# AFFIRMATION

**Resolved: In the United States, the benefits of the use of generative artificial intelligence in education outweigh the harms.**

# C1: Workforce

**AI will define the future of work --- workers aren't ready. Avid 23** [No Author, 2023, "Preparing Students to Join the AI Workforce", AVID Open Access, https://avidopenaccess.org/resource/preparing-students-to-join-the-ai-workforce/]

The Future of Jobs Report also reveals that students are not alone in worrying about future employment opportunities. Fortune Magazine reports that **very few e**mployees in the labor market are ready for a transition to AI-powered jobs. It cites the Future of Jobs Report, writing, "The A.I. field has the biggest skills gap in the tech industry, meaning there are few qualified applicants for roles despite a rapidly growing need." In this light, graduating students and current employees will all likely need to develop new skills to effectively use AI on the job.To fill this skills gap, schools and educators will need to **adapt and modify** how they prepare students for a future in this shifting occupational landscape. This will be both a challenge and an opportunity for schools to empower their students with the tools they need to succeed in this shifting work environment.Teaching Students About AIIt's becoming increasingly clear that an important step in preparing students for their future workplace will be **introducing** them to AI. In fact, many leaders in technology and instructional technology are already sending this message and emphasizing the importance of AI education.The consequences of not learning new technology and adapting to new demands can be significant. In fact, UNESCO's report warns that workers unable to work with new technologies will be increasingly **excluded** from the job market.

## Learning generative AI early is crucial for readiness in the workforce

**zinfi.** "AI in Education: Preparing Students for Workforce Readiness." ZINFI Technologies, Inc., 5 Feb. 20**25**, www.zinfi.com/blog/ai-in-education-workforce-readiness/.

Why **AI** in Education **is Crucial for Workforce Readiness**

Artificial Intelligence (AI) has become a transformative force across industries, redefining how work is performed and reshaping workforce demands. **With AI advancing rapidly, the education system is vital in readying individuals for an AI-driven future.** Integrating AI in education extends beyond teaching technical skills; it prepares learners with adaptability, problem-solving abilities, and skills to collaborate with AI technologies.
This article delves into the significance of AI in education for workforce readiness. It shows how schools and colleges can use AI to build skills, close gaps, and prepare students for diverse careers.**Transforming Education Through Artificial Intelligence Personalizing Learning Experiences**.**AI-**powered educational **tools are revolutionizing learning** b, providing personalized experiences tailored to individual needs. Platforms like Khan Academy and DreamBox use AI to tailor lessons based on students' strengths and weaknesses. This personalized approach **ensures students grasp** foundational **concepts,** enabling them to **tackle more complex topics confidently**. Moreover, it fosters independent learning, an essential skill in a workforce increasingly driven by self-paced technology adoption. Personalized AI in education promotes a learner-centric environment that empowers individuals to progress at their own pace**.** This level of customization not only improves academic outcomes but also builds confidence and motivation in learners**, equipping** them **with the skills needed for future career**s.**hancing Accessibility and Inclusivity**AI can bridge the gap for students with disabilities or those from underserved communities. Speech recognition, real-time translation, and text-to-speech tools enable learners to access content in various ways. For example, **students with visual impairments can use AI screen readers to access online resources.** At the same time, real-time transcription helps students with hearing impairments in the classroom. AI in education helps create a fair environment, allowing more s=the skills they need for jobs. By fostering inclusivity, it ensures that no learner is left behind, opening doors to opportunities for everyone, regardless of their background or circumstances. AI tools also facilitate equitable learning by providing diverse language support, enabling students from non-English-speaking backgrounds to access high-quality education. This inclusivity is critical in leveling the playing field and ensuring diverse participation in future workforce opportunities. **Building Workforce-Ready Skills** Introducing AI Early in K-12 Education Early exposure to AI concepts prepares students for careers in technology-driven industries. Programs like MIT's AI4ALL and the National Science Foundation's AI Institutes work with K-12 schools to introduce students to machine learning, robotics, and data science.This early exposure not only sparks interest in STEM fields but also builds critical thinking and problem-solving abilities. Students develop analytical thinking and adaptability to evolving technologies, essential skills in an AI-driven economy. The inclusion of AI in education from a young age lays the foundation for a future-ready workforce equipped to meet emerging challenges. By incorporating hands-on projects and real-world problem-solving tasks, K-12 programs can inspire innovation and creativity among students, fostering a passion for lifelong learning. **Promoting Interdisciplinary Learning in Higher Education** In higher education, AI integration extends beyond computer science programs. Universities are using interdisciplinary models like "AI + X." In this model, AI is combined with fields like healthcare, finance, or environmental science.For example, medical students learn to use AI-powered diagnostic tools, while business students leverage AI for market analysis. This approach equips graduates with technical skills to apply AI in real-world challenges within their fields. By blending AI in education with domain-specific knowledge, institutions produce graduates who can innovate across industries. Additionally,

interdisciplinary programs encourage students to think critically about how AI can address societal challenges, such as climate change and public health crises.**Closing the Skills Gap with AI**Addressing the Mismatch Between Education and Workforce NeedsA key challenge in workforce readiness is the skills gap, where workers lack the qualifications needed for changing industries. AI in education can address this by aligning curricula with the needs of the modern job market.**initiatives** like IBM's **Open P-TECH provide AI training a**ligned with industry standards, **preparing students with in-demand skills.** These initiatives **emphasize practical applications of AI, ensuring graduates are job-ready upon entering the workforce.** The integration of AI in education helps bridge the gap between academic learning and professional requirements. By partnering with industry leaders, educational institutions can design courses that reflect the skills and technologies most in demand, ensuring students remain competitive in the evolving job market.**Upskilling and Reskilling for Lifelong Learning**The rise of AI demands that workers continually update their skills to remain relevant. Educational institutions and online platforms play a pivotal role in facilitating lifelong learning through AI-driven courses and certifications.Coursera and LinkedIn Learning leverage AI to suggest personalized learning paths aligned with an individual's career goals. This approach empowers professionals to reskill efficiently, making them more adaptable to technological advancements. AI in education enables continuous growth, fostering a resilient and capable workforce. Employers are increasingly encouraging their teams to participate in these programs, recognizing the value of a workforce skilled in emerging AI technologies. Lifelong learning supported by AI ensures that individuals remain agile and ready to meet the demands of a rapidly changing workplace.**Using AI in education to upskill learning.** Preparing for Ethical and Responsible AI Use Educating About AI Ethics and BiasAs AI becomes ubiquitous, understanding its ethical implications is crucial. Education must emphasize the responsible use of AI, focusing on issues such as algorithmic bias, data privacy, and transparency.

**Generative AI will be present in every part of student's lives, especially once they enter the workforce.**

CIO **Dive**, May 30, 2**24**, https://www.ciodive.com/news/enterprise-generative-ai-use- workplace-altman-solon-report/717552/. Accessed February 10, 2025.

Generative AI use soared in the enterprise since last year, according to a study from consulting firm Altman Solon published this month. Nearly **two-thirds of businesses** say they've **adopted** the technology, compared to just 11% in the first quarter of 2023. Software development remains a key focus of adoption as more than three-quarters of developers use generative AI tools in the workplace, the survey of 400 senior-level executives found. **Over half of enterprises are using** more than one **gen**erative **AI** tool, while 1 in 10 businesses said teams deployed four or more. Text-based tools were most prominent, followed by images and audio.

**Yuan**, Lily. "**How to Include AI Skills on Your Resume: Tips and Examples**." **ResumeGiants**, 7**9 Jan. 2024**, www.resumegiants.com/blog/ai-skills-resume/. Accessed 4 Mar. 2025.

