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Richard Kjellgren, Doctoral Researcher University of Stirling, Faculty of Social Sciences <u>r.r.kjellgren@stir.ac.uk</u>

An Automated Methodology for Digital Investigations of Exploitation in the Sex Market

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Scottish Institute for Policing Research, School of Applied Sciences, Edinburgh Napier University Sighthill Campus, Edinburgh EH11 4BN

EXECUTIVE SUMMARY

Summary: This briefing paper highlights a theoretically informed methodology for generating opensource intelligence (OSINT) on networks operating in the UK's off-street sex market. This methodology is currently being developed as part of my PhD and is informed by fieldwork with human trafficking investigators and other professionals in the field of migration, exploitation, and sexual labour. The methodology was piloted on a longitudinal, large-scale dataset of escort adverts (*n* = 213,693) posted on a prominent adult services website (ASW) in the UK. An automated workflow was developed and used to collect, clean and analyse the data, before distilling this information into succinct OSINT reports, detailing geographical patterns, network structures and other information useful for investigators. The utility of this methodology was discussed with investigators, and the initial feedback was positive. In particular, it was highlighted that this methodology has the potential to greatly aid investigators in automatically overlaying sex trafficking investigations with a real-time, digital dimension. Caution must be exercised, however, in using such methodologies proactively, due to the high risk of over-identifying and over-estimating networked criminality and victimisation.¹

Key Points:

- 1. Contemporary investigations into exploitation in the off-street sex market are likely to involve the analysis of online escort adverts as a form of OSINT
- 2. Current methods to analyse OSINT tend to be resource-intensive and highly sensitive to generating false positives when applied proactively
- 3. Due to police demands and resources, anti-trafficking efforts must be highly targeted to maximise the potential of successful responses
- 4. OSINT should always be triangulated against more robust forms of intelligence, and its principal function is that it allows investigators to understand the online presence of a network
- 5. The connections between adverts are generally more informative than the information contained *within* adverts; OSINT analysis should therefore be focused on the structure and spatio-temporal patterning of networks
- 6. The methodology proposed in this paper offers an automated approach to overlaying investigations with a digital dimension

¹ In other words, generating false-positives.

INTRODUCTION

Human trafficking has previously been highlighted as a notoriously difficult crime to investigate (Pajón and Walsh 2018), and the emergence and widespread adoption of the internet and communication technologies has contributed to an expansion and diversification of the off-street sex market. This report provides an overview and description of a methodology developed to generate OSINT in the context of the policing of sex trafficking in the UK. This methodology is currently being developed as part of my PhD and is a response to the inefficiency and inaccuracy of both manual methods of reviewing online escort adverts to identify potential criminality, as well as the uncritical application of machine learning and artificial intelligence to identify sex trafficking within these adverts. As will be highlighted in this report, such methods are prone to generate false positives: inaccurately identifying sex workers – and particularly, migrant sex workers – as potential trafficking victims. The methodology proposed in this paper has been tailored around the needs of investigators while also trying to be sensitive to the many complexities associated with the sex market.

In the following section, insights from the fieldwork of my PhD and related literature are presented to contextualise the issue of generating and using OSINT in sex trafficking investigations. Subsequently, the methodology will be described in more detail and examples of outputs will be presented. Finally, the report concludes with a discussion of how it can best be applied, and the future directions for this particular project.

CONTEXT

Identifying and responding to exploitation in the sex market is paramount; this, however, is a highly complex task. Some of these complexities are due to inadequacies in how sex trafficking is conceptualised and legally constructed, often being far detached from the empirical reality of exploitation (Albanese et al. 2022; Cockbain 2020). From a policing perspective, even though there may be intelligence or evidence to suggest the possibility of exploitation occurring, how the assumed victims perceive their circumstances will be variable, as will their willingness to cooperate with law enforcement (Lebov 2010). This is made further complicated by the presence of poly-criminal organised crime groups (OCGs) operating within the sex market. Whether involved in distributing illicit substances, money laundering or other criminal activities, the presence of such groups makes the policing of the sex market even more challenging; sex workers may be working with the help of such groups without necessarily perceiving themselves to be exploited by them. There is also an inherent ambiguity with regards to sex trafficking: whilst many sex workers would not consider themselves as

being victims of exploitation, others may, though they may not necessarily consider it to be sexual exploitation, but rather frame it in terms of economic or labour exploitation (O'Connell Davidson 2006).

