NATIONAL CENTER ON SEXUAL EXPLOITATION

1201 F St NW #200,
Washington, DC 20004
www.endsexualexploitation.org
(202) 393 - 7245

An Overview of Technology-Based Demand Reduction Tactics

A Preliminary Summary Based Upon Research from the National Assessments of Prostitution and Sex Trafficking Demand Reduction Efforts

Supported by National Institute of Justice Grants #2008-IJ-CX-0010 and #2020-75-CX-0011

Date Updated:
March 1, 2023

Prepared for:
The National Institute of Justice
Office of Justice Programs,
U.S. Department of Justice
810 Seventh Street, NW
Washington, D.C. 20531

Prepared by:
National Center on Sexual Exploitation

An Overview of Technology-Based Demand Reduction Tactics in the United States

Documenting Demand Reduction Efforts

To combat prostitution and human trafficking for the purpose of sexual exploitation, criminal justice strategies and collaborative programs have emerged that focus on depriving these illicit markets of their sole revenue source: consumer-level demand.

NIJ sponsored a study, the "National Assessment of Demand Reduction Efforts" (Shively et al., 2012), that entailed the systematic gathering of information to determine the types and distribution of demand reduction tactics implemented throughout the United States. These efforts resulted in a typology of law enforcement and community-based tactics identifying 12 distinct methods for deterring people (mostly men) from buying sex or which sanction those individuals who solicit sex acts. The study found that these tactics were used by law enforcement and community action groups in more than 800 U.S. cities and counties in efforts to deter this damaging behavior and to hold perpetrators accountable. As a part of this project, a key deliverable was the Demand Forum website, which launched in 2013. The website documented and made publicly available information about demand deterrence methods at the city and county level throughout the US.

The Emergence of Technology-based Deterrence Methods

Subsequent to the launch of Demand Forum, the sophisticated use of technology to detect, investigate, apprehend, and deter sex buyers emerged as a distinct and new class of demand intervention. The development of technology-based sex buyer deterrence methods was prompted by a shift in the market for illicit commercial sex away from in-person solicitation and toward various advertising websites and social media applications on the Internet.

The shift to Internet facilitated prostitution required law enforcement agencies across the United States to adapt to a novel commercial sex and exploitation marketplace. As early as 2000, police departments nationwide began observing sharp increases in the use of the Internet for soliciting prostitution, and a decline in their yield of arrests made in street-based stings and reverse stings.[1] Aside from the now defunct "Erotic Services" section of Craigslist

[1] Michael Shively et al., *Final Report on the Evaluation of the First Offender Prostitution Program* (Cambridge, MA: Abt Associates Inc., March 7 2008), https://www.ojp.gov/pdffiles1/nij/grants/221894.pdf; Sudhir Venkatesh, "How Tech Tools Transformed New York's Sex Trade," *Wired*, January 31, 2011, https://transmarcations.constantvzw.org/texts/Peggy_sexworkers.pdf; Michael Booth, "Craigslist Develops a Dark Side," *The Denver Post*, December 3, 2007, https://www.denverpost.com/2007/12/03/craigslist-develops-a-dark-side; Donna M. Hughes, *Best Practices to Address the Demand Side of Sex Trafficking* (August 2004), https://popcenter.asu.edu/sites/default/files/problems/street_prostitution/PDFs/Hughes_2004.pdf; Leonora LaPeter Anton, "'Escorts' Leave the Streets to get on the Superhighway," *Tampa Bay Times*, July 6, 2006, https://www.tampabay.com/archive/2006/07/02/escorts-leave-the-streets-to-get-on-the-superhighway; Kit R. Roane, "Prostitutes on Wane In New York Streets But Take to Internet," *The New York Times*, February 23, 1998, https://www.nytimes.com/1998/02/23/nyregion/prostitutes-on-wane-in-new-york-streets-but-take-to-internet.html; M. Ross, "How the Internet is Bringing the World's Oldest Profession to a Neighborhood Near You," *Diablo Magazine*, June, 2005; Jacob Quinn Sanders, "Prostitution Hits Web in State," *Arkansas Democrat Gazette*, February 10, 2008, https://www.arkansasonline.com/news/2008/feb/10/prostitution-hits-web-state-20080210.

and the Backpage websites[2], there many other classified advertising sites that facilitate the illicit sex trade,[3] as well as other web-based interactive technologies used for the business of commercial sex. The latter includes online gaming systems, such as XBox Live, and social media platforms like Twitter and Facebook.[4]

It therefore comes as no surprise that the use of technology by sex traffickers and sex buyers has been widely adopted. In tandem with cellular technology, the Internet offers individuals the opportunity to stay connected interminably from any geographic location. The Internet's provision of immense access to information, commodities, and people—much of which was previously out of reach—are the same features that support its growing popularity in domestic minor sex trafficking[5] (among other crimes).

Accordingly, under the auspices of NIJ support provided under the project "National Assessment of Demand Reduction Efforts, Part II: New Developments in the Primary Prevention of Sex Trafficking," we have conducted a review of technology-based demand deterrence methods. This report presents an overview of our findings. It is augmented by a peer-reviewed journal article (forthcoming) that elucidates the methodology followed for data collection and presents existing scholarship and grey literature that undergird the use of technology-based demand reduction tactics.

To gather content about this relatively new tactic, a comprehensive literature search was conducted and complemented by an iterative cycle of conversations, emails, and information exchange with four different organizations and their leaders[6] about the development and use of technology-based demand reduction tactics. These organizations and the technology they employ are at the forefront of what can be considered a never-ending battle of wits between them, and criminals engaged in the online commercial sex ecosystem. This practitioner-led approach to data collection also included an iterative cycle of conversations, emails, and

---

[2] Samantha Hernandez, "End of Sex Ads on Backpage, Craigslist Only a Small Part of Human Trafficking Fight," *Green Bay Press Gazette*, April 19, 2018, https://www.greenbaypressgazette.com/story/news/2018/04/18/end-sex-ads-backpage-craigslist-only-small-part-human-trafficking-fight/512301002; Merrit Kennedy, "Craigslist Shuts Down Personals Section after Congress Passes Bill on Trafficking," *NPR*, March 23, 2018, https://www.npr.org/sections/thetwo-way/2018/03/23/596460672/craigslist-shuts-down-personals-section-after-congress-passes-bill-on-traffickin; Molly Liemontas and Madelyn Huibregtse, *A Baseline Assessment: Analysis of Women Escort Advertisements Posted on Backpage.com in Madison, WI*, UNESCO Working Paper Series, 4W Initiative (Madison, WI: University of Wisconsin-Madison, February 2020), https://minds.wisconsin.edu/handle/1793/80835?show=full.

[3] Brooks M., "It's Hard Out There for a Pimp," *ShadowDragon*, June 24, 2019, https://blog.shadowdragon.io/its-hard-out-there-for-a-pimp; Vanessa Bouché, *Survivor Insights: The Role of Technology in Domestic Minor Sex Trafficking* (THORN, January 2018), https://www.thorn.org/wp-content/uploads/2019/12/Thorn_Survivor_Insights_090519.pdf; Elizabeth Mamacos, "Camming in Suburbia: It's More Common, and More Dangerous, than You Think," *W24*, November 8, 2018, https://www.news24.com/w24/Work/Jobs/camming-in-suburbia-its-more-common-and-more-dangerous-than-you-think-20181108.

[4] Daisy Schofield, "Lockdown Sex Workers are Flocking to Animal Crossing and Second Life," *Wired*, September 6, 2020, https://www.wired.co.uk/article/video-games-sex-work; Jonathan Marino, "Congress to Launch Probe Into Escort and Prostitution Services on Twitter," *The Street*, January 30, 2014, https://www.thestreet.com/technology/congress-to-launch-probe-into-escort-and-prostitution-services-on-twitter-12277405; Danah Boyd et al., *Human Trafficking and Technology: A Framework for Understanding the Role of Technology in the Commercial Sexual Exploitation of Children in the U.S.* (Microsoft, 2011), https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/en-us-collaboration-focus-education-htframework-2011.pdf..

[5] Bouché, *Survivor Insights: The Role of Technology in Domestic Minor Sex Trafficking*.

[6] Tom Perez, Founder and CEO, EPIK Project, in discussion with the author (2022); Justin Euteneier, Program Director, EPIK Project, in discussion with the author (2022); Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author (2022); Tiffany Davis, Program Manager, The Lantern Project (Formerly Seattle Against Slavery), in discussion with the author (2022); Rob Spectre, Technologist and Founder, Childsafe.ai, in discussion with the author (2022).

information exchange with two[7] former law enforcement leaders who were familiar with demand reduction tactics and their overlap with technology-based demand reduction methods.

The Online Sexual Exploitation Marketplace

When considering the increasing shift from street-based prostitution to the rapidly growing online environment, these technologies and their acute focus on consumer-level demand reduction has the potential to add value that goes well beyond augmenting the efficacies of traditional stings. In a seminal reference to the burden that society has placed on police departments to investigate "computer crimes," Goodman (1997)[8] warned against shying away from investigating and prosecuting a "whole new class of criminal activities" (Goodman, 1997: 494). Rather than simply meeting the expertise of their criminal counterparts, Goodman called on law enforcement "to exceed their knowledge and skills*"* (p. 494) if they are to obviate a perpetual shortfall by the criminal justice system. Byrne and Marx (2011:32)[9] noted developments in technology in general, and changes in the specific area of information technology that "have been so dramatic and profound that they deserve special attention and critical review." Law enforcement agencies around the globe are increasingly at the forefront of navigating technology and its convoys of vices. Even though digital technologies such as mobile phones, social media, and the internet have added significant benefits to every stratum of society at large, new opportunities and conduits for exploitation have become equally diffused.[10] The expansion of online prostitution with its manifold manifestations[11] and the increasingly indiscernible distinction between prostitution and sex trafficking[12] have made the online environment a flourishing ecosystem of sexual exploitation.

Latonero and colleagues refer to technology-facilitated trafficking in persons as the "social and technical ecosystem wherein individuals use information and communication technologies to engage in human trafficking and related behaviors."[13] These technologies increasingly impact every aspect of the sex trafficking cycle, and a functional understanding of its uses is a critical component for the multidisciplinary response to sex trafficking and commercial sexual exploitation of adults and children. Roe-Sepowitz explored the behavior and characteristics of a national cross-sectional sample of sex traffickers arrested for the sex trafficking of a minor in the United States.[14] A total of 1,416 sex traffickers were identified in a six-year period from 2010 to 2015. Both the numbers of arrests and the use of technology progressively increased annually during this period. Technology

---

[7] Dr. Stephany Powell, Former Law Enforcement Officer, in discussion with the author (2022); Dr. Marian Hatcher, Policy Analyst, Cook County Sheriff's Office of Public Policy, in discussion with the author (2022).

[8] Marc D. Goodman, "Why the Police Don't Care about Computer Crime " *Harvard Journal of Law & Technology* 10, no. 3 (1997).

[9] James Byrne and Gary T. Marx, "Technological Innovations in Crime Prevention and Policing. A Review of the Research on Implementation and Impact," *Journal of Police Studies* 3, no. 20 (2011).

[10] Mark Latonero et al., *The Rise of Mobile and the Diffusion of Technology-Facilitated Trafficking*, University of Southern California (USC Annenberg Center on Communication Leadership & Policy, November 2012), https://cpb-us-e1.wpmucdn.com/sites.usc.edu/dist/e/695/files/2012/11/HumanTrafficking2012_Nov12.pdf.

[11] Sunny Jiao, Vicky Bungay, and Emily Jenkins, "Information and Communication Technologies in Commercial Sex Work: A Double-Edged Sword for Occupational Health and Safety," *Social Sciences* 10, no. 1 (2021), doi:10.3390/socsci10010023; Megan Lundstrom, *OnlyFans: A Case Study of Exploitation in the Digital Age* (The Avery Center, December 2021), https://theaverycenter.org/wp-content/uploads/2021/12/OnlyFans-A-Case-Study-of-Exploitation-in-the-Digital-Age-1.pdf; Alexandra K. Murphy and Sudhir Alladi Venkatesh, "Vice Careers: The Changing Contours of Sex Work in New York City," *Qualitative Sociology* 29, no. 2 (2006), doi:10.1007/s11133-006-9012-2; Mamacos, "Camming in Suburbia: It's More Common, and More Dangerous, than You Think."

[12] M.P. Daggett et al., *The Human Trafficking Technology Roadmap: A Targeted Development Strategy for the Department of Homeland Security*, Massachusetts Institute of Technology (Lincoln Laboratory, July 2019), https://www.ll.mit.edu/sites/default/files/publication/doc/2021-04/human-trafficking-technology-roadmap-daggett-127172.pdf.

[13] Latonero et al., *The Rise of Mobile and the Diffusion of Technology-Facilitated Trafficking*.

[14] Dominique Roe-Sepowitz, "A Six-Year Analysis of Sex Traffickers of Minors: Exploring Characteristics and Sex Trafficking Patterns," *Journal of Human Behavior in the Social Environment* 29, no. 5 (2019), doi:10.1080/10911359.2019.1575315.

was used during the minor's sexual exploitation in more than two-thirds of cases (n=950, 67.1%) by either advertising victims online or by furnishing a mobile phone to the victim. Online ads were used in nearly two-thirds of the cases (n=889, 63.5%). The website Backpage.com was specifically used in more than one-third of these cases (n=592, 41.8%), though the name of the advertising website was not always provided in reports, so the incidence rate may have been higher.

