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Databases in the investigation of household armed robberies: Challenges and ways of improvement

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Abstract
Amidst the full-scale war in Ukraine, an increase in the number of crimes against property involving weapons, characterised by suddenness, brutality, and aggressiveness, has occurred. Such crimes violate not only the inviolability of housing and property rights but also harm the health and lives of victims. In this regard, the study aims to examine the possibilities of using automated information retrieval systems of the Ministry of Internal Affairs and the National Police of Ukraine in the investigation of robberies involving the use of weapons. The following methods were used in the course of the study: comparative legal, analytical, systemic, and structural, generalisation, induction, deduction, and synthesis. These methods were used to analyse the world experience of databases of automated information retrieval systems to improve the investigation of robberies involving the use of weapons against citizens' homes. Based on this, the most progressive and effective methods of investigating this category of criminal offences are identified, proposals for improving national practice are formulated, and an indicative set of parameters for typical actions during such robberies is developed. The author proposes to improve information and analytical systems by filling in new databases of serious crimes committed with the use of weapons, which will facilitate ease of use and efficiency of their investigation. The development of such a database provides for the possibility of updating and collecting information based on specified requests. The content parameters are determined by the ability to collect information on criminals, the forensic traces that identify them, behavioural traces (use of a type or types of weapons, home invasion tools, nature of bodily harm, features of disguise, etc. The practical value of the study lies in the possibility of considering theoretical recommendations when creating databases that will ensure the completeness, efficiency and convenience of obtaining the necessary information for the effective investigation of robberies involving the use of weapons

Keywords:
robbery; automated information retrieval system; organised group; criminal; property

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Introduction

The present-day burglary involves the use of weapons, violating not only property rights, but also the right to inviolability of the home, also possibly causing harm to people's health and lives. As a result of the war in Ukraine, the public danger of armed robberies against citizens' homes is increasing, and the likelihood of criminals having firearms is significantly higher. In turn, the boldness and openness of such criminal offences and the low level of their investigation cause a significant public outcry (Bryskovska & Dyakin, 2023b).

Despite significant research on the investigation of robberies, the problem of investigating robberies of citizens' homes with the use of weapons requires constant improvement and study, as under martial law, weapons and their types become more diverse, as well as the means of committing such crimes. Therefore, significant attention should be devoted to the use of forensic expertise and information databases, the subject of which is various types of weapons and explosives, as well as other means of committing such attacks (Bryskovska & Dyakin, 2023a).

Using discrete spatial choice models, S. Curtis-Ham *et al.* (2023) identified the relationship between proximity to activity and crime using police database data, such as offenders' homes, family members' homes, schools, previous crimes, and other locations of interest to police. Criminals tend to be more likely to commit crimes closer to their activities than further away and closer to those they visit more often, for example (a house next to family homes, new crimes near previous crimes). The researchers propose to extend the theory of crime patterns to different locations and types of crime when studying the spatial pattern of criminal behaviour. The results have positive implications for geographic profiling in police investigations.

As M.P.J. Ashby (2019) noted in his research paper, the study of spatial and temporal patterns of crime is relevant both for academic understanding of the processes that generate crime and for policies aimed at reducing crime. He described the Crime Open Database, an open database of the United States of America. The data in this database has been processed to match geographic coordinates, dates and times, crime categories and location types, and to add census and other geographic identifiers. The resulting database provides a broader examination of the spatial and temporal patterns of crime in many US cities, allowing for a better understanding of the variations in the relationship between crime and place in different environments. In particular, graphical databases, as pointed out by A. Bhardwaj and K. Kaushik (2022), expose criminals by identifying the complex actors involved and their relationships to identify suspicious connections to graph patterns. This allows investigators to process information more efficiently and quickly.

P.S. da Conceição Moreira *et al.* (2018) emphasised the need for database-based research to identify the most dangerous groups of criminals in certain types of crimes. Simultaneously, J. Kim *et al.* (2020) proposed using SNS profiling, which was previously used to store the personal information of users and as a marketing tool to recommend products by analysing customer interests in any field, for criminal investigations. For this purpose, it is proposed to create a database to store information collected from SNSs and a model for profiling criminal offence events is proposed. Therefore, it is possible to conclude that to promptly obtain reliable data in a systematic, processed, and user-friendly form for assessing the situation and making optimally informed decisions regarding the investigation of robberies of citizens' homes with the use of weapons, it is advisable to use information and analytical resources adapted to such crimes and necessary for their successful investigation. This necessitates the creation of a separate information bank of data on robberies involving the use of weapons. It should provide the opportunity to collect the necessary information on the characteristics of such crimes, data on the perpetrators of such attacks, suspects, crimes of previous years, both investigated and not investigated, means and instruments used in the commission of such crimes and other parameters.