**In today's job market, putting AI skills on your resume** isn't just.smart move; **it's** practically **a must.** Companies all around are using AI tech more and more, so showing you've got a handle on it can make you stand out. Employers know how much AI can help make things run smoother and spark new ideas.**As industries continue to evolve, individuals with artificial intelligence skills are better positioned** to lead, innovate, and drive positive change, **making these skills a valuable asset for career growth and long-term success** in the dynamic landscape of the 21st century.

**The shift in priorities highlights the growing importance of AI education for future employment prospects.**

**Ascione**, Laura. "5 Ways AI Will Impact the Workforce--and How Higher Ed Can Respond." ECampus News, 7 Mar. 20**24**, www.ecampusnews.com/ai-in-education/2024/03/07/ai-impact-workforce-higher-ed/. Accessed 3 Mar. 2025.

1. **Most organizations will use AI by 2028.** AI is expected to significantly alter how business is done in the foreseeable future. More than 90 percent of surveyed employers expect to use AI-related solutions in their organizations by 2028. In fact, almost all believe AI will positively impact their organization to some degree. In addition, the **benefits of AI** will be **spread across the organization**. While most employers (92 percent) believe their IT departments will be the biggest beneficiary of AI, they also believe most other departments, from **sales and marketing (85 percent) to human resources (78 percent),** will derive significant value from it as well.

2. Generative AI will transform how we work. Over 90 percent of both employers and employees expect to benefit from generative AI, which refers to an advanced form of AI that can create new content and ideas. Unlike traditional AI systems that are designed to recognize patterns and make predictions, generative AI creates new content in the form of conversations, stories, images, videos, music, and more. Recent breakthroughs in generative AI technology already promise to drastically change how workers, creators, and students approach content development. AI will be used across levels of technical knowledge, with 61 percent of 'tech-specialists' expecting to use it significantly, followed by **40 percent of 'tech adjacent' workers, and 23 percent of 'non-tech' workers.**

3. **Acquiring AI skills will boost pay and create other career benefits for employees.** Eighty-four percent of employees indicate that AI could have some positive impact on their careers, mirroring the views of employers. The benefits of acquiring AI skills could be substantial for workers. Employers estimate that workers who acquire AI expertise could see their paychecks jump by 35 percent or more, depending on their departments with IT (47 percent) and sales and marketing (48 percent) seeing the highest bumps. Survey data also indicates that interest in acquiring AI skills transcends generations to advance their careers. Roughly two-thirds of workers over the age of 55 express an interest in doing so.

4. The productivity payoff from an AI-skilled workforce could be immense. Surveyed employers believe that AI could boost productivity by 47 percent, with large-sized organizations expecting the highest boost (49 percent). Employees, too, expect AI to boost their productivity, indicating that it will help them complete tasks 41 percent more efficiently. Interestingly, 88 percent of workers expect to use AI in their daily work by 2028, and of those, one in four (25 percent) expect to be using it "extensively" or in over 60 percent of their job tasks.

5. The AI skills gap can be reduced through more awareness of training programs. **Employers rank AI as the most important technology skillset a job candidate can possess,** outranking others such as digital marketing, application development, and use of cloud-based tools**.** Forty-two percent of surveyed employers are actively looking for people with AI development qualifications today, and this will rise to 51 percent in the next five years. However, the rapid transition to an AI-enabled

workforce has created a labor market shortage for AI talent. Nearly three out of four (75 percent) of employers who consider hiring talent with AI skills as a priority for them today report having difficulty finding qualified candidates. The study also found a training awareness gap. Close to 82 percent of employers said that they don't know how to implement an AI training program. Similarly, nearly 80 percent of employees say that they aren't sure what AI training programs are available to them.

**Ascott**, Emma. "AI Will Create 97 Million Jobs, but Workers Don't Have the Skills Required (Yet)." Allwork.Space, 19 Nov. 20**21**, allwork.space/2021/11/ai-will-create-97-million-jobs-but-workers-dont-have-the-skills-required-yet/.

While that statistic might make you uneasy, the same report states that **97 million new jobs will be created by 2025 due to AI.**

## Impact: Not only is AI a vital part of our future but it is bringing up our economy

JP. **Morgan**. Infrastructure Is Destiny Economic Returns on US Investment in Democratic AI. Sept. 20**24**.

Revolutionary technology propels advances in infrastructure. Capital flows determine where and how the infrastructure is built. Those decisions determine whether a society leads or lags on technological innovation, often with far-reaching consequences. This is why infrastructure is destiny. The United States leads the world today in development of artificial intelligence because of decisions made decades ago to install fiber-optic cables, coaxial lines and other broadband infrastructure that put the country at the forefront of the early digital revolution. The 1996 Telecommunications Act, with bipartisan support from forward-thinking lawmakers, reinforced the infrastructure as a national strategy. As revolutionary as electricity, and promising similarly distributed access and benefits, **AI can power a reindustrialization across the US**, extend its global competitiveness, and boost national, state and household finances for the long term. Investment **to extend the US lead in AI can yield tens of thousands of jobs; significant growth in GDP;** a modernized, cleaner energy grid and energy policy, featuring nuclear power; and a state-of-the art network of semiconductor manufacturing facilities – invigorating local economies across the country. These are New Deal-sized stakes and scale. Capital spending on AI already rivals the mainframe era of the late 1960s and the fiber optic deployment of the late 1990s1 – with an estimated $175 billion in global infrastructure funds waiting to be committed.2 The question is not whether that funding will flow, but where. If it doesn't flow into US-backed global infrastructure projects that advance a global AI that spreads the technology's benefits to the most people possible, then it will flow to China-backed projects that leverage AI to cement and expand autocratic power. There is no third option. Analysts expect the build to require unprecedented scaling of computer. **2023** saw massive **growth in demand for AI data centers – around 167% year-over-year – that shows no sign of slowing**.

# C2: Vaccines/Med industry

## Generative AI improves medical education **Reddy 24** Reddy, S. Generative AI in healthcare: an implementation science informed translational path on application, integration and governance. Implementation Sci 19, 27 (2024). https://doi.org/10.1186/s13012-024-01357-9 [Sandeep Reddy: an Artificial Intelligence (AI) in healthcare researcher based at the Deakin School of Medicine besides being the founder/chairman of Healea] In the context of medical education and training, this technology can be used to generate a wide variety of virtual patient cases. These cases can be based on a diverse range of medical conditions, patient demographics and clinical scenarios, providing a comprehensive learning platform for medical students and healthcare professionals [51, 52]. One of the primary benefits of using **gen**erative **AI in medical education is the ability to create a safe and controlled learning** environment. Medical students can interact with these virtual patients, make diagnoses and propose treatment plans **without** any **risk to real patients**. This allows students to make mistakes and learn from them in a low stake setting. Generative AI can **also** create patient cases that are rare or complex, **giving students** the opportunity to gain **experience and knowledge** in areas they might not encounter frequently in their clinical practice. This can be particularly beneficial in preparing students for unexpected situations and enhancing their problem-solving skills. Furthermore, the use of AI in medical education can provide a more personalized learning experience. The AI can adapt to the learning pace and style of each individual, presenting cases that are more relevant to their learning needs. For example, if a student is struggling with a particular medical condition, the AI can generate more cases related to that condition for additional practice. In addition to creating virtual patient cases, generative AI can also be used to simulate conversations between healthcare professionals and patients [51, 52]. This can help students improve their communication skills and learn how to deliver difficult news in a sensitive and empathetic manner. Moreover, the integration of AI in medical education can **provide valuable data for educators.** The AI can track the performance of students, identify areas of improvement and provide feedback, helping educators to refine their teaching strategies and curricula.