A troubling finding in this study was the fact that there exists such a significant market for sexual exploitation of minors. Roe-Sepowitz notes:

> *"While the demand for sex is significant, the demand for sex with minors is especially important to note. Sex traffickers of minors are intentionally offering children for sex, and adults are intentionally engaging in sex with children with no compunction or inhibition."*[15]

A 2018 study[16] by Thorn provides further evidence of the scope of the online sexual exploitation marketplace. A total of 260 survivors of Domestic Minor Sex Trafficking (DMST), involved with 24 survivor organizations which spanned 14 states, completed a survey that focused on understanding what role technology played in a victim's recruitment into, time spent in, and exit from DMST. One of the central themes from survey responses was that technology plays a major role in the grooming and controlling of DMST victims. Findings included that 1 in 6 victims were sex trafficked under the age of twelve and that 75% of those who entered "the life" in 2004 or later were advertised online. Noteworthy, were the study's findings related to interactions with sex buyers. Phone calls and texting were the foremost methods of communicating with sex buyers. The study found that the majority of respondents said that they communicated with the buyers themselves (56%; n=139). Among those with a sex trafficker, 42% (n=85) stated that their trafficker communicated with the buyers while 51% (n=104) said they communicated with buyers themselves. When sex traffickers control the communications with buyers, there is a strong indication that the age of the victim is likely to be younger than 13 years old. Of the 104 respondents with a sex trafficker who communicated with buyers themselves, 87% were 13 to 17 years old when they entered the life. Conversely, those who reported that their sex trafficker controlled the communications with the buyers were significantly more likely to be younger when they entered the sex trade, specifically, 40% were 12 or younger.

The online commercial sexual exploitation marketplaces of the United States have expanded beyond their national confines to create a global footprint with global ramifications. For instance, a U.S.-based live "camming" website (streamatemodels.com[17]) was implicated during the successful prosecution[18] of two sex traffickers, both Lesotho nationals, in a South African High Court for the sexual exploitation of a 16-year-old minor in December 2019 (*State v Seleso*). The Pretoria Office of Homeland Security Investigations provided investigative support to a national South African law enforcement agency as the website was hosted in the United States. The investigation revealed that the account used by the traffickers to exploit the victim had more than 6,000 logins by sex buyers from across the globe granting them access to direct the actions of the victim and to view her over the two-year period during which she was exploited. The global footprint and the egregious nature of crimes associated with the online sexual exploitation marketplace, the often-indistinct line between prostitution and sex trafficking, and the fact that some online prostitution platforms provide a way to advertise that is not as easily

[15] Roe-Sepowitz, "A Six-Year Analysis of Sex Traffickers of Minors: Exploring Characteristics and Sex Trafficking Patterns."
[16] Bouché, *Survivor Insights: The Role of Technology in Domestic Minor Sex Trafficking*.
[17] A website called 'Streamate' was implicated by one respondent in the 2018 study by Thorn. It could not be confirmed whether this is the same website implicated in the South African child sex trafficking case.
[18] Case References (South Africa): Westonaria Police CAS 150/10/2017 and Johannesburg High Court Case no 41/2017.

detected by law enforcement,[19] necessitated the bridging of the gap between human capabilities and technological innovations.

Several NGOs, technology experts, and private corporations have bridged that gap by taking the lead to develop sex buyer deterrence platforms that automate aspects of traditional sex buyer sting operations. Four of these platforms are discussed in this document. Across these platforms, the technologies utilized combine "a text message back-end with an autonomous chat bot trained on conversations between sex buyers and undercover agents."[20] Once a sex buyer engages via text with a number from an online decoy sex advertisement, the chat bot connects with the most appropriate response from the information and transcripts on which it was trained. Implicit to this approach is the risk of possible law enforcement action to deter sex buyers.[21] It is also typical for the chatbots to have conversations with buyers to raise awareness about the harms of sex trafficking with the goal of bringing about an attitude change towards buying sex.[22]

Notwithstanding the significant technological breakthroughs in efforts to detect and address consumer-level demand for illicit commercial sex online, the impact remains difficult to measure. Moreover, the continuing presence of an internet-based prostitution platforms "readily available to sex traffickers and buyers," contributes to the enduring nature of sex trafficking of children in the U.S.[23]

In the next section, the conventional counterpart of technology-based tactics in the offline arena, reverse stings, will be explored and followed by an overview of four technology platforms and their overlapping and distinct approaches to consumer-level demand reduction. A brief overview of other technologies that address aspects of sex trafficking and child sexual abuse material (CSAM) is then provided before concluding with a summary of the main themes stemming from our review of technology-based demand reduction tactics.

[19] Murphy and Venkatesh, "Vice Careers: The Changing Contours of Sex Work in New York City."
[20] Daggett et al., *The Human Trafficking Technology Roadmap: A Targeted Development Strategy for the Department of Homeland Security*.
[21] Tina Rosenberg, "A.I. Joins the Campaign Against Sex Trafficking," Opinion, *The New York Times*, April 9, 2019, https://www.nytimes.com/2019/04/09/opinion/ai-joins-the-campaign-against-sex-trafficking.html.
[22] Shane Downing, "How to Scare a Predator: Neutering the Sex Industry One Buyer at a Time," *The Imprint*, February 12, 2018, https://imprintnews.org/news-2/how-to-catch-a-predator-neutering-the-sex-industry/29426.
[23] Roe-Sepowitz, "A Six-Year Analysis of Sex Traffickers of Minors: Exploring Characteristics and Sex Trafficking Patterns."

Figure 1: A New York City Police Department computerized text message in response to sex buyers after their sex solicitation engagements with artificial intelligence chatbots

Conventional Reverse Stings

At least 15 major types of law enforcement and community-based tactics that aim to deter people from buying sex or to identify and sanction those who do solicit sex acts have been used in more than 2,565 U.S. cities and counties. These tactics can be broadly categorized into three groups:

- Arrest Tactics (e.g., Reverse Stings and Web-Based Reverse Stings)
- Post Arrest Tactics (e.g., Identity Disclosures, John Schools, Vehicle Seizures)
- Other Tactics (e.g., Loss of Employment, Surveillance Cameras)

When considering technology-based demand reduction tactics and their purpose to proactively identify, deter, and arrest sex buyers, it is important to consider its conventional counterpart in the offline arena. Reverse stings have been covered extensively in academic scholarship, law enforcement literature, and the media.[24] Documented in at least 2,500 U.S. cities and counties, reverse stings continue to be the most frequently used arrest tactic. By no means flawless or without criticism in its general application by law enforcement when targeting the demand

[24] Lynda Baker, "The Information Needs of Female Police Officers Involved in Undercover Prostitution Work," *Information Research* 10, no. 1 (2004); Bruce Hay, "Sting Operations, Undercover Agents, and Entrapment," *Missouri Law Review* 70, no. 2 (2005); Gerry Long, "How to Plan a 'John' Sting," *Women in Law Enforcement*, *Police Magazine*, April 18, 2012, https://www.policemag.com/374063/how-to-plan-a-john-sting; Gerry Long, "How To Stay Safe During a John Sting," *Women in Law Enforcement*, *Police Magazine*, July 2, 2012, https://www.policemag.com/374107/how-to-stay-safe-during-a-john-sting; Graeme R. Newman and Kelly Socia, *Sting Operations*, Problem-Oriented Guides for Police, Response Guides Series (U.S. Department of Justice Office of Community Oriented Policing Services, October 2007), https://cops.usdoj.gov/ric/Publications/cops-p134-pub.pdf.

side of prostitution,[25] reverse stings continue to show formidable success with over 5,000 reverse stings occurring in the United States since 1964 that have resulted in over 50,000 arrests of sex buyers.[26]

Reverse stings are law enforcement operations targeting sex buyers who engage in purchasing commercial sex services. Decoy sex advertisements are posted by a law enforcement agent who poses as a prostituted person when transacting with the targeted buyer. This usually takes place via text message or voice phone call. Law enforcement will call and text buyers from their official phones and do so using concealed or altered identities. An in-call service is negotiated between an undercover officer and the sex buyer with the agreed upon location for the solicited sex acts usually taking place at a hotel room or law enforcement-controlled premises. When the sex buyer arrives, he is detained and processed.

Reverse stings are generally very labor intensive and require substantial planning. Even law enforcement agencies that are philosophically firmly committed to addressing the consumer-level demand component of illicit sex markets cannot field these operations with great frequency. Most agencies face their wide range of local needs and obligations with scarce resources and prioritize prostitution and sex trafficking operations infrequently (or not at all). As pointed out by practitioners, reverse stings are a fairly expensive proposition. In addition to the undercover officer, the wider team includes multiple law enforcement officers that protect the undercover officer. The surveillance on reverse stings is extensive and can involve as many as 15 to 20 officers. Additionally, administrative support and relevant logistics (i.e., posting the ads, operating the phones) may require anything between 4 to 6 officers. Reverse stings can also be extremely hazardous with law enforcement officers exposed to a variety of threats such as robberies or physical violence. These hazards spill over not only to the undercover officer but also to the team that aims to support the undercover officer. Modest successes may include anything from between 6 to 17 arrests of sex buyers per operation. In some areas, solicitation of prostitution amounts to a "civil ordinance" in which even speeding tickets can carry a stronger penalty than prostitution-related charges. Several practitioners commented on the overwhelming response that decoy advertisements elicit from sex buyers but said that the threat of getting caught remained extremely low. Law enforcement penetration in the commercial sex and sexual exploitation ecosystem is therefore equally deficient.

The technologies discussed here are therefore an alternative means of pursuing primary prevention that is far less labor intensive and can be applied at a vastly expanded scale. As pointed out by one technologist consulted in this research: "For the cost of one undercover asset, you can have as many undercover assets as you want, all the time talking to buyers in a specific area, collecting meaningful data and creating meaningful deterrence, for the entire commercial sex marketplace – why would you not choose that?" These technologies and their constellations of artificial intelligence, machine learning, and natural language processing have taken on a somewhat mystical and obscured 'persona' among many sectors who could benefit from its capabilities. The aim of the next section is to demystify these aspects.

[25] Mary Dodge, Donna Starr-Gimeno, and Thomas Williams, "Puttin' on the Sting: Women Police Officers' Perspectives on Reverse Prostitution Assignments," *International Journal of Police Science and Management* 7 (2005), doi:10.1350/ijps.7.2.71.65778; Gary T. Marx, "Under-the-Covers Undercover Investigations: Some Reflections on the State's Use of Sex and Deception in Law Enforcement," *Criminal Justice Ethics* 11, no. 1 (1992), doi:10.1080/0731129X.1992.9991907; Thomas Nolan, "Commentary: Galateas in Blue: Women Police as Decoy Sex Workers," *Criminal Justice Ethics* 20 (2001), doi:10.1080/0731129X.2001.9992104; Phillip Walters, "Would a Cop Do This: Ending the Practice of Sexual Sampling in Prostitution Stings," *Minnesota Journal of Law & Inequality* 29, no. 2 (2011).

[26] Demand Forum, "Reverse Stings," National Center on Sexual Exploitation, accessed September 14, 2022, https://demand-forum.org/reverse-stings.

Overview of Selected Technologies

Four organizations and their respective technologies used in the area of technology-based demand reduction tactics were selected and are described below.

Childsafe.ai[27]

Childsafe.ai is a software startup that deploys machine learning and active collection networks that monitor actors that "buy and sell human beings from within the surface, deep and dark web marketplaces in which those transactions occur."[28] Childsafe.ai delivers a Demand Deterrence Platform serving law enforcement human trafficking units around the country to reduce the illicit finances pouring into their local sex trafficking economies. The platform has identified tens of thousands of buyers and prostituted persons through its networks and its team actively monitors, graphs, and models the online ecosystems fueling human trafficking.

At its core, ChildSafe.ai amplifies the ability to identify and respond to online abuse by mobilizing chatbots. Prostitution ads are searched to obtain information on sex buyers and providers of illicit sex services, including details pertaining to price and location of transactions. Voice recognition tools are also used to examine and identify the voices of potential sex buyers and prostituted persons. When comprehending the conversations of a potential sex buyer, ChildSafe.ai delivers a customized deterrence message in which it warns the sex buyer of the legal and social ramifications of buying sex. In a 2020 example, several law enforcement agencies had implemented the ChildSafe.ai platform, which resulted in the cumulative engagement of 1,477 potential sex buyers with an estimated total of 8,500 customized deterrence messages being sent.[29]

According to Rob Spectre, CEO and founder of Childsafe.ai, it is "important to first understand the problem of demand before trying to solve the problems you identify in the sexual exploitation ecosystem."[30] He pointed out that demand is what makes sex trafficking a profitable business proposition and law enforcement agencies have struggled to enforce demand reduction in any way that would "meaningfully move the needle"[31] based on the amount of resource investment that demand reduction tactics require. Spectre noted that sex buyers significantly outnumber of those being provided for commercial sex in the United States by as much as 25 to 1, and observed thatdoing stings in a locale, "is a fairly expensive proposition."[32]

Through a conversation with a New York law enforcement agency, Spectre explored the possibility of expanding conventional stings through the use of technology. What became apparent was that even though law enforcement arrested between 15 or 17 people per night in reverse sting operations, they were actually engaging up to 150 people at one time. Posted ads would elicit voluminous responses, but few of the sex buyers would openly show up. The problem was that law enforcement officers would be texting with several people, but only a few of them would show up in person and be arrested. Reasons for 'no shows' include prices that were either too high or too low. What became an important part of the conversation was the idea of "creating a meaningful deterrent that targets the 90% of people who spoke to law enforcement but never openly showed up."[33]

This led to the creation of Childsafe.ai, a consumer-level demand deterrence platform. Instead of an undercover officer who posts a single add and documents all the conversations on a single phone, the Childsafe.ai platform

---

[27] ChildSafe.ai, "The Artificial Intelligence Platform Protecting Kids Online," ChildSafe.ai, 2020, accessed September 13, 2022, https://childsafe.ai.
[28] Rob Spectre, *Beyond Backpage: Buying And Selling Sex In The United States One Year Later*, ChildSafe.ai (ChildSafe.ai, 2019), https://childsafe.ai/beyond-backpage-buying-and-selling-sex-in-the-united-states-one-year-later.
[29] Rob Spectre, "ChildSafe.ai: World's First AI-Platform Combating Online Child Abuse," *CIO Review*, 2020, https://law-enforcement.cioreview.com/vendor/2020/childsafe.ai.
[30] Rob Spectre, Technologist and Founder, Childsafe.ai, in discussion with the author, February 3, 2022.
[31] Rob Spectre, Technologist and Founder, Childsafe.ai, in discussion with the author, February 3, 2022.
[32] Rob Spectre, Technologist and Founder, Childsafe.ai, in discussion with the author, February 3, 2022.
[33] Rob Spectre, Technologist and Founder, Childsafe.ai, in discussion with the author, February 3, 2022.

allows for posting as many phone numbers and as many locations as desired, with as many advertisements as needed, while conducting the communications through the Childsafe.ai communications platform. Moreover, it is possible for law enforcement officers to engage in several conversations at one time. Over the course of these conversations, the platform allows for record keeping of the phone numbers of the individuals who are texting and allows law enforcement to send a deterrence message (an MMS message) to all the individuals that were seeking to purchase sex in a given period of time. The deterrence message informs recipients that their activities were observed by an actual member of law enforcement and that they run the risk of both criminal liability for their activities and for harming a potential human trafficking victim. These operations can run continuously or periodically depending on the operational posture of the law enforcement agency. It can also be automated either partially or fully.

