

## Digital Image Protection by Password

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### ملخص الورقة:

تعتبر قضية حماية حقوق الملكية التي لها علاقة بالصور الرقمية والبيانات الرقمية مهمة للغاية لأنها تحمي حقوق الأفراد والمؤسسات، وخاصة حماية البيانات والبحث والإبتكار. ومنها البيانات الرقمية وتحديدًا الصور الرقمية والتي تنتشر في مجالات الحياة المختلفة ويتم تداولها يوميا سواء على الهاتف المحمول أو الحاسوب، مما يؤكد ضرورة البحث عن طرق لحماية ملكية أي صورة تنتشر. في هذه الورقة تم تصميم نظام يعتمد على حماية أي صورة باستخدام كلمة مرور تتكون من 6 أحرف، وهي مخفية داخل الصورة وغير مرئية إلا لصاحب الملكية الفكرية (كلمة المرور). عندما نحتاج إلى إثبات ملكية الصورة، فإن صاحب الصورة يملك كلمة المرور الخاصة به، وهو فقط الشخص الذي يمكنه إثبات ملكيتها عن طريق استخراج كلمة المرور من الصور الرقمية أو البيانات الرقمية. من أهم مميزات هذا النظام أن لكل مستخدم بيانات محددة وموقع خاص به، ويتم الحصول عليه من خلال تشفير كلمة المرور الخاصة به، أي أن لكل مستخدم مفتاحه الخاص لحماية بياناته. بعد إختبار النظام أعطت نتائج ممتازة وفعالة حيث تم اختبارها على عدد كبير من الصور الرقمية وأظهرت كفاءة هذا النظام حيث وصلت إلى 100% حيث لم يستطع أحد فك أي صورة محمية بواسطة هذا النظام ، بعد تجربتها ، حيث يمكن إستخدام هذا النظام لحماية الصورة الرقمية على وسائل التواصل الإجتماعي، ويتم ذلك بوضع كلمة المرور عليها ، ويمتاز هذا النظام أنه لا يغير في الصورة حيث يبقى على الصورة بأن تكون عالية الدقة.

### Abstract

The case of protecting literate property rights in digital images and digital data is very important because it protects the rights of individuals and institutions, especially data protecting, research and inventiveness. Among these data, digital data, specifically digital images and digital data have become prevalent in various processions of life and are circulated daily, whether on the mobile phone or the computer, which confirms the need to search for ways to protect ownership of any image that is circulating. In this study, a system was designed based on protecting any image using a password consisting of 6 characters. It is hidden inside the image and is considered invisible.

When we need to prove the ownership of an image, the owner of the image, who is the owns password, is only the one who can prove its ownership by extracting the password from the digital Images or digital data.

**Keywords:** digital images, image rights, password extracting, password retrieving.

## 1. Introduction

In the current era, the era of communications and information technology, literate property rights have become one of the basics of work in various processions of life and all countries of the world. The enactment of laws that protect literate property rights, especially after the spread of electronic crime, and is why there has been a proliferation of research related to this area of research.

To protect digital images or digital data, whether it is digital audio, image, or video (In different formats). Digital materials have spread in all processions of life, especially after the spread of mobile phones with a digital camera, as millions of digital images are captured every moment around the world. Through various media, a very large number of digital pictures are exchanged without the permission of the owner of the image. For example, we find a journalist who risked his life in places of conflicts and wars to take a picture of the battles, and this image is considered his property and no one may reuse it except with his permission, since when this image is stolen, that he will in a position to prove he the owner of this image. Therefore, this system is designed so that the owner of any digital image can protect it with a password consisting of 6 digits that are hidden inside the image without having any effect on the image, as the storage in the first cells of the byte from bit 0 to bit number 4. And when it is necessary to prove the ownership of the image, the system asks the user who owns the image to enter the first 4 digits of the password. If it is correct, the remainder of the password is extracted and compared with the correct number, and if there is an error, it gives an error message or gives another word other than the one kept by the owner of the image.

## 2. Objective

The goal is to provide a secure system that protects the literate property rights of the digital image. This system is available to everyone and anyone can use it in an easy and fast way, and it takes a few seconds to get the job done.

### 3. Digital images

In the digital image, RGB type each pixel consists of three components Red, Green, and Blue and each one from these components represents a number that extends from 0 to 255. The color red consists of 256 levels. Level (0) represents the color black and level (255) represents the color red and also green and blue. If the  $R = G = B$  then the color is gray.