If we define sex trafficking too broadly, there is a risk that sex workers are identified as possible sex trafficking victims. On the other hand, if we define it too narrowly, we risk overseeing that exploitation is indeed present within the sex market but, importantly, that it falls along a wide continuum of experiences (Kjellgren 2022). This is an exceedingly important point, and police responses must be sensitive to these issues or risk causing more harm than good when responding to potential instances of exploitation in the sex market (Broad 2015; Malloch 2016). This is also inevitably linked to successfully obtaining trafficking and modern slavery convictions, since victims perceiving their own experiences as exploitative may be more likely to cooperate with law enforcement, compared to those who would rather carry on working without police involvement.

The widespread adoption of the internet and communication technologies renders criminal networks more flexible and mobile. From my fieldwork, detectives described how criminal networks move victims around the UK, often staying in one location for a brief period before moving on to the next. Technology makes these networks logistically more complex. A network may exercise control over its victims remotely, for instance, by requiring them to be in frequent communication with the network through mobile phones. Larger networks may operate a multitude of phones from a centralised location far away from where the transactions are carried out. However, sex workers also tend to 'tour' the country to increase their earnings, and they may also be organised into networks and work as co-operatives for companionship or to increase their safety. Migrant sex workers may be particularly likely to do so because of the barriers they may face to work independently (e.g., language barriers or lack of location-specific knowledge). This, of course, occurs in a context in which there are many shades of exploitation, from working for an unfair manager to being physically controlled or abused, and determining what can be considered sex trafficking can in many cases be far from straightforward.

These complexities are exacerbated in online spaces, which in the contemporary sex market is largely made up of adult services websites (ASWs). In other words, for law enforcement to successfully distinguish between a voluntary sex worker and a potential victim of trafficking is challenging even in offline contexts, largely due to the complex role of agency in precarious and exploitative situations, but it is even more difficult to make this distinction by analysing online escort adverts. The information contained within adverts posted at ASWs does not allow us to reliably distinguish between adverts posted by voluntary sex workers or potential criminal networks (Kjellgren 2022). Indicators of trafficking are often employed to signal the presence of exploitation, such as phone numbers being linked to multiple adverts, images suggesting the person depicted to be young, characteristics such as age and nationality or the language used to describe the sex worker and their services. To focus on such indicators is to fail to recognise that all the information contained within adverts are market prerogatives: they are simply there to attract clients and are not necessarily reflective of the characteristics of sex workers or the services that will actually be offered. Based on available evidence, there is nothing to suggest that such indicators can reliably distinguish between voluntary sex work

and exploitation (Kjellgren 2022). By extension, any algorithms or identification matrices relying on indicators to evaluate online escort adverts are highly susceptible to generating false positives.

Despite these complexities, OSINT is important in any investigation into potential sex trafficking within the off-street sex market. However, because of the inherent ambiguities of online interactions and data, the principal strength of OSINT is not in the pre-emptive and proactive identification of potential trafficking victims, but in overlaying ongoing investigations where contextual evidence or intelligence suggests possible safeguarding issues. More precisely, the value of OSINT is based on its potential of using it to map the spatio-temporal patterning of networks operating in the sex market and, in particular, large-scale online networks, which implies a certain degree of complex organisational structures in the offline world.

AN AUTOMATED METHODOLOGY FOR GENERATING OSINT

The premise of the methodology is that whilst OSINT is often required for investigations into internetmediated exploitation, manual means of generating OSINT are ineffective. Additionally, current automated methods tend to be informed by flawed or unsubstantiated assumptions, and are susceptible to generating false positives, particularly when applied proactively. The purpose of this methodology is not to try to identify suspicious adverts but to automatically identify distinct networks operating on the ASW in question. This shifts the focus away from adverts themselves to highlight the properties of the actual networks, without making an assumption about the presence or absence of exploitation.

The methodology itself involves a number of logistical steps and various methods and algorithms to achieve this but, importantly, no artificial intelligence or otherwise probabilistic methods to inform decision-making. An overview of the methodology is provided in Figure 1. A web crawler was created using the Python programming language, which collects online adverts on a scheduled basis, performs data cleaning and stores them in a database. In turn, the algorithm connects adverts based on sharing a phone number or adverts posted by the same user account. The rationale for using phone numbers and user accounts as a means to connect adverts is based upon insights from interviews with investigators, who perceived these characteristics to be more factual than other variables.

It is worth pointing out that tests were also conducted in which quantitative text mining was used to evaluate the textual similarity between adverts. This can be a promising method to discover connections, though it should also be emphasised that such connections can be spurious and are less factual than those based solely on phone numbers and user accounts.

