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What is the *Journal of Intelligence & Analysis?*

The JIA is a scholarly publication that strives to "bridge the gap" between academic research and the practical techniques employed by criminal research specialists and intelligence experts worldwide. It began in 1986 as the Law Enforcement Intelligence Analysis Digest with the recognition that a professional publication would provide a medium for sharing techniques and methodologies.

The objectives of the *Journal of Intelligence & Analysis* are:

- To publish articles that advance the theoretical and research agenda of the intelligence and analytical fields related to military, law enforcement, and criminal justice.

- To emphasize empirical research, qualitative studies and scientific methodology, with priority given to articles reporting original research,

- To include articles needed to advance the intelligence analysis profession, and

- To provide informed dialog about analytic policies and practices and the empirical procedures related to those policies and practices.

Submissions are considered from many sources including field-level analysts, investigators, senior policy-making officials, and college and university faculty and researchers. Manuscripts can be submitted at any time during the year and will be reviewed for the next available issue of the publication.

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Scholarly research or best practice articles should be between 15 and 30 pages in length (double-spaced, full justification, 12-point courier or times new roman font). All submissions must be in American English, paginated, and include an abstract and an author's biography. Submissions must adhere to American Psychological Association (7th Edition) standards.

Manuscripts may be submitted electronically: email the document attachment to journal@ialeia.org for consideration. If Microsoft Word is not available, save the document as a rich text format file.

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FROM THE EDITOR

The Journal of Intelligence and Analysis published by the International Association of Law Enforcement Intelligence Analysts strives to bridge the gap between practitioners of intelligence analysis and research in the discipline. The articles in this volume meet this objective. It includes articles that advance the intelligence analysis profession and provide dialogue about analytical practices and empirical procedures related to the intelligence and analytical fields. The submissions are provided by practitioners of intelligence analysis as well as those who have conducted research in the field.

In the first article, Carr and Stoddard conducted research and administered a survey designed to ascertain baseline metrics on the quality of interaction between police and community members. They used indicators developed through strategic analysis that assess police effectiveness which emphasize the values represented by the communities that law enforcement agencies serve and protect. They found that the analyst is in an ideal position to conduct strategic analysis of the police department's effectiveness and to generate methods to bolster police-community collaboration.

In the next article, through exploratory research, Byrne examines the accessibility of personal information found within electronic records maintained by U.S. government agencies and determines the benefits and application to law enforcement intelligence operations. He discusses the balance between accessibility of open-source intelligence and the right to privacy of citizens. His research provides insight into the scope of personal information that requires protection and offers suggestions for the development of curriculums to train intelligence analysts.

The third article, by Greaves, evaluates the application of a geostatistical tool, Local Indicators of Spatial Autocorrelation (LISA), not just to detect spatial clusters but its potential in anticipating future crime locations. Applying this method aims to inform effective law enforcement strategies, specifically in the allocation of resources and the implementation of crime prevention initiatives. This research contributes to the body of spatial crime analysis by providing insights into the viability of using LISA as a forecasting tool, with implications for improving urban crime prevention strategies.

The final article by Pereira uses an inductive approach and bibliographic procedure to analyze the case of former intelligence analyst Brian Regan, who was sentenced to life in prison for acts of espionage. From the analysis, Pereira reaches several conclusions and recommendations that will help law enforcement agencies protect national security and prevent insider threats and espionage.

Feel free to contact me if you have any questions about submissions or contributions to the journal.

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Role of Police-Community Interaction in Strategic Crime Intelligence

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Abstract

The purpose of this study was to highlight the role of intelligence analysts in the ascertainment of baseline metrics on the quality of interaction between police and community members through strategic indicators. The intent was to identify areas of potential growth to foster stronger police-community relations by developing pathways to better serve the community. A survey was administered to a random sample (N = 406) from the City of Ellensburg, Washington, to determine the sentiment of the public toward Ellensburg Police Department and to identify community interest areas. Quantitative responses were assessed using descriptive statistics and qualitative responses were analyzed through phenomenological thematic coding to identify emerging themes. Findings indicate a high level of trust and legitimacy by the public toward the police department and community interest areas include mental health, building community-rapport, homelessness, and child/youth concerns. Recommendations emphasize the analyst position as ideal to conduct strategic analysis of department effectiveness and generate methods to bolster police-community collaboration.

Keywords: strategic crime intelligence, strategic crime analysis, intelligence-led policing, strategic assessment, strategic indicators, police legitimacy

Introduction

The role of analysis within law enforcement has become an integral part of crime prevention and remediation over the past century (Grassie et al., 1977); however, this evolution has not been without roadblocks that continue to hinder full adaptation of intelligence analysis in today's policing. A predominate obstacle hampering the transition from traditional reactive policing to proactive intelligence-led policing is the necessary shift in culture (Ekblom, 2002). A contributing factor to this culture clash is rooted in the dependency on traditional methods of fighting crime and an active indifference toward modernization. Several key challenges causing this hesitation toward the needed culture shift were identified as "poor problem-orientated approaches, poor analytical thinking, and a culture that does not support innovation, alongside fragmentation, occupational divides, media, and public expectations" (Cope, 2004, p. 196).

The consternation driving this continued divide is the traditional police officer's prioritization of information that leads to arrests rather than intelligence focused on crime prevention (Chan, 2001). This belief often leads to unrealistic expectations of analysts and a devaluation of intelligence (Cope, 2004, p. 194). Police administrators must navigate the sensitivities around controlling patrol officers' preference to prioritize problems at the tactical level and bolster emphasis on strategic and operational planning (Cope, 2004, p. 197; Manning, 2001; Ericson & Haggerty, 1997). This political balance puts crime analysts in the precarious position of both meeting the demands of the force and delicately steering operations toward

intelligence-led policing.

The struggle between traditional policing methods and approaches led by intelligence is evident in the restraint placed on the products analysts generate, where there is evidence of hesitancy in providing analysis beyond just summarizing current problems (Cope, 2004, p. 194). Of the observations made in Cope's research (2004), what was missing from the analysts' products was the forecasting, prediction, and evaluation of future issues, the quintessential powerhouse analysts provide for policing. Whether driven by restrictions placed by upper management or a lack of honed analytical skills, the ramifications of these issues are found in the perception of police officers' doubt in the validity of crime analysis due to the perceived lack of accuracy in converting information into actionable intelligence (Chan, 2001). This issue is only exacerbated further when elevated from the tactical level to the more complex level of strategic crime analysis (2004, p. 191). To better understand the implications of these challenges and how to overcome them, law enforcement administrators and officers need to have a clearer understanding of the role of analysts in policing and how intelligence is developed.

Intelligence & Analysis

Recent generations of law enforcement have seen the benefits of intelligence development, allowing an increased ability to "target, prioritize, and focus interventions" (Cope 2004, p. 201). The shift from just solving a crime to the added ability to minimize risk has resulted in more effective police action and a more efficient use of resources. The primary contributors to this success are the analysts that allow law enforcement to convert gathered information into intelligence (Andrews & Peterson, 1990). The intent of the analyst is to cultivate emphasis on intelligence-led policing, a business model founded "on community policing, problem-oriented policing, and crime analysis…to aid law enforcement in threat prevention and identification" (Ratcliffe & Guidetti, 2008).

Analysts are vital to intelligence-led policing because they are driven to provide the "right information…to the right people at the right time" (Fletcher, 2000). This requires a full-faceted approach to lead law enforcement beyond traditional policing tactics through the various types of crime analysis: tactical, operational, and strategic. The distinction between these levels of analysis is driven more by the outcome than input due to the application of short, medium, or long-term recommendations (Cope, 2004). This culmination is honed through analysts' ability to synthesize situational information with environmental influences. As Cope (2004) stated, analysts must have the "capacity to make recommendations based on research and analysis with the capacity to make decisions about adopting recommendations and directing action" (p. 191).

As analysts are integrated more into standard policing practice, the added herculean challenge is the graduation to strategic planning and assessment (Ratcliffe, 2009; Gill, 2000; Read & Oldfield, 1995). Cope (2004) differentiates strategic crime analysis from tactical crime analysis because the former is a higher-level process, which "provides longer term, more detailed analysis of problems and their causes to facilitate strategic interventions, forecast crime, and implement crime reduction strategies" (p. 188). Grana and Windelll (2021) identify the objectives of strategic crime analysis as the blend between the identification and analysis of long-term problems with the evaluation of relevant responses and procedure. Whereas strategic crime analysis involves the processes to create actionable preventative strategies, strategic crime intelligence becomes the byproduct of this process (Ratcliffe, 2007). Ratcliffe's (2007) exploration into crime intelligence shows that strategic crime intelligence holds the most potential value for law enforcement administrators, however, it is an

often-misunderstood resource. He purposed that when more openly applied, strategic crime intelligence has the potential to add the empirical evidence necessary to enhance "discussions of policy, resource allocation, and strategy" (Ratcliffe, 2007, p. 11). The added benefits of strategic crime intelligence extend beyond law enforcement to other areas, such as "health services, city planners, and criminal justice agencies" (2017, p. 11).

Strategic Assessment

What may be considered the most instrumental element of strategic crime intelligence is the ability to measure police performance (Cope, 2004, p. 188; Fletcher 2000; Gill, 2000; Manning 2000, 2001). In the past, police success was measured predominately by crime statistics (e.g., rates, clearance, response times, and enforcement activities, etc.), which were vulnerable to fluctuations in reporting and confounding variables proving this method of strategic assessment less useful than other indicators of effectiveness (Eck & Rosenbaum, 1994). More specifically, strategic indicators, which have the potential to better assess the effectiveness of a police force, are often underutilized by police departments. However, by seeking ways to assess these high-level metrics, the overall effectiveness of law enforcement agencies is more apt to align with their established missions, thus making the need to assess these measured outcomes a priority (Tanksley, 2015, p. 78; McCarthy & Rosenbaum, 2015).

The most impactful strategic indicators that assess police effectiveness are metrics that emphasize the values represented by the communities that law enforcement agencies serve and protect (Tanksley, 2015; Mastrofski, 1999; Moore et al., 2002; Rosenbaum et al., 2015). The need to integrate police and community perspective sharing has been highlighted by the urgent demand for accountability of police on how they balance crime fighting with considering the needs of their community (Ray & Neily, 2021). This shift would require law enforcement leadership to redirect their attention away from relying primarily on crime statistics and more toward understanding the significance of police contact with their community as an influential strategic indicator of police effectiveness (Tanksley, 2015; Mazerolle et al., 2012).

Core to community-police interaction is the assessment of police legitimacy, identified as the public's "trust and confidence that the police will do their job well and serve the interests of the public in a fair and equitable manner" (Rosenbaum et al., 2015, p. 9; Hinds & Murphy, 2007). To emphasize the importance of this community rapport, law enforcement agencies should prioritize police trustworthiness as an indicator of effectiveness. Research established that trustworthiness is determined by whether the "community can trust the motives of the authorities to do the right thing and not harm them" (Tyler & Huo, 2002; Tyler & Wakslak, 2004). The ability for law enforcement officers to demonstrate the necessary empathy and compassion are measures of performance that contribute toward assessing the strategic indicator of police legitimacy (Tanksley, 2015, p. 6; Singer et al., 2006).

The overarching benefits of placing a higher priority on positive police-community interaction is evident in the developed relationships fostered by street-level police officers, therein contributing to strategic crime intelligence assessment (Modafferi & Lynn, 1999). In general, people are more likely to respond positively when they believe "others can understand their point of view, feelings, and circumstances and respond with compassion, reassurance, and comfort rather than indifference, criticism, or blaming" (Tanksley, 2015, p. 6). The significance this holds for law enforcement is that the more their communities perceive them as legitimate and trustworthy, the more likely community members will obey

laws and cooperate with police officers (Tyler, 2006). This collaborative rapport between community and police has been proven to lead to "greater public cooperation and compliance, easier de-escalation of conflict, less use of force, and greater public confidence in the police as legitimate authorities" (Tanksley, 2015, p. 2-3). Therein making the advantage of fostering improved police-community interaction to have positive influence on tactical, operational, and strategic levels of both crime intelligence and crime analysis.

Methods

The intent of this research was to establish a baseline assessment on the strategic indicator of police-community interaction in the City of Ellensburg, Washington. General descriptive statistics were used to analyze the quantitative data of this project, whereas phenomenological thematic coding was used to explore the qualitative data. The Police-Community Interaction Survey (PCIS) was selected as the data collection instrument for this research due to the similar sampling technique through solicited inquiry of community members, as well as the preestablished validity and reliability findings (Rosenbaum et al., 2017; Rosenbaum et al., 2015). The PCIS is a complex satisfaction survey evaluating interactions with the police with the goals to enhance professionalism and strengthen public trust in police (Tanksley, 2015). The survey was distributed in English and Spanish throughout the City of Ellensburg, Washington (population 18,750) both electronically and hardcopy during the month of January 2024. The collected data was used to generate measurable benchmarks for assessment in policing and to understand the factors affecting police-community interactions (2015, p. 2). Demographic questions to ensure generalizability of the findings and open-ended questions regarding potential community-interest areas were added to the PCIS to create the complete questionnaire used for this research.

Results

Diversity of participants (N = 406) shows a 99% representation when correlated with United States Census ethnicity demographic data from 2020 (U.S. Census Bureau, n.d.; see Figure 1), allowing these findings to be generalized back to the population of the area. The age distribution of participants ranged from 18 to over 65 years of age. Most of the participants (96%) identified their housing status as owning (68%) or renting (28%) at the time of this survey. The top two categories of employment, accounting for 79% of the participants, were employed (61%) and retired (18%). Most participants (66%) reported being residents of Ellensburg for over 10 years. When asked to identify their sex, 66% of participants reported female, 31% reported male, and 3% opted not to disclose.

To assess the community's perception of police effectiveness, the questionnaire contained areas specifically targeting the strategic indicators of police legitimacy, performance, and community-rapport (see Table 1). There were 14 questions using a Likert scale of 1 (strongly agree) to 5 (strongly disagree), that were aggregated to determine an overall legitimacy rating for the Ellensburg Police Department. The low mean result indicates an overall assessment of very high legitimacy (M = 1.27) with an extremely narrow range of 1.268 to 1.275.

Performance was assessed with six questions using a Likert scale of one (strongly satisfied) to five (strongly dissatisfied). Resulting scores for each section were (a) fighting crime (M = 2.08); (b) being open and honest with the public (M =

2.22); (c) working with the community to solve problems (M = 2.25); (d) listening to community concerns (M = 2.27); (e) responding to mental health issues in the community (M = 2.27); and (f) being accepting and supporting of citizens who want to file a complaint against a police officer (M = 2.25). The overall performance rating for the Ellensburg Police Department was moderately satisfied (M = 2.26).

Community-rapport was assessed using binary response, one for yes and two for no, for four specific questions inquiring on the familiarity of the participants with Ellensburg Police Department officers. The overall community-rapport rating was moderate (M = 1.69) with a range of 1.38 to 1.90. The lowest resulting 1.90 score pertained to whether the community member was a participant in a meeting where an Ellensburg Police Officer explained what police were doing about neighborhood problems in the past year.

