
WHY WE LOVED BILL GATES'S ANNUAL LETTER

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We have been writing a lot about [artificial intelligence \(AI\)](#) and the ways in which we believe that topic will continue to evolve as the calendar changes from 2023 to 2024. To recap:

- ChatGPT awakened the world's consciousness on the topic of AI and the concept of "generative AI."
- 2023 saw Nvidia's incredible business results and a focus on some of the world's largest companies making huge investments and showcasing impressive generative AI models.

It's easy to recount history, but it's hard to predict future trends accurately. Bill Gates has had a very long career, starting off by founding Microsoft and progressing to his primarily philanthropic activities today. Even if we recognize he cannot accurately predict the future, when people with this much perspective write and speak, we want to listen.

Bill Gates, as CEO of Microsoft in the 1990s, had to steer the company through the world's adoption of mass usage of the internet. He had to make a lot of predictions to position the firm for success amid an uncertain backdrop.

If Bill Gates is choosing to write about AI and the types of things he sees as important in the megatrend's upcoming evolution, it's notable that 1) he made the choice to cover this topic at all, and 2) he has a window to all sorts of different technologies, so what he chooses to focus on could be an interesting signal.

Bill Gates Posed Five Questions Regarding Things AI May Be Able to Do:¹

1. Can AI combat antibiotic resistance?
2. Can AI bring personalized tutors to every student?
3. Can AI help treat high-risk pregnancies?
4. Can AI help people assess their risk of human immunodeficiency virus (HIV)?
5. Can AI make medical information easier to access for every health worker?

We can recognize all of these as extremely important. When Bill Gates focuses on them, he is angling toward using any benefits to help the massive numbers of people—in the billions—in the world's poorest economic situations. The angle we took was simply to see if advances were being publicized within any of these areas, whether or not they focused on the poorest or most at-risk groups.

Antibiotic Resistance²

We found an announcement from December 20, 2023, that researchers at MIT have used AI to discover a class of compounds that can kill a drug-resistant strain of *Staphylococcus aureus*. It was also noted that the compounds showed a very low toxicity against human cells—important when considering a drug candidate.

A common critique of such deep-learning-based AI models that can suggest drug candidates is that the models can be black boxes—maybe you get an interesting answer, maybe not, but good luck knowing the "why" in terms of why certain compounds were or were not

suggested. These researchers have made advances not only in finding some possible compounds but also in designing a model that is more explainable in terms of the outputs it provides.

An effective model, at least in theory, should be able to keep playing the cat-and-mouse game as bacteria evolve and medicines must be adjusted or discovered to keep pace with their abilities to resist them.

Personalized Tutors³

It is interesting to consider how our trust in different types of digital information evolves. I graduated from college in 2006, and in that period, the idea of using Wikipedia as a source in a paper would have been unheard of. Now, at the start of 2024, Wikipedia might be one of the most trusted sources on the internet.

The concept of using generative AI as a tutor or foundation from which tutoring applications can be built is in its early stages—we have seen different articles that discuss possible best practices in terms of prompting—but it's clear that the technology itself should be able to perform this function. I remember having to call classmates, schedule time or wait for individual time with the teacher directly. Students today can be stuck on a question and ask for suggested approaches or ways of thinking basically in real time.

High-Risk Pregnancies⁴

We can agree that there are many sources of risk in pregnancies, so it is unrealistic to assume we can, at least presently, design a system to help with all of them. We did find a system that went about mitigating the risk of high stress in pregnancy. It used a combination of heart rate monitoring and an application within a smartphone to collect answers to questions in order to predict if the next day for the person pregnant would be particularly stressful. If yes, the system can offer some suggestions or other things that seek to mitigate this.

While not a guaranteed solution, at least attempting to lower stress levels in those dealing with pregnancy could be somewhat valuable. We'd imagine that as time goes on, more and more distinct systems meant to manage more and more specific risks could evolve.

Assessment of HIV Risk⁵

Of the five areas identified by these questions, this one feels most immediately connected to some of the world's more vulnerable populations that we know the Bill & Melinda Gates Foundation identifies as its core focus.

Actually, on the Bill & Melinda Gates Foundation website, we found a note titled: "Your Choice: Using AI to Reduce Stigma and Improve Precision in HIV Risk Assessments." This is an acronym:

Your
Own
Unique
Risk
Calculation for
HIV-related
Outcomes and
Infections using a
Chat
Engine.

It is designed to help with the epidemic in South Africa. The system fills a particular need—gathering accurate sexual history is essential in assessing HIV risk, so using an LLM to ensure privacy and confidentiality, as well as improve the accuracy of risk assessments and even suggest treatment options, could be beneficial. A system like this would also be available 24/7.

Medical Information Management⁶

Have you ever looked at your own medical chart in a doctor's office? I'll admit that I have never asked to see mine, but I do have a feeling that if I did, the answer might not be an unequivocal, "Sure, why don't you take it home and bring it back."

In the U.S. medical system, there is a sense that if you work with different doctors, the information that needs to be shared between medical professionals does get shared—but the patient may not always know exactly how, even if they do know that they signed forms indicating their consent. In developing countries, it may be impossible for the information even to be shared.

Privacy is a central concern, so any developments need to be pragmatic, but if we can assume that there is a progression of steps that can account for privacy in an appropriate way, consider this scenario:

- We know that systems like YouTube, TikTok and Netflix are successful at recording what you engage with and seeking to feed you more of what people who look like you have found interesting. The idea is to keep you engaged on the platforms.
- In medicine, each individual person is different, but many groups of people can exhibit similarities. Without needing to know the individual names of people, it could be possible to see broad-based population statistics on people who have data similar to yours, and it might more clearly define key risks, key treatment options and other important information. The concept would be to empower and make the science of medicine more understandable, which could allow you to engage with doctors more productively about your possible treatment options.

So far, at least from what we can see, this area is more "theory" than "practice," but there is no reason in the technology itself why it couldn't ultimately be done.

Conclusion: Alignment with Our Previously Mentioned Biotechnology Turnaround Thesis

We have written numerous times recently about how we believe that, after a very difficult couple of years, biotechnology companies may see a rebound in returns during 2024. Bill Gates can write about the intersection of AI with many different avenues of technology—he chose to focus a lot on medicine and health care.

For those looking for specific companies that reflect a lot of notable activities in the biotechnology sphere, check out the [WisdomTree BioRevolution Fund \(WDNA\)](#).

¹ Source: Gates, Bill, "The Road Ahead Reaches a Turning Point in 2024," *Gates Notes*, 12/19/23, www.gatesnotes.com/The-Year-Ahead-2024.

² Source: Anne Trafton, "Using AI, MIT researchers identify a new class of antibiotic candidates," *MIT News*, 12/20/23.

³ Source: Ethan and Lilach Mollick, "Customizing the Student Learning Experience," *HBR*, 9/25/23.

⁴ Source: Andrea Azzo, "Patient-Focused AI System Seeks to Reduce Stress during Pregnancy," *Center for Advancing Safety of Machine Intelligence*, 9/22/23.

⁵ Source: Sophie Pascoe, "'Your Choice': Using AI to Reduce Stigma and Improve Precision in HIV Risk Assessments," *Bill & Melinda Gates Foundation*, 6/18/23.

⁶ Source: Bhasker et al., "Tackling healthcare's biggest burdens with generative AI," *McKinsey & Company*, 7/23.

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