عنوان مقاله:

Compressing Face Images Using Genetic and Gray Wolf Meta-heuristic Algorithms Based on Variable Bit Allocation

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خلاصه مقاله:

In image processing, compression plays an important role in monitoring, controlling, and securing the process. The spatial resolution is one of the most effective factors in improving the quality of an image; but, it increases the amount of storage memory required. Based on meta-heuristic algorithms, this article presents a compression model for face images with block division and variable bit allocation. Wavelet transform is used to reduce the dimensions of high spatial resolution face images. In order to identify important and similar areas of identical macroblocks, genetic algorithms and gray wolves are used. A bit rate allocation is calculated for each block to achieve the best recognition accuracy, average PSNR, and SSIM. The CIE and FEI databases have been used as case studies. The proposed method has been tested and compared with the accuracy of image recognition under uncompressed conditions and using the common SPIHT and JPEG coding methods. Recognition accuracy increased from ۰.۱۸% for ۱۶×۱۶ blocks to ۱.۹۷% for ۳۲×۳۲ blocks. Additionally, the gray wolf algorithm is much faster than the genetic algorithm in reaching the optimal answer. Depending on the application type of the problem, the genetic algorithm or the gray wolf may be preferred to achieve the maximum average PSNR or SSIM. At the bit rate of ۰.۹, the maximum average PSNR for the gray wolf algorithm is ۳۴.۹۲ and the maximum average SSIM for the genetic algorithm is ۰.۹۳۶. Simulation results indicate that the mentioned algorithms increase PSNR and SSIM by stabilizing or increasing recognition accuracy.

کلمات کلیدی:

Genetic Algorithm, Gray wolf algorithm, Face recognition, Face compression, Block division, Variable bit allocation