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APPLICATION OF 3D TECHNOLOGY IN CRIMINAL PROCEEDINGS

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Abstract

Under current conditions, there is practical demand for the introduction of 3D technology into law enforcement activities, which can be used to solve a wide range of criminal proceedings. Based on positive examples of foreign experience in application of this technology in combating crime, there were practical opportunities of 3D technology in activities of the investigator, expert, in criminal proceedings including those with the participation of jurors. It was revealed that the application of 3D technology in the criminal proceedings in Russia is currently at the stage of formation. The reason is in a complex of problems of logistical, ethical-legal nature, as well as the lack of a proper methodological support. The creation of new and improvement of existing computer programs for creating a 3D model of objects related to the committed crime, depending on the specific tasks of criminal proceedings was proposed. The need for the settlement of legal issues of the possibility of using information and communication technologies in pre-trial and trial investigations was indicated. The organization of training of investigators, experts, prosecutors on the methodology of using 3D technologies was proposed in specific areas of their activities at the advanced training courses, etc.

Keywords: 3D technology, crime investigation, trial

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1. Introduction

The rapid and dynamic development of information technology ensures the emergence of new high-tech equipment, which in its turn is shaping new ways of detecting, recording and examining evidence. Modern data processing technologies make it possible to use qualitatively new ways of obtaining information. Therefore, the introduction of 3D technologies (3D scanning, 3D modeling, virtual reality technologies), which can be used to solve a wide range of tasks in criminal proceedings (crime scene reconstruction as well as reconstruction of the appearance of a criminal, corpse, damaged objects, etc.), is in practical demand in the law enforcement agencies.

2. Problem Statement

The use of 3D technology in the work of law enforcement agencies is a relevant and promising trend. At the same time, due to its novelty for the Russian practice of investigation and criminal proceedings, this issue requires consideration from the position of determining the functionality of 3D technology through the prism of identifying the existing problems in the implementation of this trend in Russia.

3. Research Questions

Analysis of good foreign practice allows us to identify the functionality of 3D technology in the activities of law enforcement agencies and to adapt them to the needs of the Russian practice of combating crime.

Thus, 3D scanners are widely used in practice: crime scene scanners that can capture large spaces, and 3D scanners that capture individual objects in full color and high resolution (DeLaurentis, 2009). In the first case, the use of laser beams makes it possible to measure and “capture” the surroundings to create a 3D model of the crime scene later on (Brizzi et al., 2006; Holowko et al., 2016). This model is obtained by combining 3D images recorded from different locations at the scene (Se & Jasiobedzki, 2006). The second type of scanner can be used to make high-quality dental, shoe, car and other traces, which in some cases is preferable to making plaster casts. The fixation of a trace by making plaster casts destroys the original image of the trace at the crime scene, whereas 3D scanners make the fixation without altering the original. High-definition video fixation (High Definition Surveying) in combination with 3D scanning is becoming more and more popular.

The 3D models of the scene obtained in this way make it possible not only to reconstruct the detailed crime scene, but also to illustrate it virtually, which is relevant when investigating homicides, terrorist attacks, traffic accidents, etc.

The 3D model of the crime scene can subsequently be used during the testimony test at the scene and the investigative experiment.

A virtual model of the scene will allow the participants of the criminal event to reproduce the actions committed during the crime, which significantly affects the process of proving. Using 3D technology, it is possible to create a 3D print of the victim’s face, a 3D model of the offender’s

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appearance, etc. (Baldasso et al., 2021; Carew & Errickson, 2020; Carew et al., 2019; Leipner et al., 2019). The benefits of 3D scanning are evident in facial reconstruction from the skull. The use of traditional methods of facial reconstruction based on the use of various materials (for example, sculptural plasticine) predetermines the possibility of damage to the skull during work. Virtual reconstructions, on the other hand, ensure the safety of biological material, and therefore it is possible to carry out repeated modeling of the external appearance and to create a 3D copy of the reconstructed face, which can be used later for traditional reconstructions.

3D technologies are actively used in forensic medicine for reconstruction and subsequent identification of unknown corpses (mummified, burned, etc.) for accurate recording and detailed examination of injuries, determination of the victim's gender, etc. 3D scanner digitizes the surface of the body and recreates its virtual model, which helps to reconstruct the process of damage (Bornik et al., 2018). Such scanning also provides essential assistance in determining the causes of death, determining certain humans' diseases. Cases of using a 3D scanner to identify bodies in cases of mass disasters are of particular practical importance in forensic medicine.

Virtual reality technologies are used, for example, in identification, when the identifier has the opportunity to view a 3D model of the person being identified from different sides.

Digital models of objects related to the crime, obtained through the use of 3D technology, are also used in court proceedings (Aquila et al., 2019), including those with the participation of juries. The following case vividly demonstrates the possibilities in question. In 2015, in England, S. was fatally stabbed in the neck with a broken bottle. Defendant D. claimed that he did not realize that he was hitting with the bottle and that that the incident was self-defense. A 3D copy of the broken bottle was submitted to the court. After the defendant demonstrated how he was holding the bottle, using a 3D copy of the bottle, it became clear to the jury that D. was aware of the lethality of striking with this object. Eventually, D. was convicted of the crime (Chase & LaPorte, 2018). Three-dimensional models are also used in court when presented by experts to clarify and visualize the results of examinations.

In foreign practice, 3D technology is actively used in various areas of criminal proceedings and allows solving many other emerging problems.

The study of special literature, interviewing practitioners have led to the conclusion that the interest in the use of 3D technology in the preliminary and judicial investigation is still emerging in Russia.