The qualitative questions resulted in four dominant themes that encompassed most of the open-ended comments (see Table 2). The first theme pertained to mental health and the concern for access to quality care and general responsiveness when individuals are in crisis. The second theme was community-rapport building, emphasizing the interest of the participants to improve the relationship between the community and the police department. The third emerging theme was the concern of homelessness and the need for humane treatment and reasonable relocation housing. The final theme was child and youth concerns, citing the need for more intervention in the schools and opportunities for more positive engagement activities.

Discussion

In absence of previously established strategic assessments, the results from this research provide the Ellensburg Police Department with the baseline metrics necessary to accurately gauge department effectiveness. The role of the analyst in the data collection of this study highlights the functionality of the position to identify key social metrics that align with the department's mission. These results should be taken into account when considering how to enhance general effectiveness of policing as it aligns with community interest areas (Tanksley, 2015; Rosenbaum et al., 2015; Mastrofski, 1999; Moore et al., 2002).

Although the resulting police legitimacy level rating is indicative of the community's high trust in the police, the Ellensburg Police Department should work to identify specific efforts that directly impact this area of assessment to sustain or enhance this area. In regard to the performance indicator, it is important to note that these findings did not indicate any issues or areas of concern that need to be immediately addressed. However, there are potential improvements that should be taken into consideration, such as seeking more opportunities to communicate regularly with the public. Another area to cultivate higher legitimacy is to educate the public on common misperceptions that are thought to be directly linked with crime
(i.e., homelessness, mental health, etc.) and help to educate about efforts to prevent victimization. Additionally, a more empathetic effort to support the community is to ensure continuous communication with victims of crime, providing a clear understanding of the investigation status (e.g., whether a crime is prosecutable and explanation for why it may not be litigated; Ekblom & Heal, 1982).

Even though the results of this survey can be generalized to the community of Ellensburg, further research is necessary to identify how the sentiment of the public toward police-community interaction differs in comparison with other communities surrounding Ellensburg, as well as similar sized communities with comparable demographics in the region. However, the lack of crime intelligence analytical support would require a cross-collaboration with agencies who have established analysts and those who do not to replicate the methods of this research. External resources could be utilized, such as contract researchers, but the familiarity with the department and the community could be jeopardized in the analysis of the findings.

The primary limitation of this research is the lack of comparative analysis to determine if the Ellensburg Police Department is increasing, sustaining, or decreasing the overall effectiveness of their operations from previous years. This highlights the sustainable continuity an analyst provides to conduct the research necessary for comparable assessment. The analyst empowers law enforcement agencies the ability to implement longitudinal studies using the same method of data collection and the familiarity with the community to communicate the findings in a meaningful way to both city leadership and department administration.

This specific application of social science research illustrates the data that departments can – and should – collect to inform police practices. This data collection effort allows the Ellensburg Police Department to examine citizens' perceptions toward law enforcement. In the current era of policing, this understanding of community connection and perception is critical, as much of the work in criminal justice and criminology draws from the procedural justice framework developed by Tyler and others (2006, 2004, 2002). Again, this framework indicates that citizens are likely to be more cooperative with law enforcement when they see those agencies as being legitimate. Additionally, citizens who have positive perceptions and connections to local law enforcement are more likely to work collaboratively in a more operational sense. This leads toward crime reduction with a co-production between citizens and law enforcement.

For departments to leverage power of working with communities – they must have an objective and data driven picture of what that relationship looks like. Many departments incorporate social objectives with the community into their mission, vision, and value statements. However, the lack of or often missing systematic data collection to assess these connections limits the ability to fulfil these objectives. Departments can use social metrics to identify strengths, weaknesses, and opportunities in their connection with the community to actively improve these relationships. Qualitative data can help shed light on the specific mechanisms and concerns a community may have. This information – combined with department knowledge and leadership can strengthen the connections with the community and have tangible impact on crime related metrics that are more traditionally within the crime analyst's area of focus.

In this specific example, the data Ellensburg Police Department collected can be used to identify the community connections that need to be focused on and improved. While next steps are needed (e.g., follow up measures; departmental initiatives to target any weaknesses or opportunities; continual monitoring of typical crime data, such as calls for service; etc.) this study establishes the first step in the process to affirmatively integrate strategic indicators using social metrics as an official data objective and operational imperative. This also creates the expectation of who will collect, analyze, and make sense of the data for operational purposes. These kinds of initiatives need to become common place in all police departments and the core responsibilities – due to the nature of this tool set – will typically fall upon the shoulders of the crime and intelligence analyst.

Conclusion

Research supports the need to align law enforcement performance metrics with community interests (Tanksley, 2015; Rosenbaum et al., 2015; Mastrofski, 1999; Moore et al., 2002). Through fostering a stronger relationship between the police and community, this method of community-oriented policing allows the public to have the assurance that their concerns matter and that their voice will be heard (Tanksley, 2015). This benefits law enforcement because it provides the needed strategic intelligence analysis to understand the communities they support more cohesively, as well as generate community interest to work with law enforcement to fight crime (Tyler, 2006). To achieve the successful transition from archaic methods of policing to intelligence-led policing, analysts hold the role of creating opportunities to collect data on strategic indicators and act as the catalyst between community members and law enforcement. The criminal justice and criminological literature emphasize the concept that stronger community relations have a tangible impact on crime and crime adjacent outcomes (e.g., fear of crime, perceptions of crime and disorder, etc.). While these 'hard' measures of crime are often the focus (sometimes exclusively) for crime analysts, social metrics need to become just as common. Crime and intelligence analysts typically have a strong affinity and background in social sciences and methodology. Within most police organizations, they will be the ones with the best toolset to collect, analyze, and make sense of social data about police community relationships. It is imperative that crime analysts incorporate these duties and responsibilities into their normal role and function. To summarize the purpose behind this research is the voice of one community members who participated in the study that otherwise would have been unheard:

> That, as a citizen, I don't want to be scared of them. I don't want my family members and friends to be treated as criminals before their innocence is established…I am grateful to those officers who have taken the time to know themselves, their biases, their preordained beliefs - and their awareness to not let those things get in the way of peaceful service to the people. Thank you for asking our citizens to be heard. (P25)

Table 1

Concept Overview

Concept	Question/Prompt
Legitimacy & Trust	I would work with the Ellensburg Police to identify a person who committed a crime in my neighborhood.
	If I saw a crime happening in my neighborhood, I would call the Ellensburg Police to r eport it.
	I think I would be treated fairly by Ellensburg Police.
	The Ellensburg Police treat people like me respectfully.
	If I call the Ellensburg Police, I will receive the same quality of service as others in Ellensburg.
	The Ellensburg Police are trustworthy.
	The Ellensburg Police make decisions that are right for the people in my neighborhood.
	I think my values and the values of Ellensburg Police are very similar.
	Ellensburg Police treat people respectfully regardless of their sex, gender, or sexual orientation.
	I think the Ellensburg Police Department is well managed by professional leaders.
	Ellensburg Police treat people respectfully regardless of their race or ethnicity.
	Ellensburg Police treat people respectfully regardless of their mental health status.
	The relationship between the Ellensburg Police and the people of this city is very good.
	The Ellensburg Police do not use race and ethnicity when deciding whether to stop someone.

Performance	Fighting crime
	Listening to community concerns
	Working with the community to solve problems
	Being open and honest with the public
	Responding to mental health issues in the community
	Being accepting and supportive of citizens who want to file a complaint against a police officer
Concept	Question/Prompt
Community Rapport	Have you had a casual conversation with an Ellensburg Police Officer in the past year?
	Have you attended a meeting where an Ellensburg Police Officer introduced him/herself in the past year?
	Have you attended a meeting where an Ellensburg Police Officer explained what police are doing about neighborhood problems in the past year?
	Do you know the first and last name of an Ellensburg Police Officer who patrols in your neighborhood?

Table 2

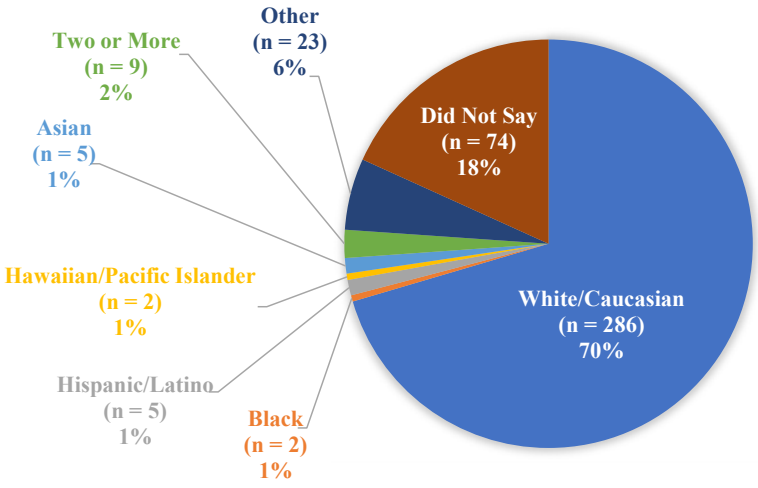
Qualitative Findings for Emerging Themes (N = 876)

Emerging Theme	Example Quote
Mental Health	"To take people's mental health into consideration and help them get the mental health treatment instead of sending them to jail if they can visibly see there is something more serious going on…Some people just need a helping hand and not everyone is a "lost cause". We need to work together to support and improve each other." (P308)
	"That a lot of people who live here can't move or get access to proper mental health care. Most of the mental health is taken care of by comprehensive mental health and they don't take Medicare. Not everyone has Medicaid." (P333)

Community-Rapport Building	"Please be more transparent with the community. You guys seem to keep a lot of reports about crime hidden. Post arrests and crime activity on your Facebook. Don't keep it hidden from us. Makes me feel unsafe." (P269)
	"Neighborhood meetings with police officers helping with information about crimes affecting people in the neighborhood. Neighbors are more likely to help police when they know the people who are victims of crime." (P333)
Homelessness	"I am unsettled about the uptick of homeless floating around town. A couple of businesses are concerned about finding people sleeping in their doorways when opening their shops in the morning and locking up after workday." (P160)
	"Quit allowing the homeless to take over our community. Sleeping on the sidewalks downtown. Especially with drug abuse or mental health problems they are unpredictable and irrational. Not fair for business owners or their staff to have to deal with these people. Most are not from here." (P233)
Child & Youth Concerns	"Tackle all of the issues at the schools. Its concerning how "funny" they think it is to joke about weapons and school shootings when they run rampant in this country. MANY innocent lives have been shed from this issue and these entitled kids continue to relentlessly bully others and make jokes about awful events…THE SCHOOLS NEED HELP. The high school and elementary are a little better off but the Middle school runs rampant with bullying, fighting, and worrying behavior...Its really changed my perspective of how I view this community because they have to learn that behavior and toxic opinions somewhere (most likely from hatred spewed at home or neglecting to monitor social media use at all!)" (P39)

Figure 1

Research Participant Ethnicity



Note. The participants who identified as Native American also identified as another ethnic category, placing them under the criteria to be represented as part of the category Two or More.

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OSINT and Public Records: A Boon for Intelligence Analysts and a Challenge for Privacy

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Abstract

Law enforcement has long benefited from OSINT, especially in the collection and analysis of information on subjects, organizations, and locations involved in a case. Through a few clicks of the mouse, thousands of publicly available local government records can be searched to uncover the personal affairs of a target's life, such as criminal history, property ownership, business affiliations, and litigation records to name a few, all of which can have a significant impact on the progress of an investigation. Data mining these open sources is invaluable to Intelligence professionals as they offer a cost-effective and discreet approach to validate and reveal hidden evidence. Often times, within these very records exists personal information that shouldn't be privy to the public and need to be safeguarded, thus the availability of digital documents has caused an unavoidable conflict; on the one hand, state governments are required to provide the public with a transparent view of its activities by offering open access to its records, and on the other hand, they need to secure their citizens' right to privacy. Especially since the threats from cybercrime are on the rise, finding the right balance between accessibility and privacy is not a simple task. This exploratory research reports on the accessibility of personal information found within electronic U.S. local state government records and determine the benefits and application to intelligence operations. The methodology entailed a content analysis of 500 public documents retrieved from 5 randomly selected states to reveal the extent of sensitive information found within and how they can be utilized in a criminal investigation. The results of this research will provide insight into the scope of personal information that requires protection in these sources and offer suggestions for the development of curriculums to train future intelligence analysts.

Keywords: Public records, privacy, OSINT, open source records, intelligence analysis

Introduction

Open-source intelligence (OSINT) is routinely utilized by analysts as an approach to collect and analyze information on subjects relevant to their investigations. OSINT is a dominant source of information that is available and includes items such as news articles, books, videos, websites, commercial databases, directories, technical literature, maps, government records (Larsen, 2023), social media (Klippenstein, 2020), and anything else that is freely accessible in the public domain. Routinely found in on-line formats, their hardcopy counterparts have significant value as well and are typically found in archives, libraries and governmental offices (Clarke, 2007). Open sources are especially helpful to law enforcement, journalists, corporations, military, and data brokers to gather information on individuals or companies. Combined with closed sources of data, categorized as classified, law enforcement sensitive, confidential and proprietary, the resulting amalgamation can develop high quality intelligence products, help in decision-making and prove hypotheses, thus police agencies require OSINT to develop the evidence needed (Byrne, 2023; Larsen, 2023; Staniforth, 2016; & Gibson, 2014).

One type of OSINT source that is particularly helpful to intelligence analysts in their investigations comes in the form of public records which are produced by local and state U.S. governments during the course of their business and are available to society to view. Public records are the result of a transparency effort to ensure the accountability of public authorities (Borgesius, et. al. 2015). Although each jurisdiction defines the term differently, the most encompassing definition includes "…a record that a government unit is required by law to keep…are open to view to the public" (Garner 2004, 1301). Generally, this consists of any business the government conducts including budgetary and legal matters and real property transactions of its citizenry. Practically any contact with a state or local level government agency generates a public record; birth certificates, drivers' licenses, civil or criminal litigation, marriage licenses and real property ownership are all examples of documents that were created as a result of a transaction with a public bureaucracy. Often times these records contain sensitive information which can be instrumental in intelligence gathering but also should warrant protection from cybercriminals.

Literature Review

Although public records provide intelligence professionals with an invaluable source of information to assist with their investigations, it comes with a drawback that they contain personal data of the citizens of the U.S. which is normally safeguarded from release. Much of this data, such as dates of birth, mother's maiden names, social security numbers, addresses, and the like are extremely helpful to analysts in developing dossiers and background information on targets, but at what cost to the privacy of citizens of the United States?

Personal Information Found in Public Records

One particular piece of information that is probably considered the most sensitive is a person's social security number. The need to protect this number is a vital concern (U.S. Social Security Administration Feb. 2004) and is often the basic piece of information that identity thieves target. The U.S. Government Accounting Office estimated that more than 75% of counties' public records nationwide contain at least one type of record that displays social security numbers (GAO 2004). Recently, 2.9 billion people had their personal information exposed, specifically social security numbers, from the hacking of data broker National Public Data, a company that aggregates public records information for use in employee background checks (Healey, 2024); in essence the information stolen can create a complete dossier now for sale on the dark Web (Townsend, 2024).