The study aims to analyse the problematic aspects of the use of automated information retrieval systems for effective investigation of criminal offences, and the practice of using the main information systems of the Ministry of Internal Affairs (MIA) and the National Police of Ukraine (NPU). In this regard, the study formulated indicative questions regarding the set of typical actions committed by criminals during a robbery attack on a citizen's home using weapons; and developed an algorithm for comparing, evaluating, and analysing information that can be obtained from the information systems of the MIA and the NPU.

Materials and Methods

A range of scientific cognition methods was used in the study, such as comparison in considering the subsystems of the unified information database and integrated information retrieval systems used by the National Police of Ukraine and the Ministry of Internal Affairs of Ukraine. The comparative legal method was used to study studies on this issue by both domestic and foreign scholars. The analysis method was used to describe the general features of armed robberies against the homes of citizens. The systematic-structural method was used to propose a scheme for finding the necessary criminally relevant information based on generalised knowledge about these types of crimes, as well as for identifying similar actions, situations, tools, means, time, and place of commission in previously committed, both investigated and non-investigated robberies of previous years. The deduction method was used to identify

each typical action that is characteristic of members of organised groups committing a series of such attacks using the general patterns of armed robberies against citizens' homes. The induction method is used to form a set of typical actions of members of organised groups in committing a series of robberies against citizens' homes with the use of weapons. Synthesis was used as a method of scientific cognition to systematise criminal proceedings to establish the seriality of robberies and to formulate guiding questions to obtain information on the individualisation of the perpetrator.

The regulatory framework of the study included: the Constitution of Ukraine, Law of Ukraine "On the National Police" of 02.07.2015 No. 580-VIII[1]; Regulation on the National Police, approved by the Cabinet of Ministers of Ukraine on 28.10.2015 No. 877[2], Order of the Ministry of Internal Affairs of Ukraine "On Approval of the Regulation on the Information and Telecommunication System "Information Portal of the National Police of Ukraine" of 03.08.2017 No. 676[3], Order of the Ministry of Internal Affairs of Ukraine "On Approval of the Regulation on the Unified Digital Departmental Telecommunication Network of the Ministry of Internal Affairs" of 24.12.2019 No. 596[4]. Additionally, the study examined the Protection of Freedoms Act[5] and the Housing and Planning Act[6], which can provide context and expand the legal perspective on the challenges and ways to improve the use of databases in the investigation of residential gun crime. This legal framework defines the scope and powers of the police in conducting investigations, including the use of databases, and can serve as a basis for analysis and suggestions for improving this process.

Results

The application of innovative methods of analysing information on criminal offences should be based on a thorough study of the positive experience of law enforcement agencies and police units in other countries in investigating crimes. Widely used information retrieval systems do not have the information and analytical resources that law enforcement agencies in Ukraine need to successfully investigate crimes. In the context of modern society's informatisation, it is advisable to adopt the best practices of foreign countries when investigating criminal offences employing constant analytical search and analytical activities through optimisation and restructuring of information flows with the introduction of a new generation of relevant software.

Ukrainian scientists O.E. Korystin *et al*. (2019) and I.A. Fedchak (2021) distinguish between three types of criminal analysis: operational or operational, tactical, and strategic. Operational or operational criminal analysis, according to them, is an information and analytical activity in certain criminal proceedings regarding information of interest to the police: identification of signs and information characterising the peculiarities of committing such crimes, objects, persons of criminal groups and organisations, identification of places of concentration of robberies against citizens' homes with the use of weapons, and identification of the profile of the victim and suspect. Tactical criminal analysis, in turn, is the analysis of crimes and crime in a certain area for a short period, for a particular type of criminal offence, to develop tactical measures to identify and capture criminals, identify risks, and prevent certain criminal offences. Strategic criminal analysis aims to identify and assess threats to individuals, society, and the state. The main goal is to identify vulnerabilities in the law enforcement system or environment and to make management decisions to prevent criminal offences and combat crime. This analysis reveals trends and patterns and forecasts the development of identified threats over a long period. The main purpose of this process is to prepare strategic management decisions and assess the risks associated with the development of the crime situation (Fedchak, 2021).