In addition to charges related to the purchasing of sex levelled against those identified and arrested by law enforcement agencies, several additional charges stemming from online engagements have been documented in these operations. These include sex traffickers who respond to ads and try to recruit others for the purpose of sexual exploitation, predators who look specifically for children when engaging with the ads, registered sex offenders, and others in violation of a probation (including explicitly prohibiting them from engaging on these sites). When Childsafe.ai is contacted by a law enforcement agency wanting to use the technology, an account is opened, and the new user is connected with other law enforcement experts who have experience in these types of operations. Ideas are shared and the new law enforcement agency users are assisted in formulating a technology-based demand reduction plan. Childsafe.ai facilitates this process but does not get involved in the granular detail of operational matters. Depending on the number of ads posted, the number of conversations that take place, and the number of deterrence messages that are sent out, operational costs for using the technology amount to approximately two-thirds of what one undercover asset would cost in a particular area.

Street Grace and Transaction Intercept

Street Grace, a nonprofit, was founded in 2009. Based in Atlanta, Georgia, Street Grace have offices in Chattanooga, Tennessee and in Texas and provides help to several areas in the United States. Transaction Intercept,[34] an initiative of Street Grace, seeks to identify the buyers of sex with minors and strip away their cloak of anonymity. According to Jamey Caruthers, Director of Demand Reduction and Policy, reducing the demand for commercial sexual exploitation in the online marketplace through technology is considered by Street Grace as "the most effective, scalable counter-demand tactic in the fight against minor sexual exploitation."[35] When potential sex buyers are identified by their having contacted a decoy ad placed by Street Grace, Street Grace subsequently communicates with these individuals through "Gracie"—an artificial intelligence chatbot— who communicates the risks and consequences of the potential buyer's actions when the intent to purchase a minor is confirmed by Gracie. Gracie was launched manually (without AI) in 2015 and subsequently launched as an AI chatbot in 2018. In 2021 Gracie was relaunched after law enforcement input. Transaction Intercept, an enhanced version of Gracie's platform available only to law enforcement, was then established. Since mid-2022 Transaction Intercept and Gracie is fully automated as a technology platform. Human behavior is mimicked by Gracie in an SMS (text messaging) environment. Gracie is not merely a chatbot, but rather a collection of technologies that operate in tandem to automate the demand reduction process. This automatization removes the cumbersome efforts of conventional human efforts to monitor ads, respond to incoming messages, document outcomes, and interpret the data. Several technologies are intrinsic to this process and make up an ever scaling and artificially intelligent chatbot that actually learns.

[34] Street Grace, "Transaction Intercept," Street Grace, accessed September 13, 2022, https://www.streetgrace.org/transaction-intercept.
[35] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.

Ads are placed and maintained across the online prostitution marketplace where Gracie is employed and intercepts conversations by harnessing SMS technology. Gracie, utilizes 112 distinct adolescent personas, interprets these conversations, and then responds in a typical human manner that includes "convincing slang and SMS lingo."[36] Conversations and the phone numbers of sex buyers are logged in a database. Upon confirmation of an appointment for a commercial sexual exchange, Gracie sends out a deterrence message to warn the sex buyer of the malfeasance being documented and the potential consequences of the putative buyer's actions. A follow-up message is sent that offers resources to the sex buyer and the number of clicks to those resources is tracked. All actions are methodically captured and displayed by Gracie on a dashboard. The data is made available to law enforcement and relevant role-players and geared towards helping to end the exploitation of both children and adults online.

Street Grace has constructed a "custom dashboard from the ground up to maintain all of the data"[37] and to fuse the "powerful stack of technologies"[38] used by Gracie. The dashboard is constantly kept up to date. They utilize cloud-based data storage services that enables the storage of all sex buyer interactions with Gracie, and a special communications platform is used for SMS communications which has capacity to link local phone numbers to the Gracie tech stack. NodeJS, a leading programming language for next-generation web projects, is used to code the conversations, and Google is used for Natural Language Processing (NLP). NLP allows Street Grace to elucidate all incoming messages from sex buyers and determine the meaning of the messages. Street Grace describes[39] the power of Google's NLP:

> *"Google's NLP is constantly learning, using data from Google web and voice search. These technologies make for a human-like bot that can handle boundless conversations in real time."*

Transaction Intercept "enables law enforcement to monitor an exponentially greater number of conversations with potential purchasers of minors."[40] This capacity far exceeds what would be possible if unaided by the technology, and law enforcement can "step in" and take control of a given exchange once they identify a sex buyer who is interested in a child. They can then begin to build a case which may result in a physical meet-up between law enforcement officials and a prospective child sex abuse perpetrator.

There are several challenges that the Street Grace team continues to navigate. One challenge is getting ads onto and keeping ads on sites frequented by sex-buyers. Some sites have intense verification systems in place which, according to Jamey Caruthers "is hard to criticize because you do want vetting of the ads although, ultimately, we also want the sites to not exist at all."[41] Many sites, albeit for liability reasons, actively police the ads and in doing so, they put security measures in place in an effort to keep minors off their platforms. Verification sometimes includes a picture of the person in the ad holding their state-issued ID document, or a request of an actual copy of their state-issued ID document.

Despite this challenge, Transaction Intercept is currently being enhanced with a multitude of new add-ons and features to further improve its use as a counter-demand tool that minimizes the expenditure of law enforcement resources and maximize reach and impact.

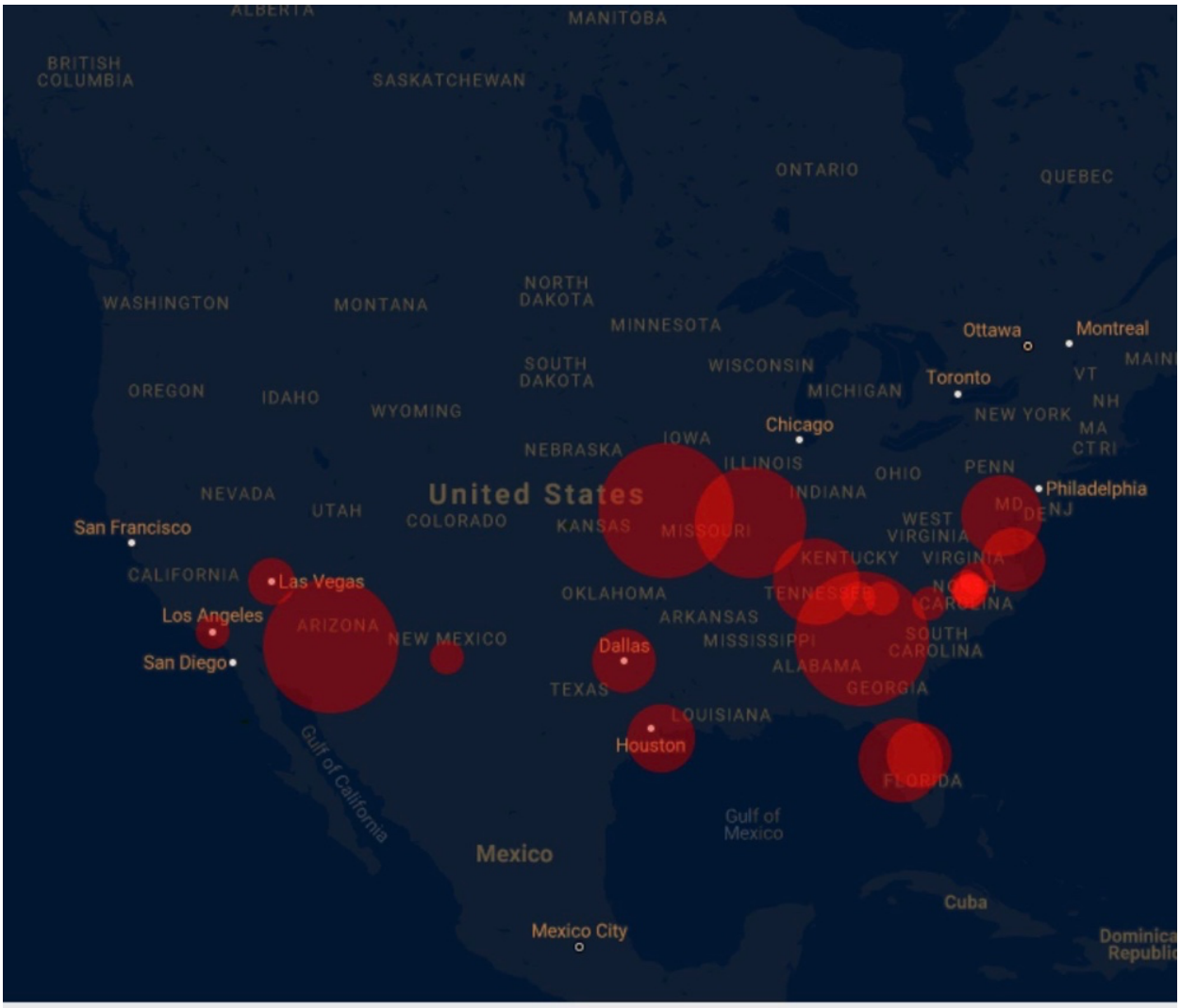
---

[36] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.
[37] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.
[38] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.
[39] Street Grace, "Meet Gracie" brochure, https://www.streetgrace.org
[40] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.
[41] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.

In a five-month period Gracie has reached:

- 25 States and 78 Cities
- Over 1,000 intercepts a month
- More than 54,000 messages exchanged
- More than 6,000 would-be predators reported

Figure 2: Visual Sample of Gracie in the United States



Early on, Street Grace made the strategic decision to remain focused on the use of technology to increase the number of successful arrests and prosecutions of buyers, rather than on identity disclosure tactics. Gracie's conversations and phone numbers are only made available to law enforcement agencies and there are no other entities that have access to this data.

Phone and conversation data can be used effectively by law enforcement agencies for a variety of purposes including identifying where sex buyers emerge in overlapping law enforcement systems and interventions (i.e., traffic stops, other sex offences, crimes, or misdemeanors). There are instances where the same number could be logged 5 times, and law enforcement would be most interested in trying to ascertain who these callers are.

Another ethical consideration navigated by the Street Grace team is the use of photographs for ads that are posted on sites. Street Grace only uses photos from adult volunteers that are digitally altered to such an extent that they cannot be connected to the original source.

The comprehensive tech stack and tools used by Street Grace enabled the in-house development of Gracie's AI component. Street Grace calls upon outside sources for technical and development expertise (including programming knowledge). This includes for-profit professionals volunteering their services.

It is important to highlight the fact that Gracie also offers trauma and therapy resources to individual sex buyers to assist them in taking the first step toward receiving help.

After beta-testing with a number of different law enforcement agencies, Street Grace is in the process of continuing to raise funds to enable Transaction Intercept to be used nationally with no subscription fees, dues, or costs to law enforcement (outside of incidental costs such as ad purchases). Currently, Transaction Intercept is available to any jurisdiction or agency that wants to use it.

Jamey Caruthers summarized the value of Gracie as follows:

> *"Every conversation that a would-be sex buyer has with Gracie is a conversation that he/she isn't having with a real minor, and some of the conversations will result in a buyer being brought to justice."*[42]

The EPIK Project

Based in the Portland/Vancouver area, the EPIK Project[43] (hereafter EPIK) was founded in 2012 in response to sex trafficking in the United States and actively utilizes technology to disrupt the buying of sex at the point of sale. The founders of EPIK were concerned about how technology was used to sexually exploit people and asked the question: "How can we use the same technology being used to exploit people to fight the demand fueling that exploitation?"[44]

In the early days of online prostitution platforms, sites like Backpage were an open marketplace for sex buying and anybody looking for anything related to the purchase of sex would start there. The evolution of EPIK started with a burner phone and a donated laptop. EPIK posted ads without pictures on Backpage, and it was clear that getting a response from sex buyers was not a challenge. The "phone blew up and we were furiously writing numbers down on a writing pad, but we just couldn't keep up."[45] During its first three years of operations, EPIK became part of the CEASE Network (Cities Empowered Against Sexual Exploitation), a project that was launched by Demand Abolition in 2014. As part of this project, Demand Abolition provided financial and technical assistance to cities that were developing local demand-reduction strategies, tactics, and partnerships. Twelve cities participated in the initiative, and important lessons were learned that continue to guide efforts to reduce demand for illegal purchased sex and hold buyers accountable across the United States.

EPIK's technology platform utilizes a custom-built commercial grade call center software, markets leading database tools, and leverages machine learning to continually optimize the impact of volunteer efforts. EPIK's program functions as a "highly trained and sophisticated neighborhood watch program"[46] by providing law enforcement with specific information related to the illegal activity of prostitution and sex trafficking. "There is

---

[42] Jamie Caruthers, Director, Demand Reduction and Policy, Street Grace, in discussion with the author, February 25, 2022.
[43] EPIK Project, "Disrupting the Demand that Drives Sexual Exploitation. Dismantling the Forces that Perpetuate It.," EPIK Project, accessed September 13, 2022, https://epikproject.org.
[44] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.
[45] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.
[46] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.

a well-established flow (and boundaries) of technical intelligence from EPIK to law enforcement" that is credited by Tom Perez to *"keeping the boundary clear between Agents of law enforcement and us as Allies."*[47]

EPIK also seeks to mobilize male allies to disrupt the illicit commercial sex market by equipping them to confront the roots of exploitation—male sex buyers—and encouraging them to effectively collaborate within the broader anti-trafficking movement. Sex buyers are connected via text and phone at the attempted point of purchase with one of nearly 200 active male volunteers who seek to educate them about the harms of the sex trade while also helping buyers to discover why they are seeking to buy sex acts. EPIK's male volunteers have had tens of thousands of calls and texts with buyers, eliciting a broad range of responses. EPIK volunteers are trained to avoid the use of shaming language.

