

RECTANGLE-BASED NEO-PLASTICISM-LIKE IMAGE --- A NEW TYPE OF IMAGE AND ITS APPLICATION TO DATA HIDING BY BINARY SPACE PARTITIONING

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ABSTRACT

A new type of computer art, called rectangle-based Neo-Plasticism-like image, is proposed for data hiding applications. An automatic method for creating this type of image is proposed, which applies binary-space partitioning to a source image by finding the maximum mutual information of the spatial positions and the image intensities. After partitioning the image into multiple rectangles by a number of partition iterations and coloring the rectangles with their average colors, a rectangle-based Neo-Plasticism-like image is created, which has the abstract style of Neo-Plasticism art with straight horizontal and vertical lines and rectangular shapes. Furthermore, a data hiding technique is proposed for covert communication by utilizing the characteristics of the Neo-Plasticism-like image creation process. Specifically, the technique builds a coloring tree to color the regions of the source image. Besides, a secret key is used to randomize the bit sequence of the secret message and the priority of the partition directions of the partition tree to enhance the security of the hidden data. Because the resulting Neo-Plasticism-like image is like an abstract artwork, users will not notice the existence of the hidden data. Good experimental results show the feasibility of the proposed method and techniques.