For example, within forensic medical examinations (ballistics, handwriting analysis), these technologies are used only in occasional cases (Gorbulinskaya et al., 2018). However, there is an urgent need to apply new technologies for the presentation of evidence through the creation of three-dimensional models, particularly, in situational expertise (Konygin & Shestakova, 2017).

The use of the capabilities of 3D technologies in the court is one of the directions for improving the tactics of judicial investigation.

The basis for the use of modern information and communication technologies by prosecutors is undoubtedly the needs of practice, trends in the development of forensic science and the methodological role of the fundamental documents of the prosecution authorities. Following the provisions of the Order of the General Prosecutor's Office of the Russian Federation of December 25, 2012 No. 465, the

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assessment of the quality of the prosecutor's work depends on what real contribution he made to the adoption of a lawful, well-grounded and fair decision by the court. At the same time, defending their position, prosecutors should show professionalism, activity, as well as integrity and objectivity.

The effectiveness of the implementation of an active position in maintaining the public prosecution is possible through the use of 3D technologies in the presentation of evidentiary information by the prosecutor in court. Taking into account the increased visibility effect during the demonstration of evidence, the use of these technologies will help to improve the quality of the consideration of criminal cases and save procedural time.

However, the results of the interviews of 25 prosecutors from different regions of Russia who support public prosecution in court have revealed that none of them use models created with 3D technology in court proceedings. At the same time, 19 respondents noted that they had only superficial knowledge about such models and methods of their creation, 6 people had no information on this issue; 12 respondents expressed a desire to use such digital models in their work after appropriate training; 1 respondent informed about the use of presentation material (diagrams, tables, photos) during court appearances.

It is also necessary to point out the problems of using digital models of objects related to the committed crime in a jury trial. Currently there remains an unresolved issue in Russian practice regarding the criteria for assessing the psychological impact on jurors of the show material (Pichugin, 2019), which can form a bias against the defendant, which is forbidden at the legislative level.

In the vast majority of cases, the presiding judge carefully examines the photo and video material of the criminal case to be demonstrated to the jury and decides on the possibility (or impossibility) to use it, based on the legal requirements and inner conviction, excluding any negative psychological impact on the jury. At the same time, the courts of some regions do not take into account the possibility of psychological influence on the jury, and the court presents the originals of material evidence, for example, clothes with traces of blood, the instrument of crime. The question of the possibility of demonstrating 3D models of forensically relevant objects in jury trials is still open and will obviously be discussed in detail only in the future.

The application of 3D technology in the investigative activity is also in its formative stages. A survey of 20 investigators shows that an overwhelming number of respondents (18 people) do not know about the capabilities of such technologies and do not know the areas of their application in the work of the investigator; 2 people mentioned their awareness of the existence of a computer programme for modelling an incident scene. However, like the prosecutors, some investigators expressed a desire to learn to use new technologies in their work (8 people).

At present, one should only point out the attempts to digitize files of criminal cases. For example, Krasnodar created the program for visualizing the analysis of the results of criminal investigations, which helps to sort the data obtained during the investigation and clearly present the evidence in court proceedings.

Individual cases of 3D modelling of the circumstances of an accident scene, particularly theft, are known. In the course of the work, the possibility of restoring or imitating the general picture of a criminal event was established in order to identify negative circumstances indicating a staged theft.

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However, software products with a wide range of applications (interiors, construction, cinematography, etc.) were used as an experiment to test the possibility of their application in law enforcement activities (Prokofieva et al., 2016).

Among the main problems of 3D technology application in the Russian practice of combating crimes are the following ones: insufficiency and imperfection of software, lack of law enforcement officers' knowledge about functional capabilities of these technologies and, accordingly, abilities and skills to create three-dimensional models; the need for procedural regulation of the issues of applying new information and communication technologies in the criminal justice system.

4. Purpose of the Study

The purpose is to study the functional possibilities of 3D technology, determining the directions of 3D models application at preliminary investigation and during criminal proceedings, revealing the main problems of application of these technologies in the Russian criminal proceedings and proposing optimal ways to solve them.

5. Research Methods

The main methods of scientific research were analysis, synthesis, comparison and modeling. Through the method of interviewing, 25 prosecutors who are involved in the prosecution in court, as well as 20 investigators from the investigative divisions of the Investigative Committee of individual regions of Russia, were questioned about the use of 3D technology in their work.

6. Findings

Digital models of objects related to the committed crime, as the final result of the use of 3D technology can be used in investigative and expert practice, as well as in criminal proceedings. Most of all, this direction has been developed in the foreign practice of combating crime. The use of 3D technologies in criminal proceedings in Russia is currently at the stage of formation, which is predetermined by the presence of logistical, ethical and legal problems, as well as the lack of proper methodological support.

7. Conclusion

The wide functionality of 3D technology predetermines the prospects of its use in criminal proceedings. In order to solve the problems of using 3D technologies in the Russian practice of investigation and judicial examination of criminal cases, identified in the course of scientific research, it seems necessary, first of all, to use the positive foreign experience of using 3D technologies in the activities of law enforcement agencies.

It is also necessary to create new and improve existing computer programs for the formation of 3D models of objects related to the committed crime, depending on the specific tasks of criminal proceedings.

An equally important task is to resolve legal issues of the possibility of using new information and communication technologies in criminal proceedings. At the same time, it requires an interdisciplinary discussion of the problems of the admissibility of psychological influence on jurors during presenting them 3D models of criminally significant objects, the development of criteria for their admissibility.

After solving these issues, it is necessary to organize at the proper level training of investigators, experts and prosecutors on the methodology of using 3D technologies in specific areas of their activities in advanced training courses, including by developing appropriate educational and methodological materials.

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