Why we liked Bill Gates' annual letter

Published 25 January 2024

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We have been writing a lot about Artificial Intelligence (AI) and the ways that we believe the topic will continue to evolve as we move into 2024. In 2023, ChatGPT opened the world's eyes to the topic of AI and the concept of 'generative AI'. We saw NVIDIA's incredible business results, as well as some of the world's largest companies making huge investments in AI and showcasing impressive generative AI models.

It's easy to recount history, but much harder to accurately predict future trends. Bill Gates has had a very long career, beginning with founding Microsoft and progressing into primarily philanthropic activities today. Even though we recognise that he cannot accurately predict the future, when people with this much perspective speak — we want to listen.

As CEO of Microsoft in the 1990s, Gates had to steer the company through the world's mass adoption of the internet. He had to make a lot of predictions to position the firm for success amidst an uncertain backdrop. Therefore, if he is choosing to write about AI, and what he sees as important in the megatrend's upcoming evolution, it's notable both that he made the choice to cover this topic at all, and that what he chooses to focus on could be an interesting signal, given his insight into different technologies.

In his letter Gates posed five questions to discuss the future of AI[1]:

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

Each of these questions is extremely important, and when Gates is focusing on them he is working toward using any benefits to help the massive numbers – the billions – in the world's poorest economic situations. We investigated each of the five areas to identify any advances being publicised and whether those advances focused on the poorest, most at-risk, groups.

Antibiotic Resistance[2]

On 20 December 2023 researchers at MIT reported that they had used AI to discover a class of compounds that can kill a drug-resistant strain of staphylococcus aureus. They also noted that the compounds showed a very low toxicity against human cells, which is important when considering it as a drug candidate.

A common critique of deep-learning-based AI models, like those used in the study, is that they can be black boxes. Maybe you get an interesting answer, maybe not, and good luck understanding the 'why' in terms of what was or wasn't suggested. However, these researchers have not only made advancements on identifying possible compounds, but also in designing a model that's outputs are more explainable. An effective model, at least in theory, should also be able to adapt current therapies or identify new options to keep pace against future resistance.

Personalised Tutors[3]

It is interesting to consider how our trust for 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 as a foundation from which tutoring applications can be built, is in its early stages. There are articles that discuss possible best practices, in terms of prompting the student, but it's clear that the technology itself should be able to perform this function. I remember having to call classmates or wait for individual time with the teacher to discuss my queries, whereas students today can be stuck on a question and ask for suggested approaches, or ways of thinking, in almost real time.

High risk pregnancies[4]

We can agree that there are many sources of risk in pregnancies, so it is unrealistic to assume we can design a system to help with all of them. We did, however, find a system that mitigated the risk of high stress in pregnancy. It used a combination of heart rate monitoring and a smartphone application to predict if the next day would be particularly stressful for the pregnant person and if it was the system would offer suggestions and support to mitigate this.

While not a guaranteed solution, at least attempting to lower stress levels in pregnant people could be somewhat valuable. We'd imagine that, in the future, more distinct systems created to manage specific risks could evolve.

Assessment of HIV Risk[5]

Of the five areas identified by these questions, this was the question most directly focused on the world's more vulnerable populations, and one that the Bill & Melinda Gates Foundation identifies as its core focus.

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." 'Your Choice' is an acronym for 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. Gathering accurate sexual history is essential in assessing HIV risk, so using an LLM to ensure privacy and confidentiality – as well as improving the accuracy of risk assessments and suggesting treatment options – could be beneficial. A system like this would also be available 24/7.

Medical information management[6]

Have you ever looked at your own medical chart in a doctor's office?

In the US, there is a sense that if you work with different doctors that any information that needs to be shared between medical professionals is shared. However, despite giving written consent, it may not always be clear how this information is being shared. And in developing countries, it may be impossible for that information to be shared at all.

When sharing information privacy is the primary concern, therefore any developments in this area need to be pragmatic. If we can assume that there is a stepwise progression that can account for privacy in an appropriate way, consider this scenario. We know that systems like YouTube, TikTok and Netflix successfully record what you engage with and feed you more of what people like you have found interesting to keep you engaged on the platform. In medicine, each individual person is different, but many groups of people can exhibit similarities. Without needing to know individual names, it could be possible to see broad-based population statistics on people who have similar data. This information could help to define key risks, treatment options, and other important information. The concept could empower people, allowing them to better understand and discuss possible treatment options with their doctors.

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 be possible.

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, but he chose to focus on medicine and health care.

For those looking for specific companies that reflect notable activities in the biotechnology sphere, check out the WisdomTree Biorevolution UCITS ETF (Ticker: WDNA).

[1] Source: https://www.gatesnotes.com/The-Year-Ahead-2024

[2] Source: Trafton, Anne. "Using AI, MIT researchers identify a new class of antibiotic candidates." MIT News. December 20, 2023.

[3] Source: Mollick, Ethan & Lilach. "Customizing the Student Learning Experience." HBR. September 25, 2023.

[4] Source: Azzo, Andrea. "Patient-Focused AI System Seeks to Reduce Stress during Pregnancy." Center for Advancing Safety of Machine Intelligence. September 22, 2023.

[5] Source: Pascoe, Sophie. "'Your Choice': Using AI to Reduce Stigma and Improve Precision in HIV Risk Assessments." Bill & Melinda Gates Foundation. June 18, 2023.

[6] Bhasker et al. “Tackling healthcare’s biggest burdens with generative AI.” McKinsey & Company. July 2023.

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