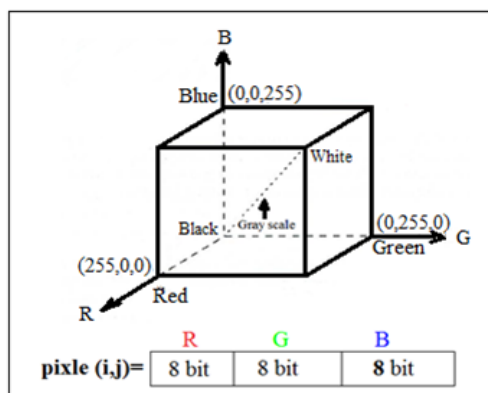


Figure 1. RGB type

### 4. Methodology

Leave the idea of storing specific pixels, from which to start, to choose a consecutive 4-byte number, where the first four (0-3) digits of each byte are used to store data.

The first stage includes uploading the image to be protected and then the system asks the user to enter a password consisting of 6 digits, then the protection order is:

- 1) The password is chosen from the first field from the left and it is encrypted by the algorithm to obtain the number 1, 2, or 3 to determine the location of the storage Red, Green, or Blue (RGB).
- 2) Column number 2 is encoded for grapes on the column number.
- 3) Row number 3 is encoded for grapes on the row number.
- 4) Field number 4 is encoded for the grains on the direction of data storage, where there are 8 directions, as shown in Figure (2).

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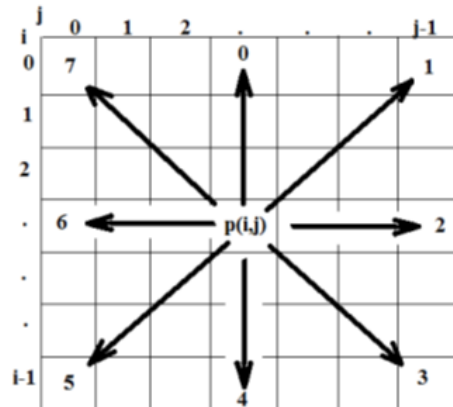


Figure2. 8 directions of data storage

5) The two digits 5 and 6 represent the data that will be stored in the previously specified location, where each cell is divided into two parts, the first section of the 0 to 3 bits and stored in a number from 0 to 3 of the pixels. The second section of bits' number 4 to 7 is stored in bits' number 0 to 3 according to the specified direction.

Where the first 4 digits are considered as the address constant in which you will receive the data represented in digits 5 and 6 as in Figure (3).

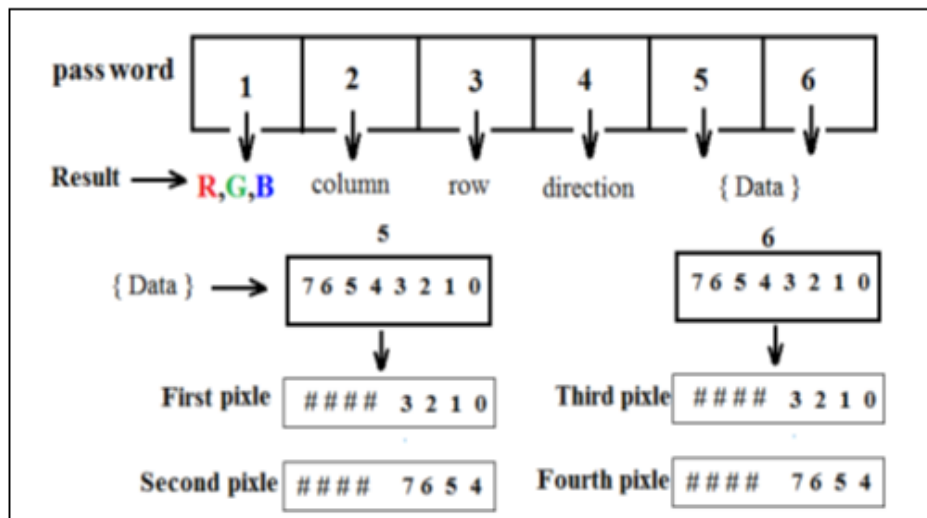


Figure 3. Password details

We also note that there are 4 levels of protecting, which are:

- The first level is to select the field Red or Green or Blue.
- The second level is to determine the column number.
- The third level is to determine the row number.
- The fourth level is to determine direction

So that if there is a level error, it will be difficult to access the specified location to see the stored data.

### 5. System characteristics

One of the most important features of this system is that each user has specific data and a specific location of his own, which is obtained by encrypting his password, meaning that each user has his own key to protect his data.

### 6. Results

After testing the system, it gave excellent and effective results, as it was tested on a large number of digital images from various and multi-use sources and showed the efficiency of this system, reaching 100% as no one was able to decode any image protected by this system, as in the figure some images System tested. Protecting a digital image on social media, is to place a password on them (and the best news is that there is invisible password that won't dilapidation in images contents). Also, if you never share high-resolution images, the opportunities are high that no one will be interested in stealing them. We can always make things official and register our work with the copyright office.

