to data stored in applications, all present a potential vector that, if not adequately protected, could result in user data becoming compromised, or misapplied. A quick flow chart of how information moves between and within these systems can be found below:

Biometric surveillance technology stack

SMART DEVICES / IOT DEVICES
Fingerprint scanners • Access control devices • IoT surveillance cameras • Smart glasses

DATA TRANSMISSION / COMMUNICATIONS
5G or WiFi network

CLOUD INFRASTRUCTURE
Infrastructure as a Service (IaaS) — the hardware, software, and other network infrastructure needed for an IoT cloud platform

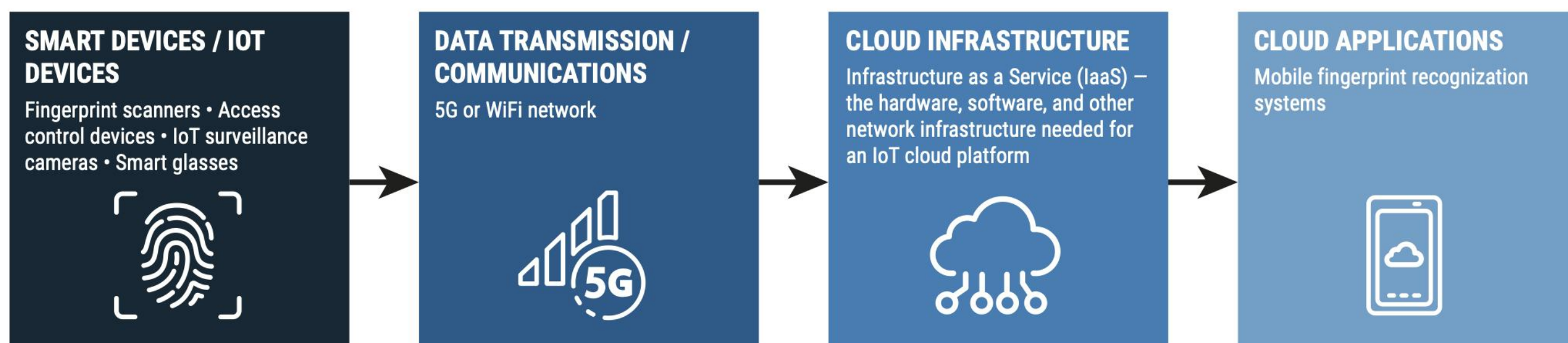**CLOUD APPLICATIONS**
Mobile fingerprint recognization systems

Image Source: Dahlia Peterson and Samantha Hoffman, The Brookings Institution, 2022.

Harkening back to the ERC-404 example above, it's becoming increasingly easier to AI-generate products and services from the ground up. However, creativity and innovation run the risk of being overshadowed by inherited weaknesses, either from faulty code or other vulnerabilities. While ambition can serve as a galvanizing factor for breaking new ground, progress can backfire when untrained eyes and knowledge gaps allow baked-in problems to escape scrutiny. This creates further "holes" that could, if not properly addressed, allow for participant value and information to leak into the hands of bad actors. In practice, the notion that such proliferation can scale without knowledgeable oversight, while still remaining successful from the perspective of consumer protections appears, at best, questionable.

Prior to Worldcoin's public launch, *The MIT Technology Review* investigated the company's practices in an array of countries, most notably Indonesia, Sudan, and Kenya, all considered "low or lower-middle income by the World Bank." Authors Eileen Guo and Adi Renaldi spoke with Alex Blania, CEO and co-Founder of Tools for Humanity, the entity behind Worldcoin, as well as numerous Worldcoin enlistees. While descriptions of accounts vary between Worldcoin and its network participants, the article comes to a curious conclusion by reading between the lines of Blania's correspondence:

> "Speaking to Blania clarified something we had struggled to make sense of: how a company could speak so passionately about its privacy-protecting protocols while clearly violating the privacy of so many. Our interview helped us see that, for Worldcoin, these legions of test users were not, for the most part, its intended end users. Rather, their eyes, bodies, and very patterns of life were simply grist for Worldcoin's neural networks. The lower-level orb operators, meanwhile, were paid pennies to feed the algorithm, often grappling privately with their own moral qualms. The massive effort to teach Worldcoin's AI to recognize who or what was human was, ironically, dehumanizing to those involved."