**IMPACT: Lives saved Pearl 24** Pearl, Robert. "Medical Education Needs Radical Reform: AI, Alone, Isn't the Answer." Forbes, 15 July 2024, www.forbes.com/sites/robertpearl/2024/07/15/medical-education-needs-radical-reform-ai-alone-isnt-the-answer/ Accessed 21 Feb. 2025. [Robert Pearl, M.D.: healthcare leader, author, educator, podcaster and Forbes contributor; for 18 years, he led The Permanente Medical Group (Kaiser

Permanente); clinical professor of plastic surgery at the Stanford University School of Medicine and on the faculty at the Stanford Graduate School of Business; Pearl is board certified in plastic and reconstructive surgery] Today, chronic diseases like diabetes and hypertension afflict 6 in 10 Americans, and are responsible for 1.7 million American deaths each year from heart attacks, strokes, cancer and other complications. These deaths are directly tied to a lack of prevention and effective disease management. Today, hypertension is the leading cause of stroke and is adequately controlled only 55% of the time. Diabetes, the leading cause of kidney failure and major contributor to cardiovascular disease, is controlled even less often. We know that control rates of 90% or more are possible with best practices, but not with today's approach. According to the CDC, 30% to 50% of the life-threatening complications from chronic disease could be avoided with effective management. **Teaching medical students how to use generative AI** for continuous—not episodic—monitoring **would** radically **improve the health of patients and our nation** as a whole. **Today's doctors have access to wearable monitors capable of measuring blood pressure and blood sugar. When linked with GenAI, these tools can reliably analyze patient health data and provide medical advice based on the expectations set by a clinician. With this combination, patients don't have to guess whether they need a physician's medical attention.** They know. And that expertise allows physicians to intervene sooner when there's a problem while reducing unnecessary office visits when chronic diseases are well-controlled. Based on CDC data, successfully **training the next generation of doctors** to **effectively** monitor and manage chronic illnesses **will save** an estimated **510,000 to 850,000 lives each year** with **an annual reduction in healthcare spending** of $163 billion **to $272 billion**

**AI is currently being taught and used in the medical field as well with major results**

**Basu**, Kanadpriya, et al. "Artificial Intelligence: How Is It Changing Medical Sciences and Its Future?" *Indian Journal of Dermatology*, vol. 65, no. 5, Sep. **20,** pp. 365–370, https://doi.org/10.4103/ijd.IJD_421_20. Most **global pharmaceutical companies** have **invested** their time and money on using **AI for drug development of** major diseases, such as **cancer or cardiovascular disease.**Given the impact that AI and machine learning is having on our wider world, it is important for AI to be a part of the curriculum for a range of domain experts. This is particularly true for the medical profession, .where the cost of a wrong decision can be fatal.

**This same AI used to help major diseases can prevent pandemics**

**Gavi 25** Using AI from Lab to Jab: How Did Artificial Intelligence Help Us Develop and Deliver COVID-19 Vaccines?" ***Gavi**.org*, 2025, www.gavi.org/vaccineswork/using-ai-lab-jab-how-did-artificial-intelligence-help-us-develop-and-deliver-covid.
**When COVID-19** first **swept** across the globe,researchers rushed to develop a vaccine that could save lives and end the pandemic as quickly as possible. Enter artificial intelligence **(AI),** which **accelerated the process** in a way that has never been done before **in vaccine development.**

**Sharma et al. '24** @article{veo2024, title={Veo}, author={Abhishek Sharma and Adams Yu and Ali Razavi and Andeep Toor and Andrew Pierson and Ankush Gupta and Austin Waters and Aäron van den Oord and Daniel Tanis and Dumitru Erhan and Eric Lau and Eleni Shaw and Gabe Barth-Maron and Greg Shaw and Han Zhang and Henna Nandwani and Hernan Moraldo and Hyunjik Kim and Irina Blok and Jakob Bauer and Jeff Donahue and Junyoung Chung and Kory Mathewson and Kurtis David and Lasse Espeholt and Marc van Zee and Matt McGill and Medhini Narasimhan and Miaosen Wang and Mikołaj Bińkowski and Mohammad Babaeizadeh and Mohammad Taghi Saffar and Nando de Freitas and Nick Pezzotti and Pieter-Jan Kindermans and Poorva Rane and Rachel Hornung and Robert Riachi and Ruben Villegas and Rui Qian and Sander Dieleman and Serena Zhang and Serkan Cabi and Shixin Luo and Shlomi Fruchter and Signe Nørly and Srivatsan Srinivasan and Tobias Pfaff and Tom Hume and Vikas Verma and Weizhe Hua and William Zhu and Xinchen Yan and Xinyu Wang and Yelin Kim and Yuqing Du and Yutian Chen}, url={https://deepmind.google/technologies/veo/}, year={2024} }

AlphaFold's impact

So far, AlphaFold has predicted over 200 million protein structures – nearly all catalogued proteins known to science. The AlphaFold Protein Structure Database makes this data freely available. So far, it has over two million users in 190 countries. That means it has already potentially saved millions of dollars and **hundreds of millions of years in research time.**

Meanwhile, AlphaFold Server predicts how proteins will interact with a broad spectrum of biomolecules, accelerating new research. AlphaFold has already made a significant impact. We hope it will eventually help to transform our understanding of the biological world.

**AI helped slow the spread of COVID it could prevent the outbreak of newstrains**

ByKaren **Feldscher** September 12, 2024 – **As new cases of bird flu and other infectious diseases continue to raise concern, Harvard T.H. Chan School of Public Health researchers share their perspectives on recognizing, preparing for, and managing future outbreaks.**

More than four years ago, **the SARS-CoV-2** virus began blazing its trail across a world that was starkly unprepared for what lay ahead. **As of August 2024,** the **virus had infected more than 700 million people and caused more than 7 million deaths. The pandemic also shined a light on vast health inequities, led to economic disruption, and spawned vitriolic politics on everything from masks to vaccines to school closures.** In recent months, with COVID-19 receding for many into less of an existential threat and more of an accepted undercurrent to daily life, a new infectious disease outbreak—H5N1 avian flu virus, or bird flu—started making headlines as it spread among dairy cows and poultry in the U.S. and infected a small number of farmworkers. Against this backdrop, we asked five Harvard Chan School researchers to weigh in on what we learned (or didn't learn) from the COVID pandemic, what their main worries are regarding current and future infectious disease risks, and what steps we should be taking to minimize risks going forward.

**Higgins**, Matthew K. "Can We AlphaFold Our Way out of the next Pandemic?" *Journal of Molecular Biology*, June 20**21,** p. 167093. https://doi.org/10.1016/j.jmb.2021.167093.

With an infectious organism dominating the world stage, the developers of **Alphafold** were keen to play their part, accurately predicting novel structures of two proteins from SARS-CoV-2.they highlighted this contribution, writing "we've also seen signs that protein structure prediction could be **useful in future pandemic response efforts**".Knowledge of the structure of the SARS-CoV coronavirus spike protein allowed design of mutants which stabilise the spike in the pre-fusion conformation.[1] As this is the form of the spike found on virus particles, vaccine immunogens which elicit antibodies that target this conformation are likely to be **most effective**. As the **SARS-CoV-2 virus,** which **causes COVID-19,** is closely related to SARS-CoV2, 3, 4 **this insight was transferable to the new pandemic strain.**[2] As a result, the Pfizer/BioNTech and Moderna vaccines, amongst others, include spike-stabilising mutations in their effective designs.[5] This is just one example of a broader field of 'reverse vaccinology', in which rational insight into the structures of pathogen surface proteins, and their complexes with neutralising monoclonal antibodies, guide design of improved vaccine immunogens The **current strengths of AlphaFold** appear to be in the prediction of structures of single proteins, both in cases where there is a similar structure to act as a template, and where there is not. As seen in the case of PfRH5, structures of single antigens **can be used to guide design of improved vaccine immunogens**

**We need these vaccinations not only in the event of another outbreak but to prevent death overall**

**Carter**, Austin, et al. "Modeling the Impact of Vaccination for the Immunization Agenda 2030: Deaths Averted due to Vaccination against 14 Pathogens in 194 Countries from 2021-2030." *Papers.ssrn.com*, 20 Apr. 20**21,** papers.ssrn.com/sol3/papers.cfm?abstract_id=3838781.

