

IMAGE COMPRESSION ALGORITHM BASED ON MODIFIED SCHEME DPCM.

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The image compression algorithm with predictor, named “modified scheme of differential pulse-code modulation” (MS DPCM), is being developed and optimized.

General differences between this scheme and classic scheme DPCM are:

1. Predictor locates before quantizer. This point allows us to restore quantized image without an error.
2. The difference signal takes integer values. The range of integers is bounded by quantizer levels. This point noticeably increases zeros series. So it improves compression.
3. Besides main DPCM units (predictor, quantizer and encoder/decoder) algorithm has additional elements:
 - the noise and minor image details smoothing filter prepares image for compression. The general problem of the smoothing filter development is to save the bounds of major objects
 - the preliminary image downsampling unit increases compression coefficient. The conversion from RGB into a different color space, called YCrCb allows to reduce the spatial resolution of the Cb and Cr components (the chrominance, split into blue and red components) much more better than Y (the brightness of a pixel);
 - the “peak points” smoothing filter for quantized image increases zeros series during encoding. This points are difficult to predict and the large numbers of sharp bounds in signal leads to entropy explosion. The general problem of this filter development is not to create new peak points.
 - the downsampled image restoration unit, based on efficient two-dimensional bicubic interpolation;
 - the managed contrast filter for restored image smooths sharp color borders in image and increases peak signal-to-noise ratio (PSNR) and other compression characteristics.

At the first step in developed scheme input image is filtered and downsampled. At the second step it is exposed to the adaptive quantization, used iteration process by Max Lloyd. Then quantized image is read the “snake” way and sent as input data to PPM or RLE encoders.

Compression system test on textural and photo images shows the result, comparable to JPEG method.