The effective investigation of armed robberies against citizens' homes, as well as the investigation of other crimes, requires reliable information available in the required amount about the subjects of the investigation, which can be obtained from various sources of forensically relevant information. Such sources of information include information systems (databases) created by the MIA of Ukraine and the National Police of Ukraine (NPU). Such forensic records are maintained by the Department of Information and Analytical Support of the National Police of Ukraine and the Expert Service of the Ministry of Internal Affairs of Ukraine. As of 2024, the trend of maintaining and creating forensic records as databases and databanks included in the unified information system of the Ministry of Internal Affairs of

[1] Law of Ukraine No. 580-VIII "On the National Police". (2015, July). Retrieved from https://zakon.rada.gov.ua/laws/show/580-19#Text.
[2] Resolution of the Cabinet of Ministers of Ukraine No. 877 "Regulations on the National Police". (2015, October). Retrieved from https://zakon.rada.gov.ua/laws/show/877-2015-%D0%BF#Text.
[3] Order of the Ministry of Internal Affairs of Ukraine No. 676. "On Approval of the Regulation on the Information and Telecommunication System "Information Portal of the National Police of Ukraine". (2017, August). Retrieved from https://zakon.rada.gov.ua/laws/show/z1059-17#Text.
[4] Order of the Ministry of Internal Affairs of Ukraine No. 596 "On Approval of the Regulation on the Unified Digital Departmental Telecommunications Network of the Ministry of Internal Affairs". (2019, December). Retrieved from https://zakon.rada.gov.ua/laws/show/z1055-16#Text.
[5] Protection of Freedoms Act. (2012, May). Retrieved from https://www.legislation.gov.uk/ukpga/2012/9/contents.
[6] Housing and Planning Act. (2016, May). Retrieved from https://www.legislation.gov.uk/ukpga/2016/22/pdfs/ukpga_20160022_en.pdf.

Ukraine[1] is still evident. The Ministry of Internal Affairs operates the Unified Digital Departmental Telecommunication Network (UDDTN) of the MIA. This network is a multi-service, logically coherent, multi-level network that interacts with the National Telecommunications Network, the National Confidential Communications System, and the public telecommunications network. The UDDTN includes a variety of technical means for both telecommunications and transport telecommunications networks, ensuring the transmission of information belonging to state information resources. The network is designed to meet the needs of consumers for the services of the UDDTN both in normal and special conditions, as well as in emergencies or the introduction of a state of emergency. The National Police of Ukraine updates and facilitates the maintenance of the databases included in the unified information system of the Ministry of Internal Affairs of Ukraine[2,3].

The Integrated Information and Search System of the National Police of Ukraine was created to ensure the effectiveness of police officers in investigating criminal offences. It includes separate subsystems: "Crime", "Person", "Item", "Criminal weapon", "Antiques", "Car Theft", "Registered weapon", "Delivered", "Search", "Identification", "House arrest", "Migrant", "Criminal statistics", "Administrative offences", "Unified record", "Stolen (lost) documents", "ODC", "Corruption", "Dacto", "Investigation: order" (Prykhodko, 2018). The Forensic Service of the Ministry of Internal Affairs of Ukraine also has other forensic records, such as automated ballistic information systems (with traces of bullets, bullet cases of various weapons, which automatically provide high-quality images of all side surfaces of cartridge cases or bullets and fully display the bottom of the cartridge case), records of counterfeit money, forged documents, handprints recovered from crime scenes, shoe prints, traces of burglary tools, vehicle traces recovered from unsolved crimes, DNA profiles of persons, micro-objects, subjective portraits of persons suspected of committing crimes.

Thus, all subsystems are integrated into a single information database, where, due to the interconnection of subsystems, it is possible to obtain detailed data on individuals or events. It is worth noting that after the introduction of the information and telecommunication system (IPNPU) "Information Portal of the National Police of Ukraine" the integrated information and search system (IISS) of the internal affairs agency "Armor" is used only for information and reference purposes, and its records are not updated. As of 2023, the main automated system used by the National Police of Ukraine is the IPNPU system (Ivanov, 2020). The organisational and informational response of the National Police units to primary information at the scene is also ensured by the information technology and system complex "Tsunami" (an electronic card with improved quality of response to robberies, which simplifies the collection and recording of primary information about the incident, which in turn reduces the time for dispatching police units, provides visualisation on the map, and provides for the calculation of reports, statistical reports and archives). The IPNPU is already bringing many benefits but still needs to be further developed and improved. In particular, there is such a problematic issue in the operation of the IPNPU system as "freezing". The same problem exists in the Tsunami information system. This blocks dispatching service and operator activity ("102" call service), who are then forced to work over the phone, receiving messages and sending police units to the scene. As a result, response times to reports of criminal offences are increasing, requiring improvements to the quality and optimisation of signal transmission of the networks that integrate into the UIDP system. As a result, police officers spend significant time summarising and processing the necessary information (Krasnobrizhiy, 2018). The use of the IPNPU system is, among other things, provided for in part 1 of Article 27 of the Law of Ukraine "On the National Police", according to which the police has direct operational (including automated) access to information and information resources of other public authorities with mandatory compliance with the Law of Ukraine "on Personal Data Protection".