More than 300 men have been trained to disrupt the demand for sexual exploitation in 21 U.S. cities and these teams conduct "Cyber Patrols" over 20 nights per month. The training sets the foundation of the long game of Demand Reduction and is rooted in the leadership of the Survivor community. EPIK recognizes the power of automation but sees technology as a way to help scale what humans can do. Justin Euteneier, Program Director and the architect of Cyber Patrols, said, "trafficking cannot end until demand ends. And demand cannot end by technology alone. Humans change culture."[48] EPIK leverages technology to scale which improves the way engagement with buyers take place. They endeavor to find "the sweet spot of using both technology and humans to engage with sex buyers."[49] This has proven to be very efficient when engaging men:

> *"We have identified roughly 125,000 active sex buyers just through our work. We know that a significant number of these guys might be open to further dialogue…We've learned a lot about how to talk to guys about these issues."*[50]

After nearly a decade of direct buyer engagement, EPIK has realized the need for proactive outreach to sex buyers and here is where technology plays a substantial role. By leveraging technologies such as AI and NLP, EPIK focus its efforts on those more open to change and continually learn what works and what doesn't. In addition, EPIK considers research that indicates that roughly 60% of active sex buyers would like to stop. The organization combines the power of technology and volunteers trained to use non-shaming tactics and use their copious opportunities to help active buyers become former buyers.

As for buyer accountability, EPIK is playing the long game. Buyers' behavior is never excused and the harm they cause is never minimized. But instead of focusing on the singular act on a given night, volunteers are trained to invite buyers into the bigger picture of what they're doing. "Shaming language is replaced with questions. Questions open doors. Open doors lead to discoveries. Discoveries lead to change,"[51] stated Euteneier. He continued:

> *"We talk about leaving the baseball bat at the door. That is also why we talk about technology and the human connection. This method has allowed us to make real connections with buyers for a significant impact."*[52]

Calls as long as an hour are not uncommon with buyers trying to make sense of their actions. To date, the EPIK Project has logged over 250,000 attempts by an estimated 125,000 men intent on buying sexual access to another person. These interruptions have led to 10's of thousands of meaningful conversations. EPIK enjoys support from survivors, advocates, and city officials and is recognized as a leader in demand reduction efforts. A contributing factor to the EPIK Project's success is its collaboration with law enforcement agencies. "We want to be allies to

[47] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.
[48] Justin Euteneier, Program Director, EPIK Project, in discussion with the author, August 17, 2022.
[49] Justin Euteneier, Program Director, EPIK Project, in discussion with the author, August 17, 2022.
[50] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June, 17, 2022.
[51] Justin Euteneier, Program Director, EPIK Project, in discussion with the author, August 17, 2022.
[52] Justin Euteneier, Program Director, EPIK Project, in discussion with the author, August 17, 2022.

law enforcement, not agents" and "we want to make sure to draw that line."[53] In the first few years EPIK was encountering the same sex buyers that were repeatedly engaging with ads. Information about high frequency buyers was shared with law enforcement. This helped law enforcement to use their resources more efficiently when conducting their own buyer operations. Having the numbers of known active buyers provides insight when decisions are made about which buyers to pursue. While no formal technical qualifications are needed to serve as an EPIK volunteer, they undergo a vetting process that involves passing a criminal background check and a sex addiction screening test. EPIK has had interested volunteers disqualify themselves from the role saying they were not ready. It is made very clear to volunteers that they are not "going after"[54] buyers as they have no legal authority to do so. Instead, they are trained to provide an offramp to sex buying. Thus, the relationship with law enforcement is such that EPIK works to help buyers who are ready to stop buying, while those in authority handle buyers who will only be willing to change when arrested.

EPIK has three ways of collaborating with law enforcement. First, law enforcement agencies are offered information about local buyer activity. This includes phone numbers and any relevant information that could be useful to them. Second, law enforcement may invite EPIK to do undercover operations with them. This includes having trained and vetted EPIK volunteers engaging with actual sex buyers who are arrested following their processing. After the arrested sex buyers are processed by police, they are given the option to speak to the volunteers from EPIK. Many of those arrested agree to engage in a conversation even though they are free to go. Third, EPIK also participates in sex buyer diversion programs in some cities.

The technology stack used by EPIK can therefore be summarized as follows:

- Web-based call center software: This requires minimal tech savviness and anyone with basic technology skills can answer calls and texts and start engaging buyers.
- Database management tools: This is used to keep track of all buyer activity which allows for larger scale data analysis.
- Machine Learning and Natural Language Processing: This allows for deep analysis of effective and/or ineffective communications and improved training
- Artificial Intelligence: Machine Learning and Natural Language Processing is leveraged to build tools that will optimize volunteer effort and buyer engagements.

According to Tom Perez, "the sexual exploitation ecosystem has changed substantially in recent years. There is no longer anything subtle about the commercial sex marketplace—it is in your face."[55] Not only has the ecosystem radically changed, but it is diffused into apps and numerous other subsystems. Ethical decision-making is a constant consideration. EPIK takes its cues from the wisdom and leadership of people with lived experience in systems of prostitution. Working to end demand requires tact and thoughtfulness about how people are impacted: buyers, survivors, volunteers, everyone. Collaboration is a significant value at EPIK.

[53] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.
[54] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.
[55] Tom Perez, Founder and CEO, EPIK Project in discussion with the author, June 17, 2022.

Seattle Against Slavery (SAS) and Freedom Signal

Freedom Signal[56] is an online platform built by the technology team at Seattle Against Slavery[57] that supports outreach to two distinct groups: 1) victims via direct automated texting service and 2) would-be buyers via artificial intelligence (AI)-powered, intercept chatbots.

Outreach to Potential Victims

Freedom Signal enables advocates and service providers to develop ongoing relationships through texting with those potentially experiencing online sexual exploitation. In response to the expansion of the online sex trade, Seattle Against Slavery recognized the need for innovative ways to reach those who were being bought and sold online. While traditional methods of intervention, through outreach on the streets, in strip clubs, brothels, etc., worked, they were not efficient. Additionally, traditional models of providing support to those experiencing sexual exploitation is largely reactive. The onus falls on the individual experiencing sexual exploitation to find a hotline number or reach out to a service provider in order to get their needs met, whereas Freedom Signal allows direct service providers to proactively reach out to those potentially experiencing exploitation through an SMS text.

Direct services organizations are enabled to send targeted text-based outreach to potential sex trafficking victims identified through web scraping. This is done with web crawlers that comb through commercial sex ads to gather information such as name, age, sex, and location. Freedom Signal currently crawls 19 websites on a weekly basis, which means that any new ads posted within the past week are captured during the crawl. When a potential victim replies, advocates are able to reach out and build trust with vulnerable individuals in crisis situations. The outreach technology was designed by software engineers and survivors of online sex trafficking in response to the specific needs of this population. It ensures a safe, direct channel of communication. Since 2017, more than 175,000 potential victims across North America have received proactive outreach from services providers using Freedom Signal. Moreover, compared to in-person or street outreach, victims who were sent direct text outreach were significantly more likely to engage with services. In one example, Amanda Hightower, executive director of the Seattle-based nonprofit Real Escape from the Sex Trade (REST), shared experiences that stemmed from their partnership with SAS. Their use of the victim text outreach service led to a 40% increase in the number of victims who reached out to REST for help in a two-year period. According to Hightower, REST would see one victim engage their services for every 60 hours of street outreach they did. Conversely, with text outreach, one victim will engage for every 6 hours of outreach.[58]

Online Demand Deterrence

Technology has also been used effectively by Seattle Against Slavery to engage in two forms of demand deterrence in the online prostitution marketplace.

Seattle Against Slavery's first approach to demand deterrence was to post fake online ads that connected potential sex buyers with chatbots, which are perceived to be persons in prostitution by the potential buyer. Once a "conversation" was engaged, a follow up deterrence message was delivered to the prospective buyer.

---

[56] Freedom Signal, "Reach Victims of Sexual Exploitation with Cutting-Edge Technology," Freedom Signal, accessed September 13, 2022, https://www.freedomsignal.org.
[57] Tech Against Trafficking, "Tech Against Trafficking Launches Second Accelerator Program," Tech Against Trafficking, updated June 30, 2021, accessed January 5, 2023, https://techagainsttrafficking.org/accelerating-the-use-of-technology-to-combat-human-trafficking.
[58] Meagan Phelan, "Technology Disrupts Child Sex Trade, Aiding Victims and Blocking Buyers," *American Association for the Advancement of Science*, February 14, 2020, https://www.aaas.org/news/technology-disrupts-child-sex-trade-aiding-victims-and-blocking-buyers.

Sites where online ads were placed include 'Craigslist type' sites and sites like SkipTheGames.com and CityXGuide.com. Between 2014 and 2016, 2.1 million ads were placed by Seattle Against Slavery that contained simple deterrence messages such as, "You could be arrested for buying sex online" or "By buying sex online you could be causing harm to a victim."[59] These messages included links to counselling services and other support groups. Seattle Against Slavery reported that there was a 40-60% decline in keyword searches (e.g., "teen escort") during this period and that this was a statistically significant decline when Seattle was compared with other US cities where the campaign had not taken place.[60]

This was followed, between 2016 and 2018, by a second approach in which the organization posted fake ads offering sex which were prompted by specific keyword searches by potential sex buyers. Keywords triggered a chatbot, designed to pose as a prostituted person, which resulted in about 19,000 conversations with 15,000 people. The impact of the deterrence messages was tested by the bot's disappearance after a short chat. In other cases, the chatbot would post a message stating the risks of buying sex online. It was found that those who received such a message were 30% less likely to click on one of the ads in the future.[61] The chatbots "posed as trafficking victims, primarily underage," and "would engage with buyers to waste their time and track the online demand."[62]

These bots were initially used as a deterrence mechanism and would send out educational messages at the end of a conversation. A pilot program later followed in which law enforcement agents could "take over" a conversation from an active chatbot and begin texting with the buyer from the same phone number as the bot in order to facilitate in-person "reverse sting" operations. The software was made available to law enforcement agencies who would pay for the service. This helped offset operational costs.

In February 2018, the Cook County Sheriff's Office reported on its partnership with Seattle Against Slavery during the 15th National Johns Suppression Initiative (NJSI) operation which ran from January 7 to February 4 and included more than 30 law enforcement agencies across 16 states. Ads were posted online that connected to bots posing as sex trafficking victims. The bots, with names such as 'Ariel,' 'Brook,' and 'Cari,' were said to "fluidly interact via text message with individuals seeking to buy sex."[63] If a price for the service was eventually set and agreed upon, the bot sent a deterrence message informing the sex buyer that soliciting sex is a crime. During the campaign, the bot was activated in Boston, King County (Seattle), Los Angeles County. and Phoenix. A total of 9,114 potential sex buyers were engaged, and more than 60% of sex buyers received the deterrence message.

> *"This incredible technology helps to further the work done by law enforcement to bring attention to the exploitive nature of the sex trafficking industry and reduce the demand for purchased sex that serves to perpetuate a cycle of violence, mental illness and drug addiction for victims."*[64]
>
> Cook County Sheriff Thomas J. Dart

[59] Hannah Devlin, "Trafficking Industry Hit as 'Sex Worker' Chatbots Fool Thousands," *The Guardian*, February 13, 2020, https://www.theguardian.com/society/2020/feb/13/sex-worker-chatbots-fool-thousands-to-hit-trafficking-industry.
[60] Devlin, "Trafficking Industry Hit as 'Sex Worker' Chatbots Fool Thousands."
[61] Devlin, "Trafficking Industry Hit as 'Sex Worker' Chatbots Fool Thousands."
[62] Tiffany Davis, Program Manager, The Lantern Project (Formerly Seattle Against Slavery), Email communication on August 25, 2022.
[63] Cook County Sheriff's Office, "National Sex Trafficking Sting Nets over 630 Sex Buyers and Pimps/Traffickers," news release, February 6, 2018, https://www.cookcountysheriff.org/national-sex-trafficking-sting-nets-630-sex-buyers-pimps-traffickers.
[64] Cook County Sheriff's Office, "National Sex Trafficking Sting Nets over 630 Sex Buyers and Pimps/Traffickers."

Figure 3: Seattle Against Slavery Feature[65]

As part of Seattle Against Slavery's demand deterrence technology stack, they used "Azure App Service and Azure SQL Database for the Freedom Signal platform, giving advocates and law enforcement a simple UI [user interface] using .NET Core and ASP.NET Core, easily hosted in Azure. To help safeguard against data breaches, Seattle Against Slavery used Azure Active Directory B2C to store sensitive or private data outside the system."[66]

In 2020, Seattle Against Slavery decided to end their demand deterrence program. The "inability to gather any data to demonstrate the actual impact of the work on demand strategies which used ads for deterrence" was cited by Seattle Against Slavery as a challenge. The use of bots also led to disproportionate outcomes for buyers of color due to glitches and other technology errors which would be more obvious to those with access to higher education. Moreover, the use of bots still required the use of "real" photos of an individual who could attract the buyer, which was considered exploitative of the persons whose photos were used. The following are some of the key factors considered by Seattle Against Slavery in their decision to sunset the chatbot program in 2020:

> **Cost of operations:** To be effective, the chatbots had to have ads posted on websites frequently. The amount of money paid to dubious websites that often facilitated sex trafficking was problematic. Additionally, the amount of time and effort it takes to keep ads at the top of the listings page was prohibitive for the small Seattle Against Slavery team. Another competitor in the technology and demand reduction space ran into similar issues. Additionally, buyers would flag ads as spam whenever they were able to identify the bots, adding another layer of ad re-posting that an employee needed to do.
>
> **Ethical issues regarding fake sex trafficking victims:** Each chatbot needed to have ads posted with photos. SAS initially used a set of photos without verified model releases. The oral history regarding the

[65] Microsoft, "Seattle Against Slavery." [Seattle Against Slavery Feature no longer available on Microsoft website].
[66] Microsoft, "Seattle Against Slavery." [Seattle Against Slavery Feature no longer available on Microsoft website].

images was that they came from an anti-trafficking researcher who did have model release forms. Possible solutions to this problem were explored and it was found that stock photography companies all explicitly banned the use of their images in prostitution, sexual ads, etc. A decision was made not to create a similar photo bank thereby creating pornography for the purpose of decoy ads. Additionally, the sheer volume of images that would be needed as ads got flagged for being spam or as buyers became familiar with the decoy photos made this seem like a project too cumbersome to explore.

