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INNOVATIVE DIGITAL TECHNOLOGIES IN THE INVESTIGATION AND PREVENTION OF CRIMINAL OFFENSES

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INTRODUCTION

The 21st century is characterized by the rapid development of innovative digital technologies, which are designed to increase the efficiency of human activity and contribute to comfort and work results. Modern digital information systems and networks that more than one person has access to usually have a security system. It is necessary to ensure the safety of information, reliable performance and prevent unauthorized access to the system. To perform the assigned functions, the security system identifies users, verifies their identity, and determines their credentials.

The historical idea of identity verification was related to the use of an identity document and was based primarily on the use of certain data. The same principle formed the basis of the latest technologies using plastic badges, magnetic Smart cards with an electronic or optical storage device. These systems provide a fairly high level of protection against forgery, copying and falsification. At the same time, technical systems have one very significant drawback: they focus on verifying the authorization subject itself – a card, badge, ID card, and not on the person-owner itself. In this case, the access control system tracks the passage of cards without confirming the identity of the person who used them. In other words, the card may be lost, stolen, transferred, and used by another person.

For a more accurate and unambiguous determination of the user of the information system, biometric identification is used, which covers the collection and analysis of behavioral and physiological characteristics of a person. Biometric characteristics of a person can be: iris and retina, fingerprints, hand geometry, human appearance geometry, voice, gait, handwriting, etc. unlike traditional identification systems, biometric methods have a number of advantages – there is no need to try not to forget or lose the Access Key, password, etc. In addition, biometric devices are easy to use, for example, put your finger to the scanner – and free.

The idea of creating biometric systems was related to the need to create security systems for strategic objects. This technology is necessary in order to automatically recognize a specific person who will be granted access to the object in case of identity confirmation.

Certain aspects of the use of digital technologies and innovations in the investigation of criminal offenses have already been considered in the forensic literature[1]. In particular, the following areas of use of biometric technologies in the investigation of crimes are defined: 1) combating terrorism and crime – organized, cross – border, related to kidnappings, new forms of slave trade (adults and children), etc.; 2) countering illegal migration; 3) stopping fraud in the field of e-commerce and abuse of credit cards (so-called "identity theft" – theft and/or misappropriation by deceiving the powers of a legitimate user to dispose of funds). It should be noted that in relation to the investigation of criminal offenses, biometric technologies are mainly assigned the role of effective and reliable means and systems of mass identification. At the same time, the specifics of using biometrics in the system of mechanisms for countering trafficking in children and other international crimes against children, in the process of conducting forensic examinations in the investigation of criminal offenses, remain insufficiently covered.

The purpose of this article is to find out the possibilities of using digital biometric technologies in the system of mechanisms for countering crimes and investigating criminal offenses, as well as to develop practical recommendations for law enforcement agencies on this basis[2].

1. The role of biometric technologies in the activities of law enforcement agencies

Biometric systems are common and widely used in various spheres of human life. Thanks to the automation and speed of face recognition, biometric technologies are very useful in any field of human activity where it is necessary to check and confirm a person based on their biometric characteristics. This can include security, defense, migration processes, banking and monitoring, etc. Moreover, it is no longer possible to give an exhaustive list of areas of application of biometric technologies, since the

[1] Захаров В. П., Рудешко В. І. Біометричні технології в XXI столітті та їх використання правоохоронними органами : посібник. 2-ге вид., доп. / В. П. Захаров, В. І. Рудешко. Львів : ЛьвДУВС, 2015. 492 с.

[2] Примітка. Стаття написана у межах розробки фундаментальної теми «Інноваційні методи та цифрові технології в криміналістиці та судовій експертизі», яка досліджується фахівцями НДІ вивчення проблем злочинності імені академіка В. В. Сташиса НАПрН України.

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very idea of checking and confirming a person's identity is already becoming more and more attractive and associated with security.

Historically, the development and implementation of biometric systems has been associated with the need to create security systems for important objects. This technology is necessary in order to automatically recognize a specific person who will be granted access to the object in case of identity confirmation[3].