Locating a social security number has obvious benefits in developing profiles of criminals, unfortunately it is also an attractive piece of data for identity thieves. Consider the case of Morris Hines, a sleuthing tax accountant who collected the personal identifying information of 150 inmates via publicly available records and filed fraudulent tax returns on their behalf, netting a significant amount in tax refunds (Cole 2006).

The Privacy Rights Clearinghouse (2023) keeps track of and maps data breaches nationwide, which includes unauthorized access to public records, and to date nearly 48,000 breaches have occurred. Monroe County Government experienced

a breach of its public records which affected its residents in August 2023 and over a decade earlier, in Durham, North Carolina identity thieves obtained some 8,700 social security numbers, dates of birth and employment details of its staff simply because this information existed in their public records which was made available via their website (Privacy Rights Organization 2023).

Although the majority of identity theft scams have been designed to obtain social security numbers, bank account information and the like for monetary benefit (U.S. Department of Justice 2010), Newman and McNally (2005) identified that perpetrators often use it to avoid prosecution for other crimes committed and creating new documents. Sharing with a police officer during a traffic stop the date of birth, the full name and address of another can be enough to avoid capture whilst linking this information together to form a new document can be used to commit fraud such as applying for a credit card (Newman 2004) by forming a "portrait of a person" (Solove 2004, 44). In this new age of technology, consolidation of information from varied sources is accomplished much easier and more extensively than during the non-digital times (Solove 2008, 118). Although beneficial to an intelligence analyst in the development of a criminal profile of a target, it has a cost to individual privacy.

Personal Information Defined

In the broadest sense personal information is simply the data that is identifiable to a single individual. In essence, certain pieces of data are unique in such a way that each can only be associated to one person (Shane, Podesta and Leone 2004). Therefore, in order to be considered personal information there has to be a relationship between a specific piece of information and the person for whom it belongs (Kang 1998). Referred to as Personally Identifiable Information (PII), it represents data that "permits the identity of an individual to be directly or indirectly inferred, including any information which is linked or linkable to the individual…" (U.S. Department of Homeland Security 2011, 6). Krishnamurthy and Willis (2001) found that personally identifiable data was uncovered when different types of information was mined and aggregated together using publicly available information uncovered on social networking websites. Termed "data leakage" meant that personally identifiable information that was gleaned from a user's activity of online social network websites could then be theoretically linked back to that specific person using public records.

Birth Records

The documentation of human birth is an example of a public record which often contains sensitive personal information including the name of the baby recently born, gender, issuing authority, state, and birth date. This document is key for use later in life to obtain a social security number, driver's license, proof of citizenship, employment and to obtain other government services and benefits (Brown 2000). Birth certificates also contain additional sensitive information including the full names of the parents, home addresses and, of particular interest, the date of birth of the child and the maiden name of the birth mother (Rhodes et. al. 2002) which like the social security number are essential to keep private. Usually, the date of birth is used in conjunction with the mother's maiden name by banks, credit card companies and other financial institutions as a second level to the authentication process to access accounts or set up passwords (Solove 2002). Many states allow the public to access birth certificates while only some regulate the process of obtaining them. For example, "… in 14 States, public access to birth records is 'open' at the State and local level, and virtually anyone can review birth records

or purchase a copy…as long as they know the name and birth date of the person listed on the birth certificate" (Brown 2000, 9). Griffith and Jakobsson (2005) examined public records held by the Texas Vital Statistics website covering a 36-year time period and found that the mother's maiden name was easily compromised. "From these records alone, we were able to fully compromise 1,114,680 males… [and]…288,751 women" (4). Access to birth records can lead to the creation of false identification documents used by fugitives of justice and narcotic traffickers (Brown 2000) and can be used by intelligence analysts to verify an individual's identity.

Court Records

An individual's photograph provides an example of personal information available in public records that could be accessed. Certain public records, such as court and arrest records often contain facial photographs and descriptors such as weight, height, gender, ethnicity, date of birth, and color of eyes and hair (Solove 2002).

Individuals who have been convicted or arrested involuntarily disclose information about themselves that the average law-abiding citizen keeps private. The rap-sheet for example, provides a summary sheet of the criminal history of offenses including arrests, criminal charges, dispositions of the case and sentencing details, and is often available to the public (FBI 2025). Rap-sheets often "contain personally identifying information such as the subject's name, date of birth, sex, race, and physical descriptions" (Nagel and Humble 2005, 1).

Essentially, the rap-sheet consists of a chronological history of an offender's involvement with the criminal justice system and includes descriptive information such as their mugshot, physical descriptions, fingerprints, and summary of police reports with disposition (CHRIA Handbook 2012). The criminal case involving the murder of Casey Anthony offers an example of just how much information was placed online to the public "…thousands of pages of legal documents detailing the sweeping criminal investigation [were] released in response to [public] records requests" (Edwards 2009, -n.p.) and "… included crime scene photos, video, audio and written transcripts of witness interviews; forensic reports; Internet chat logs; and digital images taken from the defendant's computer" (Pafundi 2010).

Tewksbury (2005) reported that convicted sexual offenders were compelled to provide personal information to the public; Megan's Law contains registered sex offenders and includes a photograph of their face, social security number, address, rap-sheet, and employment information (Paul P. v. Verniero 1997; Russell v. Gregoire 1997). Levenson and Cotter (2005) showed that outpatient sexual predators in Florida provided personal information "…such as photographs, home address and telephone number, work address, vehicle information, and HIV status…" to the public (53).

As seen, courthouse records offer an array of information about offenders that is freely accessible by the public and much of which is available via the Internet. Beebe (2002) analyzed search results for 26 states Department of Corrections' web portals that included name, date of birth, place of incarceration, photos and physical attributes such as "marks, scars, tattoos, and other distinguishing features of the inmates" (Beebe 2002, 25). Although criminal information on public websites is freely available, it doesn't mean that the information is accurate (Lageson & Stewart, 2024). Nagel and Humble (2005) found many inconsistences when compared to the official rap-sheets of six offenders.

It's not just criminal records that are publicly available. Court records contain a wealth of personal information as compared to other public record types and are readily accessible from local and state government agencies (Lageson & Stewart, 2024; Gellman, 1995). For example, Logan et al. (2003) examined the characteristics of parents involved in divorce actions and identified "case characteristics" which contained the name of the attorneys, length of time current and previous marriages lasted, ages of parties, employment details, background information on the children, substance use, history of spousal violence, custody evaluations and mental health issues of the parents.

Public court documents are a treasure trove of personal information; "…court files may contain vast quantities of data, such as…tax returns and other financial information" (Lane 2002, 246). Typically, in a personal injury type of lawsuit, the plaintiff is required to provide employment records including salary and the dollar amount for the loss of income due to the accident as well disability payments and social security information (Solove 2002).

Records filed in bankruptcy courts also offer an array of sensitive data that can be helpful to a law enforcement analyst but also to identity thieves. Webster (2011) reported on the availability of personal information from bankruptcy files as a "goldmine for investigative reporters" (7). Similarly, Holt and Pozananski (2005), uncovered significant information on amount of cash on hand, artwork, firearms, unpaid utility bills and expenditures from these records. Henderson (2004) recognized how the bankruptcy petition includes current and previous names, addresses, marital status, spouses name, date of birth, relationship to dependents, employer information, income, and expenses, while Holt and Poznanski (2005) found that they often list the last four digits of a social security number.

Real Estate Documents

Property records contain sensitive information too, such as the owner's name and contact details, the name of the bank where the mortgage was purchased, signatures of the parties to the transaction and other financial information (Solove 2002). Access to this information is a concern as criminals target this data to create fraudulent public real estate records (Roscoe & Szostak, 2017) and it can be especially vulnerable to "deed theft" which is on the rise nationwide. According to the FBI, land ownership records are being targeted by fraudsters who create documents that appear to be from the rightful owner, and use signatures captured from publicly available information to sell the property, unbeknownst to the holder (Thoreson, 2024). Newman (2010) also identified real property records available from government offices as being rich in financial information which is useful in the foreclosure process. The initial filing in a foreclosure action referred to as 'lis pendens' contains "…information that identify the borrower, plaintiff, originating lender, property address…interest rate, loan term, monthly payment and prepayment penalties" (163).

Typically, law enforcement intelligence analysts utilize public records to locate financial information on criminal suspects to investigate crimes and determine assets especially involving crimes relating to bookmaking, extortion, and money laundering. Kinnee, in his chapter entitled 'Conducting an In-depth Background Check' (1992), identified land records found in the county clerk's office as providing key pieces of financial type of information found in deeds and titles which often contain the names and home addresses of current and past property owners, the bank name used for the mortgage and signatures of the parties. Furthermore, public utility companies offer information which is publicly available and provide what is commonly found on a gas or electric bill. A second address, for example, the location where the bill is

mailed may enable intelligence analysts to locate a subject and seize their assets. Further, real estate records are chockfull of financial information such as tax assessment records, homeowner name, the amount paid for the property, the current value, amount of taxes and a full description of the structure including the number of rooms and size of the house and plot (Solove 2002).

Although public records do offer intelligence professionals with a plethora of information to assist their investigations, it comes with the cost of privacy breaches which can have major ramifications.

The benefits of placing government public records online to the masses are obvious: it increases accessibility, improves government transparency and accountability and makes efficient use of resources (Cattanach, et.al., 2021). To the intelligence professional, it offers a freely available resource of data, but at what cost to the privacy of the U.S. citizenry? Thus, this research sought to answer the following research questions:

RQ1: What types of personal information are available in state and local government public records?

RQ2: How can public records be applied to support investigations?

Research Methodology

Content analysis coupled with grounded theory was selected as the methodology because it enabled the researcher to systematically review and analyze data gathered from online public records in an objective and consistent manner to identify themes and comparisons. In addition to being the most widely implemented methodological form in reviewing any type of communication (Neuendorf, 2002), content analysis also has many advantages that make it perfect to answer the research questions posited. As Krippendorff (1980) indicated using content analysis is an unobtrusive method which relies on pre-existing documents that have been created for a particular purpose and as Denzin and Lincoln (2005) opined "grounded theory methods consist of simultaneous data collection and analysis, with each informing and focusing the other throughout the research process, in turn, we use those focused data to refine our emerging analysis" (508). Most importantly, though, content analysis combined with grounded theory provides a systematic and holistic procedure to examine text in documents.

Data Collection

This phase of the study entailed a review of 500 online local and state government records randomly selected from five states nationwide in 2020. The simple random sampling method was used for obtaining both the state and record samples in this research, which ensured that any sampling biases were removed or reduced and that the sample provided a solid representation of the total population. The five states were chosen with the simple random sampling technique from a total of 48 for this research, excluding the two states already used in the model study, (i.e., Florida or Rhode Island) as published by Byrne (2010). The "Research Randomizer" at http://www.randomizer.org was utilized for generating five random numbers from 1 to 48 to represent the five individual states (i.e., Colorado, Iowa, Maine, Montana, and Nevada) that constituted the sample population. Because many of the government public records are found at the county level, the second step involved identification of all the available counties within each of the five chosen states. BRBPub.com provided a list of counties in each state, which was used for obtaining four counties from each of the five states selected for this

research with the help of "Research Randomizer". A total of 20 subject counties were finally chosen.

The next step in the sample selection process involved the identification of the records to be studied. This was accomplished by utilizing the "Research Randomizer" again whereby 25 online local government records were selected at random from each of the 20 representative counties within the five states for a total of 500 records. The 25 records retrieved from each of the four counties focused upon five major record types: property, civil court, criminal records, family documents and professional licenses. Five documents from each of the major record types were analyzed after being selected by following a search procedure, described below, for this research. BRB website was again consulted to locate the official website addresses for all the 20 counties where the public records were found.

People's last name associated with one of five colors, namely, Black, Brown, Gray, Green and White, were used for searching one of the five states' government county websites to obtain public records. That is, each state was assigned one color that could be used as a last name. For example, White was assigned to the State of Colorado as a last name for search purposes. As described earlier, five records of each type were selected for obtaining final records for data analysis. The strategy was to choose records from as many different years as possible. For instance, one record was selected from the most recent filing, one from the oldest available filing, and the rest from the years in between. Depending on the search engine or index system available at the county website of public records, the search query was formulated accordingly. Some systems of public records only support address search. "Main Street" was used as the search term in those cases.

The five major public records were further deconstructed into subcategories. For example, property records were divided into deeds, mortgage, and tax; civil records contained marriage, birth, death, divorce, professional licenses and lawsuits while criminal records consisted of felony, misdemeanor, traffic and docket items. Once the review of the chosen public records started, categories were assigned based on observations and analyses. There was some overlap of categories that was resolved by resorting to the originator of the records. For example, a foreclosure is derived from a real estate transaction that has gone sour; however, if the record was retrieved from a local commercial courthouse website, then it was placed in the civil court category.

Measuring Sensitivity Levels

The data analysis procedure measured the levels of sensitive information found within the records collected from the sample local state government systems. Careful measures were taken to avoid the drawbacks through the utilization of a single coder in analyzing the documents retrieved and employed three strategies. The first involved implementing a test-retest process where the research was accomplished at different time intervals; the second entailed a pilot test, to improve reliability of methods, and the third involved systematic recordkeeping to ensure that future attempts at looking at the same documents will yield the same findings.

Having developed the appropriate methodology to analyze the records to ascertain the degree of personally identifiable information that can be harvested, this study reflected on the theoretical constructs Kang (1998) outlined in which he further identified three different levels of personal information. These pieces of data are unique and "identifiable to the individual" (1206) and can be placed into categories that are based on the relationship a person has with information "…

whether sensitive or trivial-is somehow identifiable to an individual" (1207). Furthermore, borrowing on the color-coding advisory system from the Department of Homeland Security, this research implemented a list of privacy level descriptions as illustrated in the Enhanced Levels of Sensitivity of Identifying Information Scale (Table 1.0). The different colors indicate the degree of sensitivity of identifying information if released in the public. As information becomes more and more sensitive, the color changes to reflect the seriousness of its exposure. For example, the release of a social security number warrants the highest alert level (color red) as compared with a person's name as found in a telephone book at the lowest level (color green).

