Not a Treat: Cookies Are a Pervasive Technology’s Instrument

Carbolytics is a project at the intersection of art and research by artist Joana Moll in collaboration with the Barcelona Supercomputing Center (BSC). The project aims to raise awareness of the environmental impact of pervasive surveillance within the advertising technology ecosystem (AdTech).

Why did you choose to investigate the carbon footprint of AdTech?

AdTech is the primary business model of the internet and the carbon costs associated with it are highly opaque. Companies need to be held accountable for what they’re doing. The AdTech industry is just the tip of the iceberg. There is a massive ecosystem beyond cookies and beyond browsers. We have no clue how user data are being exploited and how big the energy consumption of such a huge business model is.

What did you learn through the project?

In most cases, it was very difficult to identify the organizations behind the cookies. And we found that the most pervasive cookies like Google Analytics are not the most polluting. We also found out that the most polluting website when it comes to cookies was Netflix, but there weren’t many of them.
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How is it possible that such a carbon emission-intensive technology like AdTech is an ecological blind spot?

It’s an extremely fast process. Everything happens extremely fast and it’s overshadowed by all the devices that we use. If we were aware of every single process that happens, the system probably wouldn’t work. The problem is that we don’t really understand how things work. In Slovenia, I did an installation, an immersive space where you would go into a room where there were four projections. All the visitors had all these cookie logos on their faces. It really felt like what’s actually happening. A lot of people were overwhelmed by the fact that nobody really knows what to do to counter this. It’s frustrating because we as individual users can’t do anything about it. It’s a systemic problem. It’s not only very hard to understand what the cookies do, it’s a crazy amount that we are exposed to.
You see AdTech as a part of cognitive capitalism. What does this mean?

Cognitive capitalism is the economic system that we are all part of. In this system, wealth is no longer being produced exclusively by material goods but through intangible actions, experiences, communication and cognition. Most of our transactions are being quantified and commodified. AdTech takes advantage of this by exploiting everything we do online. Every mouse movement, every word we type, every click is capitalized on and ultimately generates revenue.

Did you find anything you didn’t expect?

Consent cookies, the ones that ask for user consent to take data, were the third most pervasive we found. It is quite perverse that privacy adds an extra layer to the issue. This is why I think that privacy and sustainability always need to be conceived together. They are part of the same problem: the lack of accountability of polluting companies.

What do you think of announcements such as the one made by Google, that the company will be carbon positive by 2030?

I think it’s really problematic that they can legally say this, because it’s impossible. Google is not just the operations data center. Google is on all our devices. So, there’s no way they can quantify all their energy consumption. How would it be possible that all this technology even reaches carbon neutrality? It’s not possible because they feed from our devices. When we calculated the carbon emissions of cookies, we found that there is not enough independent assessment of energy consumption and carbon emission of data in general. And researchers dramatically disagree on how to quantify this, which I believe is a huge problem.
What is your main takeaway from Carbolytics?

Something interesting happened with this project. I was expecting much more interest from the media because it’s about the primary business model of the internet. I talked to very big newspapers, but nobody would pick up or follow up on the story, which was very frustrating. Then I saw that The New York Times and similar companies had a lot of cookies that appear within the top 20 in our ranking. I was pretty sure that in the end, I was ignored because the story touched their own business model. It’s difficult to raise public awareness if the media – which is supposed to be the gateway for reaching the public – isn’t interested in spreading the news because the news affects them so much.

About Carbolytics
(Excerpt from the project description by Fernando Cucchietti, Joana Moll, Marta Esteban, Patricio Reyes, Carlos García Calatrava)

Tracking users’ online behavior has become a major business model in the last decade. Online tracking is the act of collecting data from online users as they read the news, purchase items, interact on social media, or simply perform online searches. Companies rarely disclose information on the environmental footprint of such operations. This expansive data collection often becomes the basis on which AI operates.

AdTech analyzes, manages and distributes online advertising and is the primary business model of the data economy ecosystem. In 2021, global ad spending across platforms reached $763.2 billion, and it is expected to rise 10 percent in 2022. In 2020, 97.9 percent of Facebook’s and 80 percent of Google’s global revenue were generated from advertising, and these companies, together with Amazon, will dominate 80 to 90 percent of the market in 2022, excluding China. Yet, despite the extraordinary relevance of AdTech within the global economy, its methods and processes are extremely opaque, and thus difficult to control and regulate. Data collection through AdTech often becomes the prerequisite for AI applications, such as recommender systems, and thus needs to be accounted for when considering the sustainability of AI.

Typically, data is collected through cookies and other tracking technologies integrated into devices, web pages, apps and all kinds of interactive and audiovisual digital content. Even though they are created and stored on the user’s device, tracking technologies are mostly non-transparent and sometimes undetectable to users. Despite their “invisibility” and relatively small size, tracking technologies are responsible for triggering myriad algorithmic processes at a global scale, exploiting user behavior data with a direct impact on the user’s devices power consumption.

The research behind Carbolytics analyzes the carbon emissions of all those cookies belonging to the top 1 million websites. The investigation identified more than 21 million cookies per single visit to all these websites, belonging to more than 1,200 different companies, which translates to an average of 197 trillion cookies per month, resulting in 11,442 monthly metric tons of CO₂ emissions. This number reflects only browser-based cookie traffic and does not include other behavioral advertising tools, such as app tracking activity or profiling algorithms.