

## Data Hiding by Vector Quantization in Color Image

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**Abstract :** With the growing of computer and network, digital data can be spread to anywhere in the world quickly. In addition, digital data can also be copied or tampered easily so that the security issue becomes an important topic in the protection of digital data. Digital watermark is a method to protect the ownership of digital data. Embedding the watermark will influence the quality certainly. In this paper, Vector Quantization (VQ) is used to embed the watermark into the image to fulfill the goal of data hiding. This kind of watermarking is invisible which means that the users will not conscious the existing of embedded watermark even though the embedded image has tiny difference compared to the original image. Meanwhile, VQ needs a lot of computation burden so that we adopt a fast VQ encoding scheme by partial distortion searching (PDS) and mean approximation scheme to speed up the data hiding process. The watermarks we hide to the image could be gray, bi-level and color images. Texts are also can be regarded as watermark to embed. In order to test the robustness of the system, we adopt Photoshop to fulfill sharpen, cropping and altering to check if the extracted watermark is still recognizable. Experimental results demonstrate that the proposed system can resist the above three kinds of tampering in general cases.

**Keywords :** data hiding, vector quantization, watermark, color image

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