In practice, this has proved the case time and again for AI solutions. From OpenAI hiring legions of Kenyan workers to make ChatGPT less toxic, to the revelation that Amazon's "Just Walk Out" services relied on "1,000 people from India watching and labeling videos," it seems AI mills require a lot of grist. While greater efficiency may well be on the horizon for some of these solutions, it's worth examining how they're conducting themselves in route to this imagined future. For many crypto enthusiasts, such surveillance by way of quid pro quos and sleight of hand undermines the basic trust that many participants seek in decentralized finance. Unfortunately, this may help answer an inquiry by one Worldcoin participant from Indonesia, "why did Worldcoin target lower-income communities in the first place, instead of crypto enthusiasts or communities?" Why indeed.
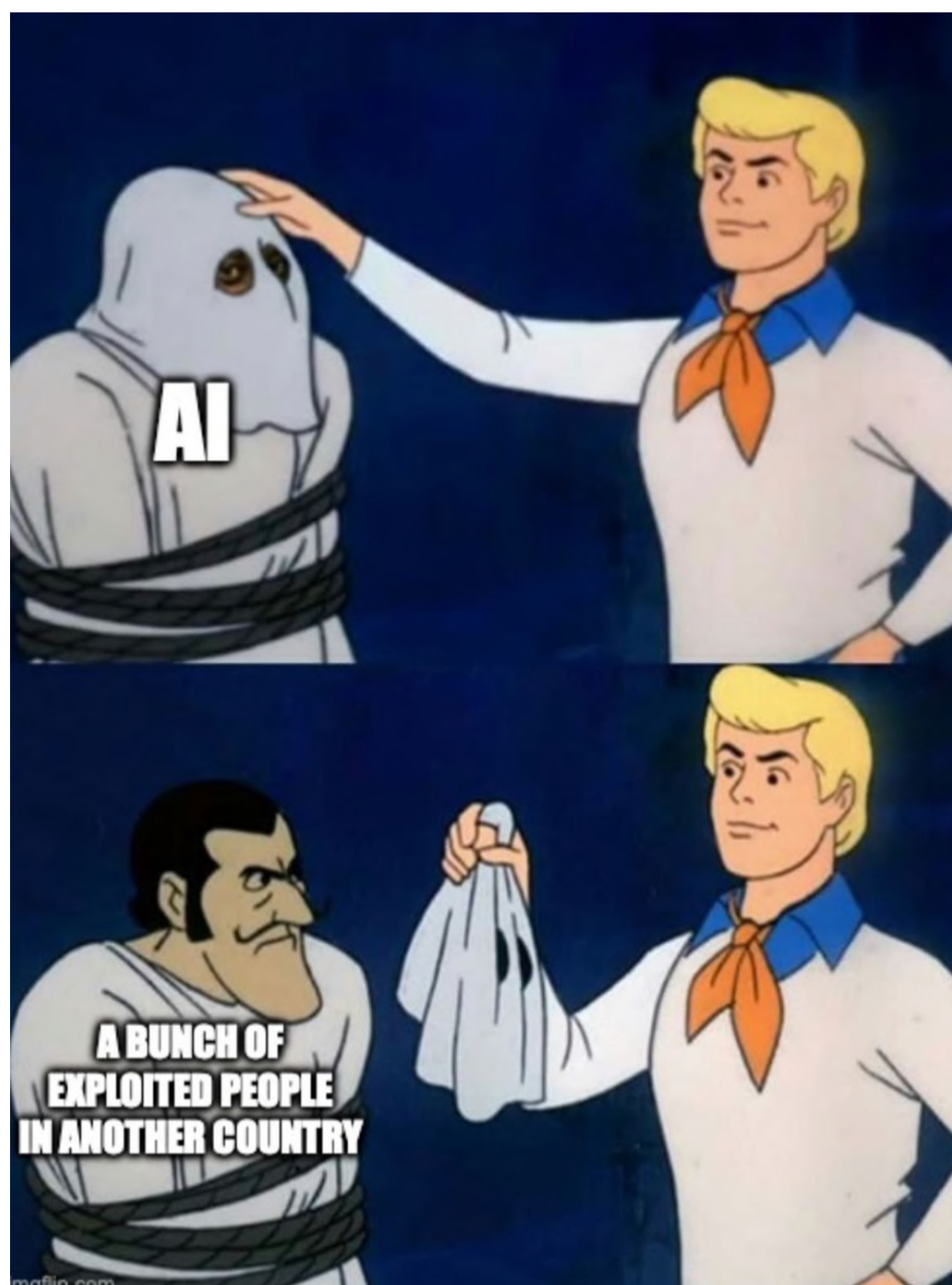