A centralised repository for investigative data as a search database exists in the United States (Integrated Automated Fingerprint Identification System, n.d.). This repository contains information related to investigative and intelligence data used to support both law enforcement and the Federal Bureau of Investigation's (FBI) counterterrorism and counterintelligence missions. This investigative data repository was created in 2004 to centralise various state and federal databases, as well as criminal history records from various law enforcement agencies. The repository also includes data from the U.S. Treasury Department's Financial Crimes Enforcement Network (FinCEN) and other databases containing information on public records (Treasury Strategic Plan…, 2021).

[1] Order of the Ministry of Internal Affairs No. 580 "On the Approval of the Instructions for the Organization of the Functioning of Forensic Records of the Main Expert Forensic Center of the State Border Service of Ukraine". (2017, July). Retrieved from https://zakon.rada.gov.ua/laws/show/z0957-17#Text.

[2] Resolution of the Cabinet of Ministers of Ukraine No. 1024 "On the Approval of the Regulation on the Unified Information System of the Ministry of Internal Affairs and the List of Priority Electronic Information Resources of its Subjects". (2018, November). Retrieved from https://zakon.rada.gov.ua/laws/show/1024-2018-%D0%BF#Text.

[3] Order of the Ministry of Internal Affairs No. 1066 "On the Approval of the Procedure for the Use of Telecommunication Networks and the Table of Affiliation of Departmental, Special and Connecting Lines in the National Police of Ukraine". (2016, October). Retrieved from https://zakon.rada.gov.ua/laws/show/z1415-16#Text.

The Integrated Automated Fingerprint Identification System (IAFIS) is a national system operated by the FBI for the automated search and identification of individuals based on their fingerprints. The system supports case management and provides automated fingerprint searching, electronic fingerprint image exchange, and storage capabilities. IAFIS is the largest biometric database in the world, including the fingerprints and criminal history of criminals, as well as a large number of fingerprints of citizens and known or suspected terrorists. This information is processed not only by national but also by international law enforcement agencies. The FBI receives fingerprints from both federal state and local law enforcement agencies, whether voluntarily or through criminal arrests and the US-VISIT program for background checks. The FBI has expressed its intention to replace the IAFIS system with a new next-generation identification system.

The Combined DNA Index System (CODIS) is a system that integrates national, state, and local databases for DNA identification. Its multi-tiered architecture allows forensic laboratories to control their data. Each laboratory decides independently which DNA profiles it will share with other areas of the country. The state government regulates which crimes can be included in CODIS. The CODIS database defines a DNA profile as a DNA profile that includes the sample identifier and the identifier of the laboratory responsible for that profile. It is worth noting that CODIS does not contain information regarding the personal identification of specific individuals, such as social security numbers, date of birth, or names. This DNA index system contains information about the Convicted Offender Index – profiles of individuals who have been convicted of crimes, as well as the Arrested and Reference Index and the Missing Persons Index and other databases (The FBI's Combined DNA Index System..., n.d.). This example of a democratic country's use of databases in the investigation of crimes once again emphasises the effectiveness of their functioning. We believe that Ukraine can follow the example of other countries to fully realise the potential of databases.

France, in turn, has a system for processing observed offences (STIC), which is a computerised police file of the French Ministry of the Interior that combines information on criminals arrested by the national police. It also contains data on the victims of these crimes, as well as the identification of stolen or misappropriated objects. Responsibility for the STIC lies with the Director General of the National Police (DGPN). It is managed by the Technical and Scientific Police Unit. Its main purpose is to facilitate the detection of criminal offences, the collection of evidence of these offences, and the search for the perpetrators. The system is also used to produce statistics. The National Gendarmerie has a file called JUDEX (Judicial Documentation and Exploitation System). In 2011, the STIC and Judex files were merged into the Criminal Record Processing (TAJ) file. It contains data on the defendants in criminal proceedings, whether they were co-perpetrators or main participants in the crime, criminal specialisation, first names, surnames, nicknames, date of birth, marital status, places of work, residence, etc. There is a separate database on persons who have committed sexual offences (Automated Criminal File on Persons Who Have Committed Sexual Offences). In other words, separate databases have already been implemented in European countries and have been successful enough to continue their existence, despite the funds regularly invested in them, which emphasises their effectiveness (The Recorded Offences Processing System, n.d.).

