

управління [4, с. 156]. Міжнародний досвід, як зазначає Т.П. Михайленко, демонструє ефективність впровадження незалежних механізмів контролю та оцінки діяльності правоохоронних органів [5, с. 89].

Особливу увагу слід приділити питанням професійної підготовки працівників правоохоронних органів та формування у них стійкого імунітету до політичного впливу. Це вимагає розробки та впровадження нових освітніх програм, які б враховували сучасні політичні реалії та міжнародні стандарти правоохоронної діяльності. Важливим аспектом є також забезпечення належного матеріально-технічного забезпечення правоохоронних органів, що дозволить підвищити ефективність їх роботи та зменшити залежність від політичних факторів.

Таким чином, сучасні політичні процеси мають визначальний вплив на розвиток та функціонування правоохоронної системи. Успішність реформ у правоохоронній сфері залежить від балансу політичних інтересів та професійних підходів до управління. Важливим завданням залишається забезпечення незалежності правоохоронних органів при збереженні їх підзвітності суспільству. Подальші дослідження в цій сфері повинні бути спрямовані на розробку конкретних механізмів захисту правоохоронної системи від надмірного політичного впливу та забезпечення її ефективного функціонування в умовах демократичного суспільства.

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A BASIC METHODS FOR DETECTING SIGNS OF DIGITAL IMAGE EDITING

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The rapid development of modern computer technologies and software not only contributes to the positive solution of various complex tasks that arise in all spheres of society, but also has a number of negative aspects, in particular, it creates an

opportunity for digital editing of photo images. In today's reality, people can easily make changes to the image without leaving home with the help of a computer and software. A skilled user using special software designed for photo editing (for example, Photoshop, Gimp, Corel, etc.) can produce a fairly high-quality fake. Increasingly, the capabilities of digital photo editing are being used for criminal purposes. Therefore, law enforcement agencies are faced with the task of identifying such fake photographs. The study of photographic images and the detection of signs of making changes to them require certain knowledge from specialists, first of all, about the ways of making changes.

In general, common changes made to digital photographs are framing, retouching, collage of an image from several images, adding a new element or object to a photo image, removing an object or image element from a photo image using masking [1, p. 170].

Digital images of which there are doubts about their authenticity are examined on the monitor under magnification, which facilitates the search for signs that would indicate the presence of changes in them. In order to identify signs of falsification in a photo, a specialist must have an idea of exactly how and with which tools certain changes could have been made to it. This will make it possible to search for signs using certain software tools in the future. Even with a fairly high level of falsification of photo images, it is possible to detect and prove the presence of signs of photomontage.

The collage method is used in most cases when it is necessary to combine several images into one so that the combined image does not arouse suspicion. The beginning of the study of such a photo image is the analysis of possible ways of mounting the photo image and the determination of how many fragments or photos it could have been formed from. When examining such a photo in an enlarged view, first of all, you should pay attention to the objects, including their contours, depicted in the photo. Blurred contours of objects, blurred edges in certain places, different relative sizes of objects that actually have the same dimensions, the presence of a contour stroke of a different color than the background or object are signs of the presence of changes to it. You should also pay attention to the presence of a shadow from the object, by which you can determine the location of the light source. So, if the light source in the image was at one point (for example, the photo was taken outdoors in sunlight), and the shadows from objects (or on objects) are at different angles, this is a direct sign of the presence of montage in the photo. A composite image may also show signs of missing certain elements of the subject that should actually be there. Also, one of the main features of the montage is the multi-angle location of the shadows from the objects.

A digital image as an object can be studied using the method of evaluating changes in the noise background of the image itself. Original photos are full of noise, which arises both from the matrix of the camera or scanner, from compression algorithms, and due to ordinary natural causes. Graphic editors do not create this noise, their tools often «smear» the noise of the original image. In addition, two images often have different levels of noise. Image retouching has gained significant popularity in the practice of image processing. Retouching mostly distorts the noise background of the image and can therefore be detected by noise analysis. A change in the noise background occurs in certain cases (photo montage, retouching, etc.), in the corresponding areas of the image in the case of applying digital editing tools and techniques to it. In many cases, the noise component of the image can be used as a sign that can indicate image editing, since usually the original images have a homogeneous noise background and can be disturbed in case of changes [2, p. 633].

The framing method is most often used when it is necessary to cut off a part of a photo image and thus hide some of its elements. This method is usually used to cut off the part of the image where the date and time of the photo was stamped by the digital camera, so in this way some people try to hide the time of photography.

The correctness of displaying the date and time of shooting on the photo image depends on the camera settings. In the settings of most digital cameras there is a section where the date and time are set. These settings are stored in the device's memory until the battery is removed for an extended period of time, in which case the date and time settings are lost and set to default the next time the battery is plugged in. Therefore, for a more complete and comprehensive study of photographs, it is desirable to submit the technical device with which they were made to the study together with them, and by analyzing the date and time settings of the device to determine the exact date of the photograph.

In general, the date and time of photo creation, as well as other parameters by which it was created, can be found in a special Exif file, which is created by the camera during shooting and is attached to the photo [2, p. 101].

However, despite the fact that Exif files provide a complete and comprehensive description of the process of obtaining an image, it is not worth relying on them as an evidence base, since any information can be entered into them with the help of special programs-editors of Exif files about the process of taking photos (although the information placed in Exif files can be edited by a rather narrow circle of people who have special skills in such manipulations).

Therefore, in order to detect signs of falsification in photographs, it is necessary not only to examine the information about the image in the Exif files, but also to conduct a detailed enlarged review of the photograph for the presence of changes to them. Of course, it is becoming more and more difficult to detect high-level changes, which are becoming more and more common these days. To detect such changes, it is necessary to use the latest technologies and specialized software.

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