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Sensible Things that Communicate

PART OF MID SWEDEN UNIVERSITY

View Rendering for 3DTV

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Abstract:

Advancements in three dimensional (3D) technologies are rapidly increasing. Three Dimensional Television (3DTV) aims at creating 3D experience for the home user. Moreover, multiview autostereoscopic displays provide a depth impression without the requirement for any special glasses and can be viewed from multiple locations. One of the key issues in the 3DTV processing chain is the content generation from the available input data format video plus depth and multiview video plus depth. This data allows for the possibility of producing virtual views using depth-image-based rendering. Although depth-image-based rendering is an efficient method, it is known for appearance of artifacts such as cracks, corona and empty regions in rendered images. While several approaches have tackled the problem, reducing the artifacts in rendered images is still an active field of research.

Two problems are addressed in this thesis in order to achieve a better 3D video quality in the context of view rendering: firstly, how to improve the quality of rendered views using a direct approach (i.e. without applying specific processing steps for each artifact), and secondly, how to fill the large missing areas in a visually plausible manner using neighbouring details from around the missing regions. This thesis introduces a new depth-image-based rendering and depth-based texture inpainting in order to address these two problems. The first problem is solved by an edge-aided rendering method that relies on the principles of forward warping and one dimensional interpolation. The other problem is addressed by using the depth-included curvature inpainting method that uses appropriate depth level texture details around disocclusions.

The proposed edge-aided rendering method and depth-included curvature inpainting methods are evaluated and compared with the state-of-the-art methods. The results show an increase in the objective quality and the visual gain over reference methods. The quality gain is encouraging as the edge-aided rendering method omits the specific processing steps to remove the rendering artifacts. Moreover, the results show that large disocclusions can be effectively filled using the depth-included curvature inpainting approach. Overall, the proposed approaches improve the content generation for 3DTV and additionally, for free view point television.