The United Kingdom has several information systems in place, including the National Fingerprint Database, the National DNA Database, and public transport data (Oyster card payments can track the movements of individuals, and the Central London transport fee provides computer images for tracking vehicle licence plates), vehicle tracking (precise tracking of all vehicle movements on the road through the use of a nationwide network of roadside cameras connected to automatic number plate recognition systems. This tracking system captures and stores details of all trips made on major roads and through urban centres, keeping the data for five years[1]), Law Enforcement Data Service (LEDS), Fraudulent Landlord and Property Agent Database)[2]. Thus, at the moment, various countries actively develop and expand individual databases, as they understand their effectiveness in facilitating the fastest and most efficient investigation of criminal offences.

Furthermore, considering the information databases of the above-mentioned countries, the resources of which are used by law enforcement agencies to investigate crimes, it is possible to conclude that not every country has databases on serious crimes committed with the use of weapons. A similar database of a specific serious crime was introduced in France, the Automated Criminal File on Sex Offenders. The database contains the registered name, pseudonym, nationality, gender, place and date of birth, address, nature of the offence, date and place and nature of the offence, and the decision and sentence imposed.

As a socially dangerous crime, an armed robbery of a household infringes not only on the right to respect for a person's home, property, and health but also on life, which is the highest value in a civilised society. To investigate such a crime, it is necessary to develop a separate software product to conduct a tactical analysis of individual crimes, as well as to conduct a comparative analysis of previously committed robberies (both solved and unsolved), comparing them with the

[1] Protection of Freedoms Act. (2012, May). Retrieved from https://www.legislation.gov.uk/ukpga/2012/9/contents.
[2] Housing and Planning Act. (2016, May). Retrieved from https://www.legislation.gov.uk/ukpga/2016/22/pdfs/ukpga_20160022_en.pdf.

aforementioned individual crime (Fig. 1). This will ensure the possibility of forming additional investigative versions and planning appropriate further public investigative (detective) actions and covert investigative (detective) actions. In turn, using the temporal analysis of the chronology of events in the time division in the relevant territory to establish hidden spatial and temporal, objectively existing, connections between events, conducting a general analysis, comparative analysis and analysis of profile features makes it possible to conduct geographical profiling, i.e. analysis of crime scenes that are in some way interconnected. This provides insight into the spatial and temporal behaviour of the offender and also makes it possible to establish the degree of familiarity of the offender with the location of the attack, which will help to focus the investigation of the attack on a smaller area. Such a software product should perform a variety of functions, including the function of ensuring the collection of information on the nature of the robbery attack on the homes of citizens with the use of weapons, on the perpetrators of such attacks, including those who have been convicted and sentenced, as well as on persons who were suspected of committing such crimes; and the functions of transferring, selecting, processing, storing, issuing and providing information upon request.