Image source: Matthew Federman, Bluesky, April 2024.

In fact, some countries have taken the step of banning Worldcoin from operating within their borders. In September 2023, Kenyan officials confiscated Orbs in Nairobi, and banned the company from continuing to harvest data from citizens. Reporting from *CoinGeek* noted how Blania was detained after returning to the country to defend Worldcoin's actions. His release was prompted by intervention from the U.S. government, which argued Blania had not been found guilty of a crime. Recently, Orb operators have been raided by officials in Hong Kong in January 2024, with Spain's high court upholding a temporary ban a few months later, in March. While questions still remain as to the ethical nature of Worldcoin's operation and acquisition of biometric data. Presently, multiple jurisdictions are seeking answers.

As with any new technology that encourages a shift in the status quo, it's important to assess what parties stand to gain, and lose, by its introduction. While the above sections help illustrate how AI tools are disrupting labor forces and financial markets at scale, emerging applications could have far reaching applications to surveillance and security sectors. Historically, periods of geopolitical conflict, as The Brookings Institution report forewarned, are often used as testing grounds for new or experimental technology. Reporting from _Salon_ in March 2024 revealed how U.S.-made, AI-enabled robots were being deployed in Gaza to explore their potential. However, this isn't the only example of AI solutions being introduced to quell instances of unrest in the region.

On April 3, _+927_ reported that an AI software called "Lavender" has been used to identify possible targets. The piece uncovers how machine-derived outputs are being acted upon "as if [they] were a human decision," with actual personnel given little oversight. It goes on to describe how the vast surveillance web, potentially supplied with information from Google Photos and WhatsApp metadata, is used to define combatant personas. The AI-system then deploys its pattern finding functionality to compile a list of targets, and geolocates individuals via their mobile devices. A second AI program, titled "Where's Daddy?" pairs with Lavender to trigger strikes once an AI-defined combatant enters their home.

This is a fitting example for how the outcomes highlighted by The Brookings Institution above could play out in practice. As the investigative reporting above outlines, the flow of data from dynamic repositories, in this case Google Photos, may have had potential downstream effects unintended by the host's once-explicit aims to "not be evil." The Intercept acknowledges that Google declined to comment on the use of their Photos service to enable Lavender. Since this reporting, _The New York Times_ confirmed that 28 employees were fired for raising concerns about the company's Nimbus partnership, which provided AI and cloud computing services. Aside from these events, another text exists that lends further light into the surveillance network's inner workings.

The theoretical concept for the AI-supported surveillance apparatus was first articulated in the book, "The Human-Machine Team: How to Create Synergy Between Human and Artificial Intelligence That Will Revolutionize Our World," which emerged online under the pen name "Brigadier General Y.S," in 2021. The text asserts that such a system would alleviate "the human bottleneck for both locating the new targets and decision-making to approve the targets." However, an apparent lapse in tradecraft allowed _+972_ to confirm Brigadier General Y.S. as Yossi Sariel, the former Head of IDF Central Command, and acting Head of elite Israeli intelligence agency, _Unit 8200_. Ironically, a Google email account linked to Sariel spurred this revelation, once again exposing the fragile nature of data-hosting systems.

On April 5, _The Guardian_ corroborated _+972's_ accounts, and highlighted further connections between "The Human-Machine Team" and its real-world applications. The book gestures toward the marketability of "AI-powered decision support systems," and the desire to "take them from the periphery and deliver them to the cent[er] stage." Students of history will likely recognize how Eisenhauer's military-industrial complex could be put into overdrive by AI-enabled solutions, an implicit implication of The Brookings Institution report above.

