The Role Of Digital Technologies In Forensic Habitoscopy

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Abstract:

The XXI century is an age of digital technology and global threats. The digitization of all areas of our lives leads to increased productivity and efficiency at work. In the article the foreign experience in the field of habitoscopy is studied. The main prospective tools and programs facilitating the identification of persons by digital images have been identified. Article highlights application of digital technologies in criminal habitoscopy.

Keywords: Criminalistics, Habitoscopy, Digital technologies, Portrait expertise, "Oral portrait", Forensic science, Special knowledge

I.   Introduction.

In modern realities, the XXI century is often called the era of digital technologies. It is known that the main basis of the economic and legal spheres of the developing countries is digitized. The digitization process is the main foundation for the modernization of every sector of the country. As a result of this activity, the efficiency and intensity of work in each field will increase.

Modern processes of activation of digitization of all spheres of state activity, in turn, necessitate the improvement of the system of law enforcement agencies and the prosecutor's office, judicial bodies. There is a transition of the existing traditional system to a new reality – a digital one, in which digital information is an integral attribute, both in the work of criminal justice bodies, on the one hand, and modern criminal activity, on the other [1]. This, in turn, determines the current trends and prospects for the development of legal science, including criminology, which is at the front of the fight against crime [2].

The digitization of forensic science is also the basis for the efficiency and optimization of forensic work. In particular, various modern opportunities are being created in the investigation and prevention of crimes in the field of criminal habitoscopy and forensic portrait expertise.

We know that habitoscopy is branch of forensic technique and it is field which is learn personal appearance. This field plays a very important role in the activities of law enforcement agencies in the detection of unsolved crimes, the search for an unknown criminal, and the identification of an unidentified corpse.

The term habitoscopy is derived from latin and greek words, which are mean "habitus" – "human appearance, signs"; "scopeo" - "learn", "determine". Habitoscopy – is a science that studies human appearance. The term habitoscopy is used as the term "habitology". Portrait expertise is carried out on the basis of forensic habitoscopy.

Habitology is also referred to as "oral portrait". Because in the investigation of crimes, the identification of the person who committed the crime is carried out by the victim, witness or other persons verbally speaking the signs of appearance of this criminal. In this activity, object of identification can be not only a living person, but also a corpse or its remains (skeleton).

Identification of a person by signs of appearance is mainly based on portraits of the object of forensic identification. Portraits are created through computer technology. These created portraits are called "PhotoRobot", which describes the part of the person up to the breast is prepared based on the anatomical signs of the person being identified. A person's photorobot is created on the basis of the fact that during the creation, the victim, witness or other person being identified. Furthermore it plays a big role in finding the person who committed the crime by covering certain signs of appearance.

Methodology

In the identification process, data on sex and age are determined and recorded on the basis of reliably known characteristics. In the absence of reliably corroborated data, the age is approximate, e.g., "male appears to be 35-40 years old". Such an indication ("in appearance") is also required if there is documented evidence in cases where the person appears to be significantly older or younger than his or her real age.

Anthropological type (demographic data) is determined by the set of anatomical features of appearance. A person's race (Europeoid, Mongoloid, Negroid-Australoid) may be combined with the colour of the skin and eyes, the nature and shape of the hair, the thickness of the lips, the size of the cheeks, the profile of the back of the nose, as well as the proportions of the face and other characteristics.

Features of the anatomical structure of the body are distinguished by visual perception and characterized by external features, such as color, size, volumes, shape.

Physical characteristics, such as weight, gender, age, are integral to the description. The structure of the body is characterized by such features as muscular, thoracic. Also highlight the physical condition of the person - healthy or sick.

According to A.M. Zinin, at the present stage of the development of forensic knowledge, it is especially important to use the ideas of integration of related sciences, such as anthropology, genetics, anatomy and forensic medicine. This knowledge helps identify images using a forensic portrait examination. A.M.Zinin was subjected to a professional analysis of educational and methodological activities in the field of habitoscopy and portrait expertise. The scientist concluded that the widespread use of digital technology dictates a new level of training for forensic experts units of internal affairs bodies. The use of innovative 3-D technologies is also allows a specialist to convey the content of the mental image more accurately and clearly, allowing one to form a forensic subjective model of appearance of wanted person[3].

II.   Results

It is known that the individual characteristics of a person are identified with uniqueness, distinctive features are subjected to careful analysis and comparison. The multiplicity of signs and the complexity of their perception can be traced in the description of the face as a key element of appearance. Even brothers, sisters, twins or individuals with mutual relationship have birthmarks that are in some ways incompatible with each other. Thus, criminalistists believe that a person's face is one hundred signs, and this figure is artificially increased if, for example, everyone the feature will be described through a prism of magnitude, shape and size. Only certain plastic surgeries (nose shape change by rhinoplasty), cosmetological practices (botox), or chronic diseases (adenoids) can change a person's appearance. Some experts believe, that the official classification of the description of a person is 50 signs.