Once all connections between adverts have been established, it is possible to identify distinct networks operating on the ASW in question. A distinct network would therefore be a collection of adverts that are linked together by various phone numbers and user accounts, but in which there are no observable

connections to other networks. The result is that every single advert in the database is assigned a unique identifier signifying network membership, and the database is updated accordingly.

The user of the methodology can easily input a phone number or user account into the algorithm, which then queries the database. All adverts associated with the network are extracted, and the algorithm proceeds to calculate statistics related to network structure, such as density and diameter, and geographical properties, such as the average geographic distance between adverts and the number of locations they have been posted in. Visualisations and summary statistics are then produced to give the user a succinct overview of the network in question. Currently, and for testing purposes, this has been automatically exported into PDF reports, but the aim would be to have an easy-to-use interface to make it more accessible and interactive.



Figure 1. Overview of the methodology used to automatically produce OSINT from ASWs.

EXAMPLE OUTPUTS

Whilst online escort adverts will be central to many contemporary sex trafficking investigations in the UK, a significant challenge is to work effectively with this source of data. One single advert is not terribly useful for OSINT purposes; what makes this data useful is first when the relational nature of these adverts is accounted for. In other words, it is the *connections* between adverts that are of interest, rather than the *content* of adverts themselves. This therefore necessitates a methodology capable of effectively reducing the complexity of the data and transforming them into an accessible product that law enforcement and partners can easily use in the course of their investigations. Fully appreciating the scale and extent of a network will not be feasible with manual means alone, for instance, searching specific phone numbers on the ASW and collecting the adverts associated with them. Consider the graph in Figure 2: this is a network consisting of 3,180 online adverts posted over a period of around 450 days. Manually identifying these connections would be a resource-intensive task, as the network throughout this period has used 399 phone numbers and 164 user accounts.



Figure 2. Example of a large-scale network (*n* = 3,180). Each node represents one advert and the link between them is either a phone number or a user account. Colours highlight cohesive communities within the network.

Scottish Institute for Policing Research, School of Applied Sciences, Edinburgh Napier University Sighthill Campus, Edinburgh EH11 4BN A more focused view of particular communities² within the network allows investigators to examine how adverts of interest are situated in the network. Figure 3 shows the types of connections between adverts. If, rather than relying on network approaches to generate OSINT, adverts are simply evaluated based on potential indicators of exploitation, we risk failing to appreciate precisely how structurally complex some networks within the sex market can be. The digital footprint of an independent sex worker, or a smaller collective of sex workers, will appear quite different compared to some of these more large-scale networks with a clear presence across the UK. However, without crucial contextual offline intelligence, it will not be possible to make an informed judgement on whether exploitation may be a feature of the network.





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² Communities in this context are densely connected clusters of adverts that are all part of the same network.

In any trafficking investigation, it is key to understand the geographical presence and movement patterns of the network. This methodology makes it possible to quickly gain an overview of the geographical footprint of the network. This may be particularly important at the onset of an investigation, since larger networks are likely to span police force and divisional boundaries; this type of intelligence can therefore play an important part in coordination efforts. Figure 4 provides a geographical overview of the network pictured above. It can be observed that the network is advertising across several different areas, though it appears most prominently around Birmingham, Manchester and London.



Figure 4. Network geography. The size and colour of the nodes correspond to the number of adverts posted within that particular set of coordinates.

The more temporal patterns are equally important in this context, as networks tend to be highly transient. Figure 5 shows the more recent changes in locations advertised by some of the user accounts from the network. The patterns suggest frequent movement between the West Midlands and Scotland. Importantly, these patterns do not *prove* where a network in fact is operating, they merely show the geographical areas and markets networks are trying to penetrate. As such, they should be considered potential movement patterns: if services are in demand in a particular locality, parts of the network may temporarily visit the location and then move on to meet the demands of other markets.



Figure 5. Potential movement patterns of a large network, by specific user accounts. The darker red colours highlight relocations that have occurred more recently within the network.

It is also crucial to be able to quickly summarise key information on the network, such as the phone numbers and accounts used. The two tables below provide a brief overview of the most prominent user accounts within the network, as well as an example of movement patterns specific to one of those user accounts. In addition to producing such summaries of information, it is also important to be able to provide access to the entire processed dataset so that intelligence analysts can extract adverts within a network and carry out their own analysis.

