Artificial intelligence toolkit spots new child sexual abuse media online

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New artificial intelligence software designed to spot new child sexual abuse media online could help police catch child abusers. The toolkit, described in a paper published in Digital Investigation, automatically detects new child sexual abuse photos and videos in online peer-to-peer networks.

The research behind this technology was conducted in the international research project iCOP - Identifying and Catching Originators in P2P Networks - founded by the European Commission Safer Internet Program by researchers at Lancaster University, the German Research Center for Artificial Intelligence (DFKI), and University College Cork, Ireland.

There are hundreds of searches for child abuse images every second worldwide, resulting in hundreds of thousands of child sexual abuse images and videos being shared every year. The people who produce child sexual abuse media are often abusers themselves - the US National Center for Missing and Exploited Children found that 16 percent of the people who possess such media had directly and physically abused children.

Spotting newly produced media online can give law enforcement agencies the fresh evidence they need to find and prosecute offenders. But the sheer volume of activity on peer-to-peer networks makes manual detection virtually impossible. The new toolkit automatically identifies new or previously unknown child sexual abuse media using artificial

intelligence.

"Identifying new child sexual abuse media is critical because it can indicate recent or ongoing child abuse," explained Claudia Peersman, lead author of the study from Lancaster University. "And because originators of such media can be hands-on abusers, their early detection and apprehension can safeguard their victims from further abuse."

There are already a number of tools available to help law enforcement agents monitor peer-to-peer networks for child sexual abuse media, but they usually rely on identifying known media. As a result, these tools are unable to assess the thousands of results they retrieve and can't spot new media that appear.

The iCOP toolkit uses artificial intelligence and machine learning to flag new and previously unknown child sexual abuse media. The new approach combines automatic filename and media analysis techniques in an intelligent filtering module. The software can identify new criminal media and distinguish it from other media being shared, such as adult pornography.

The researchers tested iCOP on real-life cases and law enforcement officers trialed the toolkit. It was highly accurate, with a false positive rate of only 7.9% for images and 4.3% for videos. It was also complementary to the systems and workflows they already use. And since the system can reveal who is sharing known child sexual abuse media, and show other files shared by those people, it will be highly relevant and useful to law enforcers.

"When I was just starting as a junior researcher interested in computational linguistics, I attended a presentation by an Interpol police officer who was arguing that the academic world should focus more on developing solutions to detect child abuse media online," said Peersman.

"Although he clearly acknowledged that there are other crimes that also deserve attention, at one point he said: 'You know those sweet toddler hands with dimple-knuckles? I see them online... every day.' From that moment I knew I wanted to do something to help stop this. With iCOP we hope we're giving police the tools they need to catch child sexual abusers early based on what they're sharing online."

More information: Claudia Peersman et al. iCOP: Live forensics to reveal previously unknown criminal media on P2P networks, *Digital Investigation* (2016). DOI: 10.1016/j.diin.2016.07.002

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