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Europe must invest in GPT-3 to avoid falling further behind

AI systems come primarily from the U.S. - including the particularly clever text generator GPT-3. It cost millions, but the investment will pay off. That's why Europe must catch up, or the continent will face a dangerous defeat.

By Kristian Kersting

Artificial intelligence (AI), as a cross-sectional technology, can help to better address many or even almost all of the major challenges of our time, such as climate change, pandemics, geopolitical or demographic upheavals. Therefore, I am not surprised that I get many phone calls from representatives of media, politics and industry, asking me to assess new developments in AI. The conversations then often revolve around questions of AI ethics, i.e., how we can realize trustworthy, fair and explainable AI systems. An important topic, no doubt.

Some time ago, however, I received a call that went differently: A journalist from France asked me about the text generator GPT-3 — and we ended up talking about the AI sovereignty of Europe.

I'm not sure if you've heard of GPT-3. Most of you certainly haven't. It's a so-called language model, a kind of "recipe" for generating written texts. It is able to write dramas in the language of Shakespeare, to program simple apps or to create game worlds. All you have to do is provide an entry point, and the AI does the rest of the writing.

How does GPT-3 manage to do that? The "recipe" consists of about 175 billion „adjusting screws.“ Each position of the screws corresponds to a different computational way to generate a text: the first word, the second word, and so on. Using machine learning, the screws are adjusted to produce as closely as possible an enormous number of training texts. For example, if there is the sentence "A whale is a mammal," it is presented to GPT-3 but with a missing word, say, "A whale is an X." The program must now replace the X with a word. Initially, it will usually not compute any meaningful substitutions, but eventually it will try the word "mammal" and realize that it is the correct word, by comparing it to the original sentence in the training set. The screws are then "adjusted" in a way making this substitution more likely. Trained with a lot of examples, GPT-3 does not "learn" anything about mammals, but it does learn about which setting of the adjusting screws is most likely to produce the correct answers in the future.

Sure, GPT-3 is not perfect. For example, it considers grape juice to be dangerous or answers the question "Who was the president of the USA in 1700?" with a name, although the USA did not even exist at that time. Fortunately, I must say, AI systems commit many such errors. "Fortunately" because the media sometimes give the impression that machines already had the full range of human intelligence and could, at least in principle, replace or surpass humans - with understandably troubling consequences.

Despite its flaws, however, the computer program GPT-3 is very useful: it can summarize long texts in a comprehensible way, fill out Excel spreadsheets, program simple apps as desired, or distinguish mammals from fish. This is helpful in many areas and holds enormous potential

added value. Just one example: In a digital world, it's not only useful for computer scientists to know how to program, but also for designers, engineers and scientists, in fact, virtually anyone. And, GPT-3 may help to learn programming significantly faster.

Of course, there is no free lunch. Training GPT-3 cost the Californian software company OpenAI, which developed the GPT-3 program, about 4.6 million US dollars, not counting the experimenting and trial and error during the development phase. In return, however, GPT-3 can be re-used in a variety of ways; it can even solve tasks for which it has not been trained. While learning from the many training texts, it also developed some basic „understanding“ of mathematics and is now able to solve simple arithmetic problems. In short, training GPT-3 is a one-time investment, but one that pays off many times. Microsoft has also recognized this and acquired an exclusive license at the end of September 2020 - other users now only have limited access.

To ensure that we stay competitive with the few global AI players, Germany and Europe should urgently invest and build their own GPT-3 variants and make them available to both research and industry as quickly as possible. After all, learning AI models on "AI supercomputers" enables other AI models that would be otherwise out of reach. If we hesitate, we run the risk of dropping out of the rapid AI innovation cycles. GPT-3 should also not only speak English. Its "mother tongue" should not be only that of the richest countries and communities in the world. Bad Human biases in the system must also be discovered and avoided. Together with AI companies like Aleph Alpha in Heidelberg, Germany, and the European AI research networks CLAIRE and ELLIS, which are driving modern AI, Europe can take care of all this. There is still time.

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