Biometric technologies are automated methods of recognizing a person's face based on physiological or behavioral characteristics[4]. Examples of recognition based on physiological characteristics are identification of a person by face shape, face thermogram, fingerprint, hand shape, location of veins on the front side of the palm, retina of the eye, iris of the eye. Behavioral characteristics include features or characteristics that are naturally inherent in it or were acquired in the course of training: signature dynamics, voice identification, and key pressing dynamics.

In order for the technology to be Biometric, it is necessary that it is suitable for use by automated means, that is, without the participation of a human controller, quickly in real time.

Not an unimportant characteristic of biometric technology is the ability to obtain a so-called biometric sample (or sample) from the object features provided for analysis. For example, in automated fingerprint registration systems, a fingerprint card is first obtained, which is then converted into a digital graphic file. Further, the system is in automatic analysis mode and recognizes identification signs of the structure of papillary lines. As a result, a fingerprint card with recognized features is displayed on the computer screen. Further, the operator can adjust the placement of the identification feature on the graphic image if a recognition error has occurred. After the operator confirms that the actions are correct, the program saves the biometric sample.

If the technology is biometric, then the following requirements apply to the sample: it should not take up much space. According to the world's existing standards for various biometric technologies, this is some kilobytes. This is due to the fact that a biometric sample can be transmitted via communication channels, and the speed of such a system is important. The less space the sample takes up in the biometric database, the smaller the database itself and the faster the search is performed.

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[3] Мороз А. О. Біометричні технології ідентифікації людини: огляд систем. *Математичні машини і системи*. 2011. № 1. С. 39–45.

[4] Велика українська юридична енциклопедія: У 20 т. Т. 20 : Криміналістика, судова експертиза, юридична психологія / редкол. В. Ю. Шепітько та ін. Харків : Право, 2018. С. 50.

A necessary characteristic of a biometric system is the degree of error resistance[5]. This means a low percentage of errors that can be made during recognition. Moreover, we are talking about two types of errors: 1. error of incorrect rejection (FRR – False Reject Rate); 2. error of incorrect skip (FAR – False Accept Rate). An incorrect error occurs if the system does not recognize an object based on an existing sample, and an incorrect error occurs if the system recognizes an object that does not match the sample. The biometric system allows only a small percentage of errors, so it is characterized by increased accuracy.

Currently, the science of biometrics, as a set of methods and technologies for automatic identification and confirmation of a person's identity, is actively developing. Dozens of research centers at universities, some scientific organizations, Biometrics Research Group (Michigan State University, USA)[6], Biometrics Institute[7] and commercial firms biometrics[8] are actively involved in biometrics research.

Accordingly, the use of biometric technologies is widespread in the investigation of criminal offenses. However, today even such a widespread investigative (search) action as questioning if the interrogated person has a biometric passport (ID-card) involves the use of biometric technology to verify and confirm the identity of the interrogated person. It is significant that such biometric documents are already distributed, and there are ready-made technical solutions for the implementation of this task. Thus, for a long time, Automated Fingerprint Identification Systems (hereinafter referred to as AFIS) used in criminal registration have become widespread. AFIS "Dakto-2000" was put into operation in Kharkiv in 2002. The advantage of such a system became obvious when in the period from August 2002 to March 2010, thanks to the use of this system, 988 persons involved in unsolved crimes were identified, 629 unidentified corpses were identified, 164 cases of concealment of personal data by persons, 27 criminal proceedings were combined[9]. In general, the expert service of the Ministry of internal affairs of Ukraine over the years of its existence has operated

[5] Швец В. А., Фесенко А. А. Основні біометричні характеристики, сучасні системи і технології біометричної аутентифікації. *Безпека інформації (Ukrainian Scientific Journal of Information Security).* 2013. № 2. С. 102.

[6] Biometrics Research Group. URL: https://biometrics.cse.msu.edu.

[7] Biometrics Institute. URL: https://biometricsinstitute.org.