Echoing some of the concerns surrounding Proof of Personhood, and even Central Bank Digital Currencies (CBDCs) by market participants, technologies such as Lavender could just as easily be used to irreparably erode consumer privacy. Given the necessity of computer systems to crypto enthusiasts, such as mobile trading and wallet apps, it should be noted how such a power could be wielded against unsuspecting participants. Where an array of factors can result in digital assets being frozen on-chain, the radical transparency of blockchain networks could just as easily be exploited by AI-enabled surveillance technology. The decisions by various jurisdictions to limit or ban crypto usage could be extrapolated to target individual participants with the same cursory oversight. In practice, this could mean the halting of specific projects, or the violation of civil liberties for those merely seeking an alternative to traditional financial systems.

There's no question that consumers have limited control over market actions. However, it's worth noting that seemingly decided courses can be altered, and ground regained by those with alternative perspectives for humanity's future. In fact, numerous luminaries in academic and philosophical circles have argued for curtailing the more oppressive tendencies in all forms of government. First introduced as the "Imperial boomerang" by Hannah Arendt in *The Origins of Totalitarianism*, and later expanded by Michel Foucault in his *Security, Territory, and Population* lecture series, this concept perhaps best exemplifies the fundamental risk of embracing violence at scale. Speaking at the Collège de France in 1976, Foucault summarized Arendt's thinking on this concept as follows:

> *"[W]hile colonization, with its techniques and its political and juridical weapons, obviously transported European models to other continents, it also had a considerable boomerang effect on the mechanisms of power in the West, and on the apparatuses, institutions, and techniques of power. A whole series of colonial models was brought back to the West, and the result was that the West could practice something resembling colonization, or an internal colonialism, on itself…"*

In fact, the speed at which AI is being implemented appears to confirm Arendt's and Foucault's theorizing around the Imperial Boomerang. Reporting from *The Guardian* in March 2024 uncovered how AI tools are being used to identify homeless encampments in San Jose, California through a controversial pilot program. The collaborative effort united an array of companies, including Ash Sensors, Sensen.AI, Xloop Digital, Blue Dome Technologies and CityRover, who all partnered with the City of San Jose. While there are civic-minded reasons to employ AI-mapping, recent actions by the California State Supreme Court suggest the criminalization of homelessness could place the resulting information in the hands of law enforcement to unknown ends.

Like a "hair of the dog" hangover cure, or deploying subsequent predators after swallowing a fly, using AI solutions to plug AI-generated or societal "holes" could prove more costly than the problems themselves. As we continue to learn more about established and emerging AI tools, it's critical not to lose sight of the fundamental social relations they aim to replace.

To a hammer, everything looks like a nail; and to uncritical AI enthusiasts, each perceived societal failing may appear like a further vector to deploy technologies in which they have a vested interest. Going forward, it may prove essential to consider the lasting effects of solutions that are already yielding tepid or concerning results.

A larger outcome remains the consequences of outsourcing decision-making power to entities trained on the full spectrum of internet content, often undergirded by non-existent critical thinking skills. Whether the question is the integrity of emerging memecoin markets or the fundamentals of national security, technological corner-cutting could invite untold risk into the equation. That's why it's important to stay informed, and seek out voices who aim to uncover the deep questions at play beneath the fanfare of an imagined future. Under the backdrop of encroaching AI, 2024 has also seen a counterpoint to such a trajectory in the form of the year's highest grossing film to date: _Dune: Part 2_.

Alternatives to "AI"

"Thou shalt not make a machine in the likeness of a human mind."

- Frank Herbert, _Dune_, 1965.

In May 2023, _The Washington Post_ published an opinion piece by columnist Megan McArdle that explored a key aspect of the world-building behind Frank Herbert's 1965 Sci-Fi epic, _Dune_. Titled, "Banning AI saved humanity in 'Dune.' So why can't this work for us?" McArdle juxtaposed our current timeline with parallel struggles that emerge in the book. With _Part Two_ of Denis Villeneuve's critically-acclaimed reimagining set to complete the plot points covered in Herbert's novel, a particular element of the excitement caught McArdle's attention on social media.