Overall, an estimated **51.0 million** (95% CI: 48.5 – 53.7) **deaths are expected to be averted due to vaccinations administered between the years 2021 and 2030.** With immunization coverage projected to increase over 2021-2030 an average of 5.1 million per year (4.9 – 5.4) deaths will be averted annually, with 4.4 million(3.6- 5.1) deaths be averted for the year 2021, gradually rising to 5.8 million(4.9-6.6) deaths averted in 2030.

**Impact: AI used in medical fields are used to make vaccinations. These vaccinations helped stop the spread of covid, and potentially the next one. This shows how our youth needs to learn AI in schools in order to work with it in the workforce.**

**Overall we can see that AI helps us build crucial infrastructure and prevent millions of deaths annually. The purpose of our education is prepare for the future , the future of our country depends on the capabilities of our youth, we must teach them what the jobs demand in order for them to employed.  therefore it is clear that the benefits of AI outweigh the harms**

**Rebuttal:**

C1- innovation

# The reason courts are clogged is not due to this its because of new immigration laws

News, ABC. “What’s Clogging the Courts? Ask America’s Busiest Judge.” ABC News, 22 July 2008, abcnews.go.com/TheLaw/story?id=5429227&page=1. Accessed 28 Mar. 2025.All along the 2,000-mile U.S.-Mexico border, courts are clogged with immigration-related cases. As a result, the region's courtrooms handle a disproportionate amount of the country's crime. Just five of the country's 94 districts -- South California, New Mexico, Arizona, West Texas and South Texas -- handle 75 percent of all the criminal cases in federal district courts around the country.The number of immigration trials have spiked since 2005, a result of a federal program called Operation Streamline that puts illegal immigrants on a fast track to prosecution, detention and deportation. In the first seven months of 2008, the government reported 38,443 new immigration prosecutions. The Transactional Records Access Clearinghouse, a data research organization at Syracuse University, estimates there will be 65,902 immigration cases this year, a 65 percent increase over last year and a 216 percent increase over 2003.

## Additionally covid worsened backload

https://stateline.org/2024/01/25/shortage-of-prosecutors-judges-leads-to-widespread-court-backlogs/ Hernadez 25 Still reeling from the COVID-19 pandemic, court systems in many states are working to clear their case backlogs.

Some court systems have moved cases faster using virtual court proceedings, court data dashboards and online jury selection. In other states, lawmakers are stepping in.

The pandemic worsened problems that already had caused state and local court delays, legal experts say. The hurdles include insufficient funding, judicial vacancies, lawyer shortages and delays processing digital and physical evidence.

Some state legislators are particularly focused on shortages of prosecutors and judges.

C2- water

## AI is hardly the biggest use of electricity

## Cho 23

Cho, Renee. “AI’s Growing Carbon Footprint.” State of the Planet, June 9, 2023, https://news.climate.columbia.edu/2023/06/09/ais-growing-carbon-footprint/. Accessed February 14, 2025.

In 2021, global data center electricity use was about 0.9 to 1.3 percent of global electricity demand. One study estimated it could increase to 1.86 percent by 2030. As the capabilities and complexity of AI models rapidly increase over the next few years, their processing and energy consumption needs will too. One research company predicted that by 2028, there will be a four-fold improvement in computing performance, and a 50-fold increase in processing workloads due to increased use, more demanding queries, and more sophisticated models with many more parameters. It’s estimated that the energy consumption of data centers on the European continent will grow 28 percent by 2030.

## Most data centers are not in the U.S. -- neg no solve

Yih-Khai **Wong**, 7-16-20**24**, Yih-Khai Wong is a Principal Analyst in the Strategic Technologies team. He is responsible for the distributed & edge computing research service, covering the evolution of processing platforms that handles various IT and OT workloads across the public, private, edge, and on-premises cloud."How Many Data Centers Are There and Where Are They Being Built?", No Publication, https://www.abiresearch.com/blog/data-centers-by-region-size-company

By the end of 2025, there will be 6,111 public data centers worldwide—5,544 colocation sites and 567 hyperscale sites. *Asia-Pacific has the highest concentration of data center locations*, with Europe and North America following. ABI Research anticipates 8,378 data centers will be in operation by 2030. As enterprises continue to digitally transform and leverage advanced technologies, demand for cloud resources and larger data centers has peaked. Although the number of data centers being built worldwide is growing, regional differences exist due to varying regulatory, legal, and space availability factors. Moreover, North America and Europe are already well-established markets for data center construction, leaving room for major growth in other regions. Related Article: Making Data Centers Green in a Digital World What Is a Data Center? A data center is a facility built for housing and distributing huge sums of data. The data center has networking infrastructure, such as cooling systems and server racks, that allow third-party enterprises to rent space for computing and data storage needs. The public data center market is divided into two main categories, each experiencing different growth rates and influenced by distinct factors: Colocation Data Centers: This category includes any space within a building, owned or leased by a company, that is rented out to third parties for their networking equipment or server storage. Colocation data centers can host multiple companies within one physical building, offering either retail or wholesale space, or both. Hyperscale Data Centers: These are large-scale facilities that offer extensive space, power, cooling, and infrastructure to support massive data and cloud computing operations. Hyperscalers include companies like Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure, Alibaba Cloud, IBM, and Oracle. Number of Colocation Data Centers by Region, 2024-2030 By the end of 2024, there will be 5,186 colocation data centers worldwide. Growing at a Compound Annual Growth Rate (CAGR) of 6.6%, the number of colocation data centers will increase to 7,640 by 2030. Today, Asia-Pacific has the most data centers (1,811 sites) worldwide, followed by Europe (1,558 sites) and North America (1,357 sites). Some of the countries with the most data centers built in these regions include China, the United States, Germany, the United Kingdom, Japan, Australia, Canada, and France. By the decade's end, ABI Research anticipates Asia-Pacific (2,126 sites), Europe (2,108 sites), and North America (1,803 sites) to sustain the first, second, and third most colocation data center locations, respectively. Number of Colocation Data Centers by Region, 2024-2030 Number of Colocation Data Centers by Size, 2024 to 2030 The size of data centers is increasing, driven by the rapidly growing adoption of generative AI and other data-intensive technologies relying on the cloud. While the number of micro and small-sized data centers will decrease throughout the rest of the decade, the construction of large and mega data centers will grow robustly. A chart that forecasts the Number of Colocation Data Centers by Size, 2024-2030. Today, large and mega-sized colocation facilities account for only 28% of total data centers worldwide. However, that number will grow to 43% by 2030 as companies build larger data centers that can accommodate AI/generative AI workloads and other data-hungry applications. By 2030, the aggregate power capacity of large and mega-sized data centers will reach 142,682 Megawatts (MW) and 289,259 MW, respectively. Hyperscale Data Centers on the Rise Hyperscale data centers are large, remote facilities with greater cloud computing capacity than enterprise data centers. Cloud service providers Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), IBM, Alibaba, and Oracle are investing billions of dollars in building data centers around the world. This will increase the number of hyperscale

data centers from 567 in 2024 to 738 in 2030. AWS has the most data center sites worldwide among all cloud hyperscalers, with 126 as of 2024. By 2030, that number will increase to 185. This gives AWS a market share of roughly 25%. Microsoft Azure and GCP will closely trail AWS through 2030 for the most amount of data centers built.