Table 1.0: Enhanced Levels of Sensitivity of Identifying Information Scale

Results and Discussion

Level	Degree	Categories of Sensitive Information	Sensitive Information Examples
Level 5	RED	SEVERE	
		Social Security No.	Last 4 digits
		Bank Account No.	
		Mother's Maiden Name	
		Drivers License No.	
Level 4	ORANGE	HIGH	
		Signature	
		Date of Birth	
		Photograph	face, home
Level 3	YELLOW	Elevated	
		Criminal Record	Rap sheet, Court Calendar, Fines, dockets
		Civil Court Actions	Judgments, liens, foreclosure
		Divorce	Decree, wife's maiden name
Level 2	BLUE	GUARDED	
		Property Ownership	Deed, Mortgage, Tax Bill, Liens
		Biographical	DOB, DOD, Race, eye/hair color, sex
		Family Members	Names of spouse, children, etc.
		Marital Status	Marriage license
Level 1	GREEN	LOW	
		Name	Full, part, initials
		Address	business, vacation home, current residence, home
		Phone Number	phone, business, cell phone, e-mail

Upon careful examination of the 500 state public records used in this study, it was found that personal information was accessible from the five online local and state government documents collected. Although all the five states selected for this study had documents containing personal information, no two states were exactly alike in their coverage nor accessibility. Some states and counties limited the number of searches performed, had a paywall or other barrier including CAPTCHA and registration via a valid email to perform a search. Table 2.0 lists the type of records that contain personal data from the five states reviewed. Property records, for example, in most cases provided owner name and address and criminal documents provided date of birth and photograph.

	COLORADO					IOWA					MAINE					MONTANA					NEVADA				
Property	C1	C2	C3	C4	TOTAL AVG	C1	C2	C3	C4	TOTAL AVG	C1	C2	C3	C4	TOTAL AVG	C1	C2	C3	C4	TOTAL AVG	C1	C2	C3	C4	TOTAL AVG
Address			1			1	1	1	1		1					1		1	1		1	1	1	1	
Owners Name			1			1	1	1	1		1					1		1	1		1	1	1	1	
Drawings/Photo			1			1	1	1								1		1	1		1	1	1	1	
Previous			1			1					1					1			1		1	1	1	1	
Value/Sale Price			1				1									1					1	1	1	1	
Signature			1								1					1			1		1	1	1	1	
Tax Info			1			1	1	1								1		1	1		1				
Link to Document			1								1					1			1						
%	0.00	0.00	1.00	0.00	0.25	0.63	0.63	0.50	0.25	0.50	0.63	0.00	0.00	0.00	0.16	1.00	0.00	0.50	0.88	0.59	0.88	0.75	0.75	0.75	0.78
FAMILY	COLORADO					IOWA					MAINE					MONTANA					NEVADA				
Record		1	1								1	1	1	1							1	1	1	1	
Address																					1	1		1	
Groom/Bride			1								1	1	1	1							1	1	1	1	
Maiden Name		1																			1				
Record Date																					1	1	1	1	
Signature																					1		1	1	
Date of Birth																					1	1		1	
Link to Document																					1				
Divorce																						1			
Occupation																					1				
Children Names																						1			
%	0.00	0.18	0.18	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.82	0.64	0.36	0.55	0.59

Criminal	COLORADO					IOWA					MAINE					MONTANA					NEVADA				
Arrest Detail	1	1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Jail Info		1				1	1	1	1							1	1	1	1			1			
Offense	1	1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Docket	1	1				1	1	1	1													1			
Court Calendar	1	1				1	1	1	1													1			
Full name	1	1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Aliases		1				1	1	1	1							1	1	1	1			1			
Phyiscal	1	1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Marital Status		1				1	1	1	1							1	1	1	1			1			
Tattoos,	1	1				1	1	1	1							1	1	1	1			1			
Date of Birth		1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Status	1	1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Link to document																									
Photograph		1				1	1	1	1		1	1	1	1		1	1	1	1			1			
Address		1				1	1	1	1		1	1	1	1		1	1	1	1			1			
%	0.53	0.93	0.00	0.00	0.37	0.93	0.93	0.93	0.93	0.93	0.53	0.53	0.53	0.53	0.53	0.80	0.80	0.80	0.80	0.80	0.00	0.93	0.00	0.00	0.23
LICENSE	COLORADO					IOWA					MAINE					MONTANA					NEVADA				
Name	1	1	1	1		1	1	1	1		1	1	1	1		1	1	1	1		1	1	1	1	
Address	1	1	1	1		1	1	1	1		1	1	1	1		1	1	1	1		1	1	1	1	
Telephone No											1	1	1	1							1	1	1	1	
Profession	1	1	1	1		1	1	1	1		1	1	1	1		1	1	1	1		1	1	1	1	
Discipline						1	1	1	1		1	1	1	1								1			
Charges									1		1	1	1	1								1			
Signature						1	1	1	1		1	1	1	1								1			
Lawyer									1		1	1	1	1								1			
Status	1	1	1	1		1	1	1	1		1	1	1	1							1	1	1	1	
Registration no.	1	1	1	1			1	1			1	1	1	1		1	1	1	1			1			
Expiration date	1	1	1	1							1	1	1	1		1	1	1	1			1			
Link to Document						1	1	1	1		1	1	1	1								1			
%	0.50	0.50	0.50	0.50	0.50	0.58	0.67	0.67	0.75	0.67	1.00	1.00	1.00	1.00	1.00	0.42	0.42	0.42	0.42	0.42	0.42	1.00	0.42	0.42	0.56

Table 2.0: Types Records that Contain Personal Data

Property records are rich in personal information and all the states offered different degrees of it. Of the twenty counties studied, Nevada led the pack with 78% of its counties providing land records while 59% of Montana's and 50% of Iowa's counties offered access to their property details. Maine and Colorado followed and in comparison, had relatively small numbers of real estate records available at 25% and 16% respectively. The reason Maine had so few documents in this category was because access required a fee to view and the search engine on the website was confusing and pop-ups hindered access. In Colorado, only one county offered full property records but required two websites with two entirely different interfaces for which to conduct a search.

In terms of the actual types of information found in these categories of public records, the results are both surprising and troubling. Under the property category for example, Montana gave the deed owner, address, parcel number, tax payment history and the types of documents filed with the clerk. Nevada also offered land records and included items such as the owner's name, address of the property address and a different mailing address. Counties in Iowa, Montana and Nevada provided a combination of GIS mapping information, assessed values, or a description of the property. Only one county, Garfield County in Colorado, offered real estate information with extensive property records via two different websites of completely different interfaces and search mechanisms. In addition to the basic records of the owner's name, address, tax history and the like, this county also supplied a sketch of the property as well as an aerial photograph of the land surrounding the area.

Nevada led the way in the category of family records which included marriage and divorce type documents. Here 59% of Nevada's counties contain family type records, followed by Maine (18%) and Colorado (9%). Both Iowa and Montana had no family records available at all. The reason for this difference is that these states are mandated by their state law to limit access only to those who can prove entitlement via written correspondence by a blood relative or a legal guardian. Nevada also has this same restriction only for its birth certificates, however its marriage records provided details of the nuptials. Only marriage records were accessible from Colorado and details were few and far between.

All of the states examined in this study had some form of criminal records available. The range was noticeable in that only 23% of Nevada's counties provided access to offender documents versus Colorado (37%), Maine (53%), Montana (80%) and the leader Iowa with 93% of its counties offering searches of their criminal records. The records in all the states surveyed contained a varied and broad range of personal information. Items such as full name, aliases, marital status, physical descriptions, dates of birth and photographs were available in virtually all the states covered in this research. Iowa's website was the easiest to navigate in terms of overall usability and ease of search query formation as compared to the others. Despite having to take a few steps to get at the details as opposed to the other states' websites, Iowa's counties provided the most robust and rich details of a criminal's history. Once past the CAPTCHA system, a basic name search was immediately available providing a summary list of results. The ability to conduct an advanced search and to obtain the full record immediately required a simple sign-up process which included entering a valid email address.

In the Professional License category, all of Maine's counties offered information followed by Iowa (67%), Nevada (56%), Colorado (50%) and Montana with 42%. In addition to a clear and simple user interface in Maine and Iowa, there were links to the scanned documents for each of their counties unlike the other states which did not provide a digitized photocopy of the original filing or reprimands. Included in professional record information were extensive types of personal details and items such as names, signatures, and telephone numbers.

Civil court documents were available in 100% of the counties of the states studied. Bankruptcy court petitions were available in all five of the states and provided the greatest number of personal types of information, particularly the social security number (full and the last four digits), dates of birth, bank account, credit card numbers, names of minor children, assets, vehicles and even cash on hand. Interestingly, there were links to the Public Access to Court Electronic Records (PACER) database for accessing each state's bankruptcy filings, but the user is required to set up an account and to pay the associated access fees.

Aside from bankruptcy documents, only Colorado, Maine and Nevada provided details relating to civil filings. Only one county in Colorado, Garfield County, allowed searches to be conducted for lawsuits, contracts and real estate disputes. Similarly in Maine only one county had civil cases involving liens, lawsuits, and related debates whereas in Nevada 75% of its counties provided extensive access to its civil court filings. Most every type of civil legal proceeding is available in Nevada from liens and defaults to small claims, automobile negligence and breach of contract. All the counties in Nevada that provided access to its files used an identical interface no matter the record type. Searches for marriage licenses, civil lawsuits, and Uniform Commercial Code (UCC) filings utilized websites which followed the same design making it easier to obtain the information.

Levels of Sensitive Information in Public Records

The 500 local governments public records examined provide evidence that personal information abounds including full names and addresses, signatures, dates of birth and even social security numbers. The enhanced Department of Homeland Security (DHS) Levels of Sensitivity of Identifying Information Scale (See Table 1.0) was thus employed to determine which items found would cause the most damage if released so that a strategy can be implemented to treat the data accordingly. Each of the 500 public records was compared to this Sensitivity Scale, which is summarized as follows in Table 3.0.

	COLORADO					IOWA					MAINE					MONTANA					NEVADA				
Privacy Level																									
CIVIL	C1	C2	C3	C4	%	C1	C2	C3	C4	%	C1	C2	C3	C4	%	C1	C2	C3	C4	%	C1	C2	C3	C4	%
Level 5		1		1	0.50	1			1	0.50		1	1		0.50	1			1	0.50	1	1	1		0.75
Level 4					0.00					0.00					0.00					0.00	1	1	1	1	1.00
Level 3			1		0.25					0.00					0.00					0.00	1	1	1	1	1.00
Level 2	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00
Level 1	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00
%	0.40	0.60	0.60	0.60		0.60	0.40	0.40	0.60		0.40	0.60	0.60	0.40		0.60	0.40	0.40	0.60		1.00	1.00	1.00	0.80	
CRIMINAL																									
Level 5					0.00					0.00					0.00					0.00					0.00
Level 4	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00			1		0.25
Level 3	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00
Level 2	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00
Level 1	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00	1	1	1	1	1.00
%	0.80	0.80	0.80	0.80		0.80	0.80	0.80	0.80		0.80	0.80	0.80	0.80		0.80	0.80	0.80	0.80		0.60	0.60	0.80	0.60	
PROPERTY																									
Level 5					0.00		1			0.25					0.00					0.00					0.00
Level 4			1		0.25	1	1	1		0.75	1				0.25					0.00					0.00
Level 3			1		0.25					0.00					0.00					0.00		1			0.25
Level 2			1		0.25	1	1	1	1	1.00	1				0.25	1		1	1	0.75	1	1	1	1	1.00
Level 1			1		0.25	1	1	1	1	1.00	1				0.25	1		1	1	0.75	1	1	1	1	1.00
%	0.00	0.00	0.80	0.00		0.60	0.60	0.60	0.40		0.60	0.00	0.00	0.00		0.40	0.00	0.40	0.40		0.40	0.60	0.40	0.40	

Table 3.0: Sensitivity Levels of Public Records Collected

Three types of public records (i.e., civil, combined with family and licenses, criminal, and property) were compared against the sensitivity scale. As far as sensitivity levels are concerned, Nevada was the leader in providing access to the most personal information for civil records: 75% of Nevada's counties had Level 5 data as opposed to 50% for the other four states. Additionally, 100% of Nevada's counties had reached Level 4 while remarkably none of the other states' public records contained this data. At sensitivity Level 3, 100% of Nevada's counties offered access while only 25% of Colorado's counties met the Level 3 scale and none of the remaining states had the same level of sensitive information. One can see that of the states studied, there is a great variation in the amount of personal information available between them. Marriage records in Nevada, under the civil category, provided a lot more details which could be a cause for concern since they met the Level 5 threshold. In addition to the summary page with marriage information, Nevada added a link to the actual scanned reproduction of the original certificate which included such items as signatures, full names of the bride and groom, and most importantly the mother's maiden names for both spouses, which belong to Level 5. Interestingly, the records also showed the ages of the bride and groom at the time of the marriage; in one case the ages indicated that the groom was 18 years old, and the bride was a minor at a mere 15 years old! Similar to marriage records, documents contained in divorce proceedings also contained sensitive information. Only one county from Nevada allowed access to its divorce decrees and included the full names of spouses in the marriage dissolution proceedings, the date filed and

the full names of the children. Mother's maiden names could be deduced from the children's surnames, consequently indicating personal information in public records at the highest level (i.e., Level 5) on the enhanced DHS scale.

Civil court documents also had varying degrees of sensitive information available. In Cumberland County Maine, the different types of documents identified included the names of the parties, partial addresses, and the date of the filing. One county in Colorado, Garfield, provided civil filings that included such items as lawsuits, Uniform Commercial Code (UCC), and real estate disputes. Of these cases, the plaintiff and defendant's name, addresses and recording dates were easily available along with fee amounts, lawyers' names and judgment details. Three of Nevada's counties (Clark, Eureka, and Lyon) provided extensive details relating to civil actions, offering access to their civil court cases and the scanned documents by clicking on the "display document" feature at the bottom of the page. Level 1 was reached with the identity of all the parties involved including their full names and addresses; Level 3 was reached with signatures and a host of additional personal information. In Carson City, Nevada, civil court filings contained scanned versions of documents from the other categories. In one case, a legal challenge in surrogates court concerning the allocation of property as the result of a dispute over a deceased's Will, a Certificate of Death was scanned and contained personal identifying information: the deceased individual's name and address, spouse's name and address, date of birth, occupation, mother and father's name and cause of death. This one document alone reached Levels 1 through 4 on the sensitivity scale.

Furthermore, Bankruptcy records contained the most sensitive of the information measured at Level 5. Bankruptcy petitions in particular, in all of the states surveyed, accounted for most of the Level 5 sensitive information because they provided either the full or partial social security numbers in the bankruptcy petition as well as financial details such as bank account numbers, credit card information and dates of birth. Fortunately, bankruptcy filings are protected from instant access via registration and a paywall; furthermore, the personal information entered into the system is controlled by the attorneys who e-file, not the government itself.

Criminal records were quite different from civil records in meeting the most severe threat level in that none of the states studied had any records at Level 5, but they came close with Level 4 data. This time though, Nevada outperformed the other four states with only 25% of its counties having Level 4 data whereas public records from all other counties contained significantly more information at the orange color designation (i.e., Level 4 of sensitivity). For example, Cumberland County in Maine gave unrestricted access to the name, date of birth, address of the convicted criminal plus their arrest information, description of the offense, facial photograph, and the last date this information was verified. The criminal records in three of Montana's counties offered distinguishing characteristics of the offender including their rap sheets which detailed dates of their prior convictions, aliases and even a complete depiction of tattoos such as a "heart with lightning bolt". Similarly detailed personal information was identified in Maine as it was with two counties in Colorado and only one in Nevada. These records also supplied criminal records while adding the docket sheet information and incarceration status. Polk County, Iowa even described the intricacies of the offense, for example "assault – use or display of dangerous weapon" and the amount of the bail bond. Colorado and Nevada added traffic offenses as well.