Known as the Butlerian Jihad, this event is introduced to the reader via appendices in the novel, and referenced by characters throughout the narrative as a turning point in human civilization. Unlike the worlds presented in _The Matrix_ or _The Terminator_, the prelude to events in _Dune_ posit that humanity rejected the conditions of a machine-dominated society to preserve the wonders of the human mind. As such, a mutual understanding reigns that the human brain should not be replicated through technological means, thus preserving the integrity of thought and creativity. While McArdle's piece pivots on the difficulties and perceived futility of humanity tackling a shared goal, both the novel and film are radical arguments for just that sort of undertaking.

In addition to the Butlerian Jihad, there's another key subplot of _Dune_ that hums below the surface in the theatrical releases, but enjoys greater prevalence in the source material. While courtly intrigue and space feudalism account for much of the story's thrust, a critical "so what?" is the generations-long effort by Dune's native population, the Fremen, to terraform the desert landscape.

Due to the planet's extremely arid climate, the Fremen have devised unique methods for capturing and preserving moisture with the hope of tipping Dune's ecology toward supporting a natural water cycle. The magnitude of this undertaking has worked to structure the entirety of Fremen society, orienting their collective will toward a future many will never live to experience.

Given the trajectory of our current timeline, McArdle is right to be cynical that we're incapable of such an undertaking. Humanity has more or less known of the extinction-level threat that awaits us all if climate change is allowed to continue metastasizing. In fact, rugged individualism is so firmly rooted in many of the world's power centers that any sort of collective goal is viewed synonymously as an encroachment on personal freedom. Then again, history is not without precedent that, when unforeseen challenges present themselves, people often do come out in support of their fellow humans. Events on the spectrum from natural disasters, to moments of collective revelry, help demonstrate how prescribed roles can be overcome or subverted to support true connection. Which begs the questions: What do we stand to gain by working together?

