The 6th International Color & Coating Congress
10-12 November 2015
Institute for Color Science and Technology, Tehran, Iran

Production of fshion camouflage based on background color by using image processing and interactive genetic algorithm

Z. Montazeri[1] , P. Payvandy [2]* , S. J. Derakhshan

1. Department Fabric Designing, Yazd Branch, Islamic Azad University, Yazd, Iran.
2. Assistant Professor, Engineering faculty, Department Of Textile Engineering, Yazd University, Iran

Abstract

Today Camouflage designs are the center of fabric and clothes designer's attention. Manually camouflage cloth designing is so difficult, time-consuming and it needs great skills in this field, as well. Therefore computer methods can be a great help to facilitate the process of producing camouflage.in this regard, using interactive algorithms, image processing can present an efficient method to achieve this goal. For the first time, in study a solution were proposed which by K-Means clustering method and conversational genetic algorithm, has ability to generate camouflage designs and is capable of optimizing the image according to user's opinion. Utilizing K-Means clustering method, input images are given color reduction to 10 colors. The reduced colors of background with colors of design, corresponding to their redundancy. Camouflage design are generates by interactive genetic algorithm then their suitability is evaluated by user. Results of the evaluation of the program by 30 user's represents that 80 present of them are satisfied with camouflage designs generated by suggested software.

Keywords: **Fashion Design- Camouflage Pattern- Image Processing- Interactive Genetic Algorithm**

1-Introduction

Camouflage is the art of disguising an object in order to hide and today, the accuracy and speed in designing textile is of great importance, so the manufacturers to maintain continuity of production and increasing the speed would rather use low cost and efficient method for the production of concerned camouflage fabrics. There's a direct connection between pattern's camouflage capability and its ability in hiding limb defects which mean that the more camouflage capability, pattern has the more success it will be in concealing the limb defect. (Fig. 1)

2- Theoretical

Image processing levels to produce camouflage pattern is illustrated in (Fig. 2).next the data bank is fed to interactive genetic algorithm.in this order camouflage images must be transformed to understandable codes by this algorithm. In fact, each fabric pattern is considered as a chromosome and its components are considered as genes. These images constitute the data bank. In this study four genes which chromosomes is made by their combination has been defined. Genes of which chromosomes composed are, respectively, 1. Pattern type 2. Number of colors 3. Pattern's dimensions 4. Angle of rotation .the flow chart of interactive genetic algorithm is shown in (Fig. 3).

3-Results and Discussion

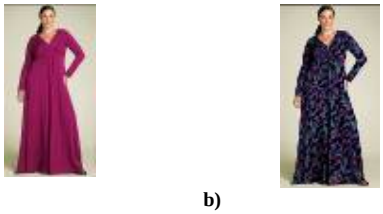
In this part, details of proposed software's implementation and its evaluation is presented to user. Software, encoding in Matlab, were utilized in order to implement the process of producing the camouflage fabric design by using background image processing and applying method of optimizing the interactive genetic algorithm and also K-Means algorithm was used for extracting the background colors [1]. In optimization method of interactive genetic algorithm, user's opinion is effective through production stages .so, in order for checking the performance of presented software and the rate of camouflage pattern's success in hiding capabilities ,30 users were asked to produce camouflage pattern by provided method which a sample result is shown in Fig. 6.

4-Conclusion

In this study, in order to design the camouflage fabrics, a software was produced using image processing and optimization method of interactive genetic algorithm .the designed software of utilized user's taste to determine the fitness of generated camouflage patterns and it can help designers with camouflage fabric designing. In also can lead to promote the level of user's taste. The results, come out of this software's evaluation, has revealed the general satisfaction of 80 percent of users.

Reference

1. Mazdak Z., Payvandy P., AlamdarYazdi A., , Extracting and Clustering Stone-Wash Design in Jeans Images Using K-means Algorithm, *Tex. Sci. and Tech. J.*, 2, 4, 209-215,2015



a) b)

Fig. 1. a) simple fabric pattern that show limb defect b) camouflage fabric pattern that hid limb defect.

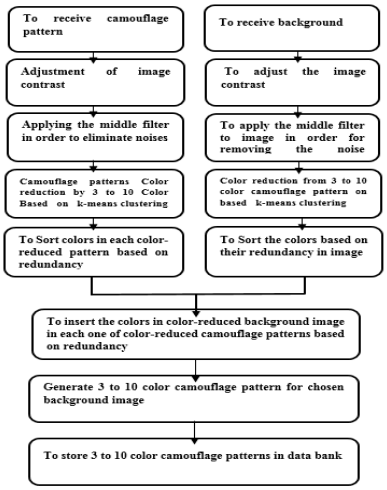


Fig. 2. Flowchart of image processing levels to create the Camouflage data bank

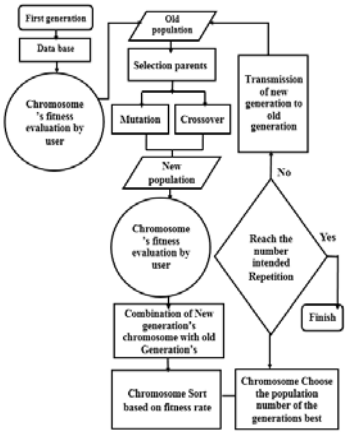
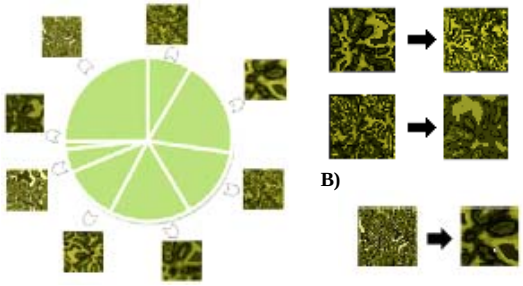


Fig. 3. Flowchart Interactive genetic algorithm

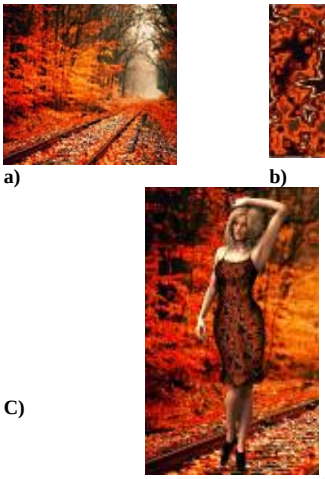
Fig. 4. First Generation Interactive genetic algorithm



A) **B)** **C)**

Fig. 5. a) roulette wheel selection b) Crossover c) Mutation

In (Fig. 4 and Fig. 5) the main parts of interactive genetic algorithm are illustrated.



a) **b)** **C)**

Fig. 6.a) Background Image b) result of purposed method c) Display of camouflage cloth on background