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Performance Analysis on Tiling Effect

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Abstract. In this paper, we present a tile effect generation algorithm. The presented method cuts a given pictures with small-size tiles and an original image is composed of those tiles. The size of tiles is generated by random function. We use four parameters: size of horizontal and vertical block, size of skip blocks in horizontal and vertical direction. The presented method is tested on McM dataset. Simulation results provide performance comparison in terms of PSNR, CMSE and FSIM.

Keywords: Tile effect, random function, skip block, performance assessment

1 Introduction

Image processing is one of signal processing shapes where input is an image. In general, image processing indicates digital signal processing, where optical image processing is possible. In image processing, a filter is a tool or process which adds specific effect or removes some unwanted feature. Image filtering is one of attributes of signal filters, where image filters have two dimensional signal while signal filters is for one dimensional signal. By applying image filters, one may suppress or express some aspect of the images. There are different types of image filters.

The tiling effect (TE) is an approach of traditional art, which can be applied to interior decoration in an old house. A TE is often viewed in poster art. For example, some effects divide original image with thousands of small pieces to form a related much larger image. Therefore, this effect may be seen as an illusion effect.

The TE approach is classified into three categories: block-based method, pixel-based method, and image-based method. Our proposed approach is one of block-based methods. In order to apply TE approach, we uses four parameters: horizontal block size, vertical block size, horizontal skip block size, and vertical skip block size. By changing the size of four parameters, we assess the objective and visual performance. We try our best to find the most appropriate size of the block in a given image.

In this paper we propose a filter which gives tiling effect on a given image. Section 2 presents a proposed filter. The proposed filter has four parameters. Section 3 describes simulation results where objective and subjective performance are compared. By changing four parameters, different effects are presented. Conclusion remarks are provided in Section 4.

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2 Proposed method

The presented method is composed with following components. There are four parameters S_{HB}, S_{VB}, S_{HSB}, and S_{VSB}, which are defined as follows:

Legend:

RF

random function which generates values bigger than 0 and smaller than 1.

S_{HB}

horizontal block size

S_{VB}

vertical block size

S_{HSB}

horizontal skip block size

S_{VSB}

vertical skip block size

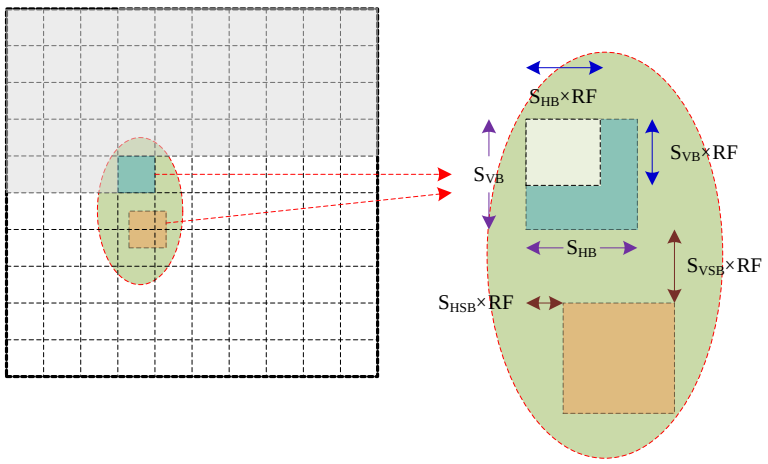

Fig. 1. Concept of four parameters and their corresponding random function

The pseudo code of the proposed method is explained as follows:

Pseudo code:

Step 1: Obtain input image.

Step 2: Determine S_{HB} and S_{VB} values.

Step 3: Determine S_{HSB} and S_{VSB} values.

Step 4: Divide given image with block size, S_{HB} by S_{VB}.

Step 5: Generate random numbers [0 1].

Step 6: Generate blocks with sizes [S_{HB}×RF S_{VB}×RF].

Step 7: Skip block size generation [S_{HSB}×RF S_{VSB}×RF].

Step 8: Collect all generated blocks.

Step 9: Obtain tiling filter applied result images.

Figure 1 explains the concept of the proposed method. As we can see, tiling effect is reflected by four parameters S_{HB}, S_{VB}, S_{HSB}, and S_{VSB}, and their corresponding random function output.

3 Experimental Results

Our simulation is based on an 18 McM images. The size of all images is 500×500. The test images are three channel color images. Titling effect was given to original images with different parameters: S_{HB}, S_{VB}, S_{HSB}, and S_{VSB}.

4 Conclusions

This paper presents a tile effect generating technique. The provided method cuts a provided image into different sized tiles. Four parameters were used to determine the size of horizontal and vertical block, size of skip blocks in horizontal and vertical direction. The provided approach is tested on McM dataset in terms of PSNR, CMSE and FSIM metrics. In addition, visual performance is comparison in detail.

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