ChatGPT heralds tech revolution

The text generator ChatGPT is breaking growth records and is the current tech hype par excellence. What makes the new tool truly special is its applicability across a broad spectrum. **PASCAL KAUFMANN, THILO STADELMANN, BENJAMIN GREWE**

Great technological revolutions have changed our society since the dawn of time: etterpress printing e.g. contributed in the 15th century significantly to the Enlightenment and to various social upheavals. Similarly, the scope of the spread of the Internet in the 20th century has been monumental and is still in full swing in the 21st century.

When the World Wide Web first went "online" in the early 1990s, it was difficult to even remotely assess the impact of this technology: The basic technology of the WWW had long been well-known, commercial applications were not in sight for the time being, the only people cavorting in cyberspace up to that point were technology nerds. It was Internet pioneer Tim Berners-Lee who, by launch-ing a public demonstrator, particularly succeeded in arousing the creativity and curiosity of numerous users. This resulted in better software (e.g., Netscape browser), commercial applications that led to enormous productivity increases (e.g., Google search, Amazon online store), as well as the emergence of social networks (e.g., Facebook) that significantly change our relationship life, self-image, and our values as a society.

«Dem lukrativsten Geschäft der Tech-Branche droht die Disruption.»

The complete pervasion of the way we live, work and do business is taking place at an enormous speed. Soon, three quarters of the world's population will be "online", and four of the five most valuable global companies owe their success primarily to the Internet and the mass networking of people, with all its advantages and disadvantages.

A utility revolution

It is possible that we are witnessing a historic birth moment comparable to that which precedes almost every technology revolution: the emergence of the first general-purpose artificial intelligences, made possible by the various developments in the field of generative AI in recent years. The forerunners of these are systems that generate images at the push of a button (e.g. "Stable Diffusion", "DALL-E") and the currently rapidly spreading text generator "ChatGPT".

Once again, it was the Americans who combined already existing and comparatively unspectacular technology to bring together a novelty with a radically simple user interface. Many investors now anticipate the next shifts in the technology market. Microsoft, for example, is said to have paid $10 billion for a minority stake in ChatGPT developer OpenAI.

For the first time in history, AI systems not only reliably solve individual, highly specialized tasks, but can also be used profitably by a broad mass of users for complex everyday issues. Therefore, we should speak less of a technology revolution than of a "usefulness revolution: The technology has already existed for several years, but its usefulness differs due to the upscaling of models, data sets and computing times to such an extent that even the undisputed number one of of search engines fears for its future.

Let's take for example language generation: In contrast to conventional AI systems, which are usually only trained for a specific task, such as playing chess, the language models of the GPT family (Generative Pretrained Transformer) are generally designed to generate the next word for a given text input. Repeating this process, the GPT model can generate meaningful texts word by word for various topics and tasks.

GPT is therefore capable of being applied in a very general manner compared to earlier AI systems, which is a common denominator with human intelligence. The chatbot thus provides a first taste of the future technological breakthrough of the first AI. However, ChatGPT still lacks many aspects of human intelligence, especially since it is limited to statistical learning algorithms that calculate which word is most likely to match a given text.

Nevertheless, the potential of such AI systems is immense: future applications aim at high-level office automation, the creation of personalized virtual assistants, fully automated text services, and the creation of fully tailored customer experiences that surpass the capabilities of an attentive customer advisor in many aspects. At this point already, ChatGPT is able to process customer emails or create marketing plans.

Professional software developers are reporting dramatic efficiency gains by a factor of five when working with the bot in a team. The Swiss educational landscape in particular is being put under pressure: ChatGPT creates essays, solves classroom assignments, and passes MBA exams. Crisis meetings and fundamental questions are making the rounds within universities and corresponding departments while high school and university students are asking themselves which knowledge and skills will hold any importance in the future. In the same way that critical thinking should be ubiquitous when reading books or holding discussions in colleges, it is more than ever required

It has already begun: Microsoft announced to integrate ChatGPT into its Internet search, while at nearly the same time Google announced to revolutionize Google search with its own bot. However, the demonstration of the latter went wrong in several ways, much to the detriment of Alphabet's share price. It will be interesting to see what this will mean for the entire search engine business. After all, it is much less easy to weave an advertising link into a distilled answer than into a list of search results, and an answer from the bot costs considerably more computing power than a query of the search index. The by far most lucrative business in the tech industry is threatened with disruption. Users, on the other hand, will see improvements: Chatbots that can enrich their knowledge databases via the Internet and reference sources.

AI-Hotspot Switzerland

At the same time, current approaches are fundamentally limited and tend to lead away from an understanding of intelligence rather than contribute to it. They devour vast amounts of data and computing power, hallucinate results based on statistical recombinations, and render the world based only on text modules without any underlying comprehension. They have no specific circuits for planning and reasoning. An understanding of the world gained through physical interaction, a desire to discover new things coupled with other ingredients for resource-efficient learning is necessary for a genuine technological revolution.

The next milestone will not consist of GPT-4, five or even higher, but of a bot that teaches itself the human mind through its own voyages of discovery in virtual worlds. In Switzerland particularly, researchers are working on systems that are able to learn with full autonomy, fathom the world and thus become reliable helpers. We would do well to play an active role in shaping this next technological step at the international forefront, since the stakes are high. As a world champion in innovation and a global hotspot for the AI scene, Switzerland is predestined for this.

Pascal Kaufmann, Lab42; Koautoren Prof. Thilo Stadelmann, ZHAW; Prof. Benjamin Grewe, ETH.