[8] Biometrics. URL: https://biomerics.com/.

[9] Удовиченко О. А. Функціонування регіонального дактилоскопічного обліку в Науково-дослідному експертно-криміналістичному центрі при ГУМВС України в Харківській області. *Криміналістичний вісник*. 2010. № 2. С. 142.

about 10 different types and versions of AFIS ("Papillon", "Dactomat", "Monna Lisa", "Sonda", "Sonda+", "DEX", "Ukrdex", etc.)[10].

Biometric systems are used to search for suspects. So, in 2018, police officers in Zhengzhou, China, received unusual sunglasses equipped with facial recognition software for work[11]. These devices are quite successfully used by the Chinese police to catch Wanted Criminals.

In Ukraine, the company "Technoserv Ukraine" in 2011 proposed "Cascade-stream" − a system of automatic identification of a person by a video image of a face in the flow of people, which allows you to search at transport facilities, in crowded places and at checkpoints.

The capital's municipal enterprise "Informatika" has introduced a new analytical video surveillance module within the framework of the Project" Safe City " (Kyiv Smart Safe City)[12]. The unique module allows you to search for criminals not only thanks to specialized face recognition cameras. It captures images from any camera installed within the network and compares them with the existing database of offenders. If the system detects similarities, the operator immediately receives an alarm signal. Therefore, law enforcement officers will be able to track down dangerous criminals faster. The new analytical facial recognition module includes an analytical system and a database consisting of a list of wanted people.

2. Digital technologies in the system of mechanisms for countering illegal migration and international crimes

In the forensic literature, digital biometric technologies are considered mainly as automated security tools in various sectors of society. But regarding the process of investigating crimes, only certain possibilities of using biometric systems and technologies are considered in the literature, and mainly we are talking about the fight against terrorism. But the place and role of these technologies in the very process of investigating international criminal offenses against children during forensic examinations remain insufficiently covered.

Trafficking in children as a criminal offense is transnational in nature and poses a threat to the National Security and defense of Ukraine, while

[10] Хахановський В. Г. Автоматизація експертних дактилоскопічних досліджень. *Форум права*. 2011. № 1. С. 1081.

[11] Китайська поліція знаходить підозрюваних через окуляри. URL: https://www.bbc.com/ukrainian/news-42979942.

[12] У рамках проекту «Безпечне місто» запущено новий аналітичний модуль відеоспостереження, що прискорить пошук правопорушників. URL: https://kyivcity.gov.ua/news/u_ramkakh_proektu_bezpechne_misto_zapuscheno_noviy_analitichniy_modul_videosposterezhennya_scho_priskorit_poshuk_pravoporushnikiv/.

significantly affecting demographic, migration, and other processes. Ukraine in the global system of child trafficking is considered as the country of origin of "live goods". Minors are mainly exported to Europe, Russia, and East Asian countries. Children who are trafficked within the country are mainly used in agriculture, construction, markets, begging, criminal activities and prostitution. Thus, the Ministry of social policy of Ukraine published the following statistics for 2019: 185 citizens were granted the status of a person affected by human trafficking, including 184 citizens of Ukraine and 1 foreigner (a citizen of the Russian Federation)[13]. Among the persons who have established this status, 53 women, 119 men and 13 children (3 boys and 10 girls). During 2019: 65 people suffered from human trafficking in Ukraine, 120 people – from human trafficking abroad. According to the types of exploitation, 85 people suffered from labor exploitation, 40 people were involved in criminal activities, 37 people from sexual exploitation, 17 people were used in armed conflicts, 3 people were used in the porn business, 1 person was involved in begging, 1 person suffered from mixed exploitation (labor and sexual exploitation), 1 child was sold to third parties. The main destination countries were: Russian Federation – 65 people, Ukraine – 65 people, Republic of Poland-11 people, Germany-10 people, Czech Republic-6 people, Republic of Turkey – 5 people, Republic of Belarus-4 people, people's Republic of China – 4 people, Italian Republic-3 people, Slovak Republic-2 people, Kingdom of Belgium – 2 People, United Arab Emirates – 1 person, Republic of Slovenia-1 person, Republic of Kazakhstan – 1 person, Federal Republic of Brazil – 1 person, French Republic – 1 person, Hungary – 1 person, state of Israel – 1 person, Arab Republic of Egypt – 1 person.