## 1. [T] AI is the only tool to bring us back from climate change's brink – and quantum computing solves for energy usage

**Ricciuti 23** Francesco Ricciuti, Runa Capital, 6-17-2023, "How AI and advanced computing can pull us back from the brink of accelerated climate change," [Francesco is a VC at Runa Capital. He has a background in Robotics Engineering and has worked on the development of autonomous robots, including launching his own company Presto Robotics], https://venturebeat.com/ai/how-ai-and-advanced-computing-can-pull-us-back-from-the-brink-of-accelerated-climate-change/, DOA 2-28-2025 //wenzhuo

Barely a week passes without another dramatic report about humanity and the planet reaching a climate change tipping point. The latest reports were a heart-stopping analysis from the World Meteorological Organization and arresting criticism from the UN Secretary-General. Both were shared in the final days of April.

**A**rtificial **I**ntelligence will **determine whether we** blow through the tipping point or **row back from** the **brink.**

AI is one of the **significant tools** left in the **fight against climate change.** AI has **turned** its hand **to risk prediction**, the prevention of damaging weather events, such as wildfires and carbon offsets. It has been described as vital to ensuring that companies meet their ESG targets.

Yet, it's also an accelerant. AI requires vast computing power, which churns through energy when designing algorithms and training models. And just as software ate the world, AI is set to follow.

AI will contribute as much as $15.7 trillion to the global economy by 2030, which is greater than the GDP of Japan, Germany, India and the UK. That's a lot of people using AI as ubiquitously as the internet, from using ChatGPT to craft emails and write code to using text-to-image platforms to make art.

The power that AI uses has been increasing for years now. For example, the power required to train the largest AI models doubled roughly every 3.4 months, increasing 300,000 times between 2012 and 2018.

This expansion brings opportunities to solve major real-world problems in everything from security and medicine to hunger and farming. It will also have a punitive impact on climate change.

The cost of high energy

Computing goes hand-in-hand with high energy costs and a larger carbon footprint, which tap the accelerator pedal on the world's climate change.

This is especially true for AI. The huge number of GPUs running machine learning algorithms get hot and need to be cooled; otherwise, they melt. Training even one large language model (LLM) requires an eye-watering amount of energy with a large carbon footprint.

For example:

BLOOM's training emitted 50 metric tons (50,000 kg) of carbon dioxide, which is the same as 60 flights between London and New York.

Training OpenAI's GPT3 emitted 500 metric tons while Meta's OPT emitted 75 metric tons.

Training GPT-3 took 1,287 gigawatt-hours, creating 502 tons of carbon emissions. That's the amount of electricity 120 U.S. homes use annually.

As we move into the GPT4 era and the models get larger, the energy needed to train them grows. GPT-3 was 100 times larger than its predecessor GPT, and GPT-4 was ten times the size of GPT-3. All the while, larger models are being released quicker. GPT-4 arrived in March 2023, nearly four months after ChatGPT (powered by GPT-3.5) was released at the end of November 2022.

For balance, we shouldn't assume that as new models and companies emerge in the space AI's carbon footprint will continue growing. Geeta Chauhan, an AI engineer at Meta, is using open-source software to reduce the operational carbon footprint of LLMs. Her latest work shows a 24-fold reduction in carbon emissions compared with GPT-3.

However, AI's popularity and its exponential power undermine much of the climate action in force today and call into question its potential to be part of the solution.

We need a solution that allows AI to flourish while arresting its carbon footprint. So, what do we do?

Tempering the carbon addiction

As always, **technology will drag us out** of this predicament.

For the explosion of AI to be sustainable, **advanced computing** must come to the fore and **do the heavy lifting** for many tasks that are currently performed by AI. The good news is that we already have advanced computing technologies that are primed to execute these tasks more efficiently and quickly than AI, with the added benefit of using much, much less energy.

In short, advanced computing is the most effective tool we have to **temper AI's carbon addiction**. With it, we can **slow** the creep of **climate change.**

There are a number of different technologies in advanced computing emerging that can solve some of the problems AI is currently tackling.

For example, **quantum computing is superior** to AI in drug discovery. As humans live longer, they are encountering, in ever greater numbers, new diseases that are complex and untreatable. This is called the "better than The Beatles" problem, where new drugs have modest improvements on already successful therapeutics.

So far, drug development has focused on rare events within a dataset and making educated guesses to design the right drugs to target and bind to the proteins that cause disease. **LLMs can be efficiently used** to help with this task.

LLMs are remarkably good at predicting which words in our vocabulary can best fit a sentence to accurately convey meaning. Drug discovery isn't wildly dissimilar as the problem is identifying the best fit, or configuration, of molecules in a compound to get a therapeutic result.

However, molecules are quantum elements, so quantum computing is much better at tackling this problem. Quantum computing has the capacity to quickly simulate vast numbers of binding sites in medicines to create the right configuration for treating currently incurable diseases.

Advanced computing: Quantum and beyond

**Quantum's capabilities mean that these can be solved** much faster and **with much less energy usage.**

Another development with a real possibility to be an enhancement to AI is photonics, or so-called optical computing, which uses laser-produced light instead of electricity to send information.

Some companies are building computers that use this technology, which is much more energy-efficient than most other computing technologies and is being recognized increasingly as a route to achieving Net Zero.

Elsewhere, we have neuromorphic computers. This is a type of computer engineering where elements of the computer system are modeled on those in the human brain and nervous system. They perform computations to replicate the analog nature of our neural system. Trials of this technology include projects by Mythic and Semron. Neuromorphic is another greener option that needs further investment. Its hardware has the potential to run large deep learning networks that are more energy-efficient than comparable classical computing systems.

For example, processing information through its hundred billion neurons consumes only 20 watts, similar to an energy-saving light bulb in a home.

Developing and applying these innovations are imperative if we are to apply the brakes on climate change.

Advanced computing leaders

There are many startups (and investors) around the world obsessed with advanced computing but there are just a handful of companies that are focusing on so-called impact areas like healthcare, the environment and climate change.

Johnson, Alex. "AI and Energy Sustainability: Creating a Greener, Smarter World."

Techresearches, February 12, 2025, https://techresearchs.com/tie-tech/ai-and-energy-sustainability-creating-a-greener-smarter-world/. Accessed February 14,2025.

AI-Powered Smart Grids The integration of AI and energy management systems is enhancing smart grids by predicting demand, optimizing distribution, and minimizing waste. Traditional power grids struggle with inefficiencies due to outdated infrastructure and unpredictable consumption patterns. AI-driven smart grids use machine learning algorithms to analyze real-time data, enabling grid operators to make informed decisions that improve reliability and reduce energy loss. AI in Renewable Energy Integration AI is playing a crucial role in optimizing the integration of renewable energy sources like solar and wind into the power grid. Since renewable energy sources are often intermittent, AI helps forecast weather conditions, predict energy generation, and balance energy supply and demand effectively. AI-powered storage solutions ensure that excess energy generated from renewables is efficiently stored and distributed when needed, reducing dependency on fossil fuels. AI in Energy Consumption Optimization For industrial and commercial sectors, AI-driven energy optimization solutions analyze usage patterns and suggest measures to reduce waste. AI-powered automation adjusts energy-intensive processes, such as heating, cooling, and lighting, based on real-time demand. These AI-driven systems not only cut costs but also lower carbon footprints, making energy consumption more sustainable.

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**Saenko 23 Saenko, K. (2023, May 25). *A Computer Scientist Breaks Down Generative AI's Hefty Carbon Footprint*. Scientific American. https://www.scientificamerican.com/article/a-computer-scientist-breaks-down-generative-ais-hefty-carbon-footprint/**

In 2019, researchers found that creating a generative AI model called BERT with 110 million parameters consumed the energy of a round-trip transcontinental flight for one person. The number of parameters refers to the size of the model, with larger models generally being more skilled. Researchers estimated that creating the much larger GPT-3, which has 175 billion parameters, consumed 1,287 megawatt hours of electricity and generated 552 tons of carbon dioxide equivalent, the equivalent of 123 gasoline-powered passenger vehicles driven for one year. And that's just for getting the model ready to launch, before any consumers start using it.