III.   Discussion

In Italy, scientists conducted a study of the degree of variability of external characteristics of the nose as an integral feature of the description of the person the suspect, depending on age and sexes. 519 men and 340 women were examined, corresponding on physiological grounds, between the ages of 4 and 73. Comparisons were carried out using factor dispersion analysis. The nose is one of the structures of the body that continues to change and expand throughout life, far beyond achieving skeletal maturity. Studies have shown that older people tend to have more developed nasal cavities than young people of the same sex and ethnic group. It is established that the volume of the nose on average in men is greater than in woman. Age-related changes directly affect the change in the shape of the nose; the angle of the tip of the nose decreases with age. No patterns associated with age have been identified for ratios, nose bulges, or slope angles. In general, in most cases, the size of the nose in men was larger than that of women's. Data collected in the present investigation could serve as a database for a quantitative description of human nasal morphology during normal growth, development and aging. Forensic applications

(evaluation of traumas, craniofacial alterations, teratogenic-induced conditions, facial reconstruction, aging of living and dead people, personal identification) may also benefit from age and gender based data banks [4].

Therefore, knowledge of the normal size and shape of the nose is necessary to choose the time of surgical reconstructions. Data banks related to sex, age and ethnicity could therefore be created, providing background information for a multitude of diagnostic, clinical and forensic procedures (ageing of both living and dead people, personal identification).

Of course, in habitoscopy, it is necessary to take into account the variability of signs of appearance in dependence on age, various diseases, and surgical intervention. As a result, in the classification, two main approaches can be distinguished: the signs are permanent (which originate from birth) and acquired (depending on factors and circumstances). Elements with a bone base, such as the skull and forehead, do not undergo major changes throughout human life. Nonetheless, it is possible to assess the nature of their transformation mainly by experts with extensive experience[1].

Japan's experience in habitoscopy is interesting [5]. Scientists are working here on two-dimensional (2D) facial images made by surveillance cameras, which are often used to identify suspects. With the help of computer overlay images from surveillance cameras on three-dimensional (3D) images of people of suspects, image quality is significantly improved. This method can be used to process inconsistencies arising from differences in orientation and perspective due to differences in shooting distance. The software is designed to reduce distortion by calculating distortion parameters such as distortion coefficient, principal point and focal length along camera lens axes. In addition, the Japanese system Yoshino Et Al protects the threshold of discrimination using points of intersection of false positive (FP) and

false negative (FN) with a valid error to identify the same person when applying a face image.

Research in the forensic medical expertise laboratory in Japan showed the applicability of computer correction of optical distortions to the imposition of two-dimensional (2D) and three-dimensional (3D) face images. Two-dimensional (2D) face images of 10 male volunteers were made using a commercially available device with closed contour (CCD0 camera (support camera) in four areas of the lens field; center, top, upper right and right. A correction was made using a computer by calculating the differences in coordinates of points on the test diagram. Differences in facial outlines between 3D and 2D images decreased after correction in all fields of the tens and were below the threshold of true positivity. The correction method was also tested using real surveillance cameras and a video recorder installed in the bank. Because a common mistake (observed error) remaining after correction was close to a random error (real error), systematic error was considered minimized by correction. Therefore, it was determined that this method has high accuracy and can be useful for further study of conventional overlay [5].

Thus, the development of digital technologies, in our view, systematizes the multiplicity of scientific approaches in the description of elements and features of external description. A scientific research in the field of image quality improvement suggests rapid habitoscopy development.

Conclusion

To sum up, the current stage of international development of the forensic doctrine of the appearance of a person is determined by the integration of certain provisions of natural science and technical knowledge. The significance of forensic habitoscopy is that only the use of strictly scientific data and modern digital technologies based on advanced foreign experience contributes to the effective use of information about signs of human appearance for the purpose of detection and investigation of crimes.

As digital technologies are introduced into numerous sectors of forensic study, portrait expertise, and legal practice, it is thought that the process of digitizing criminalistics is a normal step of evolution and production of modern criminalistics knowledge. Simultaneously, extra focus should be placed on expanding the use of forensic didactics, specifically criminalistics training for courts, detectives, prosecutors, investigators, criminalistics investigators, and forensic specialists in the field of digital technologies. Training a digital criminalist and embarking on a new career are quite significant nowadays. In such cases, the current paradigm of criminalistics out to focus on the advancement and formation of digital criminalistics in order to successfully complete new tasks in the conditions of martial law and digitalization processes.

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