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MODERN METHODS AND GRAPHICAL PROTECTION TYPES ANALYSIS OF PRINTED DOCUMENTS

Modern graphical methods analysis of printed documents protection. It is shown that the image is a promising way to protect the formation of latent images. Latent images can reliably protect printed documents from falsifications.
Keywords: method of protection, securities, security elements

1. INTRODUCTION

Modern information technologies forming the security documents are developing rapidly. There is a necessity to create new types of printed documents protection as facilities and methods of falsification become more widespread. To date, falsified documents are being created by new technological methods that are close to the original manufacturing methods. Every year technical characteristics of copiers are becoming more perfect so there is a need to develop a new protection of printed documents. One of the most effective, economical and reliable methods of protection is creating documents in graphical protections.

The examination of the information activities object of the printed document in relation to the types of protection has been held.

Generally accepted that the protected document is created with

1. The use of special types and new technologies in the creation of paper (watermark, security fibers, confetti, plastic tape, chemical protection)

2. The use of special printing technology (printing, gravure printing, iris print, Orlov printing and others)

3. Protection based on paints (paints "oviay" fluorescent ink, etc.)

4. Graphical methods of protection (latent image, stacks effect, anti-scanner net, guilloche elements, micrography)

5. Postprinting Protection (perforation, the introduction of microchips and biometric elements)

Graphic protection for printed document can be made with a positive and negative way. Line thickness for positive performance lines 40-80 microns, and for the negative - 60-100 microns. The color and shade lines are selected so that when you copy and scan lines are not reproduced.

Fidelity protection elements satisfy the technological conditions of printing paper at resolving capacity 2400 x 2400 dpi (dots per inch) or higher. Another indicator is the output lpi (number of lines per inch), which can reach 100 - 300 lpi, which meets the latest requirements.

Particularly noteworthy are the latent images that belong to graphic-species protection. Latent images are the property of hiding the image by changing the

