

Image Processing and Synthesis

RAY-SPACE COMPRESSION BY USING DISPARITY COMPENSATED DCT

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Since the ability of personal computer and manufacturing camera is advancing dramatically, multi-camera system which has around one hundred is emerging increasingly in the world. In this background, studies about the generation of a free viewpoint image/video from the images/videos captured by multi-camera system attract a great deal of attention and find multiple fields to be applied: preservation of cultural heritage and traditional dancing, free viewpoint television, educational application, entertainment etc. This technology is based on some techniques: Ray-Space theory which treats images/videos as ray information, correction of captured images/videos, ray interpolation, display of free viewpoint image/video, compression etc. For generating photo-realistic free viewpoint image/video, development of all techniques are desired and studied in practice. In this research we focus on the compression method of multi-camera images, in other words, the compression method for enormous ray information.

We try to adapt a hybrid DPCM/DCT Codec(HDDC) for the compression based on the fact that the ray information is almost continuous, a character which is similar with that of video data, for which HDDC is designed. The results of this study are as follow: (1) the axes to execute DCT and their number should be decided considering the ray information resolution. (2) The maximum dimensional DCT is best if the resolution of all axes is high. (3) The combination of multi-dimensional DCT and disparity compensation is best when the resolution of one axis or more is low. (4) Disparity compensation for an axis is efficient if the disparity of that axis is conceivable in theory.