At this point, it should be clear that there's a slippage between the promises of AI and its actual applications. Whether it's the investment bubble inflating downstream of wishful thinking, or the employment losses that stem from the replacement of work with AI, it's unclear what the average person stands to gain from these developments. From untoward surveillance, to sector-wide layoffs, to surge pricing on Frostys, the top-down transference of power enabled by AI does not appear to favor workers or consumers often enough. At present, these tools are best served to cut corners in some professions (assuming you've avoided automation by the tools themselves) or as a form of entertainment. Like early smartphone apps that were little more than tech-inspired parlor tricks, it's difficult to ascribe true progress to something that comes with so much baggage.
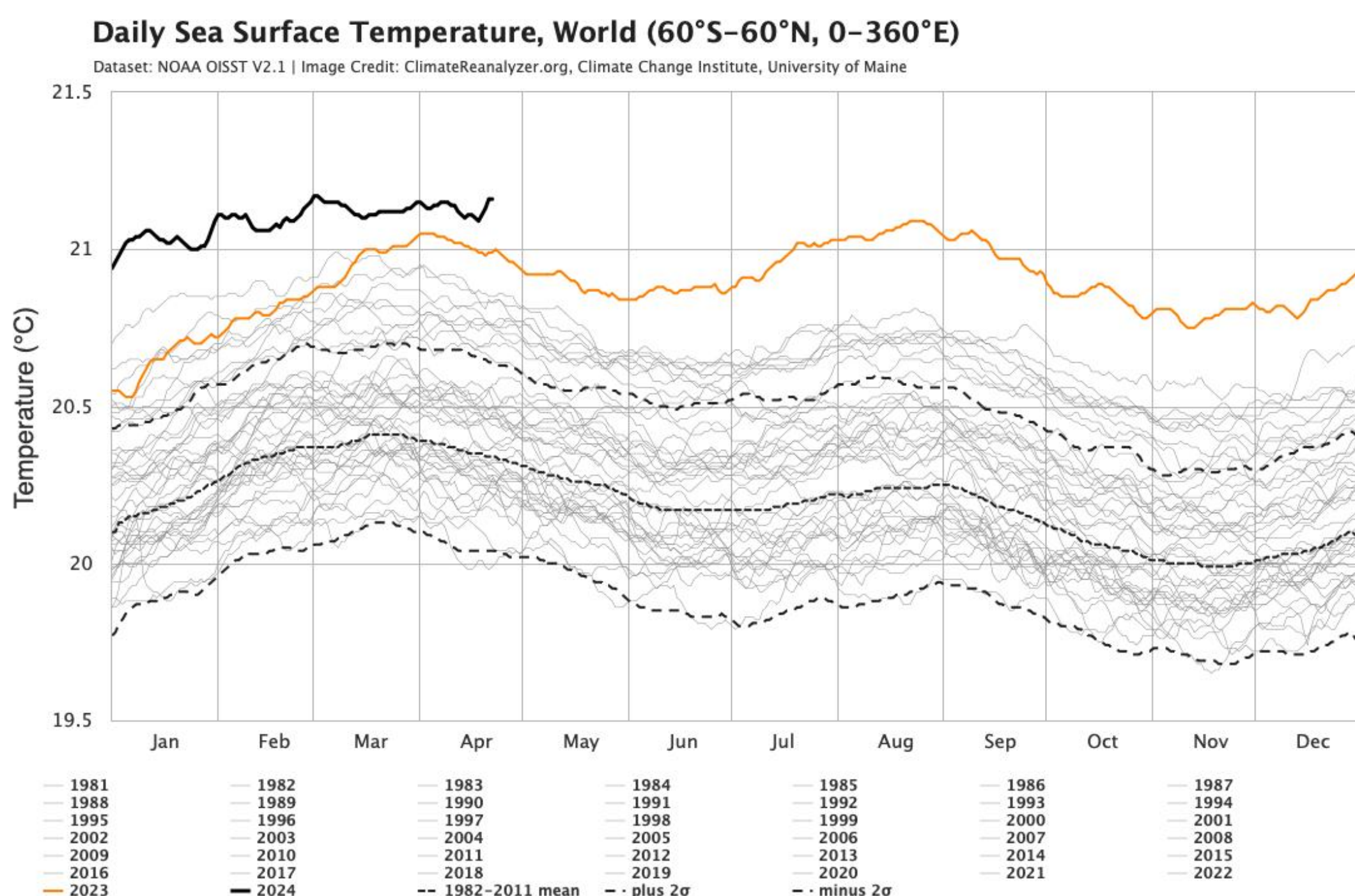

Daily Sea Surface Temperature, World (60°S–60°N, 0–360°E)
Dataset: NOAA OISST V2.1 | Image Credit: ClimateReanalyzer.org, Climate Change Institute, University of Maine

Image source: Climate Reanalyzer; The Climate Change Institute | University of Maine, 2024.

McArdle's pessimism aside, *Dune* functions as a potent allegory because it depicts a people choosing a human-first approach in spite of technological advancement. Like the power analysis above, Herbert imagined a trajectory for societal development radically at odds with the expressed aims of those who sought to control, and therefore subjugate, human thought. While we don't know how AI programs arrive at their conclusions, we know even less about our own brains. And yet, we're willing to restructure entire industries, and pay gig workers to feed AI models that currently pale in comparison to the people employers seek to make obsolete. It should be no surprise that audiences are finding inspiration in a story that's already grappled with the same questions we're now facing.