Size is not the only predictor of carbon emissions. The open-access BLOOM model, developed by the BigScience project in France, is similar in size to GPT-3 but has a much lower carbon footprint, consuming 433 MWh of electricity in generating 30 tons of CO2eq. A study by Google found that for the same size, using a more efficient model architecture and processor and a greener data center can reduce the carbon footprint by 100 to 1,000 times.

C3- laws/nuke war

# AT: LAWs

[DL] LAWs default to non-lethal measures.

Cantrell 19

Hunter Cantrell, 05-10-2019, "Arguments for Banning Autonomous Weapon Systems: A Critique," Georgia State University, https://philarchive.org/archive/CANAFB

Leveringhaus insists that we must allow for the option of not following a legitimate order to kill the enemy on the battlefield, in essence, the option not to shoot a legitimate combatant and instead exercise mercy. He says "[c]ompared to artificial agency, what makes human agency in warfare, and in ordinary life, valuable is the possibility of engaging in an alternative course of action."60 Leveringhaus genuinely believes that on a battlefield one must be fully capable of making the decision not to kill when faced the permissible option of exercising lethal force. He supposes that if an AWS is preprogrammed with its orders, mission parameters, Law of War and Rules of Engagement parameters, it will simply attack all enemies that it encounters. This supposition, I believe, is not necessarily true. **If we follow Arkin's advice regarding the 'ethical governor,' a properly designed AWS will first default to non-lethal measures to** either **evade the enemy or subdue him and to immediately default[ing] to lethal action would be impossible.** If we require an algorithm to be built on this model, then **lethal actions would only occur if they were obligatory**. For example, suppose there is an AWS on patrol with a squad of American infantry soldiers, we could set as one of the RoE as: "If one member of your squad is in imminent danger of being captured, then you are obligated to use proportionally correct force to prevent their capture." If any member of the patrol is not in imminent danger of being captured, then **the AWS must default to non-lethal action, unless it meets some other predefined obligatory criteria.**

## [T] AI are less likely to miscalc. Tucker 20

Patrick Tucker 4-29-2020 "Artificial Intelligence Outperforms Human Intel Analysts In a Key Area", https://www.defenseone.com/technology/2020/04/artificial-intelligence-outperforms-human-intel-analysts-one-key-area/165022/ (technology editor for Defense One)

In the 1983 movie WarGames, the world is brought to the edge of nuclear destruction when a military computer using artificial intelligence interprets false data as an imminent Soviet missile strike. Its human overseers in the Defense Department, unsure whether the data is real, can't convince the AI that it may be wrong. A recent finding from the Defense Intelligence Agency, or DIA, suggests that in a real situation where humans and AI were looking at enemy activity, those positions would be reversed. **A**rtificial **i**ntelligence **can** actually **be more cautious than humans** about its conclusions in situations **when data is limited.** While the results are preliminary, they offer an important glimpse into how humans and AI will complement one another in critical national security fields. DIA analyzes activity from militaries around the globe. Terry Busch, the technical director for the agency's Machine-Assisted Analytic Rapid-Repository System, or MARS, on Monday joined a Defense One viewcast to discuss the agency's efforts to incorporate AI into analysis and decision-making. Earlier this year, Busch's team set up a test between a human and AI. The first part was simple enough: use available data to determine whether a particular ship was in U.S. waters. "Four analysts came up with four methodologies; and the machine came up with two different methodologies and that was cool. They all agreed that this particular ship was in the United States," he said. So far, so good. **Humans and machines using available data can reach similar conclusions.** The second phase of the experiment tested something different: conviction. Would humans and machines be equally certain in their conclusions if less data were available? The experimenters severed the connection to the Automatic Identification System, or AIS, which tracks ships worldwide. "It's pretty easy to find something if you have the AIS feed, because that's going to tell you exactly where a ship is located in the world. If we took that away, how does that change confidence and do the machine and the humans get to the same end state?" In theory, **with less data**, the human analyst should be less certain in their conclusions, like the characters in WarGames. After all, humans understand nuance and can conceptualize a wide variety of outcomes. The researchers found the opposite. "Once we began to take away sources, everyone was left with the same source material — which was numerous reports, generally social media, open source kinds of things, or references to the ship being in the United States — so everyone had access to the same data. The difference was that the machine, and those responsible for doing the **machine learning**, **took far less risk** — in confidence — **than the humans did**," he said. "**The machine** actually **does a better job of lowering its confidence than the humans do**….There's a little bit of humor in that because the machine still thinks they're pretty right." The experiment provides a snapshot of how humans and AI will team for important analytical tasks. But it also reveals how human judgement has limits when pride is involved. **Human**s, particularly **experts** in specific fields, have a **tend**ency **to overestimate their ability to** correctly **infer outcomes when given limited data.** Nobel-prize winning economist and psychologist Daniel Kahneman has written on the subject extensively. Kahneman describes this tendency as the "inside view." He cites the experience of a group of Israeli educators assigned to write a new textbook for the Ministry of Education. They anticipated that it would take them a fraction of the amount of time they knew it would take another similar team. They couldn't explain why they were overconfident; they just were. **Overconfidence is human** and a **particular[ly]** trait **among highly functioning expert humans**, one that machines don't necessarily share.

## ALPHAFOLD IS GEN AI,

**Koul '24** AlphaFold 3 - A Generative AI Model to predict 3D structure of biomolecules. Dr. Nimrita Koul Dr. Nimrita Koul ·6 min read · Jun 14, 2024

AlphaFold-3 (AF3) is the latest generative AI model in the series of AlphaFold models. It provides an accurate atomic-level view of the structure of biomolecular systems. AlphaFold3 can accurately predict not only the 3D structure of almost all the proteins, but also the interactions among DNA, RNA, and other small molecule ligands within our cells. It can also predict the structural impact of post-translational modifications and ions on these molecular systems.

**They said that 85 million jobs will be lost but**

Kristine Gloria 21, Ph.D. in Cognitive Science from Rensselaer Polytechnic Institute; Director of Artificial Intelligence for the Aspen Digital Program, July 2021, "Power and Progress in Algorithmic Bias," Aspen Institute, https://www.aspeninstitute.org/wp-content/uploads/2021/07/Power-Progress-in-Algorithmic-Bias-July-2021.pdf

As outlined above, efforts to counter algorithmic bias can come from the implementers, regulators, policymakers, and civil society. Strategies include legislation, audits, ethical frameworks, and grassroots activism and lobbying. For example, there are now multiple toolkits, such IBM's AI Fairness 36019 (AIF360-open source Python toolkit for algorithmic fairness) or Amazon's SageMaker Clarify,20 and/or Microsoft's InterpretML21 that help facilitate evaluations of algorithms, identify bias in datasets, and explain predictions. We also see growing interest in additional efforts on explainable AI, AI system factsheets,22 datasheets for datasets,23 bias impact statements,24 and many others. Additionally, power and progress in the data context must include a robust approach to data literacy, which is vital to consumers and citizen advocates. As we learned, this lack of knowledge may hinder a group's ability to acknowledge and challenge algorithmic decision-making outcomes.