Lack of evidence about the efficacy: When the program was started, there were claims made about its efficacy (i.e., "80% of buyers who got deterrence messages never messaged again"), but Seattle Against Slavery was not able to measure the ability of the bots or deterrence messaging in reducing men's rates of sex buying. Additionally, by only posting occasionally on one or two sites, the SAS team knew that they were not getting an accurate picture of the online market. The need for an empirical study would have required significant investment of time and money, as well as the risk of not finding any evidence-based reason to claim that the chatbots reduced demand for sex.

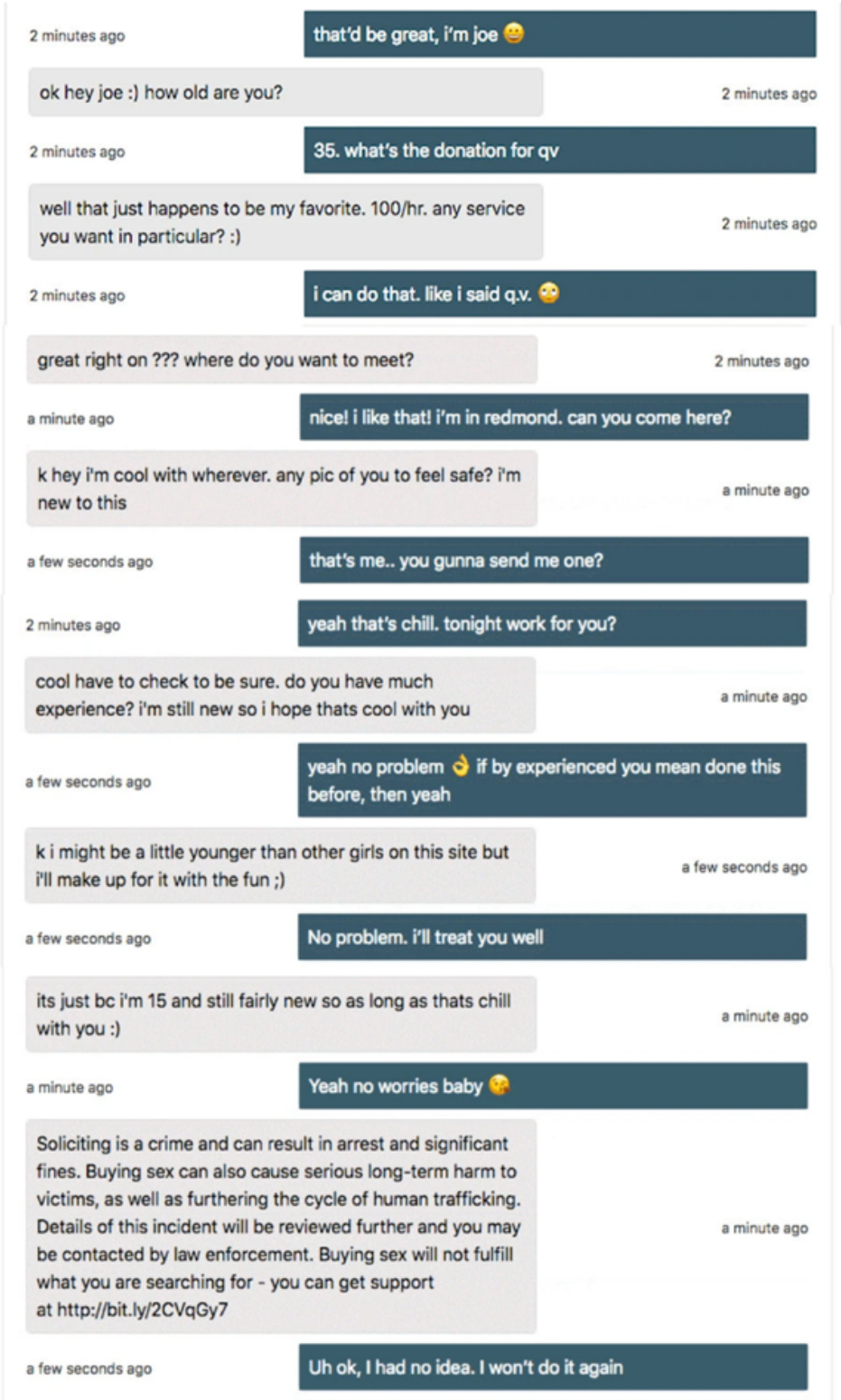
Inability to determine equitable outcomes resulting from chatbot/law enforcement engagement: Studies[67] show that most buyers are white, upper/middle class, and educated men. Seattle Against Slavery was unable to determine if the buyers who were most frequently tricked by the decoy bots or pursued by law enforcement actually represented the buyers doing most harm. The SAS team was concerned by the likelihood that the tool allowed law enforcement to disproportionately target people of color, regardless of intent.

Below is a Seattle Against Slavery example of a conversation between a sex buyer and a chatbot, and the computerized text message in response to sex buyers after their sex solicitation engagements with chatbots.[68]

[67] Demand Abolition, *Who Buys Sex? Understanding and Disrupting Illicit Market Demand* (November 2018), https://www.demandabolition.org/wp-content/uploads/2019/07/Demand-Buyer-Report-July-2019.pdf; Lauren Martin et al., *Mapping the Demand: Sex Buyers in the State of Minnesota*, Women's Foundation of Minnesota (Minneapolis, MN: University of Minnesota, August 2 2017), https://conservancy.umn.edu/bitstream/handle/11299/226521/MappingtheDemand-FullReport%20-%20FINAL%20July%2031%202017.pdf?sequence=1.

[68] Rosenberg, "A.I. Joins the Campaign Against Sex Trafficking."

Figure 4: A conversation between a sex buyer and a chatbot – Seattle Against Slavery



In 2021 Seattle Against Slavery was renamed to The Lantern Project, and after 12 years of working to end trafficking and exploitation, effectively closed on August 31, 2022. However, their work will continue through their three flagship programs: Freedom Signal, Stopping Sexual Exploitation, and Trafficking Prevention for Schools. Freedom Signal's outreach to potential victims in the online prostitution marketplace will continue

operations under Scarlet Hope,[69] and Stopping Sexual Exploitation and Trafficking Prevention for Schools will continue with Washington Trafficking Prevention.[70]

The National Johns Suppression Initiative, an operation aimed at deterring buyers and disrupting the online facilitation of sex trafficking, have utilized the AI Chatbot technologies made available by Seattle Against Slavery[71] and Childsafe.ai.[72] The value and efficiency of these technologies have also been lauded by Cook County Sheriff Thomas J. Dart, who initiated the NJSI operations in 2011 to *"bring attention to the exploitive nature of the sex trafficking industry and reduce the demand for purchased sex that serves to perpetuate a cycle of violence, mental illness and drug addiction for victims."*[73] Table 1 below reflects the number of sex buyers arrested or engaged by bots in NJSI operations for the period 2017-2020**.**

Table 1: Number of Sex Buyers Arrested or Engaged by Bots in National Johns Suppression Initiative Operations, 2017-2020[74]

NJSI Operations	# Agencies Participating in NJSI	# Jurisdictions Deploying Bots	# Sex Buyers Arrested	# Potential Buyers Engaged by Bots
August 2017	37	3	1,020	454
February 2018	30	5	638	9,114
August 2018	24	5	473	1,576
February 2019	24	7	390	1,477
July 2019	26	6	503	3,097
February 2020	22	9	451	1,627
Total			**3,475**	**17,345**

Other Technologies: National and International

C3-Sex

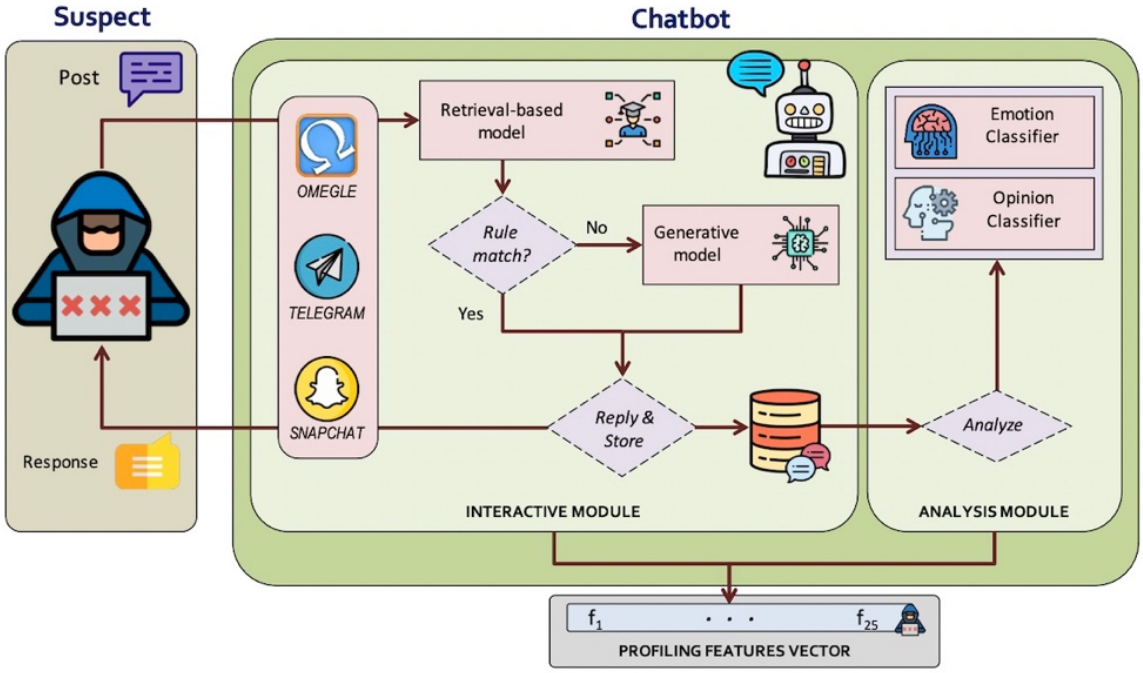
The potential of technology-based tactics to disrupt sexual predators and sex buyers is also gaining traction further afield. Developed by computer engineering and computer science scholars in Colombia and Spain, the

[69] Scarlet Hope, "Share Hope + Bring Love: A Gospel Response to Exploited and Trafficked Women," Scarlet Hope, 2022, accessed September 13, 2022, https://scarlethope.org.
[70] Washington Trafficking Prevention, "Our Mission," Washington Trafficking Prevention, accessed September 13, 2022, https://traffickingprevention.org.
[71] Cook County Sheriff's Office, "National Sex Trafficking Sting Nets over 630 Sex Buyers and Pimps/Traffickers.".
[72] Cook County Sheriff's Office, "National Sex Buyer Sting Nets More Than 450 Arrests," news release, August 29, 2018, https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-450-arrests.
[73] Cook County Sheriff's Office, "National Sex Trafficking Sting Nets Over 1,000 Sex Buyers and Pimps/Traffickers," news release, August 2, 2017, https://www.cookcountysheriff.org/national-sex-trafficking-sting-nets-1000-sex-buyers-pimpstraffickers.
[74] Cook County Sheriff's Office, "National Sex Buyer Stings Reach 10,000 Arrests," news release, February 5, 2020, https://www.cookcountysheriff.org/national-sex-buyer-stings-reach-10000-arrests; Cook County Sheriff's Office, "National Sex Buyer Sting Nets More Than 500 Arrests," news release, July 31, 2019, https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-500-arrests; Cook County Sheriff's Office, "National Sex Buyer Sting Nets More Than 390 Arrests," news release, February 6, 2019, https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-390-arrests; Cook County Sheriff's Office, "National Sex Buyer Sting Nets More Than 450 Arrests."; Cook County Sheriff's Office, "National Sex Trafficking Sting Nets over 630 Sex Buyers and Pimps/Traffickers."; Cook County Sheriff's Office, "National Sex Trafficking Sting Nets Over 1,000 Sex Buyers and Pimps/Traffickers."

C3-Sex[75] is an automatic software-controlled conversational agent that is deployed online and interacts with users autonomously. It similarly uses NLP and is deployed on websites or in scenarios where it profiles the interests of suspects regarding online child sexual abuse. Thus far, C3-Sex operates in Omegle online chat rooms and has the capability to seamlessly migrate to Snapchat or Telegram sessions. After deployment, the entire record of completed conversations in both Omegle and Snapchat platforms is analyzed to extract metrics about a suspect's interest in child sexual abuse material (CSAM). Figure 3 (below) shows an overview of the workflow of posts and replies by C3-Sex.

In a 50-day experiment conducted by researchers between April and June 2020, C3-Sex connected to the online chat platform Omegle and typed "sex" as a conversational topic of interest. When a conversation between a user (suspect) and the chatbot ensued, the suspect's willingness to exchange multimedia content was confirmed. C3-Sex then proceeded to suggest Snapchat as the platform to exchange the multimedia content. Once the suspect left the chat room, C3-Sex closed the conversation and continued to analyze the interaction using the profiling metrics and AI models (see Figure 4 below). The 50-day experiment revealed that, on average, the C3-Sex smart chatbot can interact with 900 suspects weekly. In the seventh week of the experiment, the chatbot engaged with more than 500 users, and in weeks 2, 3, and 5, it surpassed 1,500 suspects. In the second week, C3-Sex was able to maintain contact with nearly 2,500 network users and was able to stay online throughout the eight weeks of the experiment, with a total of 7,199 users contacted.

