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DEVELOPMENT OF A NOBLE ALGORITHM FOR EMBEDDING DIGITAL ELLIPSE WATERMARK

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ABSTRACT

It is very important for digital images to exhibit the gesture of ownership of their owners. One of the most efficient methods used for it is digital image watermarking. A watermarked image can't be used directly by a person to whom it doesn't belong as it contains the seal of ownership. This paper represents a basic method of embedding an ellipse watermark to an image in an efficient manner.

Key words: segment, match ratio, watermark, convolution, segment integration

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1. INTRODUCTION

An *image* is a visual perception of an object which gives the exact idea of look of object. An image can be either *analog* or *digital*. Images projected on photographic film, painted or drawn on paper can be called analog images. Simply no digital support is taken and only chemical, mechanical or electrical type means are used to produce *analog images*. When digital media and support are taken, then images produced are called *digital images* [1] [2].

Dividing an image into sub images is called *segmentation* and each sub image is called a *segment*. It is a very useful and efficient operation performed on digital images when there is

a need to work on a selected portion of an image because if process is to be performed on a specific area of image, so working on the overall area of image is not a wise choice [1].

Applying a matrix on an image in order to perform some desired operation is called *convolution*. The matrix is mostly a 3X3 or 5X5 kind square matrix and is applied on image in parts in order to cover entire image. The next term introduced here is *match ratio* which is the property of embedding watermark into image in such a way that it intermixes with image by giving a feel of being a part of it and is in least distinguishable format.

2. INTRODUCING ALGORITHM FOR ELLIPSE WATERMARKING

In this paper an algorithm is being proposed for embedding ellipse watermark(s) into image. Concept used is to input both image to be watermarked and watermark(s) to be embedded. Then image is divided into sub images having the size same as of watermark. Afterwards match of each segment with watermark is done and found how much it is being settled over segment without being much differentiable. The lesser the differentiability the more the match ration is. Match ratio can be viewed as the ration of watermark giving the feel of being the part of that segment with least differentiability. Algorithm being proposed is as follows –

Algorithm : Embed_Ellipse_WM

Input image and watermark(s).

Measure size of watermark by covering it into a rectangle such that border of ellipse contacts with border of rectangle and record length and breadth of rectangle.

If [sizeof(watermark)] <= [sizeof(image)/2] then

Segment image into parts such that size of each *segment* should be equals to size of watermark i.e., rectangle containing it.

Apply transparent substitution of watermark over each segment until all segments are matched and find which segment(s) have maximum match ratio.

Keep all segments apart having maximum *match ratio*.

Embed watermark with one or more segments having maximum *match ratio*.

Integrate all segments including watermarked segments too in order to form complete image.

else if [sizeof(watermark)] >[sizeof(image)/2] then

Convolute watermark over image from initial point to last point to find region with maximum match ratio.

Embed watermark to the region having maximum match ratio.

else if [sizeof(watermark)] >[sizeof(image)] then

Size watermark up to the size of image.

Substitute watermark on the image.

Use reproduced image as watermarked image.

Process is represented by the example ahead depicted by figure 1 which contains the image without watermark then the algorithm introduced is applied on it and image produced is represented by figure 2 which contains a watermark specified.

Figure 1 Image without watermark[3]

Figure 2 Image with watermark after applying algorithm

3. CONCLUSION

Obviously, by moving ahead more refinements can be done in the algorithm and more features and processes can be added too by researchers. Initially this algorithm introduces a basic idea to embed watermarks into image at best suited portions of it.

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