Sadly, humans are often slow to course correct. Just recently, the U.S. banned the ongoing use of asbestos, a known carcinogen, and made the first tepid motions to address PFAs that are ubiquitous in global drinking water. In fact, it's assumed that 98% of people alive today have some level of toxic forever chemicals percolating in their bloodstream. Along with the dangers of fossil fuels, successive administrations have known of these risks for decades. While it's impossible to go back in time and hold 3M accountable for outcomes known in the 1970s, we can vow to be more assiduous going forward. When outlets are sounding the alarm over AI polluting the internet with content sludge, so much so that we could be heading towards a "dead internet," the time to act is now. Rather than lamenting the road not taken, we have the opportunity to stifle the information equivalent of Deepwater Horizon, and preserve what remains of humanity's collective knowledge repository.
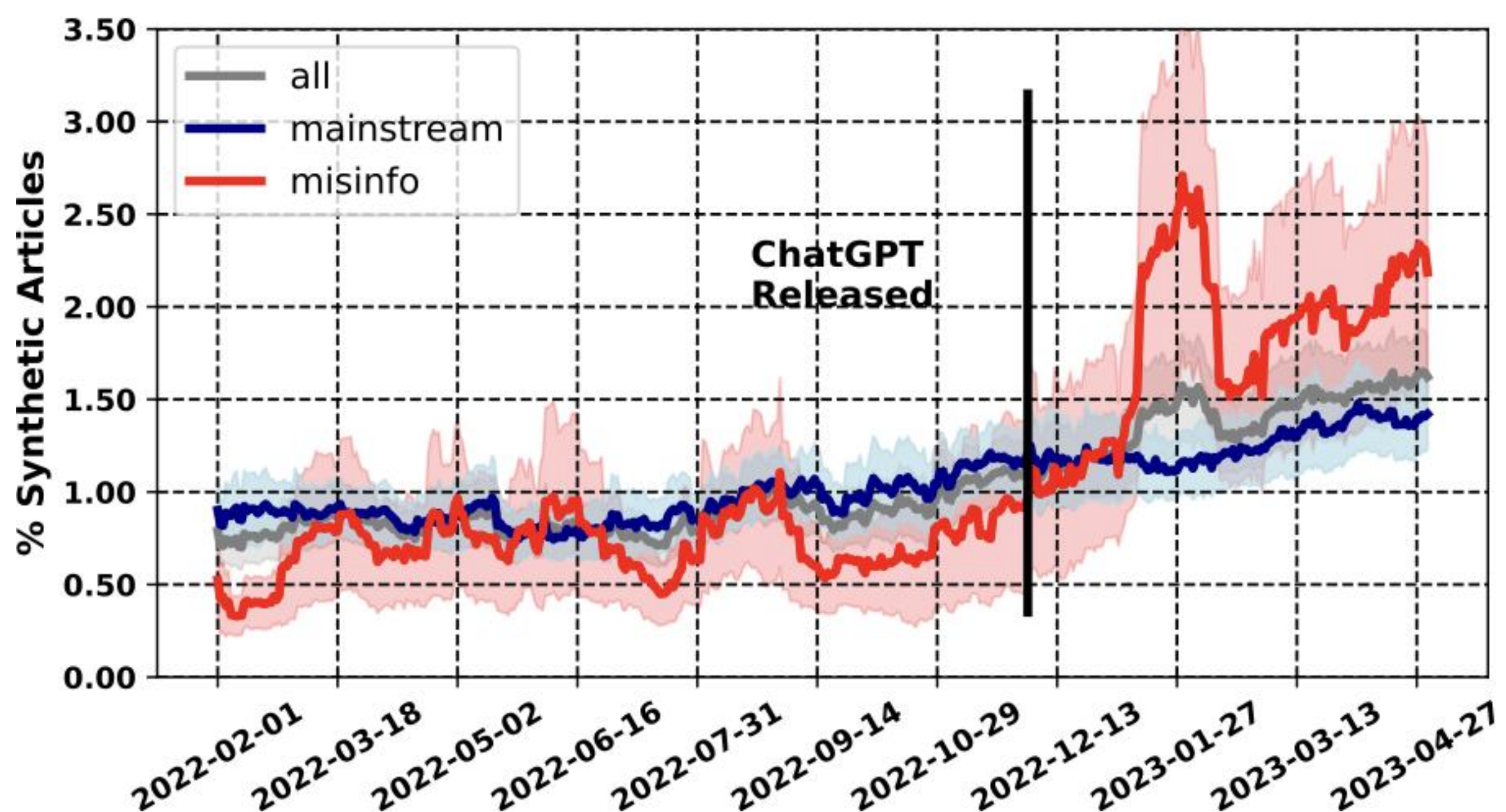

Image source: Hans W. A. Hanley and Zakir Durumeric; Stanford University, 2024.