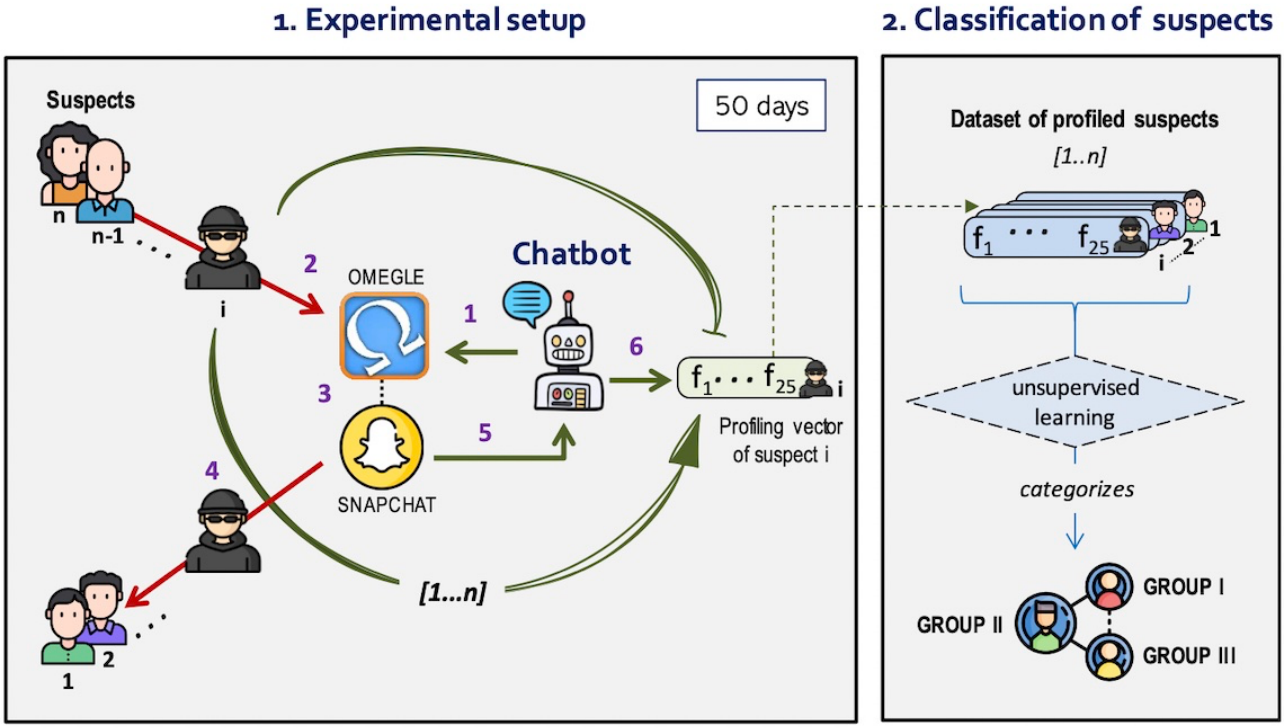
Figure 5: C3-Sex overview depicting the workflow of posts and replies[76]



C3-Sex developers expect to deploy this technology to other types of sexual crimes, including sexual exploitation, sexting, sextortion, sex scam, or sex trafficking. They note that these types of sexual crimes would require C3-Sex to manage more complex conversations for a more protracted period.

[75] John Ibañez Rodríguez et al., "C3-Sex: A Conversational Agent to Detect Online Sex Offenders," *Electronics* 9, no. 11 (2020), doi:10.3390/electronics9111779.
[76] Rodríguez et al., "C3-Sex: A Conversational Agent to Detect Online Sex Offenders."

Figure 6: Experiments launched with C3-Sex[77]



Wilber.ai by Buyer Resist

Wilber.ai is an AI-powered chatbot developed by the Canadian-based group Buyer Resist[78] and promoted by The BreakFree Collective.[79] It has engaged with nearly 500 sex buyers and has shown potential for reducing demand for commercial sex. Similar other chatbot-based previously discussed, the strategy involves posting online ads targeting sex buyers with a phone number linked to the chatbot. When sex buyers contact the chatbot, it takes them on a discussion that leads prospective buyers to understand the legal consequences of purchasing sex, the associated health consequences, and the cruel realities of the sex trafficking. By the end of this educational experience, some sex buyers recognize the harms of sex buying and are provided with supplementary resources like information on counselling or local sex addict anonymous groups so they can receive the help they need to overcome their addictions and regain a hold on their lives.

Spotlight by Thorn

Thorn[80] aids and accelerates law enforcement's ability to identify victims of child sex trafficking online. Through their principal technology tool Spotlight, Thorn's 2021[81] impact report stated they identified 3,977 children and reduced law enforcement investigation time by 61%. More than 2,700 agencies are reported to be using Thorn

[77] Rodríguez et al., "C3-Sex: A Conversational Agent to Detect Online Sex Offenders."
[78] Buyer Resist Education Society, "Do You Have a Sex Problem?," HTBS, 2021, accessed September 13, 2022, https://www.buyerresist.ca.
[79] The BreakFree Collective, "Partner with The BreakFree Collective and help stop Human Trafficking in Canada," BreakFree, 2022, accessed September 13, 2022, https://www.breakfreecollective.org.
[80] Thorn, "Spotlight Helps Find Kids Faster," THORN, 2022, accessed 2022, October 31, https://www.thorn.org/spotlight; Thorn, "We Are Thorn," YouTube, November 14, 2013, https://www.youtube.com/watch?v=Se4OvAGJu4U.
[81] Thorn, "Building What We Believe: THORN'S 2021 Impact," THORN, 2021, https://www.thorn.org/impact-report-2021.

tools, with the number of children identified since inception of the technology totaling 24,366. Police investigators laud[82] the value and efficiency of Spotlight. According to Kyle Woods and Kyle Hartsock, detectives inside the Ghost Unit with the Bernalillo County Sheriff's Office, Spotlight is used to aggregate online data and enables the use of data gathered from websites. Apart from utilizing Spotlight for victim interviews, it provides much value in tracking "a victim's movement across the country, with exact dates and times of posts as well as when phone numbers changed (the trafficker picked her up, etc.). We have identified ads 6 months after the incident utilizing Spotlight, which, in one case, cracked open the case and lead to a successful prosecution of a child sex trafficker."[83]

DeliverFund

DeliverFund[84] is a non-profit "private intelligence organization" heavily involved in the utilization of technology to combat sex trafficking.[85] DeliverFund's approach does not focus on demand deterrence but uses the "same technology that human traffickers use to scale their business to tear down their networks." Through its International Human Trafficking Analysis Center, the DeliverFund identifies advertisements for sex trafficking victims online and uses a variety of technology tools and special operations methodologies to identify and locate sex traffickers. The gathered information is shared with law enforcement agencies to verify and arrest traffickers. In December 2022, its website reported that more than 3,459 intelligence reports have been generated by the organization.

In March 2022, Deliver Fund announced[86] its participation in California's seventh annual anti-human trafficking operation that included simultaneous operations among local, state, and federal law enforcement agencies. The effort resulted in 413 arrests, including 30 suspected traffickers and exploiters, and the recovery of 72 trafficking victims, of whom 7 were minors. More than 80 participating federal, state, and local law enforcement agencies and task forces from across California were involved in a week-long statewide effort from February 6-12, 2022. Assistance was provided to law enforcement in multiple trafficking and several traveler and child exploitation cases. Investigators from multiple agencies and task forces collaborated to "better address the supply and demand side of the trafficking market as well as underage sexual exploitation market by finding traffickers, including pimps…Over 100 escort ad contacts were conducted by the investigative team."[87]

ShadowDragon.io

ShadowDragon.io[88] endeavors to make the world a safer place by developing easy-to-use digital investigation tools that address the complexities of modern online investigations and augment the capabilities of in-house

[82] Kyle Woods and Kyle Hartsock, "Using Spotlight to Investigate Human Trafficking," *THORN*, August 9, 2018, https://www.thorn.org/blog/using-spotlight-to-investigate-human-trafficking; Matt Blumenthal, "Inside Human Trafficking Investigations," *THORN*, April 24, 2018, https://www.thorn.org/blog/what-human-trafficking-investigations-look-like.
[83] Woods and Hartsock, "Using Spotlight to Investigate Human Trafficking."
[84] DeliverFund, "How DeliverFund Combats Human Trafficking," DeliverFund, 2021, accessed September 13, 2022, https://deliverfund.org/how-deliverfund-is-fighting-human-trafficking-in-america; DeliverFund, "DeliverFund: How we Hunt Human Traffickers Online," YouTube, April 13, 2020, https://www.youtube.com/watch?v=7R2S_BeeJP4.
[85] DeliverFund, "Operation Reclaim and Rebuild: DeliverFund Announces 413 Arrests and 72 Victims Rescued During Multi-'County' or 'Agency' Anti-Human Trafficking Operation," *PR Newswire*, March 2, 2022, https://www.prnewswire.com/news-releases/operation-reclaim-and-rebuild-deliverfund-announces-413-arrests-and-72-victims-rescued-during-multi-county-or-agency-anti-human-trafficking-operation-301494255.html.
[86] DeliverFund, "Operation Reclaim and Rebuild: DeliverFund Announces 413 Arrests and 72 Victims Rescued During Multi-'County' or 'Agency' Anti-Human Trafficking Operation."
[87] DeliverFund, "Operation Reclaim and Rebuild: DeliverFund Announces 413 Arrests and 72 Victims Rescued During Multi-'County' or 'Agency' Anti-Human Trafficking Operation."
[88] ShadowDragon, "OSINT Software, Data, and Training for Modern Investigations," ShadowDragon, 2022, accessed October 31, 2022, https://shadowdragon.io.

teams. The organization is partnering with nonprofits that share the common goal of ending human trafficking by using sophisticated digital tools and tested investigative methods. As with DeliverFund, its approach does not expressly seek to deter consumer-level demand, but rather focuses on identifying sex traffickers and their victims. In 2015,[89] ShadowDragon provided DeliverFund with OIMonitor[90] and SocialNet,[91] which formed part of the investigation tools that led to the solving of a case in New Mexico involving a known trafficker and a 22-year-old woman.

Relevant tools by ShadowDragon enable human trafficking investigators[92] to identify where information is being talked about and enables the monitoring of specific areas of interest including the DarkNet, online forums, chat rooms, data dump sites, and online marketplaces. These sites can be monitored "to pick up new leads and chatter." The tools also enable a "robust intelligence product output, enabling attribution, action and disruption." In a 2019 ShadowDragon blog entitled "It's Hard Out There for a Pimp,"[93] the organization asserts that sex traffickers are using the expansion of escort websites to "advertise their products to the world." An example of an online investigation using their OIMonitor tool was then showcased by employing it on some of the largest escort sites in operation and searching them for potential sex trafficking ads. They reported that one data point has the potential to unveil hundreds of posts—many of which will be the same and possibly in different cities. ShadowDragon.io points out that a reason for repeated data could be that changing information in online posts has cost implications, thus pimps may only purchase a limited number of ads. Posting the same data is also easier than creating new language for each post. When potential sex traffickers are identified by specific data points, they are added to an OIMonitor project that alerts the user when that data is posted. OIMonitor's historical search and alerting functionalities are therefore able to locate potential sex traffickers and setup alerts. The specific online investigation that was showcased in the blog was "put together in just under an hour" and highlights the indelible contribution of technology to sex trafficking investigations.

Tech Against Trafficking (TAT)[94]

Tech Against Trafficking was jointly founded by Microsoft, Nokia, and British Telecoms in 2018 with one of its first initiatives leading to the development of the TAT Interactive Map,[95] encompassing 300 counter-trafficking technology tools developed to combat both sex and labor trafficking. The interactive map and corresponding tool survey have been jointly published[96] with the Organization for Security and Co-operation in Europe (OSCE). Of the 300 tools identified, only three—Street Grace's "Transaction Intercept" and Seattle Against Slavery's "Freedom Signal" and "Intercept"—were expressly aimed at disrupting consumer-level demand for sex trafficking. Other noteworthy mentions of organizations who use technology to address distinct and overlapping

[89] Daniel Clemens, "ShadowDragon and DeliverFund Partner to Catch Human Traffickers," *ShadowDragon*, December 16, 2016, https://blog.shadowdragon.io/shadowdragon-io-and-deliverfund-org-partner-to-catch-human-traffickers-2.
[90] ShadowDragon, "OIMonitor / Open Source Intellligence Monitoring and Alerting," ShadowDragon, 2022, accessed October 31, 2022, https://shadowdragon.io/oimonitor.
[91] ShadowDragon, "SocialNet / Social Media Monitoring and Investigations," ShadowDragon, 2022, accessed October 31, 2022, https://shadowdragon.io/socialnet.
[92] Daniel Clemens, "Alabama Cyber Now: Disrupting Human Trafficking Using Digital Forensics & Social Media Forensics," *ShadowDragon*, May 7, 2018, https://blog.shadowdragon.io/alabama-cyber-now-disrupting-human-trafficking-using-digital-forensics-social-media-forensics.
[93] M., "It's Hard Out There for a Pimp."
[94] Tech Against Trafficking, "Companies Collaborating with Global Expert to Help Eradicate Human Trafficking Using Technology," Tech Against Trafficking, 2020, accessed October 31, 2022, https://techagainsttrafficking.org.
[95] Tech Against Trafficking, "Interactive Map of Anti-Trafficking Tech Tools," Tech Against Trafficking, accessed October 31, 2022, https://techagainsttrafficking.org/interactive-map.
[96] Tech Against Trafficking, *Leveraging Innovation to Fight Trafficking in Human Beings: A Comprehensive Analysis of Technology Tools* (Vienna: OSCE Office of the Special Representative and Co-ordinator for Combating Trafficking in Human Beings, May 2020), https://www.osce.org/files/f/documents/9/6/455206_0.pdf.

aspects of sex trafficking, CSAM, and the broader dimensions of human trafficking include Giant Oak,[97] Marinus Analytics,[98] and IBM.[99]

Summary

The spectrum of technology-based products identified have several common elements, but also vary in their capabilities, purpose, and how they are being deployed. The scraping of data, identification and monitoring of open-source electronic communications, analysis of raw data, and flagging of communications that actually or potentially illustrate a commercial sex offer or transaction are some of these tools' common features. Artificial Intelligence and its subsets of machine learning and natural language processing are intrinsic to most of these technologies and through sets of algorithms, make up the "DNA" of bots (also known as chatbots). Bots are essentially software programs that can mimic or simulate human behavior through voice commands, text chats, or both. A bot represents a virtual conversation in which one party is an online "chatting" robot. The chatbot is programmed to interpret the input data into a desired output value.[100] The software program is continuously fed with large volumes of information that prompts "the machine" to trace relationships between data points that are too intricate for the human brain to identify. "Learning" takes place and AI makes informed guesses about the potential outcome of a new question.[101]

The combination of these capabilities holds much promise for efforts to combat consumer-level demand for prostitution and sex trafficking. The dimensions of variation among the separate products and how they are used to reduce demand for commercial sex begins with their focus. Some target the identification and deterrence of sex buyers, while other programs are used primarily to (a) identify pimps and traffickers posting online ads or infiltrating social media, (b) identify victims, or (c) analyze local commercial sex and trafficking markets. Other aspects of variation are how the technology fits within the set of activities that constitute the initiative, and how it interfaces with the people operating the programs.