Figure (4.a, 5.a) image protection and Figure (4.b, 5.b) the image test by correct password Figure (4.c, 5.c) failed test because incorrect password.

Note: The system is programmed using the visual code vb.net.

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Figure 4.a Image protection



Figure 4.b image test by correct password

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Figure 4.c failed test because incorrect password.



Figure 5.a Image protection

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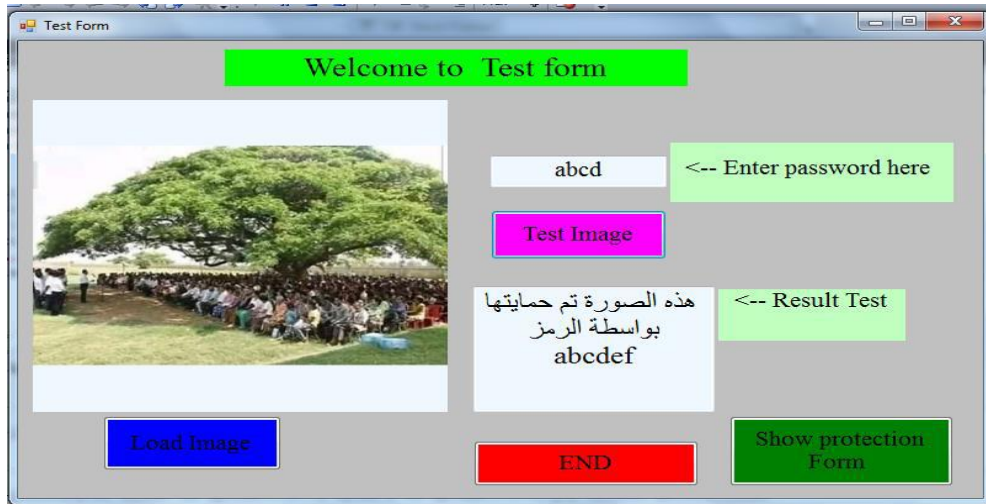


Figure 5.b image test by correct password



Figure 5.c resulted of testing an image by incorrect password



## 7. Future works

In this paper, we addressed the problem of image protecting the designed algorithms, which does not consume time execution special case using  $O(n)$  and less space of memory (one image per protection), next research area could be done in merging and protecting main while. Many different adaptations and approaches in this direction can be induced from techniques: It could be interesting to consider the algorithm's in the model and data images with different importance, depending on their features or their specific with respect to the rights owning process. This mechanism would for instance aid to distinguish in very complex problems which are the regions that are essential to be found, the ones that sometimes appear, and the ones that rarely do. The way the password is constructed could be also changed: instead of using one typical image, it could be based on different images, in order to provide some information on the variability among the different images, and introduce it in the attributes.

## References

- [1] Nesrine Tarhouni , Maha Charfeddine and Chokri Ben Amar " Novel and Robust Image Watermarking for Copyright Protecting and Integrity Control", Circuits, Systems, and Signal Processing (CSSP), 11th April 2020.
- [2] Ching-Sheng Hsu and Shu-Fen Tu, "Digital Watermarking Scheme for copyright protecting and tampering Detection ", International Journal on Information Technologies & Security, № 1 (vol. 11) pages (107-119), 2019.
- [3] Suhad A. Ali, Majid Jabbar Jawad and Mohammed Abdullah Naser, "Copyright Protecting for Digital Image by Watermarking Technique", Journal of Information Processing Systems Vol. 13, No. 3, pp. 599-617, Jun.2017 .
- [4] Jyoti T. G. Kankonkar and Nitesh Naik, "Image security using image encryption and image stitching", International Conference on Computing Methodologies and Communication (ICCMC), Conference Location: Erode, India, 2017.
- [5] C.S. Hsu and S.F. Tu, "Digital watermarking scheme enhancing the robustness against cropping attack," Proceedings of The 6th International Conference on Frontier Computing (FC2017), pp. 143- 152, Osaka, Japan.
- [6] I.A. Ansari, M. Pant, and C.W. Ahn, "SVD based fragile watermarking scheme for tamper localization and self-recovery," International Journal of Machine Learning and Cybernetics 2015.

- [7] Rafael C. Gonzalez and Richard E. Woods" Digital Image Processing "Second Edition. Prentice Hall 2002.
- [8] [8] I. Protection of Journalists and Media Professionals in Time of Armed Conflict, available at, <https://casebook.icrc.org/case-study/protection-journalists>. Retrieved 16/02/2021.
- [9] The Ultimate Image Protection Guide: 13 Tips to Prevent Image Theft, available at, <https://www.pixsy.com/academy/image-owner/protect-images-online/>. Retrieved 17/02/2021.
- [10] Methods To Protect Images On Your Site In 2022, available at, <https://www.wpoven.com/blog/protect-images/>. Retrieved 02/01/2022.