There was evidence of Level 5 data from property records in one of the five states surveyed based on the sensitivity scale. Iowa did the worst because it had mortgage documents with bank account numbers for 25% of its counties that reached Level 5 and was the leader for Level 4 data with 75% of its counties having personal information at the second to the

highest threat level. Only 25% of Colorado and Maine's counties consisted of Level 4 data while Montana and Nevada had zero. The rationale as to why so few property documents reached Level 5 on the scale involves the original filing itself. Upon examination of each filing, the record typically did not call for sensitive information to be recorded. For example, each deed, mortgage, and easement for the majority of documents that were analyzed did not have Level 5-type of information in the first place. In other words, the form used to memorialize the event in the majority of cases did not require a social security number or similar type of Level 5 data to be included.

Overall, there exists a diverse amount personal information in local government records. Therefore, the research questions were answered in that there is evidence of personally identifiable information available in local government public records. There was evidence of Level 5 data especially from mortgage, bankruptcy, and marriage licenses all the way down the scale to Level1. In other words, public records are chockfull of personal information which is beneficial to intelligence professionals but also a threat to public safety if fallen into the wrong hands.

Application for Intelligence Analytical Work

As seen in this research, public records can offer a pivotal asset to intelligence operations, but how exactly can they leverage the data within these repositories to support investigations?

The personal identifiers such as social security numbers, dates of birth, addresses, and names typically only offer the ability to verify information provided, although this could be accomplished through internal systems and commercial proprietary databases. The goal of OSINT is not to merely collect raw data that is freely available, rather it is geared to giving this information meaning. Critical thinking combined with the information uncovered will answer a question or inquiry, support a hypothesis, develop leads, or assist in decision making. This is what OSINT is known for and therefore this research provides some applications to the practice of intelligence for criminal investigations. Presented below are some ways public records can be utilized to benefit intelligence analysts and law enforcement officers to enable progress, however, each is best served on a case-by-case basis.

Application of Public Records to Support Investigations

Identification of the owner of real property: Real estate records can assist in uncovering the base operations of a criminal enterprise; for example, a residence is being used to package and distribute narcotics; knowing who the owner is of the location can lead to the development of a new target. The owner, if not involved in the crime, may be a good source to approach to learn about who is renting/using their property.

Uncover hidden assets: Real estate records can inform the analyst of additional properties purchased as a result of the criminal conspiracy; this can lead to new locations to add to the search warrant and seized in asset forfeiture proceedings if they were obtained with the illegally gotten gains. Bankruptcy records can also be searched to identify vehicles, artwork, and other items of monetary value that may have been acquired as part of criminal activity.

Identify co-conspirators: Real estate records can also support the investigation by the identification of individuals linked to the property as a co-owner or financier. These individuals may have knowledge of illegal activity and might make for a good source to interview or surveil. Sometimes, the financial records can reveal that the property was transferred or sold for a minimal amount, which can provide evidence of a payoff or release from a loan shark debt.

Timeline creation: Real estate records and the related financial filings can be used to trace the dates the properties were acquired and link them to money laundering aspects of the case.

Identify possible hideouts: When trying to locate a fugitive from justice or targets that are difficult to keep track of, real property and utility records can come in handy to identify locations unknown from traditional sources. Additionally, the mother's maiden name as indicated in various records (birth certificates, divorce, and mortgage records, etc.) can be utilized to identify relatives that do not share the same surname of the target and seek out their locations of the fugitive.

Performing due diligence: Often times intelligence analysts are tasked with non-criminal investigatory tasks such as conducting pre-employment background checks. A search of bankruptcy records can verify dates of birth and other PII; also a search of local county jail dockets can determine whether a wanted individual is incarcerated in a different jurisdiction; mother's maiden name is again useful to identify relatives with a different surname who may be associated with a prohibited gang or criminal group.

Gathering information on individuals, organizations, and entities: Civil court records can be searched to uncover lawsuits; real property records can lead to the identification of businesses which can provide additional leads to identify co-conspirators and locations.

Execution of search warrants and arrests: Property and tax assessor records often provide the layout of the location, complete with photographs, maps, blueprints, and improvements to the dwelling. This will ensure that planning for entrance into the building and knowledge of the location of rooms ensures the safety of officers.

Creating offender profiles and dossiers: Criminal records and incarceration files can provide dates of birth, criminal histories, photos, tattoos, and piercings as well as co-defendants and locations frequented.

Approaching Subjects: Criminal histories will reveal types of offenses of the target, especially if they were violent in nature, which will allow for the proper preparation by the officers to avoid injury.

Conclusion

Although public records provide law enforcement intelligence analysts with a vital resource to obtain information on targets, it does so at a cost to personal privacy. Each of the 500 public records examined in this research had some degree of personal information readily available at the click of a mouse. Whether the data reached the highest sensitivity level on the scale (e.g., a social security number, mother's maiden name or bank account number) or landed somewhere in the middle (e.g., a person's marital status and property ownership details), the data can be beneficial to intelligence professionals and consequently detrimental to privacy.

This research has a number of limitations. As is true with any research of a qualitative nature, the reliability of the current study could be questioned, even though the coder took steps and performed a pre-test and pilot study to improve reliability and validity. The first limitation of this study relates to its sample size at the level of public records. Only five states were reviewed and of them 500 local government records were randomly selected and analyzed in this research, with only five records from each of the five public record categories (i.e., property, criminal, civil court, family, and professional licenses) gathered and included in the investigation. Furthermore, among the 500 records chosen for this study, only three out of the five record categories (i.e., 300 records in total) were evaluated when determining the levels of personal information in the items gathered, thus these results are not generalizable for all of the records found within each state nor for all local government records nationwide. Another limitation is well out of the purview of the researcher as the public records databases are managed by different entities that have the ability to change the contents at any given time. The dynamic nature of these repositories is problematic as the format, accessibility and information can be revised, deleted, or modified at any given moment as well as discrepancies such as outdated materials and errors may exist in these records.

Future Directions

Access to digitalized public records revolutionized intelligence analysts' capabilities, and as a result there is a need to formalize training in this area to best prepare these future professionals to utilize such a valuable resource. Results of this research suggest that higher-education and training curriculums can improve education for intelligence analysts by adding an element to the collection phase of the intelligence cycle to include methods and sources used to search OSINT, particularly public records. Future research should focus on the approaches professionals use to sift through large datasets, whether by hand or through the implementation of artificial intelligence and large language models in retrieving sensitive data, as well in the development of approaches to safeguard the personal information that exists in these publicly available online files. Furthermore, there should be conscious effort by those who work in law enforcement and intelligence alike to be cognizant of the ramifications that this data could have on anyone, particularly themselves. Thus, further research should be undertaken to determine methods to opt-out, increase the use of paywalls, or subscription services, and develop policy recommendations to control the release of personal information to protect against unintended consequences.

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Assessing the Accuracy of Local Indicators of Spatial Autocorrelation (LISA) in Crime Location Forecasting: A Case Study of Chicago for the Years 2023 and 2024

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Abstract

Urban crime presents persistent challenges for law enforcement agencies, impacting public safety, resource management, and policy development. The ability to forecast the location of future crime incidents is critical for proactive interventions, yet traditional methods often fail to capture the spatial complexity, and relationships between communities, inherent in urban crime patterns. This research aims to address this gap by evaluating the accuracy of Local Indicators of Spatial Autocorrelation (LISA) in forecasting crime locations. LISA, a geostatistical method commonly employed to detect spatial clusters and anomalies, provides insights into localized crime patterns. However, its potential as a tool for anticipating future crime locations has not been extensively studied.

The focus of this study is on crime datasets from the City of Chicago for the years 2023 and 2024 (City of Chicago, 2023, 2024), where LISA will be applied to assess correlations between community areas, and how those patterns can be used for year over year forecasting. The research question guiding this study is: How effective is the application of Local Indicators of Spatial Autocorrelation (LISA) in anticipating the location of crime incidents in an urban setting?

The study will evaluate LISA's utility by examining spatial correlations between crime clusters, year over year. It will also assess whether LISA, given certain stability in the communities, can be used in lieu of more complex methods to anticipate patterns using comparative analysis. Ultimately applying this method aims to inform more effective law enforcement strategies, specifically in the allocation of resources and the implementation of crime prevention initiatives, particularly those that address structural protections in the community.

The expected outcome of this research should provide a detailed assessment of LISA's capacity to be used in forecasting spatial crime patterns in Chicago, potentially offering a new avenue for this practice. This research will contribute to the growing body of spatial crime analysis and geostatistics research by providing insights into the viability of using LISA as a forecasting tool, with implications for improving urban crime prevention strategies.

Keywords: Spatial autocorrelation, LISA, crime forecasting, spatial analysis, geostatistics

Introduction

Urban crime remains a pressing concern for law enforcement agencies, municipal governments, and communities alike. Effective forecasting of crime locations is essential for supporting proactive policing strategies, allocating public safety resources, and implementing community-based interventions. However, traditional crime forecasting models, often based on historical averages or regression-driven hot spot identification, frequently fail to capture the nuanced, localized patterns of crime that persist within complex urban environments. These models often operate under assumptions of spatial independence and temporal stability, neglecting the spatial autocorrelation inherent in urban crime distributions.

This study addresses that gap by evaluating the utility of Local Indicators of Spatial Autocorrelation (LISA) as a predictive tool for urban crime. LISA is a geostatistical technique used to identify clusters and spatial outliers, providing insights into localized patterns of spatial dependence. While LISA is widely applied for retrospective spatial analysis, its application as a forward-looking tool for crime forecasting has not been well explored in literature. This research seeks to determine whether spatial clusters of crime identified in one year persist in the subsequent year, thereby offering predictive insight for future crime mapping and strategy development.

The analysis centers on crime data from the City of Chicago for the years 2023 and 2024, focusing specifically on the city's 77 community areas. These areas exhibit a high degree of socio-spatial variability, making them a strong testing site for examining the predictive stability of spatial clusters. Chicago is particularly well-suited for this research not only due to the richness of its open data infrastructure, but also because of its long-standing structural inequalities, varied neighborhood dynamics, and persistently high crime rates in certain regions. These characteristics allow for a rigorous examination of spatial autocorrelation and cluster persistence in an urban setting marked by both change and continuity.

This research draws on theoretical foundations from environmental criminology and urban sociology. Routine Activity Theory (Cohen & Felson, 1979) posits that crime occurs when a motivated offender and a suitable target converge in the absence of capable guardianship, emphasizing the spatiotemporal conditions necessary for crime to take place. Social Disorganization Theory (Sampson et al., 1997) suggests that neighborhood-level factors such as poverty, ethnic heterogeneity, and residential mobility erode informal social controls, creating environments conducive to crime. Crime Pattern Theory (Brantingham & Brantingham, 1984) highlights the role of urban infrastructure and individual activity spaces in generating predictable patterns of crime. Collectively, these theories suggest that crime is not randomly distributed but instead reflects underlying socio-environmental structures.

Geospatial approaches to crime analysis build on these foundations by enabling analysts to quantify and visualize spatial patterns. While LISA has been widely used in exploratory spatial data analysis, questions remain about its value in a forecasting context. This research asks: To what extent can LISA-identified spatial clusters of crime in one year predict the distribution of crime in the next? In answering this question, the study evaluates LISA's ability to provide actionable insights for tactical decision-making and strategic resource deployment, especially when used as part of a broader toolkit of crime mapping and predictive modeling approaches.

By examining the persistence of spatial clusters and comparing these results against neighborhood-level demographic variables, the study offers a practical assessment of LISA's forecasting potential. The findings inform a growing body of work in spatial criminology, offering both methodological insight and policy-relevant implications for crime prevention strategies. This work also considers the limitations of relying solely on LISA for forecasting purposes and identifies opportunities for incorporating additional explanatory variables to strengthen model fit, for regression analyses, enhancing predictive power.

Methods

The spatial analysis of 2023 crime data across Chicago's Community Areas reveals a clear tendency toward clustering, with several neighborhoods emerging as significant "hotspots" for multiple offense types. As shown in Figure 1-1, the city's 77 Community Areas span diverse socioeconomic contexts, and these differences manifest in the distribution of both violent and property crimes. Overall, the results indicate moderate to strong positive spatial autocorrelation, suggesting that areas with high crime counts tend to be surrounded by similarly high-crime neighbors, while low-crime clusters also persist in more socioeconomically stable regions. To maintain clarity and facilitate broader applicability of the method, this study avoided overcomplicating crime categorization. Instead of using the more granular IUCR (Illinois Uniform Crime Reporting) codes, crimes were categorized according to the primary crime type native to the dataset. This simplified schema not only streamlines the analysis but also enhances the ease with which similar studies can be conducted in other urban areas across the United States, where detailed coding systems may vary or be less accessible.

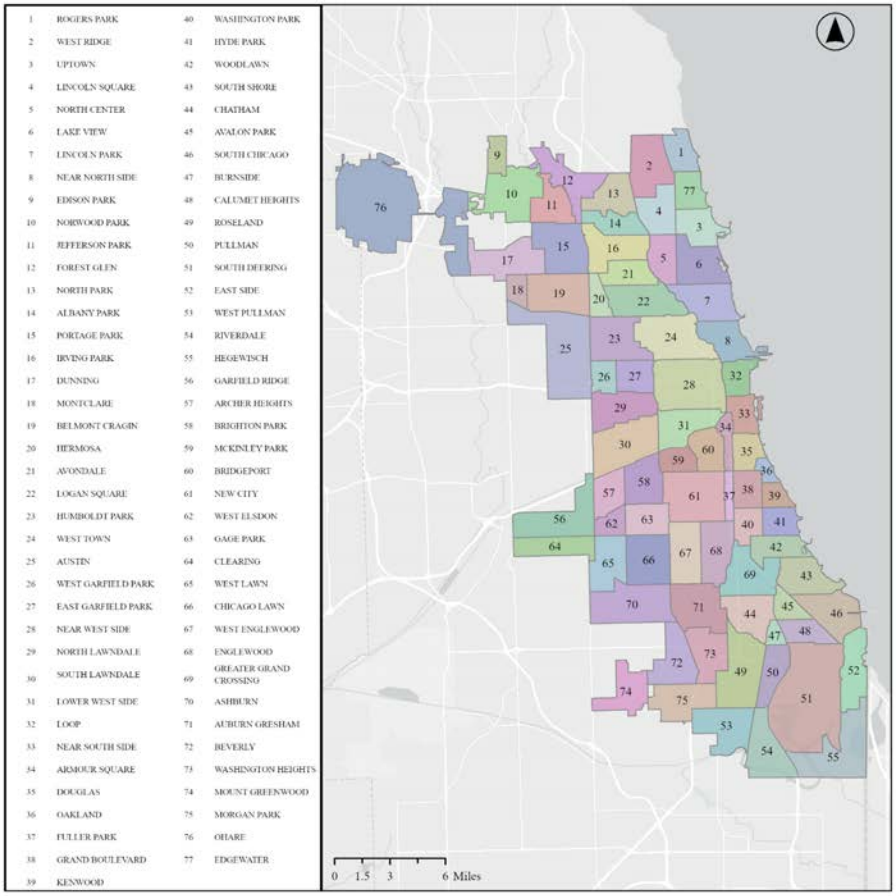


Figure 1.1 Case Study Area and Units of Analysis: Chicago Community Areas

The figure delimits the area of the case study and the units of analysis, which are the Chicago Community Areas. The Chicago Community Areas were selected as the units of analysis over census tracts, block groups, and police beats, because their boundaries have social meaning, particularly as it pertains to the act and avoidance of crime, and are generally known. Neighborhoods could be another natural choice but, due to some being very small, were considered to have the potential to skew the results of the analysis and thus, were not selected as the unit of analysis.