Technologies used to target sex buyers can be used in several distinct modes of interaction with both the buyers and with law enforcement or others seeking to deter them. First, they can operate in fully automated mode, constantly scanning ad websites, search terms, or social media communications, identifying potential sex buyers, and then responding with deterrence messages. Second, they may continuously scan and then alert law enforcement personnel when cases are identified that meet the criteria that has been set (e.g., individuals seeking to purchase sex with children), at which point police may respond by launching an investigation or a sting operation. Third, the technology may be programmed to scan during a set time period like a sting or deterrence operation; the program identifies potential sex buyers and then program personnel respond by delivering deterrence messages. While the programming which has been developed to identify and respond to online messages contains different algorithms, they all appear to have the same basic capacity to function at different levels of automation, and the flexibility to coordinate with humans in different modes and for different kinds of operations.

---

[97] Giant Oak, "Introducing GOST Fall 2022 Release: Your Solution for Confidence in Coverage," Giant Oak, 2019, accessed October 31, 2022, https://www.giantoak.com/giant-oak-technology-for-screening-and-vetting-1.
[98] Marinus Analytics, "Creating AI Solutions for Social Impact," Marinus Analytics, accessed October 31, 2022, https://www.marinusanalytics.com.
[99] IBM, "Impact in Practice," IBM, accessed October 31, 2022, https://www.ibm.com/impact/initiatives.
[100] Mai-Hanh Nguyen, "How Artificial Intelligence and Machine Learning Produced Robots we Can Talk To," *Insider*, January 27, 2020, https://www.businessinsider.com/chatbots-talking-ai-robot-chat-machine.
[101] Aubrey Calaway, "Artificial Intelligence and the Fight Against Human Trafficking," *Business & Human Rights Resource Centre*, January 12, 2021, https://www.business-humanrights.org/en/blog/artificial-intelligence-and-the-fight-against-human-trafficking.

All four technologies reviewed provide an automated means of scanning online communications and advertising, identifying instances of commercial sex, and then identifying individual sex buyers who have responded to online ads or social media messages. Each also engages prospective buyers in some form of interaction designed to deter them from attempting to purchase sex at the present "point of purchase" moment as well as in the future. Each can operate in fully automated mode and can be deployed at all times. Bots are programmed to identify communications indicative of commercial sex or sex trafficking and obtain contact information based on the accounts used by buyers via voice, text, email, or chat function to initiate a commercial sex transaction. Through extensive testing, development, and live deployment, artificial intelligence supports the evolution of the automated messaging that is pushed out to the sex buyers so that the language used, pacing, and local dialects become tailored to appear authentic rather than computer-generated. These and other capabilities allow the constant deployment of the technology to gather unprecedented levels of data about patterns in local illicit markets and have the capacity to identify activity consistent with attempting to purchase sex. Automated scanning and identification, coupled with realistic automated responses to sex buyers, thus provides the only feasible means of constantly (rather than periodically) attempting to disrupt markets for sexual exploitation by dissuading sex buyers at points of purchase. In addition to cost effectiveness and scalability in addressing demand, the technologies also have appealed to law enforcement agencies and collaborative efforts by providing methods for addressing both the "supply" and distribution components of local markets. The constant scanning and analytic capabilities of these products also identify likely cases of child sex trafficking and other exploitation and has successfully aided law enforcement agencies in identifying victims, as well as sex traffickers and sex trafficking networks.

Despite the significant opportunities and potential of chatbots and AI supplements, the foreseeable future will likely see the continuation of humans *and* machines utilizing each other's strengths (augmented intelligence). As noted recently within the field of mental healthcare, AI chatbots are not yet able to fully replace human interactions. Albeit having the capacity to improve efficiency, affordability, convenience, and patient-driven access, AI interfaces and chatbots "cannot be expected to provide the feelings of respect and subtle constellations of interpersonal supports necessary for a sense of social agency, inclusion and equity."[102] Among the ways the different products vary is how they interface with humans. What has been referred to as "Augmented Intelligence"[103]—in which humans and machines utilize each other's strengths—is a tenet of some technologies that alert law enforcement when certain criteria are met. Law enforcement, in turn, may then choose to launch an investigation or stage a sting operation. Notably, the EPIK approach features a consistent use of human labor where technology identifies people actively seeking to purchase sex, and then trained volunteers to step in to provide deterrence messages. As highlighted by EPIK's Justin Euteneier:

> *"An over dependence on technology undermines the story we tell victims and survivors; that they are valued. If so, then they are worthy of our time, not just our capacity to create technology."*[104]

What has been communicated by a number of technology experts is that technology is not the panacea for ending consumer-level demand or eradicating the online commercial sexual exploitation infrastructure. Ending demand "requires humans who will change cultural norms that make sexual exploitation so easy and accepted."[105] In a similar vein, Rob Spectre noted:

[102] Julia E. H. Brown and Jodi Halpern, "AI Chatbots Cannot Replace Human Interactions in the Pursuit of More Inclusive Mental Healthcare," *SSM - Mental Health* 1 (2021), doi:10.1016/j.ssmmh.2021.100017.
[103] Lynn Heidmann, "What Is Augmented Intelligence?," *Scaling AI*, *Dataiku*, August 3, 2021, https://blog.dataiku.com/augmented-intelligence.
[104] Justin Euteneier, Program Director, EPIK Project, in discussion with the author, August 17, 2022.
[105] Justin Euteneier, Program Director, EPIK Project, in discussion with the author, August 17, 2022.

> *"Distribution is important to consider, but until we do something about all these white guys that wants to purchase kids online, we will not be making progress. Technology is an important part of that, it is also only one part of that."*[106]

Finally, the confluence of complexities intrinsic to the ever-expanding capabilities of technology and the online environment continue to eclipse operational responses by law enforcement agencies when dealing with the technology strand in crime.[107] Furthermore, not staying current with market trends and spending resources on outdated technology may do more harm than good. Ultimately, technology tools have the ability to scale and catalyze the work that humans are already doing and can provide macro-level intelligence about the commercial sex market. Embracing and optimally using available technology tools to constrain consumer-level demand for commercial sex is no longer optional. Parents, families, communities, law enforcement agencies, and corporations across the United States are all concerned and affected, directly and indirectly, by the sex trafficking and commercial sexual exploitation of adults and children. Similar to what has been pointed out[108] in the context of available police technologies, citizens and society at large know that these technology tools exist and expect law enforcement agencies and leaders to employ them in their efforts to protect people and create safer communities—both online and offline.

References

Anton, Leonora LaPeter. "'Escorts' Leave the Streets to get on the Superhighway." *Tampa Bay Times*, July 6, 2006. https://www.tampabay.com/archive/2006/07/02/escorts-leave-the-streets-to-get-on-the-superhighway.

Baker, Lynda. "The Information Needs of Female Police Officers Involved in Undercover Prostitution Work." *Information Research* 10, no. 1 (2004). http://informationr.net/ir/10-1/paper209.html.

Blumenthal, Matt, "Inside Human Trafficking Investigations." *THORN*, April 24, 2018, https://www.thorn.org/blog/what-human-trafficking-investigations-look-like.

Booth, Michael. "Craigslist Develops a Dark Side." *The Denver Post*, December 3, 2007. https://www.denverpost.com/2007/12/03/craigslist-develops-a-dark-side.

Bouché, Vanessa. *Survivor Insights: The Role of Technology in Domestic Minor Sex Trafficking.* (THORN, January, 2018). https://www.thorn.org/wp-content/uploads/2019/12/Thorn_Survivor_Insights_090519.pdf.

Boyd, Danah, Heather Casteel, Mitali Thakor, and Rane Johnson. *Human Trafficking and Technology: A Framework for Understanding the Role of Technology in the Commercial Sexual Exploitation of Children in the U.S.* (Microsoft, 2011). https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/en-us-collaboration-focus-education-htframework-2011.pdf.

Brown, Julia E. H., and Jodi Halpern. "AI Chatbots Cannot Replace Human Interactions in the Pursuit of More Inclusive Mental Healthcare." *SSM - Mental Health* 1 (2021): 100017. doi:10.1016/j.ssmmh.2021.100017.

Buyer Resist Education Society. "Do You Have a Sex Problem?" HTBS, 2021, accessed September 13, 2022, https://www.buyerresist.ca.

Byrne, James, and Gary T. Marx. "Technological Innovations in Crime Prevention and Policing. A Review of the Research on Implementation and Impact." *Journal of Police Studies* 3, no. 20

[106] Rob Spectre, Technologist and Founder, Childsafe.ai, in discussion with the author, February 3, 2022.

[107] Jack Karsten, "As Criminals Adapt to New Technology, so Must International Law," *The Justice Stephen Breyer Lecture Series on International Law*, *Brookings*, April 21, 2017, https://www.brookings.edu/blog/techtank/2017/04/21/as-criminals-adapt-to-new-technology-so-must-international-law.

[108] Police1 Staff, "The Biggest Technology Challenges Facing Police Leaders: How to Chart a Roadmap to Future-Proof your Agency's Technology Needs," Police1, updated March 22, 2022, https://www.police1.com/chiefs-sheriffs/articles/the-biggest-technology-challenges-facing-police-leaders-7QFimpOSEgJZRQyX.

(2011): 17-40. https://www.ojp.gov/ncjrs/virtual-library/abstracts/technological-innovations-crime-prevention-and-policing-review.
Calaway, Aubrey, "Artificial Intelligence and the Fight Against Human Trafficking." *Business & Human Rights Resource Centre*, January 12, 2021, https://www.business-humanrights.org/en/blog/artificial-intelligence-and-the-fight-against-human-trafficking.
ChildSafe.ai. "The Artificial Intelligence Platform Protecting Kids Online." ChildSafe.ai, 2020, accessed September 13, 2022, https://childsafe.ai.
Clemens, Daniel, "Alabama Cyber Now: Disrupting Human Trafficking Using Digital Forensics & Social Media Forensics." *ShadowDragon*, May 7, 2018, https://blog.shadowdragon.io/alabama-cyber-now-disrupting-human-trafficking-using-digital-forensics-social-media-forensics.
———, "ShadowDragon and DeliverFund Partner to Catch Human Traffickers." *ShadowDragon*, December 16, 2016, https://blog.shadowdragon.io/shadowdragon-io-and-deliverfund-org-partner-to-catch-human-traffickers-2.
Cook County Sheriff's Office. "National Sex Buyer Sting Nets More Than 390 Arrests." news release, February 6, 2019, https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-390-arrests.
———. "National Sex Buyer Sting Nets More Than 450 Arrests." news release, August 29, 2018, https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-450-arrests.
———. "National Sex Buyer Sting Nets More Than 500 Arrests." news release, July 31, 2019, https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-500-arrests.
———. "National Sex Buyer Stings Reach 10,000 Arrests." news release, February 5, 2020, https://www.cookcountysheriff.org/national-sex-buyer-stings-reach-10000-arrests.
———. "National Sex Trafficking Sting Nets Over 1,000 Sex Buyers and Pimps/Traffickers." news release, August 2, 2017, https://www.cookcountysheriff.org/national-sex-trafficking-sting-nets-1000-sex-buyers-pimpstraffickers.
———. "National Sex Trafficking Sting Nets over 630 Sex Buyers and Pimps/Traffickers." news release, February 6, 2018, https://www.cookcountysheriff.org/national-sex-trafficking-sting-nets-630-sex-buyers-pimps-traffickers.
Daggett, M.P., F.R. Waugh, H.J. Davison Reynolds, C.D. Engholm, J.A. Sloboda, and C.E. Heine. *The Human Trafficking Technology Roadmap: A Targeted Development Strategy for the Department of Homeland Security.* Massachusetts Institute of Technology (Lincoln Laboratory, July, 2019). https://www.ll.mit.edu/sites/default/files/publication/doc/2021-04/human-trafficking-technology-roadmap-daggett-127172.pdf.
DeliverFund. "DeliverFund: How we Hunt Human Traffickers Online." YouTube, April 13, 2020. https://www.youtube.com/watch?v=7R2S_BeeJP4.
———. "How DeliverFund Combats Human Trafficking." DeliverFund, 2021, accessed September 13, 2022, https://deliverfund.org/how-deliverfund-is-fighting-human-trafficking-in-america.
———. "Operation Reclaim and Rebuild: DeliverFund Announces 413 Arrests and 72 Victims Rescued During Multi-'County' or 'Agency' Anti-Human Trafficking Operation." *PR Newswire*, March 2, 2022. https://www.prnewswire.com/news-releases/operation-reclaim-and-rebuild-deliverfund-announces-413-arrests-and-72-victims-rescued-during-multi-county-or-agency-anti-human-trafficking-operation-301494255.html.
Demand Abolition. *Who Buys Sex? Understanding and Disrupting Illicit Market Demand.* (November, 2018). https://www.demandabolition.org/wp-content/uploads/2019/07/Demand-Buyer-Report-July-2019.pdf.
Demand Forum. "Reverse Stings." National Center on Sexual Exploitation, accessed September 14, 2022, https://demand-forum.org/reverse-stings.