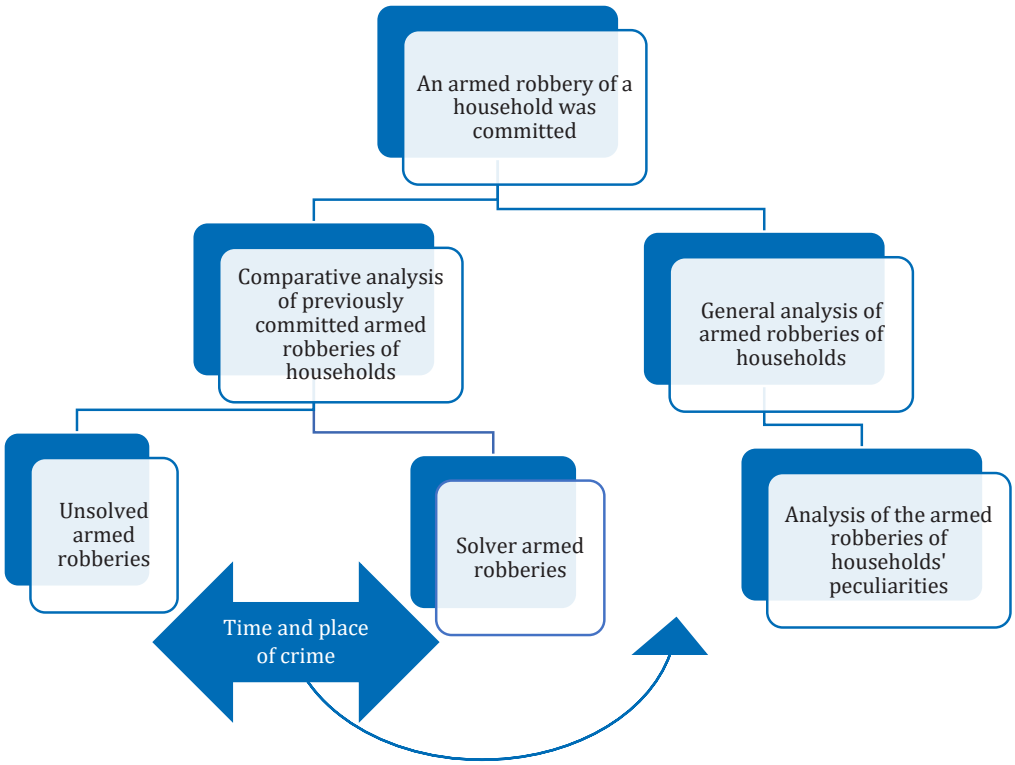

Figure 1. Correlation of the analysis of the peculiarities of an armed robbery of a household with the analysis of previously committed similar attacks

Source: compiled by the author

To establish the territorial and temporal scope of a serial armed robberies of households, it is necessary to determine: the boundaries of the territory within which a serial armed robberies of households were detected; the location of houses and apartments; the distance from transport routes, railway and bus stations, land transport stops, subway; the facts of the location of the robberies near places of sale of illegally seized property (markets, taxi stands, pawnshops); the attackers' routes to the places of robberies and their escape routes; the time (hours, days of the week, dates) of all established acts of serial robberies, the number of thereof, intensity in the relevant time period (season of commission, day of the week, dark or light time of the day); determine the method and sequence of actions of the attackers in the preparation, commission and concealment of serial robberies; the use of the same weapons and tools for committing the crime in a number of such robberies; and the amount of stolen property as a result of each robbery.

Thus, when investigating an armed robbery of a household, it is advisable to study the methods of committing such a crime and to establish the existence of a series of such robberies to clarify whether they were committed by a group. With a new, separate database of armed robberies, access to such information would be much faster and easier. At the same time, it is necessary to study, compare, evaluate, and analyse the conclusions of expert examinations to identify identical traces in different robberies, other circumstances that

confirm the relation of some episodes to the investigated series of robberies and the involvement of persons other than the identified ones, which can be done using databases, in particular, the database of armed robberies of households. Examination should determine: the presence of tangible and ideal traces of the crimes, according to the conclusions of relevant examinations and those contained in the testimony of victims' witnesses, indicating the commission of a series of group robberies, verification of the versions of the group nature of all or part of the robberies that constitute the serial; the fact that the same suspects were present at the scene of two or more robberies; the fact that they used weapons, vehicles, tools to commit the crime and to suppress the resistance of the victims in several robberies; the characteristic habits and skills of the attackers, which were manifested in the way they committed such criminal offences; the boundaries of the space where a series of such robberies were detected, the location of citizens' homes; the characteristics of the objects of illegal appropriation and the characteristics of the victims (name, specificity, number); the existence of a possible common acquaintances and communication between members of the criminal group and two or more victims.

It is also necessary to analyse information about persons who have previously been convicted of violent crimes. This information can be obtained through the use of automated databases, including fingerprinting systems (to record fingerprints recovered from unsolved crimes), other operational and search records on persons who have committed a crime but have been released from criminal punishment; antiques and cultural property; lost and found firearms. In this context, it is necessary to study forensic registers that operate at different levels – national and local. At the national level, there are central (ABDC) and local (ABDO) forensic registers. These banks keep records of persons who have committed serious crimes and are on the international wanted list, as well as information on unsolved serious crimes, stolen items, firearms, vehicles, antiques, etc.

The Central Criminal Records Centre (ABDC) keeps records of the same data, but in a larger volume, covering less dangerous crimes and certain categories of persons with a tendency to commit crimes. *Modus operandi* is a system of registering crimes based on stable, visible features that characterise the mechanism of criminal acts and the person who committed them. This data is collected during investigative actions (inspection of the scene, reconstruction of the circumstances of the event) and forensic examinations. Criminalistics records have two files: one for how crimes are committed by known persons, primarily repeat offenders, and the other for how crimes are committed by unknown persons (criminals who have not yet been identified). Both databases are in a state of constant mutual verification in the operational mode.

