Joint Depth/Texture Bit-Allocation For Multi-View Video Compression

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Abstract : Multi-View display technology allows the presentation of a 3D video by showing simultaneously several views of the same scene. One approach to render these multiple views is to synthesize novel views using a Depth Image Based Rendering (DIBR) algorithm. Consequently, for the efficient transmission of 3D video signals, the compression of texture and also the depth images is required. Since the ratio between the depth and texture bit-rate is still an open question, we propose in this paper a novel joint depth/texture bit-allocation algorithm for the compression of multi-view video. The described algorithm combines the depth and texture rate-distortion (R–D) curves to obtain a single R–D surface that allows the optimization of the joint bit-allocation problem in relation to the obtained rendering quality. We subsequently discuss a fast hierarchical optimization algorithm that exploits the smooth monotonic properties of the R–D surface. The hierarchical optimization algorithm employs an orthogonal search pattern so that the number of image-compression iterations for measuring quality is minimized.

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Abstract : (cont.) Experimental results show an estimated gain of 1 dB compared to an ad-hoc selection of bit-rates. Besides this, our joint model can be readily integrated into an MVC H.264 coder because it yields the optimal compression setting with a limited computation effort.