conditions of observation. Latent images can be created in various ways: by means of holography using polarization phenomena, by using special paints and coatings, by a method of formation of pixels
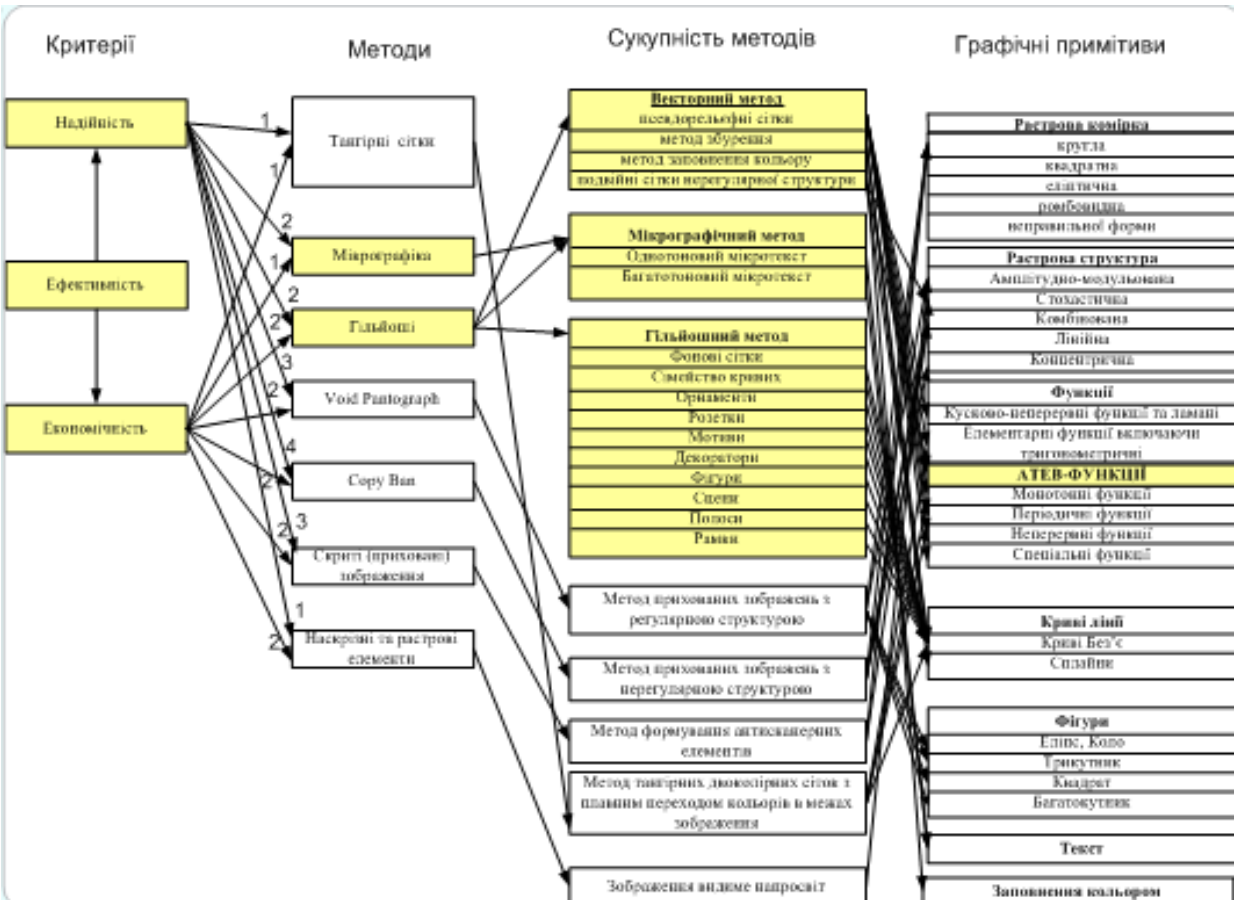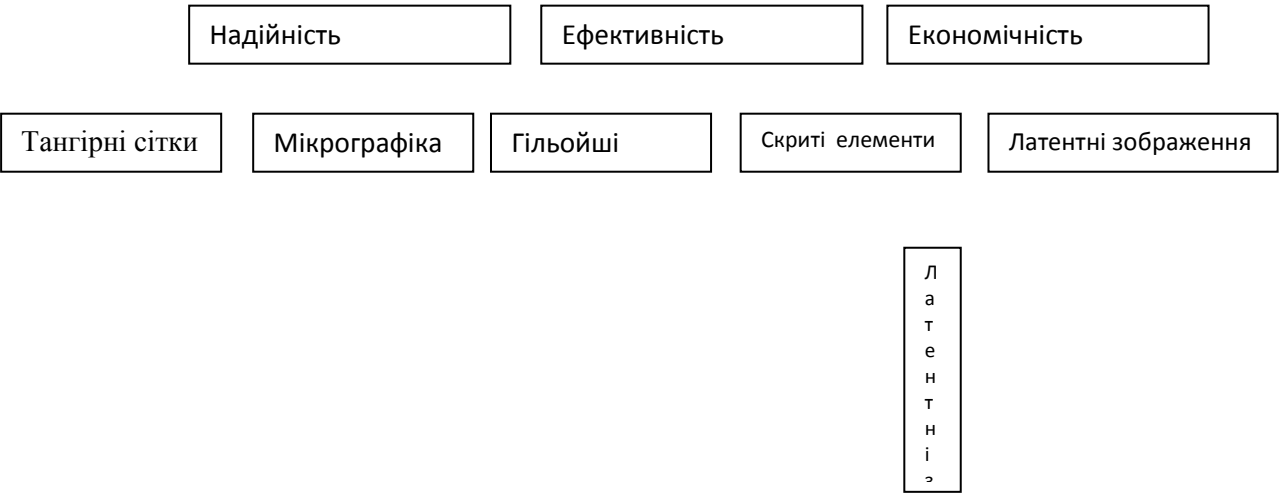