Table 1: Network 27: Top 20 User Accounts

Table 2: User Account MCERE Movement Pattern

		-	S-2017 A11 21				
User Account	Frequency	User Account	Date	Location	Lat	Lon	Frequency
40756465	170	30038334	2021-01-11	Beeston	1976.0	1.169/0783	1
40050655	152	DED.CERT	2021-07-26	Selby	10.721.83	1.067100	3
48635856	123	.00014CE14	2021-08-16	Barnsley	0384840	14.42.000	1
43435877	100	304333334	2021-08-30	Scarborough	16.25(1.0)	~ 10000	1
4872,9822	95	30433383.0	2021-09-08	Little Germany	-5.050	 1 Tays 91 	1
12562-002	86	50055555	2021-09-27	Shavington	1 C (Dor 18)	- 42.5× 31	1
1662/2/2	76	20164251	2021-10-04	Stafford	32,81005	~ 1000 MeV	1
1210123	63	30633301	2021-10-18	Barnsley	10.5 (910)	-1.46500	1
52,020 BY 5	60	304333831	2021-11-09	Inverness	17.473148	1.224 (4.8)	2
101-3010	60	-500355554	2021-11-22	George Street	17.17.27	10.005536	1
12237214	56	30133334	2021-12-06	Balnain	37,872,99		2
12030-0016	55	.99034831	2021-12-06	Balnain	16.66.60	 ••• 2000 (a) 	1
c.1429874	50	30633334	2022-01-03	Streethay	2.06137	1.005.02	1
4252.02	46	30033031	2022-01-24	Fishpool	12.654.03	20.11	1
4873980 C	44	1.8285600	2022-02-02	Newcastle City Centre	1.486.57	1.1.6.2050	1
45.5742.00	43	800 240240	2022-02-23	Barnsley	(3.507D)	-1.463030	1
48,835,768	42	1000100011	2022-03-07	Leicester Centre	246.000	1.31.9	1
48.847.54	41	30033034	2022-03-17	Doncaster	1646418	1.21-01	2
2,61412	38	304333834	2022-03-31	Drumderfit	17,072,05	0., 23,230	1
127.0012	37	20038034	2022-03-31	Drumderfit	17.00007	$\omega_{\rm e} = 0.01$	1

METHODOLOGICAL APPLICATION: A DIGITAL OVERLAY

Through the course of interviews with investigators, the best way of using OSINT methodologies was discussed. In contemporary discourse around the applicability of technology to the policing of trafficking, it is often suggested that this somehow is straightforward and, moreover, that the application of algorithms is unproblematic in this context (see Kjellgren 2022 for an extended discussion). Contrary to these claims, using data-driven technologies to proactively identify criminal networks and/or trafficking victims can be deeply problematic. Exclusively relying on online data to identify suspicious adverts is susceptible to generating false positives. This, of course, is equally true for both more manual means of screening online adverts (e.g., L'Hoiry et al. 2021) as well as algorithmic approaches (e.g., Giommoni and Ikwu 2021).

Once an advert has been classified as suspicious, this might trigger a safety and wellbeing visit. Whilst safety and wellbeing visits to sex workers can be considered routine practice in certain police forces, they can cause a non-trivial amount of stress and anxiety, disrupt the business of sex workers, and can certainly be perceived as an infringement of their rights (Holt et al. 2021; Sanders et al. 2018). As such, relationships between the police and the wider sex worker community may continue to deteriorate as a result of increased police scrutiny of sex workers. This is indeed unfortunate, as strong police-sex worker relations could potentially lead to more robust intelligence on possible instances of exploitation, since individuals facing exploitation (especially if they have a precarious migration status) might be more likely to seek support from groups supporting sex workers, rather than the police themselves. The use of OSINT in this context, whilst important, requires sensitivity towards these issues.

Notwithstanding issues relating to victim identification, another serious issue is related to police demand and police resources. Human trafficking investigations are notoriously resource-intensive, and it is highly unlikely that every potential lead generated from OSINT could be adequately developed and

followed up, and there is hence a need for effective prioritisation of potential cases. Here, any intelligence suggesting immediate safeguarding issues must be prioritised; such intelligence, however, cannot be obtained from online escort adverts. Indeed, more robust offline intelligence may be obtained through other channels, such as reports of domestic disputes, concerned clients, or other organisations and NGOs that have been in contact with someone describing their experiences as exploitative. Such intelligence may, more plausibly and accurately than OSINT from escort adverts, inform us of the presence of exploitation.