Biometric technologies are successfully used in the activities of migration services in almost all countries of the world. The idea of verifying and verifying a person's identity when crossing the state border is already becoming more and more attractive and associated with security.

Biometric documents are identity documents that contain an electronic information carrier on which information about the biometric data of the document owner is recorded for the purpose of identifying it. It is assumed that such documents are most protected from forgery and exclude the possibility of using them by any person other than the owner. The main idea of introducing more secure documents that provide identity identification is to significantly increase the security of society from manifestations of crime and international terrorism.

[13] Мінсоцполітики відзвітувалося ГРЕТА про проведені у 2019 році Урядом України заходи щодо протидії торгівлі людьми. URL: https://www.msp.gov.ua/news/18685.html

Biometric passports are becoming increasingly common in the world[14]. According to the world Civil Aviation Organization (ICAO), more than 90 countries out of 193 UN member states are currently issuing such documents, and more than twenty states are ready to implement such documents in the coming years.

About 45 countries that issue biometric documents store both fingerprints and face images on documents at the same time, while more than 30 countries use only a digitized photo of the document owner. Other countries currently use only face images, but they plan to use fingerprinting data in the near future.

According to the ICAO, more than 15 countries currently use automated checkpoint systems for electronic passport holders. In order to pass the passport control procedure, the traveler can use the "electronic gate", which automatically checks their biometric data with the information stored on the document chip. Among the countries that read (scan) e-passports at airports and borders are the United States, Great Britain, Singapore, Portugal, New Zealand, Japan, Indonesia and Germany.

The initiator of the introduction of biometric passports at the state level was the United States: in 2002, the US Congress passed the law on the security of state borders, according to which citizens of countries that had agreements with the United States on visa-free travel could freely enter the United States for up to 90 days only if they had biometric documents[15].

Since 2004, the US-Visit program has been launched in the United States, which provided for the introduction of a fingerprint system and photographing all foreigners arriving in America (115 airports, 14 seaports, 104 checkpoints, a biometric database for more than 5 million people). More than 80 countries around the world (including Afghanistan, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) use electronic ID-card programs that contain biometric data[16].

Currently, the world's largest biometric identification system is Aadhaar (India). Aadhaar is an Indian online identification service provided by the UIDAI state agency. As of the end of March 2021, more than 1.28 billion

[14] Держприкордонслужба презентувала систему фіксації біометричних даних іноземців та осіб без громадянства. URL: https://dpsu.gov.ua/ua/news/Derzhprikordon sluzhba-prezentuvala-sistemu-fiksacii-biometrichnih-danih-inozemciv-ta-osib-bez-gromadyanstva/.

[15] Homeland Security Act of 2002. URL: https://www.govinfo.gov/link/plaw/107/public/296?link-type=html

[16] United States Visitor and Immigrant Status Indicator Technology (US-VISIT). URL: https://www.epic.org/privacy/us-visit/

people were registered in the system, which is about 90 % of Indian citizens[17].

Since March 2018, the embassy of Saudi Arabia in Ukraine has introduced a mandatory procedure for fingerprinting everyone who wants to get a visa to the country[18]. The procedure is carried out after submitting documents on a pre-appointed day and time.

On 20.11.2012, Ukraine adopted the law "On the Unified State Demographic Register and documents confirming Ukrainian citizenship, identity or its special status" No. 5492-VI, which provides for the introduction of documents with an electronic carrier that provides for the placement of biometric data about a person[19]. In 2017, the Government of Ukraine approved the Regulation on the national system of biometric verification and identification of Ukrainian citizens, foreigners and stateless persons[20]. The document defines that this is an automated system created in the interests of national security, economic well-being and Human Rights, which ensures the identification of a foreigner and a stateless person entering and leaving Ukraine, monitoring their compliance with the rules of stay on the territory of our state.

