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CAMOUFLAGE PATTERN GENERATION USING LAB COLOR MODEL

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Abstract - *Military people are the heart of the security of India. The basic mission of the military people is to ensure national security and defending the nation from external aggression. Considering the current scenario regarding the uniform of Military, one common uniform is provided for them without considering the location at which they are going to face the battle. It will be beneficial if we design patterns for uniform according to the location of the battle. In this paper, we are going to propose a system for the safety of military people. We are going to generate a pattern according to the particular image taken. In this we are using LAB color model as it is more beneficial than RGB color model. This system will be definitely beneficial for the safety and security of our soldiers.*

Key Words: **Camouflage, Image processing, Color model, Quantization, Camouflage image generation, Security.**

1. INTRODUCTION

As we know the image processing is nothing but a image into a digital form and performed some actions on it, to get the useful information in it. It is a type of application in which input is image, like photograph and output may be image or characteristics associated with that image.

Image processing includes the following three steps:

1. Importing the image with digital photography.
2. Analyzing and manipulating the image which includes data compression image enhancement.
3. Output is the last step in which result can be alter image.

Camouflage is a visual mask. Without it, an animal would be detected easily. If the natural color of an animal makes it look like its surroundings that is camouflage. A tiger's stripes in the long grass, and the battle dress of a modern soldier are examples.

Camouflage is a form of deception. The word camouflage comes from the French word *camoufler,* which means "to hide"

2. Existing System:

1. All-terrain camouflage design on frequency analysis

In this paper, the system is designed for how to give effective camouflage for disguise in the specific terrain, and a method is presented which is different from the traditional k-means clustering. In general, camouflage consists of several blocks. Firstly, this paper combines the method of probability with statistics to analyze the colors from different pictures of one kind of terrain. After that through the self-assessment screening method, the basic color of camouflage is identified. This method is based on fuzzy clustering, using frequency distribution and the additional weight to update parameters for several times. Finally, the optimal parameters are selected to generate main color of camouflage. In the process of the formation of digital camouflage, the main color is chosen which has minimum Euclidean distance with the environmental pixel block to fill it, and form the whole camouflage in the end.

2. Fuzzy C-means Clustering Based Digital Camouflage Pattern Design and Its Evaluation

In this paper, a creative computerized cover design configuration in light of fluffy c-implies grouping and its assessment is displayed to copy the foundation both in shading and surface. In this new technique, histogram quantization and coordinating between the genuine foundation and I military standard hues is initially done in HSV shading space. At that point cover example is went without by a blend of the fluffy c-implies bunching and morphological operations, for example, open operation and close operation. Furthermore, the disguise scene is created with tank utilizing new advanced cover design. At long last, a few regular edge indicators are used to give a target assessment to the new advanced cover design which is painting on the objective in a made disguise scene.

3. Color models:

- RGB Model: - Red-Green-Blue color model.
- CMY Model: - Cyan-Magenta-Yellow color model.
- HSV Model: - Hue-Saturation-Value color model.
- YIQ Model: - Luminance-In phase Quadrature color model.
- Grey Scale color Model.

3.1 RGB color model:

RGB is an acronym for Red, Green and Blue. RGB color model is an additive color model in which red, green and blue are added together to produce a large number of colors. The main purpose of RGB color model is for sensing, representation and for displaying images in any electronic system.

3.2 Lab color model:

LAB is advanced color model as it can describe all perceivable colors. In LAB color model L is for lightness and a and b are color opponents red-green and blue-yellow. The main feature of Lab color model is that it exceeds the gamut of RGB and CMYK color models.

Why to convert RGB to Lab?

1. Unlike the RGB color model, Lab is designed to approximate human vision.
2. Lab is device independent color model whereas RGB is device dependent model.

3.3 Conversion of RGB to Lab:

Firstly, we are converting RGB image to Lab as quality of image is increased and for further processing Lab values are taken. But as we cannot display the image in Lab color model, we are converting back Lab image to RGB image.