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Alicia Lai 21, J.D. from the University of Pennsylvania Carey Law School, Articles Editor of the University of Pennsylvania Law Review, B.A in Neuroscience from Princeton University, "Artificial Intelligence, LLC: Corporate Personhood as Tort Reform," 2021, Mich. St. L. Rev. 597, p. 620-625, Lexis // bellaire FL

3. Efficient Errors: Human Baselines To begin with, it would be improper to penalize AI errors that depend upon datasets containing human errors, particularly if the AI system is performing better than a human decision-maker would perform on average. Often, the data used to train AI systems are derived from actions chosen by their human equivalents, which carry with them human irrationalities and subjectivity. 129According to behavioral economics, psychologists and economists have found that decision-making by large masses of people are subject to a slew of cognitive biases--people tend to overestimate the importance of what they know, linger on salient information, find patterns where there are not any, give weight to more recent events, confuse correlation with causation, and cling to certainty even when it is costlier than uncertainty. 130These decisions are costly, from shaping judicial decisions of disproportionate sentences based on racial characteristics to decisions that quickly snowball into financial bubbles bound to burst. 131When an AI is trained upon this data, the propensities of humans are effectively transferred to the machines. 132When it has proven infeasible to "fix" human decision-making by pinpointing human errors, is it reasonable to expect manufacturers to "fix" artificial decision-making by creating a perfect dataset on which to base the AI training? Arguably, fixing the root of the bias (humans) is the first step towards remedying the symptoms (AI). In fact, on average, AI performance is often better than human performance. 133In many cases, human decision-makers in the public and private sectors are subject to physical fatigue, are swayed by external or hierarchical pressures, have poor impulse or emotional control, are inaccurate or inconsistent in their performance, and are prone to groupthink or other cognitive biases. While it may be disconcerting to imagine a robotic arm autonomously conducting a complicated surgical procedure, in most cases the AI will sidestep human mistakes--it will not get tired at the end of a long seventy-two-hour shift; its hand will not shake from nervousness; it will not forget a sponge in the patient's body. 134 Due to the unpredictable nature of the physical world, it is impossible to expect an inventor to expose its technology to all corner cases. Although one may wish that inventors were omnipotent, an AI inventor held to a "reasonable expert" standard may not be able to foresee the scope of the potential harms. When AI technologies inevitably falter in the face of an unexpected scenario, strict liability would disincentivize transparency-inventors should be encouraged to be open about the errors in order to proactively correct them. 135While these errors could be costly, they are a learning opportunity carrying the seed of future improvement. When a human makes a mistake, the single human actor can only be retrained with difficulty, if at all. When an AI system makes a mistake, the entire system can be retrained with ease, and its entire ecosystem benefits. 136 4. Efficient Errors: Game Theory Problems Additionally, it would be improper to penalize AI errors when alternative decisions would result in situations where the community is collectively worse off. Under a game theoretic structure, an individually rational choice may lead to overall worse systemic performance. 137Although the superiority of utilitarianism is intensely debated against other tenants of moral philosophy such as deontology, there is no consensus unilaterally refuting either principle in the U.S. legal system. 138A utilitarian perspective demands that the better option is the one where the net good is greatest. 139Victims may not

agree. Because individuals are accustomed to using technology for selfish gains, they may believe that they should be entitled to their individually optimized gain-whether that gain is unequivocal protection within a self-driving car or the fastest network route-and that anything less is an "error." However, should every individual be afforded the "best" option, game theory problems will collectively arise. Consider an autonomous vehicle that must choose between hitting a group of innocent pedestrians or crashing the car with the driver inside. Research on machine ethics reveals that moral principles that guide a driver's decisions vary significantly by country and by culture. 140Consumers themselves also have contradictory ethical frameworks: survey participants said that they would prefer an autonomous vehicle protect pedestrians even if it meant sacrificing its passengers, yet they also said they would not buy autonomous vehicles programmed to act this way. 141Given these variations, an AI system may well choose the good of the community above the good of the individual. The unlucky driver may believe herself to be unfairly harmed, and perhaps even entitled to civil remedies in court, but the proper choice in ethical quandaries should be a jury question, not strict liability as a matter of law. Alternatively, consider a Google Maps algorithm that allows all cars to take the shortest, most efficient route-a phenomenon deemed "selfish routing." 142As a result, a multitude of cars will clog the same highway, slowing traffic down for everyone while leaving sideroads empty. Instead, redirecting some cars through a variety of longer routes may be considered an "error" by an individual unlucky driver who is sent the long way, but ultimately beneficial for road congestion for the area as a whole. A traffic jam is nothing to sue over, but the same principle could be applied to other finite resources such as network routing or natural resources. Today's AI technology often takes advantage of "efficient errors" by adhering to utilitarianism to avoid collective action problems-a business choice that should be a subject to a jury decision, not strict liability. 5. Efficient Errors: AI System Training Furthermore, some errors are necessary for AI technologies to learn and improve. In general, the conception that stumbles are necessary on the road to success is widely accepted: "Supernova success . . . breakthrough creation . . . is hard and inconsistent," David Epstein writes in his book Range. 143"If you want the sky highs, you have to tolerate a lot of lows." 144Further, struggling performance can be indicative of future long-term gains, and frustration and errors are stronger signs of learning than are ease and short-term accuracy, as denoted by psychologist Robert Bjork's term "desirable difficulties." 145This approach applies to more than just the process of human learning. In reinforcement learning systems, the AI system is constantly updating its predictions based off new data, sometimes generated by human interaction with the model. 146As the exploration-exploitation theory denotes, all decision-making involves a fundamental choice at each step: "exploit" by making the best decision given current information, or "explore" by gathering more information. 147This is applicable to decisions by both humans and machines: Go to your favorite restaurant or try a new one? Show the most successful online advertisement or try a different video sequence? Drill for oil at the best-known location or try your luck at a new site? The choice to explore may result in an immediate outcome that is worse than the current best-known outcome, yet it provides invaluable information and has the potential to reveal a new best strategy. In other words, it may be worth exploring suboptimal paths in order to find the global maximum instead of confining oneself to a local maximum. Consider the natural language processing algorithms in Google Translate or foreign languages on Facebook. 148Each of these platforms offer an English translation alongside a link to "suggest an edit" or "suggest a better translation" for a human user who notices that the machine language translation failed to catch an idiom or turn of phrase. 149Strictly speaking, each of these suboptimal translations could be considered an "error," yet it is only with extensive human feedback that the AI natural language processing algorithm can improve. Other generative adversarial networks--naïve blank-slate AI systems trained on vast data sets--also learn off trial and error, whether or not the errors are consumer-facing. These deviation "errors" are all inherent to the value of self-learning AI, and to impose strict liability for such errors would prohibit gradual improvement and would be tantamount to bringing the entire system to a standstill. Or consider algorithmic adjudication in the information age. Internal policies and adjudicatory decisions on social media platforms develop through an iterative feedback loop. 150In fact, these "[c]orporations have thus developed the type of dynamic feedback loop between disputes and policymaking to which the public system aspires. . . . They update their substantive and procedural policies regularly in a dynamic feedback loop. They experiment with and innovate their procedures in response to customer feedback." 151The effectiveness of these adjudicatory frameworks is informed heavily by these conflicts. The path to breakthrough successes is disorderly and full of commercial failures and flops. In a world without a well-defined formula or perfect system of feedback to follow, AI systems should be given a long leash if we want to unlock their potential benefits. Jurist Oliver Wendell Holmes once wrote a powerful dissent that went beyond legal theory to a fundamental fact of human existence--that we all make mistakes: "It is an experiment, as all life is an experiment. Every year if not every day we have to wager our salvation upon some prophecy based upon imperfect knowledge." 152

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Gabriel et. al 24 Saadia Gabriel, Jessy Xinyi Han, Eric Liu, Isha Puri, Wonyoung So, Fotini Christia, Munzer Dahleh, Catherine D'Ignazio, Marzyeh Ghassemi, Peko Hosoi, and Devavrat Shah, 3-27-2024, "Advancing Equality: Harnessing Generative AI to Combat Systemic Racism," An MIT Exploration of Generative AI, https://mit-genai.pubpub.org/pub/1ake7rfu/release/3, DOA 2-26-2025 //Wenzhuo

These case studies suggest ways of leveraging the capabilities of generative AI–driven modeling and simulations to uncover instances of discriminatory practices, attitudes, and hidden biases; predict outcomes; and design proactive interventions that prioritize community engagement and equitable practices in policing, healthcare, and housing.