In December 2017, the state border service presented a system for recording biometric data of foreigners and stateless persons[21].

A demonstration of the system's operation took place at the capital's Kiev airport. This system of recording biometric data of foreigners and stateless persons is deployed by the border agency in compliance with the decree of the president of Ukraine of August 30, 2017 No. 256 "on the decision of the National Security and Defense Council of Ukraine of July 10, 2017 "on strengthening control over the entry into Ukraine, departure from Ukraine of foreigners and stateless persons, their compliance with the rules of stay on the territory of Ukraine". It is one of the subsystems of the departmental automated border control system. The state border service is actively working to improve the security component on the borders of

[17] Unique Identification Authority Of India. URL: https://uidai.gov.in.

[18] Візу до Саудівської Аравії українцям необхідно отримати перед поїздкою. URL: https://tourpoint.com.ua/ua/vizy/asia/saudi-arabia.

[19] On the Unified State Demographic Register and documents confirming Ukrainian citizenship, identity or its special status: Law of Ukraine No. 5492-VI of 20.11.2012. URL: https://zakon.rada.gov.ua/go/5492-17.

[20] Regulation on the national system of biometric verification and identification of citizens of Ukraine, foreigners and stateless persons: resolution of the Cabinet of Ministers of Ukraine No. 1073 of 27.12.2017. URL: https://zakon.rada.gov.ua/laws/show/1073-2017-п#Text.

[21] Держприкордонслужба презентувала систему фіксації біометричних даних іноземців та осіб без громадянства. URL: https://dpsu.gov.ua/ua/news/Derzhprikordon sluzhba-prezentuvala-sistemu-fiksacii-biometrichnih-danih-inozemciv-ta-osib-bez-gromadyanstva/.

Ukraine. Today, the technical means of the State Border Service allow reading foreign passports manufactured according to ICAO International standards, including those with a built-in chip, ID cards and driver's licenses. At the same time, the experience of advanced countries of the world, European and American partners in building Passport Control Automation Systems is constantly being studied. The best samples of equipment are implemented in the departmental information and telecommunications system. 157 existing checkpoints are equipped with means for reading information from biometric documents, and 126 checkpoints are connected to Interpol databases. Since August 2017, the information system of the border agency automatically calculates the number of allowed days of stay of foreigners in Ukraine.

The launch of the biometric data recording system of the State Border Service is another step towards improving the security component when crossing the border and improving the border control system. during passport control, state Border Service inspectors will check the passport documents of foreigners, including through Interpol databases. Information (fingerprints) will also be read using readers, which will be sent to the Department's biometric data processing subsystem. In addition, through the interdepartmental information and telecommunications system "Arkan", it will be sent to the National system of biometric verification and identification of Ukrainian citizens, foreigners and stateless persons of the State Migration Service. When a person crosses the border again, the identity identification process will be carried out. At the same time, the inspector will see whether the person has submitted their biometric data and will check them. If the data does not match, the person will be sent for additional monitoring to clarify the circumstances.

3. Use of digital technologies in criminal registration and forensic examination

Today, even when conducting a common type of forensic examination, as a fingerprint, it is advisable to use an automated fingerprint information system (AFIS) based on automatic analysis and recognition of papillary patterns. Such innovative information forensic expert systems are currently common in criminal registration. Thus, for a long time, Automated Fingerprint Identification Systems (AFIS) used in criminal registration have become widespread. AFIS "Dakto-2000"was put into operation in Kharkiv in 2002[22].

[22] Удовиченко О. А. Функціонування регіонального дактилоскопічного обліку в Науково-дослідному експертно-криміналістичному центрі при ГУМВС України в Харківській області. *Криміналістичний вісник*. 2010. № 2. С. 140–144.