In selecting the primary crime type for categorization, the sole criterion was frequency, identifying the five most common crime types in the study area. This approach was applied without distinguishing between violent and property crimes, ensuring that the analysis remains agnostic to the nature of the offense while capturing a representative spectrum of criminal behavior. Consequently, the analysis focuses on primary types of Assault, Battery, Criminal Damage, Motor Vehicle Theft, and Theft. Future research directions might include investigating either non-violent or violent crime with an aim to identify differences when this method is applied, should they exist.

2.1 Rationale for Spatial and Temporal Aggregation

Temporal segmentation of the data (by year) aligns with routine activity theory, which emphasizes the importance of time in the occurrence of crime. This segmentation enables an examination of whether crime clusters identified in one year persist or evolve in the following year. Spatial aggregation to Community Areas captures neighborhood-level influences, ensuring that the analysis reflects the interplay between demographic, economic, and environmental factors that shape crime patterns.

2.2 Application of LISA for Spatial Analysis

GeoDa software is employed to calculate Local Indicators of Spatial Autocorrelation. The first step involves creating a spatial weights file using first-order Queen's contiguity, to capture the influence of immediate neighboring areas (Brantingham & Brantingham, 1984). LISA is then applied to the aggregated crime data to identify statistically significant clusters of high and low crime areas. The method is refined by adjusting for false discovery rates (Caldas de Castro & Singer, 2006) to minimize the risk of false positives. **Figures 4-1, 4-2**, and **4-3** illustrate the results of spatial analysis for Assault in 2023 (for example). The LISA cluster map, **Figure 4-1**, highlights neighborhoods with statistically significant spatial patterns of Assault crimes committed throughout the year, indicating either clusters of high or low crime, or spatial outliers. The Moran's I scatterplot, **Figure 4-2**, summarizes the overall tendency for similar crime levels to cluster across the city, offering a global measure of spatial structure and helping to identify how each neighborhood compares to its surroundings. The LISA significance map, **Figure 4-3**, filters these results by statistical confidence, indicating where clusters or outliers are unlikely to exist due to chance. Together, these visuals offer both a local and global perspective on spatial crime dynamics and establish a foundation for comparing year-over-year change.

2.2.1 Prognostic Modeling and Model Evaluation

Building on the spatial analysis, the study integrates LISA outputs into prognostic models designed to forecast future crime locations. Spatial lag models and leading indicator models (Thakur & Kumar, 2023) are used to assess the persistence of crime clusters over time. The predictive performance of these models is evaluated using cross-validation techniques, ensuring that the findings are robust and generalizable.

2.2.3 Ethical Considerations and Limitations

Ethical considerations are important when working with crime data. This study analyzes data at an aggregate level to avoid stigmatization of individual communities. Limitations such as potential underreporting of crime and the inherent challenges of spatial aggregation are acknowledged. These factors are critically assessed in the interpretation of the results, ensuring a balanced and responsible approach to spatial crime analysis. This methodology is also presented as a workflow diagram in **Figure 3-1**.

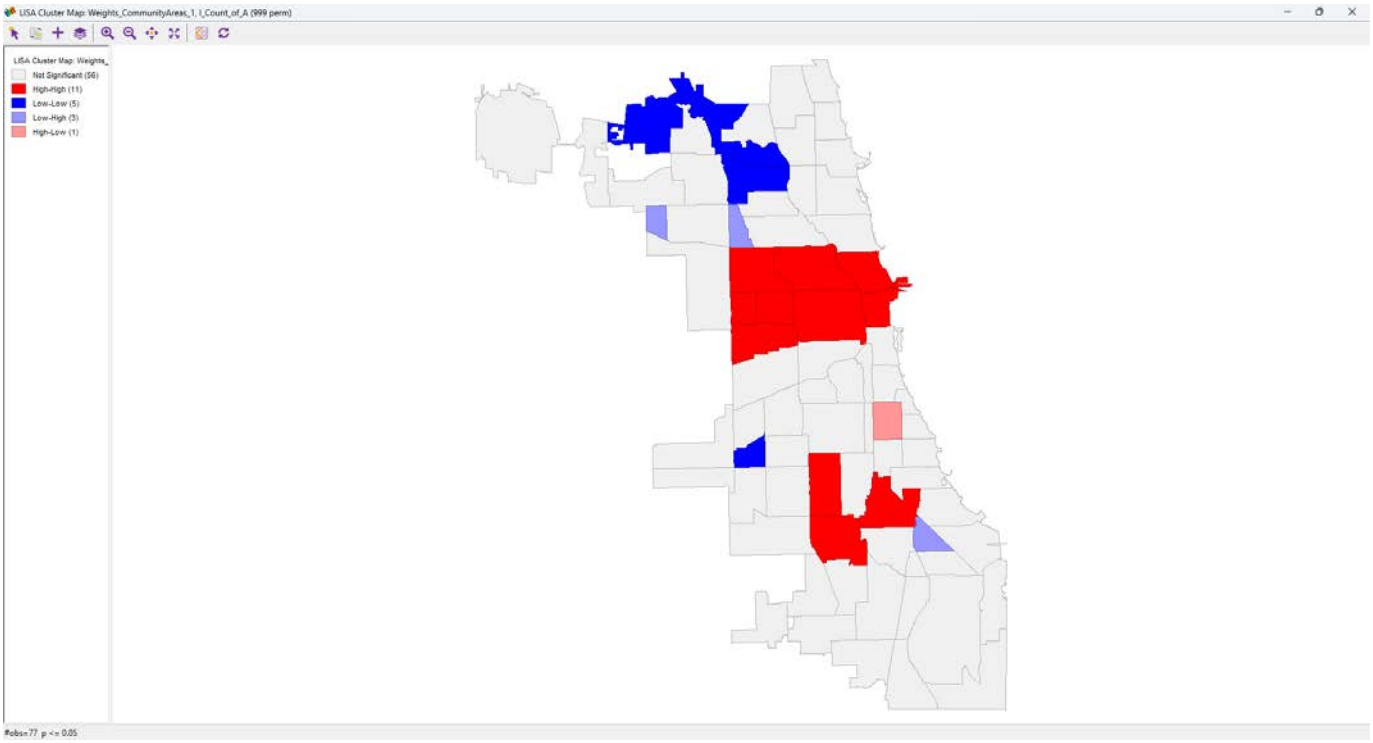


Figure 4-1
LISA Cluster Map: 2023 Assault Counts
The cluster map categorizes each of Chicago's 77 community areas based on the nature of their spatial relationship with neighboring areas, using Local Indicators of Spatial Autocorrelation (LISA). High-high clusters indicate areas with high Assault counts surrounded by other high-count areas, while low-low clusters represent localized pockets of low Assault activity. High-low and low-high designations mark spatial outliers. The identification of these clusters allow for targeted assessment of the structural, political, socioeconomic, and demographic features of the community areas, and how they may or may not relate to the adjacent geographies.

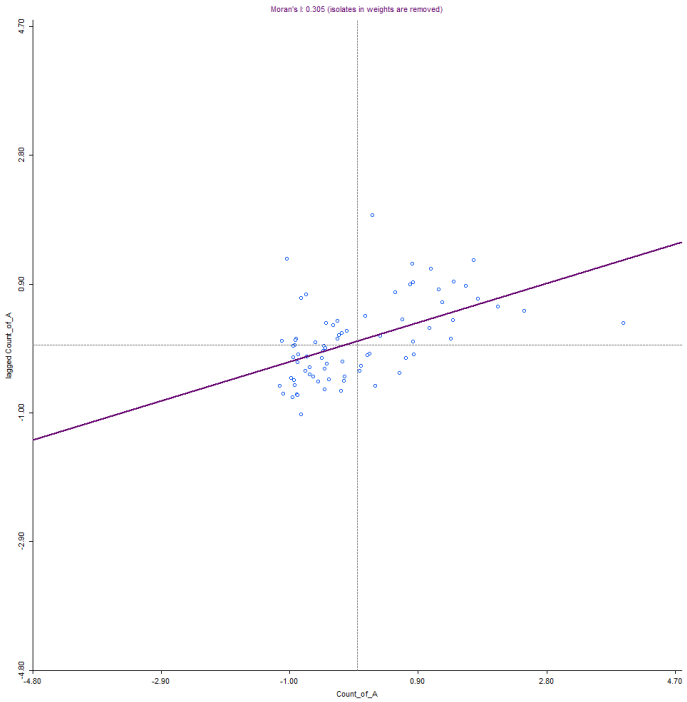


Figure 4-2
LISA Cluster Map: 2023 Assault Counts
This plot presents the same LISA cluster classifications as in **Figure 4-1**. This plot compares each community area's Assault count (x-axis) with the average count in neighboring areas (y-axis). The upward-sloping trend line reflects the global Moran's I value, a summary number that indicates whether high or low crime areas tend to cluster citywide. While the LISA cluster map shows where significant clusters occur locally, the Moran's I plot helps to identify whether there is meaningful spatial structure in the data as a whole. It also highlights which areas behave unusually relative to their adjacent areas. While not shown, this plot in the GeoDa program is interactive and displays the IDs for each community area upon request.

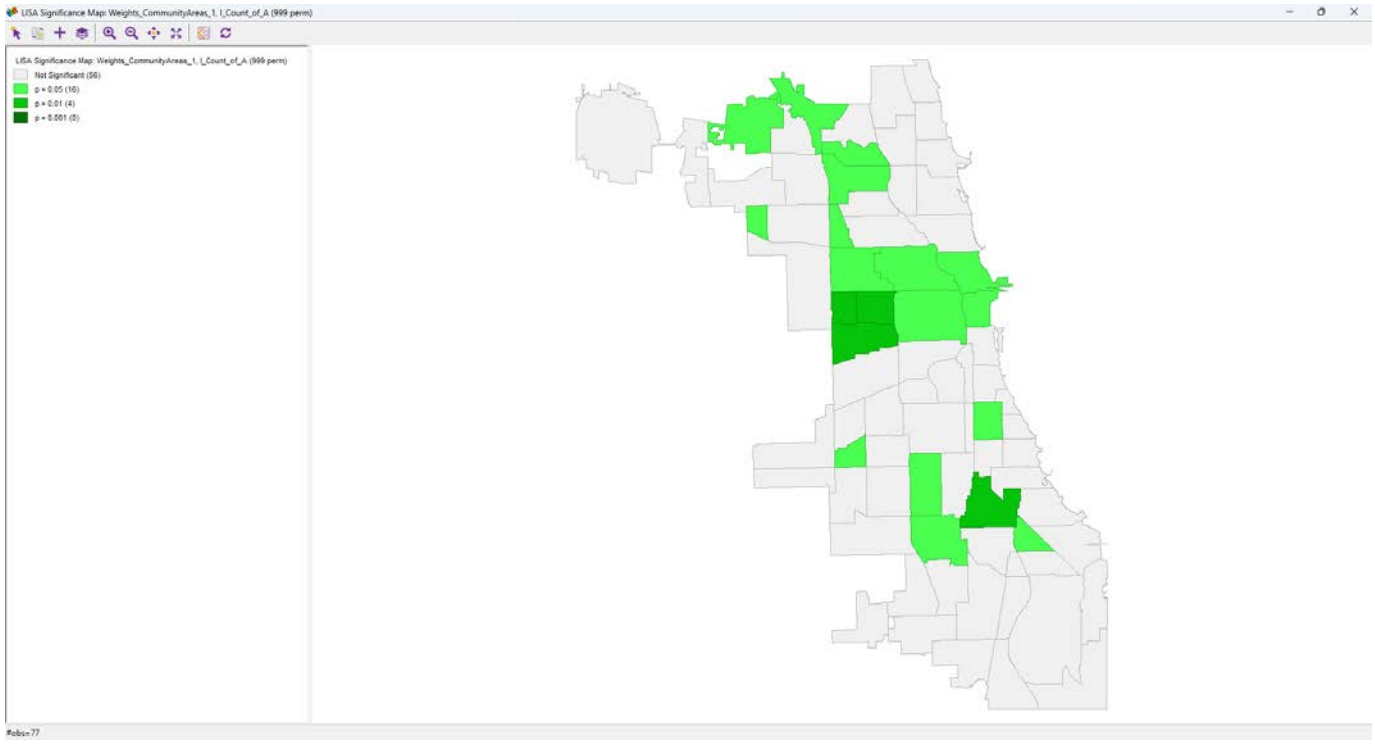
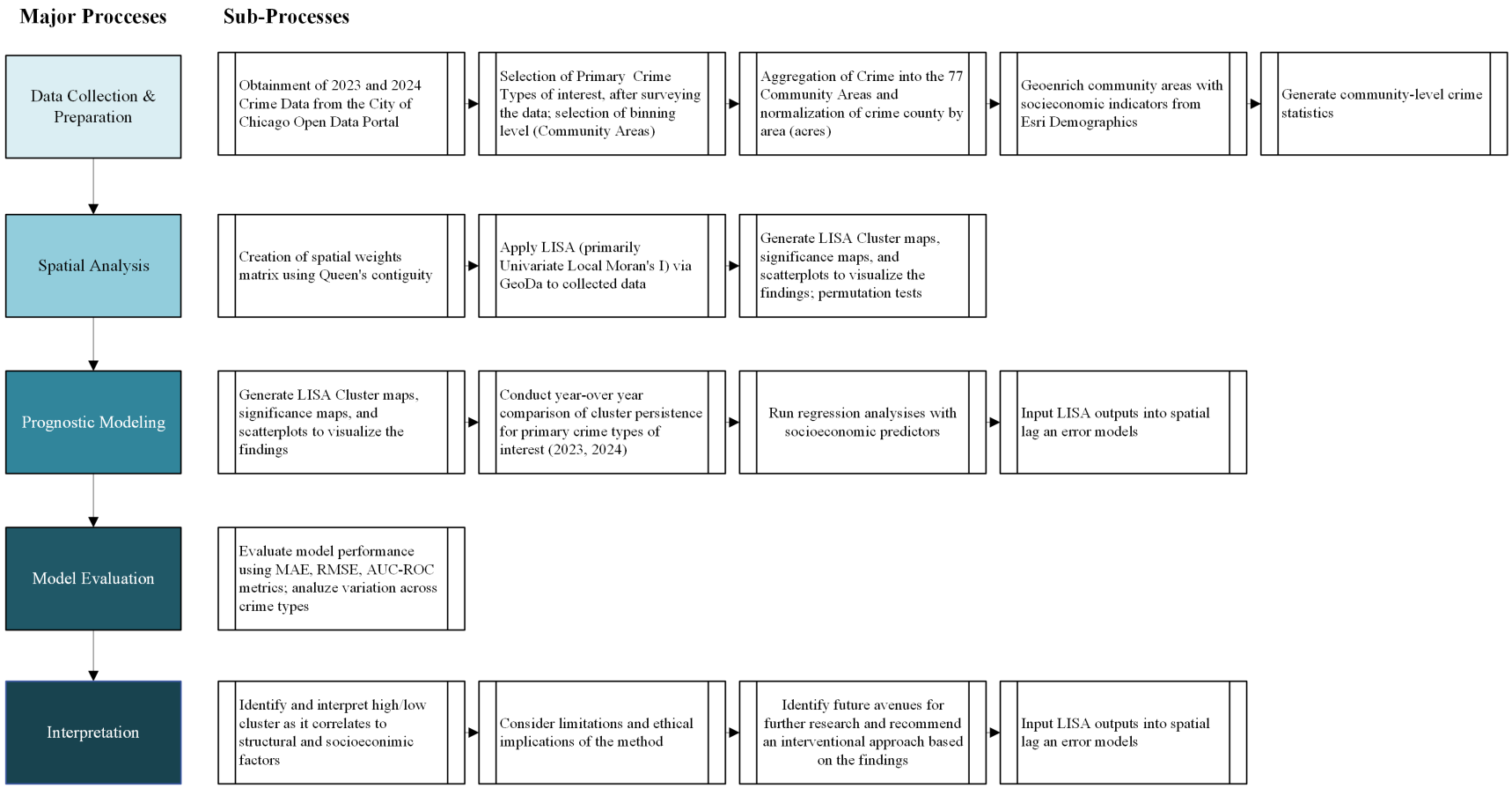