In those situations when there is more robust intelligence or evidence suggesting safeguarding concerns, that is precisely when OSINT methodologies may prove most useful as a means of triangulation. By using the methodology described in this paper, it is possible to quickly get an overview of whether the situation appears to only involve an independent sex worker, or perhaps a smaller collective of sex workers, to what can be described as large-scale networks operating across the UK. This makes it possible for an investigator to make an initial assessment of the scale and extent of the network, and also to continuously monitor how the network develops throughout time; it creates a digital overlay of the network in question.

CONCLUSION AND FUTURE DIRECTIONS

Preliminary feedback from discussions with human trafficking investigators has been positive, and their contributions have been used to actively shape this methodology into making it as useful as possible. Whilst it was highlighted how such a tool can be useful for more proactive investigations (e.g., examining the large networks present within an area), it was also recognised how more robust forms of intelligence will always be necessary to inform the direction of a case. In other words, OSINT is best used in highly targeted efforts, in which there is pre-existing intelligence suggesting safeguarding concerns. The principal merit of this methodology is therefore in its ability to overlay an ongoing investigation, or to be used to triangulate other forms of intelligence to account for the online dimension of a particular network. There are, however, still several crucial issues that should be addressed to increase the validity and utility of this methodology:

• There are still many ethical challenges to be considered prior to any formal implementation. In particular, the justification of targeting sex workers based on OSINT must be avoided due to the high probability of false positives; OSINT is best used reactively to provide a digital overlay of ongoing investigations or as a means of triangulation against more robust intelligence.

- The methodology needs to be applied during live investigations to adequately evaluate its potential utility and limitations.
- An increased effort must be made to consult sex worker support/advocacy groups and their knowledge and experience. The feedback from such groups is not only important in the design and implementation of algorithms but also in continuously monitoring how the technology is applied in practice. Their expertise will undoubtedly be required to understand data related to the sex market, but also, to strike a balance between public protection and sex worker rights.
- If the methodology is considered for being used in practice on a greater scale, an accessible user interface needs to be developed.
- Partnerships should ideally be established with the largest ASWs in the UK to allow for data sharing. In turn, the methodology should incorporate adverts from all the major ASWs.

REFERENCES

- Albanese J, Broad R, Gadd D, 2022. Consent, Coercion, and Fraud in Human Trafficking Relationships. Journal of Human Trafficking, 8 (1), 13-32.
- Broad R, 2015. 'A Vile and Violent Thing': Female Traffickers and the Criminal Justice Response. British Journal of Criminology, 55 (6), 1058-1075.
- Cockbain E, 2020. From Conflict to Common Ground: Why anti-trafficking can be compatible with challenging the systemic drivers of everyday abuses. Anti-Trafficking Review, 15, 155-161.
- Giommoni L, Ikwu R, 2021. Identifying human trafficking indicators in the UK online sex market. Trends in Organized Crime. Available: https://link.springer.com/article/10.1007/s12117-021-09431-0 [Accessed: 11 November 2022]
- Holt V, Kenway E, Berry A, 2021. Sex Workers As Collateral Damage, Once Again: A Critique Of The New 'Sex Trafficking Identification Matrix' Tool. Available: https://www.swarmcollective.org/blog/2021/9/28/sex-workers-as-collateral-damage-onceagain-a-critique-of-the-new-sex-trafficking-identification-matrix-tool [Accessed: 3 November 2022]
- Kjellgren R, 2022. Good Tech, Bad Tech: Policing Sex Trafficking with Big Data. International Journal for Crime, Justice and Social Democracy, 11 (1), 149-166.

- L'Hoiry X, Moretti A, Antonopoulos GA, 2021. Identifying sex trafficking in Adult Services Websites: an exploratory study with a British police force. Trends in Organized Crime. Available: https://doi.org/10.1007/s12117-021-09414-1 [Accessed: 3 November 2022]
- Lebov K, 2010. Human Trafficking in Scotland. European Journal of Criminology, 7 (1), 77-93.
- Malloch M, 2016. Criminalising Victims of Human Trafficking: State Responses and Punitive Practices. In: Malloch M, Rigby P. ed. Human Trafficking: The Complexities of Exploitation. Edinburgh: Edinburgh University Press, 175-193.
- O'Connell Davidson J, 2006. Will the real sex slave please stand up? Feminist Review, 83 (1), 4-22.
- Pajón L, Walsh D, 2018. Proposing a Theoretical Framework for the Criminal Investigation of Human Trafficking Crimes. Policing: A Journal of Policy and Practice, 14 (2), 493-511.
- Sanders T, Scoular J, Campbell R, Pitcher J, Cunningham S, 2018. Internet sex work: Beyond the gaze. Cham: Springer Nature.