AFIS “Dakto-2000" is used for forensic accounting of hand traces. With the help of a fingerprint scanner, images of papillary patterns of fingers are obtained that are suitable for identification. Obtaining samples of fingerprint information from the Kojak 10 print roll scanner took 17 minutes, the prints have the required size and extension of bmp, png files uploaded to the AFIS Dacto-2000 working program, after which the specialist receives an image quality sufficient for placing integral characteristics, establishing general and individual signs of papillary patterns (lines). After further program coding and searching the database for a fingerprint array of information at the regional and, if necessary, central levels of AFIS “Dacto-2000”, a list of candidates for comparison will be obtained. The total time for receiving samples, uploading, processing and checking using the AFIS automated fingerprint array is up to 30 minutes[23].

When conducting forensic examinations, digital biometric identification technologies are used to identify the persons involved. In particular, a striking example is the forensic phonoscopic examination (examination of video audio recording).

Voice identification is based on acoustic pronunciation features that are unique to each person. The voice reflects both a number of anatomical features (for example, the size and shape of the throat and mouth), and habits acquired by a person during life (voice volume, manner of conversation).

Modern voice biometric technology breaks down each spoken word into a series of segments. The recorded voice “fingerprint” is converted into a biometric sample, which is stored in a special data bank. To identify an individual, they are asked to answer several questions (for the most part, the number does not exceed three), the answers to which are easy to remember. For example, provide your last name, first name, patronymic, and date of birth. Modern computer systems automatically create a digital model (“fingerprint”) of the voice, which can later be compared with any phrase spoken by a person[24].

Voice biometrics in the banking sector uses a similar algorithm. So, in the spring of 2022, PrivatBank introduced voice authorization technology,

[23] Осуховський Р. В., Кизименко С. Г. Використання технічних засобів дактилоскопіювання для ідентифікації осіб. *Використання досягнень сучасної науки й техніки в розкритті злочинів* : матеріали міжвідом. наук.-практ. круглого столу (Київ, 25 лютого 2021 р.). С. 174–179. URL: https://www.naiau.kiev.ua/files/kafedru/ord/2021/ks-250221.pdf

[24] Захаров В. П., Рудешко В. І. Біометричні технології в XXI столітті та їх використання правоохоронними органами : посібник. 2-ге вид., доп. / В. П. Захаров, В. І. Рудешко. Львів : ЛьвДУВС, 2015. С. 149.

and as of Mid-Autumn, the number of users who used the function exceeded one million people[25]. The mechanism of operation is as follows:

the client calls the support service and starts explaining the reason for the request to the robot (virtual assistant) ;

at this time, the technology makes a cast of the voice and compares it with the options available in the database;

within a few seconds, the client is identified, which significantly speeds up and simplifies the interaction process.

The biometric identification procedure by voice allows the user to get rid of the long and for many confusing processes of confirming risky transactions.

A striking example of the use of biometric technology in the activity of a forensic expert is genotyposcopic examination, or DNA analysis, that is, the study of micro traces at the cellular level. This allows you to identify the criminal by traces of biological origin: blood, saliva, (semen), epithelial cells, parts of human tissues and organs, hair.

Forensic molecular genetic examination solves the tasks of identifying a person by DNA analysis, including: establishing the belonging of objects of biological origin (blood, semen, saliva, hair, muscle and bone tissue)to a certain person, establishing traces of biological origin of a particular person in mixed traces, establishing the identity of remains in cases of dismemberment of a corpse and identifying victims of disasters when close relatives are alive, determining the heredity of certain genetic traits of a person (biological kinship) – identification of the child's parents in cases of disputed paternity, infanticide, theft, substitution of children[26].