Figure 1. Analysis of the current state of the problem

Надійність	Ефективність	Економічність

Тангірні сітки	Мікрографіка	Гільойши	Скриті елементи	Латентні зображення

Латентні

2. Protection formation based on the micrography. Protection with using micrographics is based on the creation of fine graphic elements: guilloche, nets, sockets, vignettes, hidden objects and micrographics. Reproduction of fine lines is only possible when using technology of printing processes. Printing protection is considered to be effective if the micrography takes at least 70% of the document area. The difficulty of reproduction associated with complicated geometry and minimum possible thickness of the elements lines that can not be reproduced with reprographics. Protection of printed and electronic documents is based on a high level of reliability and the ability to protect printed and electronic documents from damages and falsifications. In the method of protection graphic elements are created, which are formed as an array of intersection points of the input image with graphics lines, to the formation in the color filling zone.
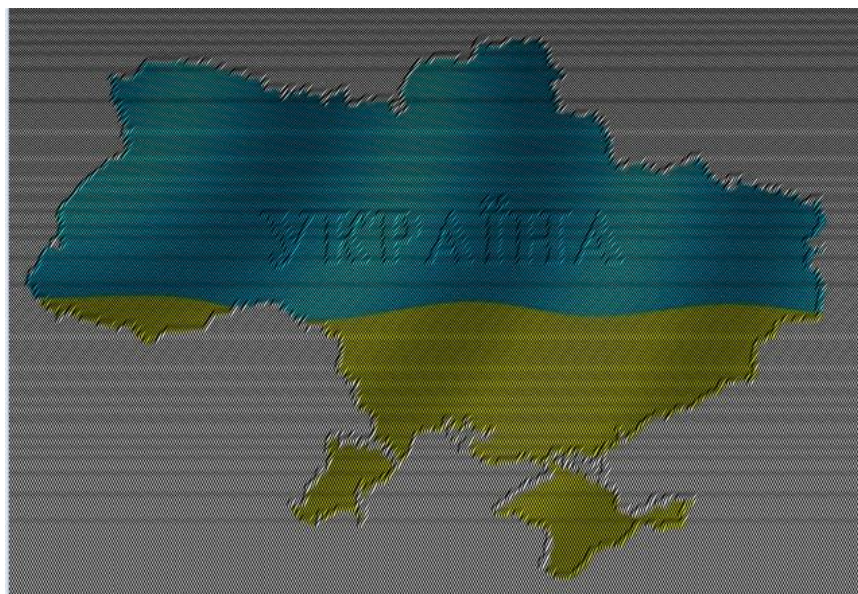

Figure 2. Ukraine map protective image by using the color fill

3. Protection formation based on the guilloche elements.

When manufacturing a printed document with protection guilloche elements are used to improve the level of protection. In this way it is possible to authenticate the document by creating fine lines that are continuous and do not overlap with each other throughout the plane of the paper. If there is an attempt of falsification, the document is scanned and digitized with computer equipment and transformed into an array of pixels, which make it possible to reproduce guilloche. Images on

falsified documents will be gray, blurry and jerky. One can easily distinguish the original from the falsification. [1] Fig. 3 is shows the protection formation based on guilloche.