The next important steps are to identify, gather and systematise information about the attackers' identities and compare it with the information in the database of robberies involving the use of weapons. It is necessary to compile a subjective portrait of each attacker and highlight the features necessary for the search (special features of the attackers, level of criminal qualification, availability of data on convictions for robberies, the propensity to use alcohol and drugs, discernment and interest in specific objects of criminal assault (interests, hobbies or profession, or the presence of an order for a criminal assault or the relevant specialisation of the offenders, which gives grounds for a criminal assault), and enter them in the database responses. It is advisable to establish and analyse the identified evidence base, compare it with the one available in the database of robberies against citizens' homes with the use of weapons, and build a territorial and temporal model of the offender's actions to determine the possible place and time of the next series of robberies, as well as his place of residence or base, which will be easier to implement with access to the database of robberies against citizens' homes with the use of weapons. All of the above will provide necessary conclusions and plan further investigative search operations and/or covert investigative search operations.

Many scholars addressed information databases in the context of their use in the investigation of crimes, including violent ones, and also studied robbery and its social danger. Their opinions will be discussed in the article below. In particular, L. Lisnychenko (2019) emphasises that robbery is one of the most dangerous violent and mercenary crimes. She notes that the issue of combating crime, including combating robbery, will never lose its relevance, especially given the economic downturn and growing social tensions in society. Her position on robberies and their level of danger is consistent with the viewpoint expressed in this article, as the article suggests that separate databases should be used to investigate robberies precisely because they are particularly dangerous. D. Adnan (2018) also emphasises the particular danger of robberies, which encroach on the sense of security of both the individual and society, whereas D.V. Churilov (2020) addresses the involvement of criminal groups in such crimes.

Given the aforementioned the information of L. Locarno *et al*. (2019) on the benefits and challenges faced by Argentina in the creation of a criminal genetic database is noteworthy. They emphasised that despite the lack of decisions, interest and resources among responsible persons and bodies at the institutional level, the creation of such a database in 2016 confirms the potential of databases and gives hope to victims of crime. Considering that the resources in Ukraine that could be used to create a new database are rather limited as a result of the Russian invasion, we consider the experience of countries with similar funding problems to be

particularly valuable. Despite this, the study once again emphasises that facilitating the investigation of socially dangerous crimes through databases leads to a significant positive result that justifies the resources spent.

Given the importance of criminal databases, M. Łoś *et al.* (2021) aimed to improve the performance of graphical operations to improve the performance of databases in the field of criminal intelligence. The results show that in some cases, they have achieved performance improvements in criminal databases. The results of such studies should be implemented to improve Ukrainian databases, which still have performance problems, as mentioned earlier in this study.

In turn, in Israel, the Israeli DNA database has recently started conducting so-called "family searches", for which a new system based on kinship analysis has been adopted. That is, this system assumes that a criminal or victim with an unidentified identity will be identified by kinship with their possible relatives included in the database, using additional pedigree analysis. This strategy was analysed by T. Ram *et al.* (2023). They emphasise that genetic databases, among other things, help to identify unidentified human remains, which can be the basis for further investigation of a murder. The detention of the offender, in this case, prevents the subsequent commission of similar crimes. It is worth noting that information databases, as shown in their scientific work, are used to investigate criminal offences and are being improved in different countries of the world, which underlines their effectiveness in this area.

Notably, E. Plemel (2019) concludes in her research that an increase in the amount of information in genetic databases is necessary for the most effective investigation of criminal proceedings. Moreover, she emphasises that a global genetic database would be more effective than separate small databases. In turn, the development and improvement of databases increases the effectiveness of the investigation of crimes, including such socially dangerous crimes as robbery, as emphasised in this study.

Particular attention should be devoted to the study by G.M. Campedelli (2020), who considers the possibility of using the Scopus database by artificial intelligence, which could thus generate new ways of investigating criminal offences. The idea deserves attention, as databases, including criminal databases, have great potential to be used to solve crimes, which will make our society safer for civilians. For Ukraine, the possibility of cooperation between specialised criminal databases and artificial intelligence cannot be ruled out, which can significantly speed up the work of law enforcement agencies. And in the investigation of robberies, as in any other crime, time is of the essence.