Central to the investigation of racism is the fundamental query "Would the outcome of a specific decision have remained unchanged if the individual were White instead of Black?" Applications on policing and healthcare presented below examine how generative AI models can be used to correct for bias present in observational data through accounting for unobserved confounding variables. Specifically, we highlight the possibilities of using generative AI to develop causal simulations for intricate outcomes in situations where comprehensive data isnot available. Additional applications discussed below on healthcare and housing show how to identify bias and discriminatory narratives exhibited by large language models (LLMs) driving generative AI.

The applications presented here are compelling proofs of concept for the larger line of research that can happen in the space of generative AI and race. To that effect, they also signal the importance of expanding such work to construct reparative models that incorporate the dimension of time to elucidate the evolution of discriminatory practices, attitudes, and policies over time. Such work can provide valuable insights into the historical trajectory of racism as well as inform the development of large-scale policy interventions that eliminate racialized differences in policing, healthcare, and housing, among others.

Looking ahead to racial justice–related research, there is a need for active efforts to identify and combat generative AI–related biases. Ways to address them would include the use of racially diverse training sets, the creation of generative AI algorithms that are transparent and interpretable, regulatory oversight, community engagement, and education over generative AI.

This broader enterprise, consistent with the norms driving ICSR at MIT, needs to approach generative AI in an interdisciplinary fashion, ensuring that the technology is used ethically and as a complementary tool in conjunction with broader efforts involving direct engagement with stakeholders and communities. The intent of this line of work is to offer concrete insights for evidence-based reform efforts aimed at ensuring more equitable opportunities for all.

2.1. Causal Simulators and Generative AI

The first set of cases, on policing and healthcare, outline a method that uses generative AI to build causal simulators leveraging historic data. At its core, generative AI is a class of algorithms and models adept at generating new content—data, images, text, or simulations—from learned patterns and information in the existing datasets. The popularized parlance of generative AI has been typically for data or pattern replication.

The proposed approach aims to understand and model underlying, potentially causal relationships. By harnessing the power of generative AI, we aspire to create models that not only mirror real-world complexities but also predict and simulate outcomes. This method allows us to test hypotheses and predict outcomes in areas where traditional experimental approaches are either impractical or unethical. It integrates data collection and processing, advanced statistics and machine learning techniques, and rigorous analysis to ensure accurate and reliable simulations.

To evaluate the validity of our approach and keep it grounded in real-world problems, we focus on two important contemporary challenges: (1) racial biases in policies pertaining to policing and the criminal justice system and (2) clinical decisions for patients under different treatment therapies. The complexity of societal and biological systems pose significant challenges in decision-making. In the criminal justice system, policymakers often rely on historical data that may not fully capture the dynamic nature of human interactions. Similarly, in healthcare, retrospective data on patients' treatment responses can vary significantly across different populations. Traditional models often fail to capture the multifaceted nature of these systems, leading to wrong decisions with far-reaching consequences.

Generative AI–powered data-driven simulation can offer a viable solution. This approach involves standardizing and cleaning the collected data, developing models using statistics, machine learning and deep learning techniques, and running causal simulations based on different 'prompts' or conditions to see how changes in policies or treatments could potentially impact outcomes. By accurately modeling real-world scenarios, these simulations can uncover hidden patterns and causal relationships, providing a more nuanced understanding of various policies and treatments and more accurate predictions of the outcomes of interest.

As showcased below, the application of generative AI in building causal simulators for societal systems presents a transformative opportunity. In policing, it is about developing data-driven statistics that can help determine whether racial bias exists or not, and if it does, offering the ability to identify the root cause of it to potentially guide better policy design for reforms and more, offering a pathway to more equitable law enforcement strategies. In therapeutics, it is about the ability to produce accurate survival analysis for heterogeneous patient cohorts using global, sparse, disparate, and potentially biased data.

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Capraro 24 Valerio Capraro, Austin Lentsch, Daron Acemoglu, Selin Akgun, Aisel Akhmedova, Ennio Bilancini, Jean-FrançOis Bonnefon, Pablo BrañAs-Garza, Luigi Butera, Karen M Douglas ... Show More, 6-11-2024, "The impact of generative artificial intelligence on socioeconomic inequalities and policy making," OUP Academic, https://academic.oup.com/pnasnexus/article/3/6/pgae191/7689236, DOA 2-24-2025 //Wenzhuo

Given that human educators are susceptible to biases and dis- crimination, AI systems offer a theoretical advantage: they could be engineered to exhibit less bias. A significant benefit of AI is the ability to audit and address biases within educational systems, a process that proves difficult, if not impossible, with human biases. However, simply introducing slightly less discriminatory tech- nologies into classrooms is not a substitute for the goal of remov- ing discrimination from school (92). Moreover, AI systems should be designed with sufficient transparency for users to monitor for and identify potential biases to ensure that these tools effectively serve their intended purposes and reflect the interests of key stakeholders, including students, teachers, and parents (93).

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Fitter and Hunt 24| 7/24/24 Fawn Fitter, a freelance writer based in San Francisco, has written about small business, technology and workplace issues for numerous publications, ranging from Fortune Small Business to Cosmopolitan. Dr. Hunt's work focuses on using technology to increase workforce agility and performance through improving employee experience, development, engagement, inclusion, and well-being. He also studies how technological and demographic shifts are changing the nature of work, organizations and careers. An internationally recognized

thought leader in the field of HR technology, he has worked with over one thousand organizations spanning almost every industry. In 2019 he was awarded the honor of Fellow in the Society for Industrial-Organizational Psychology for advancing psychological science through creation of solutions that have positively influenced millions of employees around the globe. How AI can end bias | SAP //DOA 2/27/25 ASO

The reason for these checks and balances is clear: the algorithms that drive AI are built by humans, and humans choose the data with which to shape and train the resulting models. Because humans are prone to bias, we have to be careful that we are neither confirming existing biases nor introducing new ones when we develop AI models and feed them data. "From the perspective of a business leader who wants to do the right thing, it's a design question," says mathematician Cathy O'Neil, founder of a consulting firm that helps organizations manage and audit their algorithmic risks and author of the best-selling book Weapons of Math Destruction. "You wouldn't let your company design a car and send it out in the world without knowing whether it's safe. You have to design it with safety standards in mind," she says. "By the same token, algorithms have to be designed with fairness and legality in mind, with standards that are understandable to everyone, from the business leader to the people being scored." To eliminate bias, you must first make sure that the data you're using to train the algorithm is itself free of bias or that the algorithm can recognize bias in that data and bring the bias to a human's attention. For example, companies today know not to include language as overtly discriminatory as "no women need apply"—but, deliberately or otherwise, they still use phrases like "outspoken" and "aggressively pursuing opportunities," which are proven to attract male job applicants and repel female applicants, and words like "caring" and "flexible," which do the opposite. Once humans categorize this language and feed it into an algorithm, AI can learn to flag words that imply bias and suggest gender-neutral alternatives. Unfortunately, this process currently requires too much human intervention to scale easily, but as the amount of available de-biased data grows, this will become far less of a limitation in developing AI for HR and other applications. Using newer automated systems for bias detection could allow it to be done at scale. One potential solution: companies are now using AI to detect bias in other AI models, an extension of the practice of using AI to monitor AI. For instance, the Allen Institute for AI, a nonprofit created by the late Microsoft founder Paul Allen in 2014, offers an open-source model called AllenNLP and other training tools as well as bias mitigation algorithms. A host of other for-profit organizations—from startups to tech giants—also offer AI audit tools. Cloud AI providers are beginning to