DNA identification is based on the uniqueness of the deoxyribonucleic acid sequence in each individual. The process begins with preparing a sample of a person's DNA (commonly referred to as a "control sample"). For sampling, a buccal smear is used, as well as blood, saliva, other secretions of the human body, and tissues. The control sample is analyzed using special biometric technology and equipment to create a human DNA profile. Such a profile can then be compared with another sample to determine if there is a genetic identity. The process of obtaining a DNA profile takes a certain amount of time. Therefore, the method itself for automatic identification of a person in real time is not yet suitable. But for

[25] Що таке голосова біометрія: як працює і в чому переваги. URL: https://psm7.com/uk/technology/chto-takoe-golosovaya-biometriya-kak-rabotaet-i-v-chem-preimushhestva.html.

[26] Види судових експертиз, які проводяться у лабораторії біологічних досліджень та питання які вони вирішують : Інформаційний лист. ДНДЕКЦ МВС України, Київський НДЕКЦ МВС України, 2017. URL: https://ndekc.kiev.ua/wp-content/uploads/2017/02/Інф.лист_ДНК-2017.pdf

conducting forensic research, the method of DNA analysis has become widespread. This method is used in forensic examinations, for example, in criminal proceedings in the investigation of premeditated murders[27].

A significant feature is the close integration of forensic records and biometric information systems. Thus, the creation and expansion of centralized national databases is an important aspect of the use of Forensic Genetics in the criminal justice system. Such databases contain genetic profiles that are established and stored in accordance with the criteria defined in the legislation of each country using forensic records of human genetic traits with automated information and search systems[28]. Automated forensic records are designed to accumulate and store data obtained in the course of research, for the purpose of further verification by comparing them with those data that are already stored in the database. Automated accounting of human genetic traits operates at the central and regional levels. The creation of forensic records of human genetic characteristics contributed to the genetic analysis of biological samples obtained at the crime scene, which greatly simplified the work of investigators. They have received a reliable tool that allows you to identify the criminal or his victim, get irrefutable evidence and solve crimes.

CONCLUSIONS

The use of innovative digital technologies in the system of mechanisms for shaping the security environment in Ukraine is extremely appropriate. The conducted research allows us to determine the directions of using biometric systems:

1) in the system of national security and defense mechanisms of Ukraine;

2) in automated criminal registration systems for the purpose of accumulating criminally significant information for use in the future, including as materials for forensic examination;

3) in automated systems that ensure the use of biometric documents for identity cards (for example, a biometric passport);

4) in automated systems that ensure the use of biometric characteristics of a person for the search for persons;

[27] Вирок Хмельницький міськрайонний суд Хмельницької області від 22.12.2021 р. *База даних «Єдиний реєстр судових рішень».* URL: https://reyestr.court.gov.ua/Review/102204614.

[28] Ірина Єпринцева Актуальні питання криміналістичних обліків генетичних ознак людини. *Молодий вчений*. 2020. № 9 (85). URL: https://molodyivchenyi.ua/index.php/journal/article/view/703/679.

5) when conducting certain types of identification forensic expert examinations (forensic phonoscopic examination, DNA analysis).

The use of digital technologies is a necessary condition for the formation of a secure environment in Ukraine.

SUMMARY

The article is devoted to the study of the possibilities of using digital technologies and innovations in the system of mechanisms for countering crimes and investigating criminal offenses. The possibilities of such technologies in activities both in the process of preventive activities of the police and other state bodies, and during pre-trial investigation of criminal offenses are considered. The article examines the history of the development and implementation of digital technologies in law enforcement activities. The correlation of biometrics as a science and information biometric technologies for identity identification and confirmation is given. Biometric technologies are a type of forensic information technologies and therefore should be used in the work of law enforcement officers and forensic experts. Thanks to the high level of automation, they increase the efficiency of research and the use of special knowledge, saving the time of a forensic expert. Opportunities for identification expert research are being expanded. A special feature of the use of biometric information systems in forensic examinations is the high level of technical equipment of laboratories and compliance with the requirements for the qualification of personnel. Another significant feature is the close integration of forensic records and biometric information systems. This expands the possibilities of access to criminally significant information not only by a forensic expert, but also by other law enforcement officers who have the appropriate right of access to it. Increases the speed and efficiency of Forensic Accounting. The possibilities of searching for and identifying criminals are being expanded.

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