

Research finds 52 times more online anti-ad blocking than previously thought

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Credit: University of California - Riverside

The web is only "free" because our attention is sold to the highest bidder via complex real-time auction systems, based on data-mining algorithms, that serve up ads. If you were a fan of the AMC series *Mad Men*, with its depiction of smartly crafted agents of persuasion, you probably hate the irritating interruptions of today's digital messaging.

You're not alone. Eleven percent of the global internet audience is now using ad blocking software, available either as browser extensions—Adblock, Adblock Plus, and uBlock—or fully fledged browsers—Brave and Cliqz—for a less intrusive online experience.

However, it turns out those ad blockers aren't as effective as advertised, because major publishers have gone on the counter-offensive. In a desperate bid to avoid losing billions of dollars in revenues, they're employing technical trickery to continue serving up targeted ads.

A new research paper, "Measuring and Disrupting Anti-Adblockers Using Differential Execution Analysis," written by UCR professors Zhiyun Qian and Heng Yin; UCR graduate student Shitong Zhu; Xunchao Hu of Syracuse University, and Zubair Shafiq of the University of Iowa, takes an in-depth scholarly look at the anti-[ad blocking](#) landscape and what can be done.

The authors will be presenting their work at the Network and Distributed Systems Security Symposium in San Diego from Feb. 18-21.

"The ad industry lacks self-regulation and all sorts of issues exist such as malware delivered through ads, universal tracking, annoying ads and so on," said Qian, an assistant professor in the computer science and engineering department, who previously worked for Microsoft and Cisco. "Our research paper came out of work which was initially funded by the Data Transparency Lab, and now by the National Science Foundation, and its initial goal was simple: to learn more about the escalating arms race between ad blocker and anti-ad blockers."

The authors ran multiple concurrent experiments, including a differential execution analysis to automatically detect and analyze anti-ad blockers, collecting execution traces by visiting a website with, and then without, ad blockers to measure the different in-browser experiences. Their system detected anti-ad blockers on an astonishing 30 percent of the Alexa top 10K websites.

"This is up to 52 times more than reported in prior literature," said Quin, a 2017 NSF CAREER award recipient. "We know that earlier research was limited to detecting visible reactions, such as warning messages and pop-ups, by anti-ad blockers. But our system can discover attempts to detect ad blockers even when there is no visible reaction, which happens in over 90 percent of cases."

Based on their findings, the team developed software tools, including JavaScript rewriting and API hooking based solutions, the latter implemented as a Chrome extension, to help ad blockers bypass state-of-the-art anti-ad blockers.

In bypassing ad blockers, Qian said malware delivery and widespread tracking will come back to

threaten the stability of digital interconnected systems.

"We see our research as part of the movement to keep up pressure on publishers and advertisers in the long term," Qian said. "Because it is crucial that ad blockers keep pace with anti-ad blockers in the rapidly escalating technological arms race."

More information: Measuring and Disrupting Anti-Adblockers Using Differential Execution Analysis. Network and Distributed Systems Security (NDSS) Symposium 2018. [DOI: 10.14722/ndss.2018.23331](https://doi.org/10.14722/ndss.2018.23331)

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