'Climinator' vs. greenwashers: Researcher develops AI tool to debate climate on a factual basis

August 15 2024, by Andres Eberhard

Markus Leippold created the AI tool "Climinator", which aims to make the climate debate more fact-based by uncovering factually incorrect and vague quotes in sustainability reports. Credit: Ursula Meisser

Companies like to act "green" by publishing thick environmental sustainability reports replete with photography of pristine landscapes, but

precious few of them keep their promises. Finance professor Markus Leippold is using AI-based tools to fight greenwashing.

Wherever the Terminator goes in the eponymous movie, the cyborg from the future wreaks havoc. "I'll be back," he says at a police station before barreling a car into the precinct and killing the police on duty there. The mission of the Terminator, embodied by actor Arnold Schwarzenegger, is nothing less than the destruction of humanity.

The "Climinator" gets down to work with much more benevolent intentions. It is an AI tool whose mission is to put the climate debate on a more factual basis, which is a necessity in the battle against global warming. The Climinator was developed by a group of UZH researchers led by Markus Leippold, a professor of financial engineering. Its artificial intelligence enables counterfactual statements on climate-related issues to be exposed and debunked within minutes.

The Climinator deals with false and fake climate facts just as destructively as the Terminator treats its adversaries. It stamps a verdict of "incorrect" on Swiss People's Party President Marcel Dettling's statement that no one can halt climate change, and it calls his assertion that a reduction of greenhouse gas emissions will hardly arrest warming "misleading."

However, the Climinator doesn't stay as sparing with words as the original played by Arnold Schwarzenegger does. The AI-based tool appends to its verdict a multi-page argument complete with a list of sources, which it takes just under two minutes to compose. The sources it draws on are research papers that reflect the scientific consensus, particularly reports published by the Intergovernmental Panel on Climate Change (IPCC).

"It works kind of like the way things did with the ancient Greek

philosophers," Leippold explains during a meeting in his office in Zurich. The fact-checking tool, he says, verifies the accuracy of statements by enlisting an array of large language models to interact with each other in a kind of debate. To prevent blind spots, the researchers even deliberately incorporated the perspective of climate denialists.

"It's like a Socratic debate where, in the end, scientific arguments determine the verdict," Leippold says.

Vague intentions instead of firm commitments

Leippold stood on the world stage for 15 minutes when he recently delivered a TED talk in Paris. The nonprofit organization TED provides a platform for experts whose ideas it deems are worthy of consideration and posts recordings of TED talks on the internet.

The YouTube video of Leippold's TED appearance has racked up around a half-million views to date. Leippold leveraged the attention to hammer home his main message. "Global warming, at its root, is an economic problem," he said. Emissions ultimately are caused by human economic activity, and that activity is coordinated by financial markets, he explains.

Leippold's point is that in order to halt global warming, businesses need to invest in sustainable technologies. And in order to steer investment in desired directions through laws or incentives, for example, policymakers need transparency. But that's in short supply at present.

Although every self-respecting large company publishes a sustainability report these days, hardly anyone really reads them carefully. So, there is a huge risk of greenwashing. Take Shell, for example. The oil company's latest sustainability report is 98 densely worded pages long. Photos adorning the pages show workers conferring in front of a solar panel

array and managers being guided though lush fields by local natives.

Shell, though, is one of the world's largest emitters of CO_2 and has been reprimanded repeatedly for greenwashing. The problem is that companies use words that sound good, but they commit to as little as possible. That's why Leippold and his team have developed an additional AI-based tool capable of telling tangibly measurable climate pledges from vaguely worded intentions. Or as Leippold put it in his TED talk, "We separate the walkers from the talkers."

That works very well by now. However, the finding revealed by the research conducted thus far with the software is dismaying: roughly every second company has a Cheap Talk Index score above 50%. In other words, every second promise in sustainability reports is worthless.

One example of nice-sounding but essentially vague wording is the intention to become "climate-neutral by 2050." This frequently uttered vow can mean anything. It can mean, for instance, that the company pledging it will cease emitting greenhouse gases altogether. But it can also mean that said company will actually even produce more carbon dioxide, an action made possible through the trading of carbon credits that promise to make a contribution to combating climate change by, for example, funding the protection of ancient woodlands in Africa or Latin America.

Although there is a great deal of dispute about the effectiveness of carbon credits trading, companies deduct the saved emissions from their CO_2 output and become "climate-neutral" that way. Leippold likens this to the "old days of the Catholic Church, when one could buy absolution from sins by purchasing an indulgence."

But deception takes place more than just linguistically. Actual CO_2 and methane emissions are also susceptible to manipulation because the

companies themselves are the only ones able to supply reliable data on them.

Leippold thus has his mind set on finding out the true magnitude of those emissions and how big an impact companies have on biodiversity in their vicinity. Satellites that deliver data in real time could make that possible. Smart image analysis software could then analyze the data. The researchers led by Leippold are currently working on developing a solution of that kind.

Chat about the climate with AI

In order to bring the trickery to light, the researchers' findings need to make their way out of the ivory tower. To ensure that happens, Leippold promises that all of the tools developed will be released to the public as open-source software. Some policymakers and international institutions already use these tools today to detect corporate greenwashing.

Another tool developed by the researchers can already be used by anyone today: on ChatClimate, users can input questions on global warming and receive answers to them powered by artificial intelligence. The large language model behind ChatClimate sources its information from the scientific findings in IPCC reports.

Leippold sees a lot of potential in this kind of platform. It's getting harder and harder, he says, to sift trustworthy information from the vast wilderness of data on the internet. "When Google was brought into existence 25 years ago, 25 million webpages were indexed. Today the Google Search index contains hundreds of billions of webpages."

Although googling is convenient, the results aren't always entirely reliable. A search engine, for example, trained on scientific evidence would be better suited to answer the question of whether a person should

buy an electric car.

Combating greenwashing is also a personal matter for Leippold. During his TED talk, he mentioned that the birth of his children was what prompted him to engage in the fight against global warming in his capacity as a finance mathematician.

Asked about that during our conversation in his office, he clasps his hands together and reflects for a while before answering. Then he says, "I'm picturing the moment when I ask my grandchildren what they would like to do in the future when they grow up. What if they retort: 'What future?'"

The chances are good that Leippold's descendants will have nothing to reproach him for someday. After all, he is leaving nothing untried. Recently he even sent an e-mail to "Terminator" Arnold Schwarzenegger.

Leippold is hoping for a cooperation arrangement with the original, which of course would give a boost to public awareness of the Climinator fact-checking tool. A team-up isn't entirely unrealistic considering that the former governor of California hosts annual climate conferences in his native country of Austria. Leippold hasn't received a reply from Schwarzenegger yet, but will persevere with his efforts anyway, whatever the outcome.

Provided by University of Zurich

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