Figure 4-3
LISA Significance Map: 2023 Assault Counts
This map highlights the Chicago community areas that had statistically significant clustering of Assault incidents (using the same cluster classifications as in **Figure 4-1** and **Figure 4-2**. Green-colored areas represent community areas where the relationship between crime levels and those of neighboring areas is unlikely to be random. Significance is calculated through permutation testing, with darker shades indicating stronger statistical confidence (typically at the 95% or 99% confidence level). Areas not meeting the threshold (e.g., p-values greater than 0.05) are left unshaded. This map complements the LISA cluster map (**Figure 4-1**) by highlighting only the areas that meet conventional statistical standards, allowing for focused analysis. Note that outlier communities can also represent "significant clustering" by way of high assault counts in contrast with adjacent lows, and vice versa.

Figure 3-1 Flow Chart of Data Collection and Methodology Steps



Discussion

This study set out to evaluate the viability of using Local Indicators of Spatial Autocorrelation (LISA) for forecasting crime patterns across time in an urban setting. By applying LISA to 2023 crime data in Chicago and assessing whether those spatial clusters persisted in 2024, the research offers a critical test of whether localized spatial dependencies can inform proactive crime prevention strategies. The results show that while LISA successfully identified statistically significant clusters of both high and low crime across Chicago's community areas, its forecasting capacity was limited.

Some areas, particularly those with stable socio-economic conditions and consistent crime reporting practices, did exhibit year-over-year cluster persistence. These included neighborhoods with entrenched patterns of concentrated disadvantage or relative affluence. However, many clusters shifted in both location and intensity from 2023 to 2024, suggesting that crime distribution is more dynamic than LISA's static modeling assumptions can accommodate. This was especially evident in transitional neighborhoods experiencing economic development, demographic shifts, or major institutional interventions.

Regression analyses comparing crime intensity to variables such as average property value and property vacancy rates showed only moderate explanatory power. This further underscored the limits of LISA when applied in isolation. Although certain structural features of neighborhoods correlate with crime levels, they do not fully account for the spatial redistribution of crime over time. Moreover, the adjusted R-squared values of the models, particularly in areas with higher volatility, were not strong, suggesting that additional variables or more complex modeling techniques are needed to achieve meaningful predictive accuracy.

These findings align with previous critiques in the literature. While LISA remains a valuable tool for exploratory spatial analysis and visualizing clusters, its predictive use should be approached cautiously. It does not account for underlying causal mechanisms, temporal lags, or feedback loops that may influence where crime emerges or subsides. Furthermore, because LISA's output is highly dependent on the choice of spatial weights and scale, its forecasting power is likely sensitive to how geography is framed.

Despite this, LISA offers several practical benefits that justify its inclusion in a crime analyst's toolkit. Its visual outputs are intuitive and communicable to non-technical audiences, making it an accessible option for public-facing dashboards and police operational planning. Additionally, when used alongside complementary tools, such as temporal forecasting models, machine learning classifiers, or community surveys, LISA may provide an important spatial lens for understanding the context in which crime occurs.

While the study did not find strong evidence to support LISA as a standalone forecasting model, it does affirm its utility in identifying persistent crime areas and directing further investigation.

Conclusion

This study evaluated the feasibility of using Local Indicators of Spatial Autocorrelation (LISA) as a tool for forecasting future crime locations in an urban environment. Applying LISA to crime data from the City of Chicago for the years 2023

and 2024, the research assessed whether statistically significant spatial clusters persisted over time, and whether these patterns could inform resource allocation and strategy within law enforcement.

Findings suggest that while LISA is effective for identifying localized crime concentrations, it has limited value as a standalone forecasting model. Although some neighborhoods displayed stable patterns of spatial association, many clusters shifted between years, particularly in transitional or gentrifying areas. Regression analysis further demonstrated that traditional structural indicators such as vacancy rates and property values offer limited explanatory power on their own and cannot fully account for dynamic spatial changes in crime distribution.

The results underscore the importance of supplementing spatial autocorrelation tools with additional contextual data and modeling techniques. LISA remains a valuable exploratory tool for visualizing spatial crime patterns and initiating investigative leads. However, for predictive purposes, it is most effective when used in tandem with models that account for temporal dynamics and localized socio-environmental change.

Future research should explore integrating LISA outputs with spatial-temporal models or machine learning frameworks to improve accuracy. In doing so, analysts and practitioners can better support proactive policing strategies and develop place-based interventions rooted in a deeper understanding of neighborhood dynamics.

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About the Author

Elizabeth Greaves recently earned her M.S. in Spatial Data Science from Pennsylvania State University. This article presents an abridged version of her master's thesis, which explores the use of spatial statistics in urban crime forecasting. Elizabeth currently serves as a Solutions Engineer at Esri, where she supports state and local government users across Illinois. Based in the Chicago metropolitan area, she chose her research topic to reflect both her professional focus and her interest in the complex crime dynamics of Chicago. Her future research & professional interests include criminological applications of GIS, custom web application development, and the automation of spatial analysis workflows.

Observations on the Brian Regan Espionage Case

By Alfredo Ribeiro Pereira[1][2]

Abstract

Brian Regan, a former US Air Force intelligence analyst, was arrested in 2001 and condemned to life in prison for espionage. He stole more than 20,000 pages of classified documents but was arrested before selling them. Unlike other cases where espionage lasts for years, Brian was quickly discovered. To understand why Brian was not successful, bibliographic research was carried out. Analysis included an examination of Regan's previous life, the Espionage Acts, and investigative reports. Some conclusions are drawn, especially that psychological characteristics acquired in childhood can influence becoming a traitor, and that spying on the adversary is important to identify internal sources. It is recommended to learn your employee in depth, to monitor employees close to retirement, to instruct human sources not to stand out and draw attention to themselves, and to have a network of assets capable of identifying internal threats. Successful detection depends on behavioral profiling, analyzing communication and evidence, and using human intelligence. These methods help law enforcement protect national security and prevent insider espionage.

Keywords: Brian Regan; data theft; espionage; insider threat; NRO

Introduction

This article addresses the case of former intelligence analyst Brian Regan, who was sentenced to life in prison for acts of espionage. Unlike other cases where espionage lasts for years, Brian was quickly discovered. The main thesis is that the existence of a human source in the Libyan embassy was the main reason why the espionage operation failed.
On August 3, 2001, former US Air Force intelligence analyst Brian Patrick Regan was arrested trying to board a flight to Switzerland. He was carrying missile site information on Iraq and contact information for embassies in Switzerland (Defense Personnel and Security Research Center [PERSEREC], 2008).

From July 1995 until August 2000, Regan worked at the National Reconnaissance Office[3] (NRO), were he "was assigned to the Signals Intelligence Applications Integration Office, which is responsible for focusing signals intelligence support for tactically deployed military units" (United States of America v. Brian P. Regan, 2001a).

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3 "The NRO is the U.S. Government agency in charge of designing, building, launching, and maintaining America's intelligence satellites" (Office of the Director of National Intelligence [ODNI], n.d.). In addition, "conducts intelligence-related activities for U.S. national Security" (National Reconnaissance Office [NRO], n.d.).

At NRO, at least from mid-1999 until USAF retirement (August 31 2000), and after that, as a TRW Incorporated contract employee to the NRO, Brian accessed Intelink[4] to obtain classified information related to the military capacities of Iran, Iraq, Libya, and the People's Republic of China (United States of America v. Brian P. Regan, 2002).

The documents were mostly printed, while some were downloaded in digital format. Once removed from the base, they were hidden for future sale (Bhattacharjee, 2016). Intending to sell to Iraq, Iran and other countries, Regan buried more than 20,000 pages of classified documents (Markon, 2003a). Brian pleaded not guilty to three charges of attempting to market highly classified documents and one charge of gathering national defense information, on November 5, 2001 (PERSEREC, 2008). Finally, in February 2003, Regan was convicted at trial and agreed to serve a life sentence and to cooperate in locating the buried materials (Federal Bureau of Investigation [FBI], n.d.).

Despite obtaining a large amount of classified material, his espionage operation failed even before he could get a buyer for the stolen secrets. It is interesting to note that his case differs from most. According to the Office of the Director of National Intelligence ([ODNI], 2015), as cited in Sims (2015, p. 53), "Insiders convicted of espionage have, on average, been active for a number of years before being caught". However, Brian was quickly identified and arrested.

The purpose of this article is to discuss Brian Regan's motivations for spying, the effectiveness of his actions and the FBI's actions in identifying the spy[5].

This research highlights the critical role of human intelligence (HUMINT) in law enforcement, especially in detecting and preventing espionage and insider threats. By studying cases like Brian Regan, law enforcement agencies learn how personal backgrounds, psychological traits, and life circumstances can make individuals vulnerable to recruitment by foreign or hostile entities. Understanding these factors helps agencies develop better profiling techniques to identify potential threats early.

Methodology

This research used the inductive approach and the bibliographic procedure method. The inductive approach starts with a set of particular observations from which general propositions are extracted (Sheppard, 2020). The bibliographic procedure is the "gathering of information from published materials" (Boon, 2017, p. 93).

4 "Intelink is the United States Intelligence Community's classified version of the Internet, and can be accessed only by persons holding appropriate security clearances" (United States of America v. Brian P. Regan, 2001b).

5 Spy is a person who acts clandestinely or under false pretences to obtain or endeavours to obtain information, with the intention of communicating it to the hostile party (The Hague Convention IV, 1907). Therefore, we will use the term spy to designate a person who practices espionage, regardless of whether they are an intelligence officer, recruit or a discontented employee.

Results

Previous life

A New Yorker from Queens, Brian P. Regan was born on October 23, 1962 (United States of America v. Brian P. Regan, 2001b). His childhood was very difficult; peers frequently bullied him, due to his dyslexia and odd personality. This affected him as everybody underestimated him, while he overestimated himself (Bhattacharjee, 2016). As will be seen later, this fact has relevance in this espionage case. He served in the United States Air Force (USAF) from August 1980 until August 2000, when he retired as a Master Sergeant. Signal intelligence analysis was his primary specialty (United States of America v. Brian P. Regan, 2002).

According to Bhattacharjee (2016), Regan started thinking of committing espionage in the beginning of 1999. He was "feeling humiliated at work, his financial situation was getting worse, and his marriage was deteriorating". The US Air Force had the intent to transfer him to Europe, but Regan, to preserve his family, did not want the transfer. So, he was forced to retire, completing 20 years of service (August, 2000). With retirement approaching, "Regan's anxieties about the future transformed into a rising sense of panic". When Regan was arrested, he was married, had four children, and debts amounting to $53,000 (United States of America v. Brian P. Regan, 2001a).

Espionage acts

Hundreds of pages of classified information from Intelink were printed in the office by Brian Regan in the fall of 1999 (Bhattacharjee, 2016). "The documents, classified at the Top Secret SCI[6] level, concerned the US satellite program, early warning systems, and communications intelligence information" (PERSEREC, 2008). Ironically, as his co-workers thought he was an "oaf", they didn't pay attention to what he was doing. This allowed Brian to leave the NRO building every day carrying stolen classified materials hidden in his gym bag (Schneider, 2016). Regan had buried the stolen material in several places. He had written the locations on a note, which was hidden inside a toothbrush holder and buried under the I-95 exit sign near Fredericksburg, Virginia (FBI, 2017). The documents, packed in garbage bags, lightweight plastic or Tupperware, were buried 18 inches deep (Markon, 2003b).

As he had no contact with any foreign intelligence officers (Bhattacharjee, 2016), he had to look for possible buyers for the stolen material. Regan accessed the internet in public-access computers at libraries to search addresses and telephone numbers of Embassies of Arab countries and China located in Washington, D.C., Switzerland and Austria (United States of America v. Brian P. Regan, 2001b).

In mid-November 2000, Regan mailed three packages containing samples of the stolen material to the Libyan consulate. His intention was to sell all classified documents for $13 million (Schneider, 2016). Sending separate packets was a strategy to ensure secure communication in case the consulate's correspondence was being spied on. One envelope had a four-page letter with 149 lines of typed text consisting of alphabets and numbers. Another envelope contained instructions on how to decode the letter, and a third envelope included two sets of code sheets: one that contained a list of ciphers and one

6 "Sensitive Compartmented Information (SCI): SCI is classified national intelligence information concerning or derived from sensitive intelligence sources, methods, or analytical processes, which is to be handled exclusively within formal access control systems established by the Director of National Intelligence" (ODNI, 2006, p.22).

that listed dozens of words with their encoded abbreviations (brevity codes). Together, the two sets were supposed to serve as a decryption key (Bhattacharjee, 2019). The encrypted letters contained contact instructions (including a free provider email address) and offered additional sensitive information in exchange for payment (United States of America v. Brian P. Regan, 2001a).

Brian planned to get paid into an offshore account. "A computer diskette located in his residence contained a letter, dated August 31, 2000, addressed to an individual in the Canary Islands, Spain, stating "I am interested in offshore IBC and bank accounts/credit cards and requesting information" (United States of America v. Brian P. Regan, 2001b).

Investigation and Arrest

The three envelopes of papers, which had an anonymous sender, were delivered to the FBI by an informant recruited at the Libyan Consulate in New York (Christensen, 2019). In December 2000, the New York City office sent the material to the FBI's counterintelligence unit in Washington, D.C. (Schneider, 2016).