4. Proposed System:

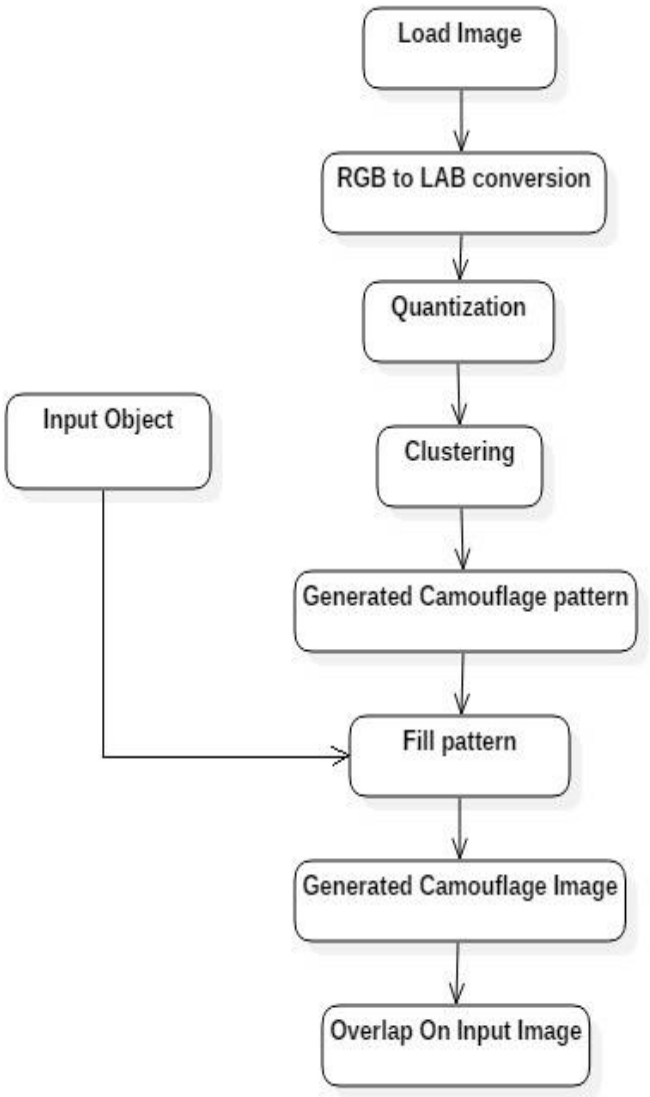

Fig-1 Proposed System

As shown in above block diagram, firstly source image is loaded. Then blurring is done using Gaussian Function, which reduces image noise and detail. Then after Red Green Blue model (RGB model) to Hue Saturation Lab conversion is done of the image. Quantization of source image is done after conversion from RGB to Lab. Then clustering i.e. K-means clustering is applied based on required color according to environment. After that a camouflage image is generated. Then patterns are generated of the camouflage image. Finally embedding of generated camouflage image and target image is done and finally we get the final camouflage image.

4.1 Quantization:

Quantization is the simple technique in which compression of a range of values to a single value takes place. The stream becomes more compressible if a discrete symbol in a given stream is reduced. In color quantization, the number of colors used in image is reduced. This is required if devices are not capable of displaying images with large number of colors. Popular examples of color quantization algorithms includes median cut algorithm, nearest color algorithm etc.

Fig-2 Quantization of Image

4.2 Blurring:

In image processing, A Gaussian blur is the result of blurring an image by a Gaussian function. It is a used effect in graphics software to reduce image noise and reduce detail.

The visual effect of this blurring technique is a smooth obscure taking after that of review the picture through a translucent screen, not quite the same as the booked. Effect produced by an out of focus lens or the shadow of an object under usual illumination. Gaussian smoothing is also used as a pre-processing stage in computer vision algorithms in order to enhance image structures at different scales. Numerically, applying a Gaussian obscure to a picture is the same as convolving the picture with a Gaussian capacity

The equation of the Gaussian function in one direction is:

$$Sum_R = \frac{R1+R2+R3+\cdots R9}{9} = X$$

$$Sum_G = \frac{G1+G2+G3+\cdots G9}{9} = Y$$

$$Sum_B = \frac{B1+B2+B3+\cdots B9}{9} = Z$$

Where X, Y, Z are the RGB values of noise pixel.

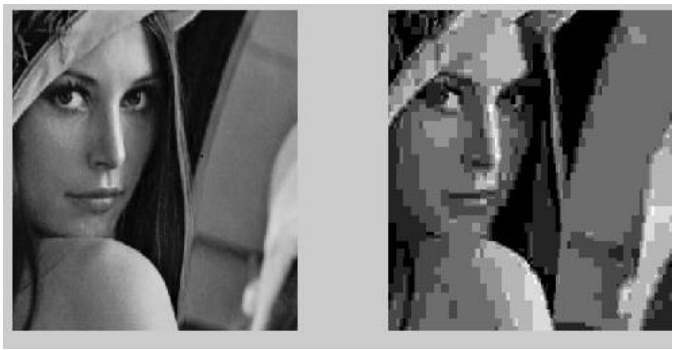

Fig-3 Blur Image

4.3 Clustering:

Clustering is process of organizing objects into groups whose members are similar in some way. Cluster is a collection of objects which are “similar” between them and are “dissimilar” to objects belonging to other cluster**.**

4.4 Camouflage pattern Generation:

To obtain pleasing camouflage target, during the process of generating the camouflage image, the target pixel should be proportionally substituted by main colors. This camouflage scheme is implemented under the input images and is tested under some different types of algorithm. Two test images with different types were selected as a case study to test the proposed camouflage pattern design.

4.5 Image overlapping:

In this part, we are placing the filled object in the input image. But the care should be taken that the only the part of the object which is filled with the pattern that should be placed in input image that is the white background in the object must be removed. If the

object with the white background is kept as it is, then it will be easily identifiable which we don't want.

4.6 Pattern Filling:

Pattern filling is the process of applying generated pattern on any object like person or animal.

5. CONCLUSIONS

By studying all the relevant papers and studying different algorithms we come to conclusion that every technique is different and unique in its own way. Lab coloration is superior to all other techniques because it changes high visual quality of image and can be used in many different fields. Hence, our proposed system is aimed to generate the perfect camouflage image.

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