Vector image is created in which the contour is formed on the lines perturbation. The algorithm is implemented as follows. In pixels where the image outline with the curve is superimposed an outrage line is generated by the contour shifting. A single line is created with graphics primitives. Line perturbation is possible using any of the graphics primitives [3].
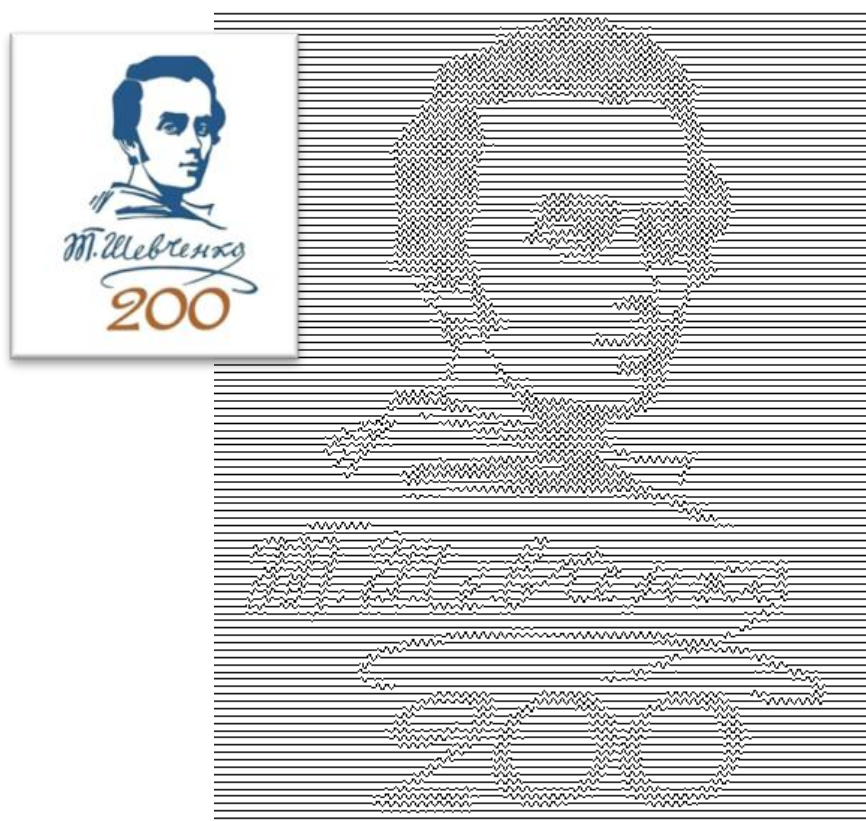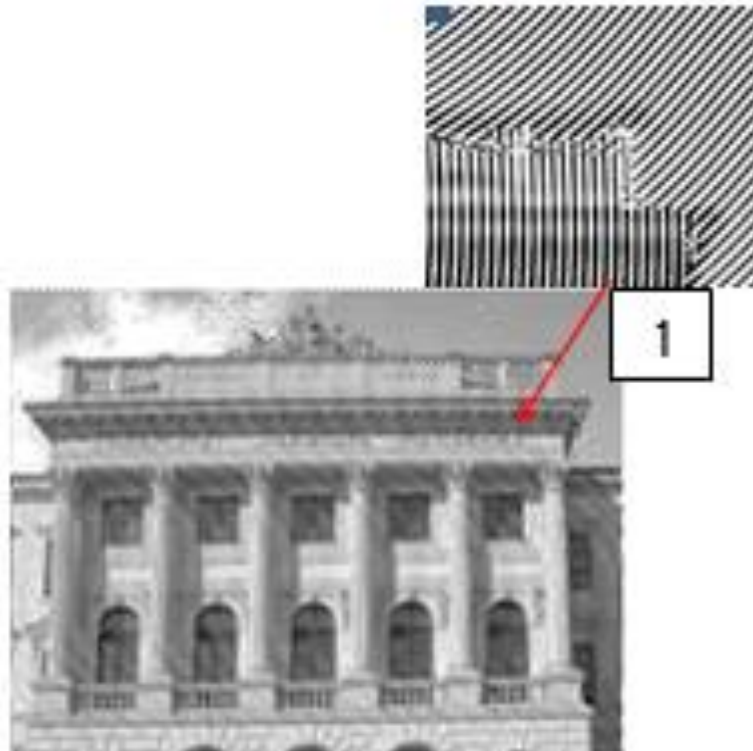

Figure 3. The image formation based on the lines perturbation.

The method of guilloche elements construction has the unique curves view and the lines construction on a given mathematical apparatus. When deriving a document, PDF format is implemented, that ensures a high-quality output.The proposed method can be used to protect labels, strict accountability forms, tax stamps etc.

4. Protection formation based on graphic traps
One of the ways to protect your documents is to create graphic traps in which the breach of an existing image or document text is accomplished. Graphic traps creation occurs with deliberate lines distortion. When building graphic traps

various tricks are used: subtle breaks in the graphic ornaments; intentional violation of local symmetry while playing one of several recurring elements of ornament; used in the text details of single characters that are different from the other in size, type, or slope, etc. In addition, you can enter secret ornaments and other complex images, fragments from repetitive strokes with given thickness and period.

Figure 4.
The image formation based on the lines perturbation.

5. Protection formation on the basis of hidden items. Latent items that are displayed by the effect of the hidden image on the print is the text done with a font with signs height not more than 0.2 mm, virtually invisible to the human eye. When using copying equipment one can easily distinguish the original from the fake with the help of this effect. [3]

Figure 2. Scanned document

A natural background is created with this method that will be printed on the original. When you copy the original a latent image becomes visible and a background grid is created as well, that includes a unique pattern that appears when copying. Background grid is based on the construction of varying thickness lines [2]. This allows to differentiate the authenticity in the level of expertise and to distinguish the original from the fake. The generation of the unique code ensures reliability even if the same software is used.

Conclusions

Graphical methods analyses of protection have been held that can effectively fight with documents fakes and falsifications. The possibilities of modern technology protection have been analyzed and found that protection can be achieved by developing new information technologies.
Different ways of latent images implementation based on guilloche elements, micrography, graphic traps and hidden items have been observed. The work is illustrated with examples.

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