A study conducted by Stanford University concluded that in the aftermath of ChatGPT's release, "the relative number of synthetic news articles increased by 57.3% on mainstream websites while increasing by 474% on misinformation sites," with the majority of this increase driven by "less popular websites." Whether motivated by search engine optimization or election interference, the ease at which information of dubious accuracy can be produced and disseminated has skyrocketed. Not only does this make training subsequent AI models exceedingly difficult as outlined above, this functionality is serving to dilute the efficiency of existing web infrastructure. Whether the metric is the health of the internet, civil liberties, or global sea surface temperatures, there's just cause for objection to the current course.

Furthermore, the current makeup of social forces appears inadequate to respond to the threats posed by permutations of market demands. In other words, as long as AI has the potential to edge out perceived competition, business leaders will be incentivized to pursue integration despite the warning signs. In her 2024 work *Vulture Capitalism*, scholar Grace Blakeley summarizes this problem in the following:

> *"[M]any challenges faced by businesses in a capitalist economy take the form of collective action problems. When a crisis like climate breakdown threatens capitalism's very foundations, private businesses must coordinate to respond. In more competitive economies, such coordination is difficult. If every business leader agreed to decarbonization, a few less responsible companies could edge ahead of their competitors by continuing to use fossil fuels."*

For this and many of the above reasons, a seismic shift is needed in technology spaces to discourage this very behavior. As the above examples of corner-cutting and "hole" filling suggest, these temptations will always remain where such incentives are left intact. In an ironic twist of fate, the publisher, Simon & Schuster, who issued Blakeley's work, was recently considered by Meta for possible acquisition to train their nascent AI models. Like a chatbot, the commentary almost writes itself.

Conclusion

"Picture this
If I could make the change
I'd love to pull the wires from the wall
Did you?"

- Gary Numan, "Metal," *The Pleasure Principle*, 1979

In 1995, celebrated astronomer and scientist, Carl Sagan, published the *The Demon-Haunted World: Science as a Candle in the Dark*, which contained the following rumination on what he saw as the perils of an information economy:

> "I have a foreboding of an America in my children's or grandchildren's time -- when the United States is a service and information economy; when nearly all the manufacturing industries have slipped away to other countries; when awesome technological powers are in the hands of a very few, and no one representing the public interest can even grasp the issues; when the people have lost the ability to set their own agendas or knowledgeably question those in authority; when, clutching our crystals and nervously consulting our horoscopes, our critical faculties in decline, unable to distinguish between what feels good and what's true, we slide, almost without noticing, back into superstition and darkness…"

In 2024, Sagan's words are both prophetic and foreboding. From crystal-clutching to the "awesomeness of technological powers," there's just cause to ponder the road not taken. What benefits exist, if any, for waiting to see if our worst premonitions come to pass? In 2024, it's hard to imagine outcomes not ruled by economic incentives. As the numerous examples above attest, a level of skepticism toward "the next big thing" should be a prerequisite without proven results. As the BTC Genesis block helps affirm, crypto arose from the notion that we won't get fooled again. However, taking a firm stance against wishful thinking that undermines a sense of collective well-being requires that, as a community, crypto enthusiasts adopt the conviction displayed by Sagan in 1995.

The old adage "work smarter, not harder" is not immediately made manifest by simply throwing the word "intelligence" in front of a proposed solution. Ultimately, if proposed AI solutions fail in their purported efficiency, yield questionable outputs, or prove to be the root cause of negative downstream effects, it's up to retail users and workers to halt its integration. While some would rather wait for the receipts to trickle in, we may be losing precious time to take advantage of this unique juncture, and avoid the worst effects.

Before we're flooded with even more questionable assets and a technology infrastructure that undermines the expressed interests of market participants, Sagan's quote could offer prescient guidance. Here, a "seeing is believing" approach could serve to remove the limited aperture of an economic worldview in favor of other long term goals. Even crystals, no matter how hard they're clutched, have a boiling point. Instead, ample precedent exists in these pages and beyond to suggest that alternative actions might be prudent, if not long overdue. Rather than waiting for a world where water must be carefully preserved in stillsuits, charting a more thoughtful course could prove essential to maintaining one worth inhabiting. After all, it's considerably harder to turn a desert into paradise than ensuring what we've been gifted doesn't slip, like sand, through our grasp.

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