According to Bhattacharjee (2019), by analyzing the received material, it was possible to assemble a profile of the spy. The system of brevity codes and cryptography used, along with the concern for operational security, pointed to somebody with a military background, with knowledge of cryptology. The access to Top Secret documents and to Intelink pointed to somebody in the U.S. intelligence community. The concern with family security mentioned in the letter pointed to somebody probably married, with children. And the letters, also had very peculiar spelling errors, which served to identify the spy.

With a warrant, "the agents asked the service provider to let them pry into the account. They discovered that the account had been created four months earlier" and that it "had been accessed half a dozen times from public libraries around Washington, D.C. pointing to someone living in the metropolitan area" (Bhattacharjee, 2019).

As the profile pointed to Brian, his NRO computer was searched in April 2001. FBI analyzed the hard drive and "found that someone using Regan's password had surfed a large number of Intelink Uniform Resource Link ("URL") addresses" related to Arab countries. Also found were common spelling errors in messages and documents (United States of America v. Brian P. Regan, 2001a).

The FBI had Regan under surveillance since June 2001. On several occasions they observed Regan conducting surveillance detection runs[7] (United States of America v. Brian P. Regan, 2001a). On June 26, 2001, Regan flew to Berlin, Germany, and returned on July 3, 2001, in a travel not connected with any official duties (United States of America v. Brian P. Regan, 2001b

Beginning October 2000, Regan worked for TRW Incorporated, a company that provided services to the NRO. On July 30, 2001, he began a computer-based training necessary for recertification. The training did not require access to Intelink. Even so on every weekday from August 6 to August 23, Brian used Intelink to access "classified information relating to military

7 "that is, conducting multiple U-turns, pulling over to the side of the road, and appearing to be checking to see whether he is under surveillance" (United States of America v. Brian P. Regan, 2001a).

facilities in Iraq, Iran, Libya, and the People's Republic of China, as well as classified documents relating to current United States intelligence collection capabilities against those countries" (United States of America v. Brian P. Regan, 2002).

On August 23, 2001, at 9:00 a.m., FBI searched Brian's car and found a bag with five pages of encrypted messages and one page of a decryption key, addresses and phone numbers for diplomatic offices of China and Iraq in Switzerland and Austria (United States of America v. Brian P. Regan, 2001a). On the same day, approximately 10:49 am, Regan left NRO office and went to Dulles International Airport to check his suitcase onto his flight to Europe. Then he returned to his NRO office. At approximately 3:55 pm, Regan came back to airport, to catch his flight to Europe, and at approximately 5:05 pm FBI special agents placed him under arrest (United States of America v. Brian P. Regan, 2001b).

At the time of his arrest, Regan carried a small notebook containing various handwritten notations. These notations consisted of a series of apparently unrelated innocuous words that in fact constitute a personal system of code representing geocoordinates. He also carried (in his wallet and concealed in his right shoe) pieces of paper bearing the street addresses and international telephone numbers for the Embassies of China and Iraq in Austria, France, Switzerland and the Netherlands (United States of America v. Brian P. Regan, 2001b).

The encrypted note Regan was carrying with him at the moment of arrest was a simple Caesar cipher with key 1. It referred to bank addresses in Zurich (Union Bank of Switzerland and Credit Suisse), and it was easily deciphered. The encrypted note with buried locations used a book cypher (the book was his high school yearbook), and it could not be deciphered (Schmeh, 2018).

Discussion

The insider threat is a human problem that cannot be solved only by technological solutions (Anderson et al., 2000; Hoffman et al., 1990). The intelligence community, in general, credits the motivation for espionage in the mnemonic MICE (money, ideology, commitment or coercion and ego or excitement), although some authors find it too simplistic (Burkett, 2013; Sheppard, 2019). "An act of espionage rests upon more than one determining cause" (Sheppard, 2019, p. 7). In fact, a PERSEREC study (Herbig & Wiskoff, 2002) identified seven primary and secondary motivators for the insider threat: money, divided loyalties, disgruntlement or revenge, thrills or excitement, ingratiation, coercion, and recognition.

As Regan often complained to former co-workers and neighbours about his job and position in life, it is believed that Regan was motivated not only by money, but also by a feeling of discontent (PERSEREC, 2008). He could be in search of thrills and/or recognition. According to Maasberg et al., (2015) as cited in Cooley (2021, p.29): "Regan showed compensatory behaviours for low self-esteem due to his dyslexia. He also lacked impulse control, showing symptoms of paranoia".

Most spies started out of a desire for revenge[8], out of disgruntlement with their personal, financial or professional life (Sarbin et al., 1994 as cited in Sims, 2015). However, discontentment alone does not seem to be enough, as many discontented employees do not commit espionage or other crimes. There seems to be a need for a trigger and a susceptibility in the character of the individual. There is a process that is influenced by an interplay of environmental and psychological characteristics. Some psychological characteristics acquired in childhood seem to influence the process of becoming a traitor and should be investigated in the selection of the candidate.

Childhood experiences and their impact on the formation of individual personality seem to be important for the adult's predisposition to become a spy. Like Brian Regan, Ana Montes, who spied on the Defense Intelligence Agency for the Cubans for 16 years, also had a difficult childhood that made her susceptible to becoming a spy, as discussed by Pereira (2022). Montes's childhood caused her to be intolerant of power imbalances, encouraged her to empathize with the less powerful, and strengthened her desire to seek revenge against authoritarian figures. As a result, her vulnerability to being recruited by a foreign intelligence agency increased. Thus, the Cubans took advantage of her vulnerabilities and psychological needs to successfully recruit her (Popkin, 2013).

Interviews with convicted spies suggest a pattern in which personal breakdowns or crises precede, or trigger, the decision to commit espionage. Crises can be negative like divorce or the death of relatives or they can be positive like a new relationship. It is assumed that if timely help or intervention had been offered in these cases, the crime could have been avoided (Herbig, 2008, p. xi).

David Charney's work, based on interviews with three prosecuted insider spies (Robert Hansen, Earl Pitts, and Brian Regan himself), noted that the insider's pathway to commit the acts of espionage can be characterized in terms of ten life stages. In particular, the period between 35 and 45 years of age is related to a revaluation about the individual's life, choices, and goals. Simultaneous marital and work-related stress could be understood as vulnerabilities, common in this period of life; almost all the spies and defectors tend to act during this period (Conrad et al., 2009). It seems that in Brian's case, the imminence of retirement, in a context of deep discontentment, triggered the decision to spy.

To become a source, "the first step is the opportunity and access to sell or steal classified information and access to a potential customer" (Sarbin et al., 1994 as cited in Sims, 2015, p.33). Brian was able to remove the classified documents from the office, without anyone noticing or distrusting him, however, when using his own password, he left evidence of the crime. It would have been more prudent if he had stolen his colleagues' passwords and used them on another person's computer to access the documents.

After that, his plan began to fail in trying to get a buyer. Apparently, his complex plan to send encrypted letters to the embassy did not work well. Other attempts to propose spying by mail have also failed, like the Bertil Ströberg case. In a letter to the Polish embassy, someone offered to sell confidential information about Swedish defense planning to Poland.

8 In my professional experience, revenge seems to be the most common trigger for espionage. The individual is persecuted or harmed at work and decides to "get even". After some time spying, the individual has already satisfied his desire for revenge and begins to think more about the consequences of being discovered. At that moment, money becomes a more important motivator, as the agent is already used to the extra money. At all times, there is more than one motivation, even if there is one predominant one.

A sample secret document was sent along and $3,400 was requested as payment. Polish diplomats informed the Swedish government and Lieutenant Colonel Bertil Stroberg was arrested at a post office trying to take funds from the Polish embassy (Palme, 1983).

Perhaps Brian would have been more successful if he had simply "walked-in" to an embassy, with a proof of his access, like Aldrich Ames did. As in many areas, Occam's Razor[9] applies to intelligence and espionage as well. On April 16, 1985, intent on avoiding bankruptcy, Ames walked into the Soviet Embassy in Washington, D.C. and offered information for $50,000. What would have been a one-off exchange turned into an ongoing job for the next nine years. It is estimated that he received US$ 2.7 million during this time (Burkett, 2013; Central Intelligence Agency [CIA], n.d.; FBI, n.d. b).

There would also be another advantage to going to the embassy first: if his offer was accepted, a case officer[10] would direct the collection of classified documents of interest to the contractor, ensuring the business transaction. The sending of the encrypted espionage sample and the instructions for decryption, separated in three envelopes, was a strategy to avoid the discovery of his plan in the event of interception of the correspondence by U.S. counterintelligence. However, if an embassy correspondence spying operation was underway, the letters could be copied and delivered normally, albeit on different dates. So, this strategy could be innocuous.

Brian used two handwritten ciphers, the Caesar cipher, which was easily cracked by FBI and the book cipher, which was not cracked. Brian made a mistake when doing the encryption, as even he could not decrypt it after he was put in prison. Both are substitution ciphers. The Caesar cipher substitutes one letter for another shifted in the alphabet, in this case the key was 1, that is, the letter "a" becomes "b", the letter "b" becomes "c" and so on. In the book cipher, the words in a book are numbered and the letters of the message are replaced by the corresponding number of the word with that initial letter. The book's cipher is quite secure as long as the key book is not known and the numbers are never repeated in the encrypted messages (Ribeiro, 2017).

The handwritten notes with addresses and telephone numbers of foreign embassies were evidence that criminalized him, if he had memorized instead of writing, there would be no such evidence against him. Memorization is of utmost importance so that spies are not discovered; Brandy (2017) interviewing a former MI6 agent reveals that discretely hiding important information in their memories is important to avoid getting killed undercover. Ana Belén Montes, a Cuban agent, spied at the Defense Intelligence Agency (DIA), at least 16 years before being arrested (PERSEREC, 2004). "To escape detection, Montes never removed any documents from work, electronically or in hard copy. Instead, she kept the details in her head and went home and typed them up on her laptop" (FBI, n.d.). Obviously, the nature of the material stolen by Brian (satellite photos) does not allow the application of memorization, this material would have no value to the buyer. However, other data, such as addresses and telephone numbers, allow for memorization, avoiding leaving material evidence of crime.

9 "'the simplest solution is almost always the best.' It's a problem-solving principle arguing that simplicity is better than complexity" (Soegaard, 2020).

10 "A professional employee of an intelligence or counterintelligence organization, who is responsible for providing directions for an agent operation and/or handling intelligence assets" (Case Officer in Dictionary of Military and Associated Terms, 2010).

The ability not to draw attention to himself is critical to the spy's success and survival. Like the 17th century English poet George Herbert said "The life of spies is to know, not to be known" (Herbert, 1652, p. 63). Brian managed to remove the stolen material from the air base, precisely because he didn't stand out. In this phase of the espionage operation, he was successful, almost like a "Gray man[11]".

The informant, who delivered the cryptic letters to the FBI, in the fall of 2000, was critical in uncovering Regan's plot (Bhattacharjee, 2019). The factor that started the FBI investigation, which ended up preventing foreign nations from taking possession of the stolen secrets, was a credit to the action of an asset inside the Libyan embassy. Recruiting human sources inside hostile intelligence services is "the most valuable tool" for identifying spies (U.S. Department of Justice, 2007). To generate more results, the counterintelligence must be offensive and "work to infiltrate the networks and organizations" (Harber, 2009, p.228).

Data obtained by an American agent in Cuba was crucial for the identification and arrest of Ana Montes, who spied on the DIA for 16 years (Pereira, 2022). The same happened in the Anna Chapman case, in which an espionage network, with 25 years of operation, was only dismantled due to data provided by a defector of Russian intelligence (Pereira, 2024). From the study of these cases, it appears that spying is the "best way to catch a spy" (Pereira, 2022, p.9).

Of course, this is a general rule, and there are always exceptions, such as the Jonathan Pollard Case. Pollard was arrested by the FBI shortly after trying to enter an Israeli embassy. A few days earlier, he had been interviewed by FBI and Naval Investigative Service investigators. The interview had been motivated by a report from a co-worker who had observed inappropriate behaviours (Best & Mark, 2001, p. 2).

The profile drawn up by the FBI from the three letters correctly matched Brian's profile. Moreover, the spelling errors served to confirm that Brian was the wanted source, as they made his writing unique. Every asset, as well as any criminal, must avoid leaving traces that identify them, that can be associated with their person, distinguishing them from others.

Another observation that can be made in this case is that, as in Pereira (2022), from the moment a spy is investigated, his activity becomes much more difficult and riskier. It is therefore more prudent to cease espionage activities for a few months or even years to avoid capture and allow a return to activities in the future. If the source is very well positioned in the target institution and is capable of delivering high-value information, it is even convenient to maintain making payments.

Conclusions

Brian was skilled at going unnoticed when stealing classified material, but he made mistakes in contacting the embassies, by unnecessarily complicating communication. He also made a mistake in leaving material evidence and wasn´t careful about some of his characteristic personal traits (in particular, the dyslexia). The FBI was skilful in profiling the asset, and the use of a human source was critical to the discovery of the spying action.

11 "'Gray man' is an espionage term describing the 'perfect' covert operator" (Smith, 2003, p.113), "the kind of person you might never notice in the first place, someone whom you would forget two minutes after he passed you on the street or rode with you in an elevator" (Mendez & McConnell, 2000, p.62).

From the Brian Regan case, some conclusions can be drawn: dissatisfaction with professional and personal life is an important risk factor for committing espionage, especially around retirement. Therefore, knowing how employee's personality traits can interact with life cycle, environmental and organizational stressors, could be helpful to formulate interventions aimed at reducing the probability of damaging acts perpetrated by insiders.

It can also be concluded that to avoid detection, and continue working, a source must remain unnoticed, not stand out in the group and not leave traces that can be individualized. It is also very important not to leave material evidence. Well done profiling works to reduce the population to be investigated, and finally, in general, spying is the best way to catch a spy.

It is recommended to get to know your employee in depth. Instruct human sources not to stand out and draw attention to themselves. It is also recommended to have a network of assets capable of identifying internal threats.

The research emphasizes the importance of effective profiling, which narrows down the pool of suspects and focuses investigative resources on the most likely individuals. It also shows how valuable human sources and informants are in uncovering clandestine activities—like the informant who delivered the cryptic letters in Regan's case—highlighting the need for proactive infiltration and network analysis.

Furthermore, the study underscores that insider threats often stem from personal dissatisfaction, stress, or crises, especially around significant life changes like retirement. Law enforcement can use this knowledge to implement targeted monitoring and intervention strategies, such as employee screening, behavioural analysis, and organizational support, to reduce the risk of insider espionage.

Finally, the research demonstrates that successful detection relies on a combination of behavioural profiling, careful analysis of communication and evidence, and strategic use of human intelligence assets. By applying these principles, law enforcement agencies can better protect national security and internal integrity, making espionage much harder for malicious insiders to succeed.

Declarations

The original opinions in this article are those of the author alone and are not intended to reflect the positions or policies of any government agency. The author declares that he has no conflicts of interest.

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