Considering the opinions and research of the above scholars, criminal databases and other types of databases used to investigate crimes are used and considered useful in a wide variety of countries. It is worth supporting the position of researchers who believe that the development of databases leads to a much more effective investigation of criminal offences by law enforcement agencies. The use of a separate database for the investigation of a particular type of serious crime will increase the effectiveness of the investigation of criminal proceedings relating to robberies with weapons committed with the penetration of victims' homes.

Conclusions

Therefore, given the particular social danger of such a crime as armed robbery and breaking, as well as the tendency for such crimes to be repeated by one person or group of persons, and the increase in the number of lethal weapons in Ukraine during the war, we consider the creation and use of a separate database for this type of crime to be particularly necessary and useful. It will speed up the investigation of robberies with weapons and home invasions, and thus prevent the recurrence of such crimes by the same individuals or groups. This study will be useful for the formation of a future database on robberies with weapons and home invasions, as well as for its use at various stages of pre-trial investigation.

It may be noted that databases are used in various countries where they have already proved to be effective for the investigation of criminal offences by law enforcement agencies. At the same time, databases, especially those that are particularly important for the state, require appropriate maintenance and continuous improvement. This, in turn, requires cooperation with foreign partners, domestic efforts and material support.

Police officers who can receive the necessary, reliable, comprehensive information promptly can sufficiently analyse the situation, build versions, develop an action plan for conducting priority investigative (detective) actions and covert investigative (detective) actions, make the necessary correct decision to perform the task, which will significantly increase the efficiency of their activities and lead to positive results in the investigation. It is necessary to carry out modern, state-of-the-art modernisation measures to form a unified information and analytical environment for supporting the activities of the National Police of Ukraine by improving the information systems for such support. The study suggests specific ways of effective use of databases, proposes the creation of an additional separate type of database – a database of robberies of citizens' homes with the use of weapons and encourages scientific discussion on the creation of databases for serious crimes involving weapons.

The theoretical recommendations outlined in this study can also be used to create databases that will ensure the completeness, efficiency, and convenience of obtaining the necessary information for the effective investigation of robberies involving the use of weapons. At the same time, the architecture of such databases

and the practical, legal and ethical issues of their use require further research.

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Conflict of Interest

None.

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Використання баз даних у розслідуванні розбійних нападів на житло громадян із застосуванням зброї: проблемні аспекти та шляхи вдосконалення

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Анотація
В умовах повномасштабної війни на території України відбулося збільшення кількості злочинів проти власності із застосуванням зброї, що вирізняються раптовістю, жорстокістю та агресивністю. Такі злочини порушують не тільки межі недоторканості житла, права власності, а й завдають шкоди здоров'ю і життю жертв. У зв'язку із цим, метою дослідження було вивчення можливостей використання автоматизованих інформаційно-пошукових систем Міністерства внутрішніх справ і Національної поліції України під час розслідування розбійних нападів на житло громадян із застосуванням зброї. Під час дослідження використано такі методи: порівняльно-правовий, аналізу, системно-структурний, узагальнення, індукції, дедукції, синтезу. Використання цих методів надало можливість проаналізувати світовий досвід баз даних автоматизованих інформаційно-пошукових систем для покращення розслідування розбійних нападів на житло громадян із застосуванням зброї. На цій підставі виокремлено найбільш прогресивні й ефективні методики розслідування цієї категорії кримінальних правопорушень, сформовано пропозиції з удосконалення національної практики, розроблено орієнтовний комплекс параметрів щодо типових дій під час вчинення таких розбійних нападів. Запропоновано вдосконалити інформаційно-аналітичні системи шляхом заповнення новими базами даних тяжких видів злочинів, вчинених із застосуванням зброї, що сприятиме зручності в користуванні й оперативності їх розслідування. Розроблення такої бази даних забезпечує можливості поповнення та збору інформації за заданими запитами. Параметри наповнення обумовлені можливостями збору інформації щодо: злочинців, їх криміналістичних слідів, які їх ідентифікують, поведінкових слідів (користування видом або видами зброї, знаряддям проникнення до житла, характером завдання тілесних ушкоджень, особливостями маскування зовнішності тощо); підозрюваних, які фігурували в провадженнях про розслідувані та нерозслідувані злочини минулих років. Практична цінність дослідження полягає в можливості врахування теоретичних рекомендацій під час створення баз даних, які забезпечать повноту, оперативність і зручність отримання необхідної інформації для ефективного розслідування розбійних нападів на помешкання громадян із застосуванням зброї

Ключові слова:
розбійний напад; автоматизована інформаційно-пошукова система; організована група; злочинець; власність