Devlin, Hannah. "Trafficking Industry Hit as 'Sex Worker' Chatbots Fool Thousands." *The Guardian*, February 13, 2020. https://www.theguardian.com/society/2020/feb/13/sex-worker-chatbots-fool-thousands-to-hit-trafficking-industry.
Dodge, Mary, Donna Starr-Gimeno, and Thomas Williams. "Puttin' on the Sting: Women Police Officers' Perspectives on Reverse Prostitution Assignments." *International Journal of Police Science and Management* 7 (2005): 71-85. doi:10.1350/ijps.7.2.71.65778.
Downing, Shane. "How to Scare a Predator: Neutering the Sex Industry One Buyer at a Time." *The Imprint*, February 12, 2018. https://imprintnews.org/news-2/how-to-catch-a-predator-neutering-the-sex-industry/29426.
EPIK Project. "Disrupting the Demand that Drives Sexual Exploitation. Dismantling the Forces that Perpetuate It." EPIK Project, accessed September 13, 2022, https://epikproject.org.
Freedom Signal. "Reach Victims of Sexual Exploitation with Cutting-Edge Technology." Freedom Signal, accessed September 13, 2022, https://www.freedomsignal.org.
Giant Oak. "Introducing GOST Fall 2022 Release: Your Solution for Confidence in Coverage." Giant Oak, 2019, accessed October 31, 2022, https://www.giantoak.com/giant-oak-technology-for-screening-and-vetting-1.
Goodman, Marc D. "Why the Police Don't Care about Computer Crime ". *Harvard Journal of Law & Technology* 10, no. 3 (1997): 465-495. http://jolt.law.harvard.edu/articles/pdf/v10/10HarvJLTech465.pdf.
Hay, Bruce. "Sting Operations, Undercover Agents, and Entrapment." *Missouri Law Review* 70, no. 2 (2005): 387-431. https://scholarship.law.missouri.edu/mlr/vol70/iss2/2.
Heidmann, Lynn, "What Is Augmented Intelligence?," *Scaling AI. Dataiku*, August 3, 2021, https://blog.dataiku.com/augmented-intelligence.
Hernandez, Samantha. "End of Sex Ads on Backpage, Craigslist Only a Small Part of Human Trafficking Fight." *Green Bay Press Gazette*, April 19, 2018. https://www.greenbaypressgazette.com/story/news/2018/04/18/end-sex-ads-backpage-craigslist-only-small-part-human-trafficking-fight/512301002.
Hughes, Donna M. *Best Practices to Address the Demand Side of Sex Trafficking.* (August, 2004). https://popcenter.asu.edu/sites/default/files/problems/street_prostitution/PDFs/Hughes_2004.pdf.
IBM. "Impact in Practice." IBM, accessed October 31, 2022, https://www.ibm.com/impact/initiatives.
Jiao, Sunny, Vicky Bungay, and Emily Jenkins. "Information and Communication Technologies in Commercial Sex Work: A Double-Edged Sword for Occupational Health and Safety." *Social Sciences* 10, no. 1 (2021): 23. doi:10.3390/socsci10010023.
Karsten, Jack, "As Criminals Adapt to New Technology, so Must International Law," *The Justice Stephen Breyer Lecture Series on International Law. Brookings*, April 21, 2017, https://www.brookings.edu/blog/techtank/2017/04/21/as-criminals-adapt-to-new-technology-so-must-international-law.
Kennedy, Merrit. "Craigslist Shuts Down Personals Section after Congress Passes Bill on Trafficking." *NPR*, March 23, 2018. https://www.npr.org/sections/thetwo-way/2018/03/23/596460672/craigslist-shuts-down-personals-section-after-congress-passes-bill-on-traffickin.
Latonero, Mark, Jennifer Musto, Zhaleh Boyd, Ev Boyle, Amber Bissel, Kari Gibson, and Joanne Kim. *The Rise of Mobile and the Diffusion of Technology-Facilitated Trafficking.* University of Southern California (USC Annenberg Center on Communication Leadership & Policy, November, 2012). https://cpb-us-e1.wpmucdn.com/sites.usc.edu/dist/e/695/files/2012/11/HumanTrafficking2012_Nov12.pdf.
Liemontas, Molly, and Madelyn Huibregtse. *A Baseline Assessment: Analysis of Women Escort Advertisements Posted on Backpage.com in Madison, WI.* UNESCO Working Paper Series,

4W Initiative (Madison, WI: University of Wisconsin-Madison, February, 2020). https://minds.wisconsin.edu/handle/1793/80835?show=full.
Long, Gerry, "How to Plan a 'John' Sting," *Women in Law Enforcement*. *Police Magazine*, April 18, 2012, https://www.policemag.com/374063/how-to-plan-a-john-sting.
———, "How To Stay Safe During a John Sting," *Women in Law Enforcement*. *Police Magazine*, July 2, 2012, https://www.policemag.com/374107/how-to-stay-safe-during-a-john-sting.
Lundstrom, Megan. *OnlyFans: A Case Study of Exploitation in the Digital Age.* (The Avery Center, December, 2021). https://theaverycenter.org/wp-content/uploads/2021/12/OnlyFans-A-Case-Study-of-Exploitation-in-the-Digital-Age-1.pdf.
M., Brooks, "It's Hard Out There for a Pimp." *ShadowDragon*, June 24, 2019, https://blog.shadowdragon.io/its-hard-out-there-for-a-pimp.
Mamacos, Elizabeth. "Camming in Suburbia: It's More Common, and More Dangerous, than You Think." *W24*, November 8, 2018. https://www.news24.com/w24/Work/Jobs/camming-in-suburbia-its-more-common-and-more-dangerous-than-you-think-20181108.
Marino, Jonathan. "Congress to Launch Probe Into Escort and Prostitution Services on Twitter." *The Street*, January 30, 2014. https://www.thestreet.com/technology/congress-to-launch-probe-into-escort-and-prostitution-services-on-twitter-12277405.
Marinus Analytics. "Creating AI Solutions for Social Impact." Marinus Analytics, accessed October 31, 2022, https://www.marinusanalytics.com.
Martin, Lauren, Christina Melander, Harshada Karnik, and Corelle Nakamura. *Mapping the Demand: Sex Buyers in the State of Minnesota.* Women's Foundation of Minnesota (Minneapolis, MN: University of Minnesota, August 2, 2017). https://conservancy.umn.edu/bitstream/handle/11299/226521/MappingtheDemand-FullReport%20-%20FINAL%20July%2031%202017.pdf?sequence=1.
Marx, Gary T. "Under-the-Covers Undercover Investigations: Some Reflections on the State's Use of Sex and Deception in Law Enforcement." *Criminal Justice Ethics* 11, no. 1 (1992): 13-24. doi:10.1080/0731129X.1992.9991907.
Murphy, Alexandra K., and Sudhir Alladi Venkatesh. "Vice Careers: The Changing Contours of Sex Work in New York City." *Qualitative Sociology* 29, no. 2 (2006): 129-154. doi:10.1007/s11133-006-9012-2.
Newman, Graeme R., and Kelly Socia. *Sting Operations.* Problem-Oriented Guides for Police, Response Guides Series (U.S. Department of Justice Office of Community Oriented Policing Services, October, 2007). https://cops.usdoj.gov/ric/Publications/cops-p134-pub.pdf.
Nguyen, Mai-Hanh. "How Artificial Intelligence and Machine Learning Produced Robots we Can Talk To." *Insider*, January 27, 2020. https://www.businessinsider.com/chatbots-talking-ai-robot-chat-machine.
Nolan, Thomas. "Commentary: Galateas in Blue: Women Police as Decoy Sex Workers." *Criminal Justice Ethics* 20 (2001): 2-67. doi:10.1080/0731129X.2001.9992104.
Phelan, Meagan. "Technology Disrupts Child Sex Trade, Aiding Victims and Blocking Buyers." *American Association for the Advancement of Science*, February 14, 2020. https://www.aaas.org/news/technology-disrupts-child-sex-trade-aiding-victims-and-blocking-buyers.
Police1 Staff. "The Biggest Technology Challenges Facing Police Leaders: How to Chart a Roadmap to Future-Proof your Agency's Technology Needs." Police1, Updated March 22, 2022, https://www.police1.com/chiefs-sheriffs/articles/the-biggest-technology-challenges-facing-police-leaders-7QFimpOSEgJZRQyX.
Roane, Kit R. "Prostitutes on Wane In New York Streets But Take to Internet." *The New York Times*, February 23, 1998. https://www.nytimes.com/1998/02/23/nyregion/prostitutes-on-wane-in-new-york-streets-but-take-to-internet.html.

Rodríguez, John Ibañez, Santiago Rocha Durán, Daniel Díaz-López, Javier Pastor-Galindo, and Félix Gómez Mármol. "C3-Sex: A Conversational Agent to Detect Online Sex Offenders." *Electronics* 9, no. 11 (2020): 1779. doi:10.3390/electronics9111779.

Roe-Sepowitz, Dominique. "A Six-Year Analysis of Sex Traffickers of Minors: Exploring Characteristics and Sex Trafficking Patterns." *Journal of Human Behavior in the Social Environment* 29, no. 5 (2019): 608-629. doi:10.1080/10911359.2019.1575315.

Rosenberg, Tina. "A.I. Joins the Campaign Against Sex Trafficking." Opinion, *The New York Times*, April 9, 2019. https://www.nytimes.com/2019/04/09/opinion/ai-joins-the-campaign-against-sex-trafficking.html.

Ross, M. "How the Internet is Bringing the World's Oldest Profession to a Neighborhood Near You." *Diablo Magazine*, June, 2005.

Sanders, Jacob Quinn. "Prostitution Hits Web in State." *Arkansas Democrat Gazette*, February 10, 2008. https://www.arkansasonline.com/news/2008/feb/10/prostitution-hits-web-state-20080210.

Scarlet Hope. "Share Hope + Bring Love: A Gospel Response to Exploited and Trafficked Women." Scarlet Hope, 2022, accessed September 13, 2022, https://scarlethope.org.

Schofield, Daisy. "Lockdown Sex Workers are Flocking to Animal Crossing and Second Life." *Wired*, September 6, 2020. https://www.wired.co.uk/article/video-games-sex-work.

ShadowDragon. "OIMonitor / Open Source Intellligence Monitoring and Alerting." ShadowDragon, 2022, accessed October 31, 2022, https://shadowdragon.io/oimonitor.

———. "OSINT Software, Data, and Training for Modern Investigations." ShadowDragon, 2022, accessed October 31, 2022, https://shadowdragon.io.

———. "SocialNet / Social Media Monitoring and Investigations." ShadowDragon, 2022, accessed October 31, 2022, https://shadowdragon.io/socialnet.

Shively, Michael, Sarah Kuck Jalbert, Ryan Kling, William Rhodes, Peter Finn, Chris Flygare, Laura Tierney, *et al. Final Report on the Evaluation of the First Offender Prostitution Program.* (Cambridge, MA: Abt Associates Inc., March 7, 2008). https://www.ojp.gov/pdffiles1/nij/grants/221894.pdf.

Spectre, Rob. *Beyond Backpage: Buying And Selling Sex In The United States One Year Later.* ChildSafe.ai (ChildSafe.ai, 2019). https://childsafe.ai/beyond-backpage-buying-and-selling-sex-in-the-united-states-one-year-later.

———. "ChildSafe.ai: World's First AI-Platform Combating Online Child Abuse." *CIO Review*, 2020. https://law-enforcement.cioreview.com/vendor/2020/childsafe.ai.

Street Grace. "Transaction Intercept." Street Grace, accessed September 13, 2022, https://www.streetgrace.org/transaction-intercept.

Tech Against Trafficking. "Companies Collaborating with Global Expert to Help Eradicate Human Trafficking Using Technology." Tech Against Trafficking, 2020, accessed October 31, 2022, https://techagainsttrafficking.org.

———. "Interactive Map of Anti-Trafficking Tech Tools." Tech Against Trafficking, accessed October 31, 2022, https://techagainsttrafficking.org/interactive-map.

———. *Leveraging Innovation to Fight Trafficking in Human Beings: A Comprehensive Analysis of Technology Tools.* (Vienna: OSCE Office of the Special Representative and Co-ordinator for Combating Trafficking in Human Beings, May, 2020). https://www.osce.org/files/f/documents/9/6/455206_0.pdf.

———. "Tech Against Trafficking Launches Second Accelerator Program." Tech Against Trafficking, Updated June 30, 2021, accessed January 5, 2023, https://techagainsttrafficking.org/accelerating-the-use-of-technology-to-combat-human-trafficking.

The BreakFree Collective. “Partner with The BreakFree Collective and help stop Human Trafficking in Canada.” BreakFree, 2022, accessed September 13, 2022, https://www.breakfreecollective.org.
Thorn. “Building What We Believe: THORN'S 2021 Impact.” THORN, 2021, https://www.thorn.org/impact-report-2021.
———. “Spotlight Helps Find Kids Faster.” THORN, 2022, accessed 2022, October 31, https://www.thorn.org/spotlight.
———. "We Are Thorn." YouTube, November 14, 2013. https://www.youtube.com/watch?v=Se4OvAGJu4U.
Venkatesh, Sudhir. “How Tech Tools Transformed New York's Sex Trade.” *Wired*, January 31, 2011. https://transmarcations.constantvzw.org/texts/Peggy_sexworkers.pdf.
Walters, Phillip. “Would a Cop Do This: Ending the Practice of Sexual Sampling in Prostitution Stings.” *Minnesota Journal of Law & Inequality* 29, no. 2 (2011): 451-476. https://scholarship.law.umn.edu/lawineq/vol29/iss2/6.
Washington Trafficking Prevention. “Our Mission.” Washington Trafficking Prevention, accessed September 13, 2022, https://traffickingprevention.org.
Woods, Kyle, and Kyle Hartsock, "Using Spotlight to Investigate Human Trafficking." *THORN*, August 9, 2018, https://www.thorn.org/blog/using-spotlight-to-investigate-human-trafficking.