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MULTICAMERA SETUP-BASED STITCHING SCHEME FOR GENERATING WIDE FOV VIDEO WITHOUT GHOST

Wu-Chih Hu[1] and Deng-Yuan Huang[2]

[1]Department of Computer Science and Information Engineering
National Penghu University
#300, Liu-Ho Rd., Makung, Penghu 880, Taiwan
wchu@npu.edu.tw

[2]Department of Electrical Engineering
Dayeh University
#168, University Rd., Dacun, Changhua 515, Taiwan
kevin@mail.dyu.edu.tw

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Abstract. *This paper proposes a multicamera setup-based stitching scheme for generating wide field-of-view (FOV) video without ghosts. Wide FOV videos can be constructed using an extensible wide FOV model for multiple cameras and a stitching process. With the extensible wide FOV model for multiple cameras, video streams are captured synchronously from multiple cameras without the need for a specially designed lens; viewing angle of wide FOV video can be up to 360 degrees. Using the stitching process, a wide FOV video without ghosts can be constructed from the video streams. We propose matching the appropriate corresponding pairs based on the corners in the overlapping region of two adjacent images. This greatly reduces the computational cost and improves the accuracy of the corresponding pairs. We also propose a two-phase image blending scheme to obtain a seamless image. The scheme, which uses half of the image, can alter a wider range of color intensity than is possible if only the overlapped part of the image is used. Therefore, it can smooth the color transitions from one image to another. The proposed two-phase image blending scheme balances the significant intensity difference in adjacent images, and smoothes the color intensity of overlapping regions in adjacent images. Experimental results show that the proposed method performs well for generating wide FOV videos.*

Keywords: Wide FOV video, Ghost, Multicamera, Image mosaics, Image blending

1. **Introduction.** Wide field-of-view (FOV) video can provide for users with a sequence of wide FOV images (frames) instead of a single static wide FOV image. In addition, wide FOV video contains more information about a scene from a given viewpoint. Panoramic video, a kind of wide FOV video, can provide a view of up to 360 degrees. Research on wide FOV video has increased significantly in the last decade, such as the application of tele-immersive virtual reality (VR) [1], video mediated education [2], the application of mobile robotics [3] and street browsing on the internet. Furthermore, the interesting research on image processing would be studied in wide FOV videos, i.e. image watermarking [4], image coding [5], etc.

One method of wide FOV video generation is to use a single camera with a specially designed lens, such as a fish-eye lens [6,7], a panoramic lens [8], or an omni-direction lens [9]. However, the cost of specially designed lenses is high and the obtained video is distorted. Another method is to use a single camera with a special type of mirror [10,11], but this requires that a mirror with certain mathematical properties be made.