

Title: 6 DOF VIEWPOINT MOTION, SUPERRESOLUTION, AND HETEROGENEOUS CAMERA CONFIGURATIONS

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Keyword(s): Light Fields
Ray Synthesis
Superresolution
True Zoom

Subject(s): Light Field Photography

Abstract: Light Fields are the fundamental representation of light. They give a thorough description of the light rays permeating through a scene from different positions and directions. Novel views are generated by extracting suitable 2-D slices of the 4-D light fields. This work produces novel views for displaced true and tele zoom by two different approaches and proves that both yield same results. Further novel views are synthesized for virtual cameras defined by six DoF parameters. Views generated are shown to be dependent on the order of DoF parameters. Next, we present a method for the synthesis of improved superresolution images from a light field database. Finally, this thesis proposes efficient ways of image synthesis for the case of heterogeneous camera configurations. Views are synthesized and evaluated on the basis of maximizing the PSNR against the ground truth which has been generated by graphics engines such as 3DS MAX.

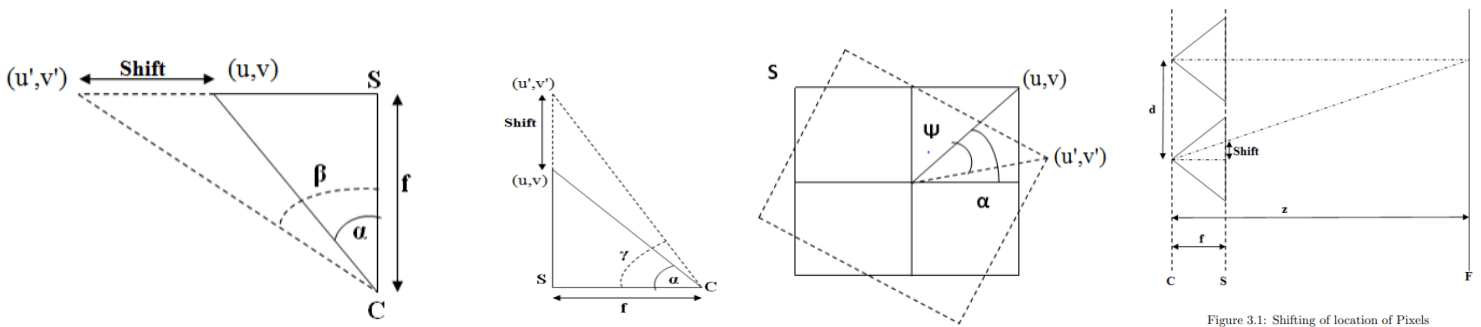


Figure 3.1: Shifting of location of Pixels

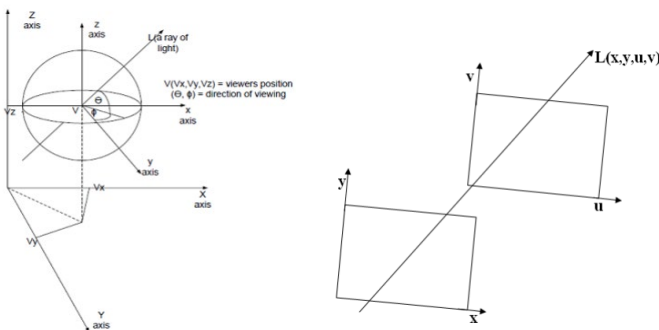
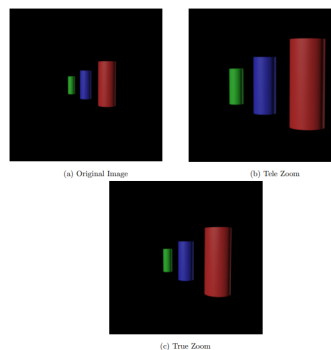


Figure 1.1: Plenoptic function [1]

Figure 1.2: Two plane parameterization



(c) True Zoom

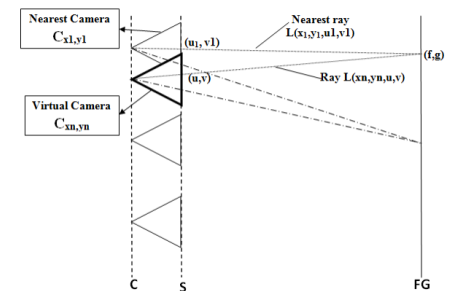
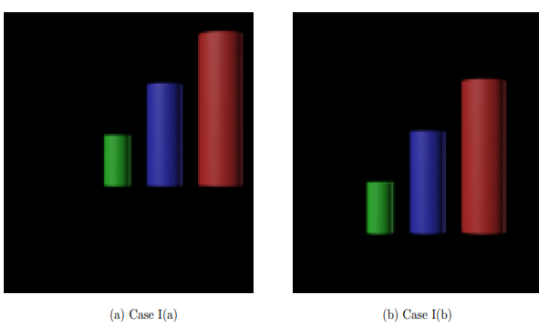


Figure 1.3: Novel view synthesis using ray tracing



(a) Case I(a)

(b) Case I(b)

Figure 2.4: Tele Zoom: displace-zoom for 3x3 Camera array

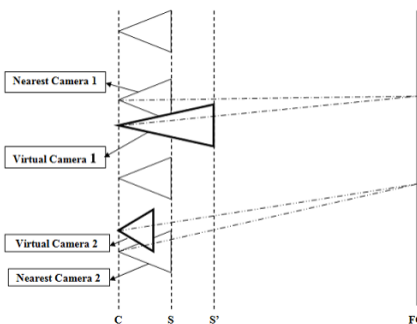


Figure 2.2: Ray Tracing for tele zoom

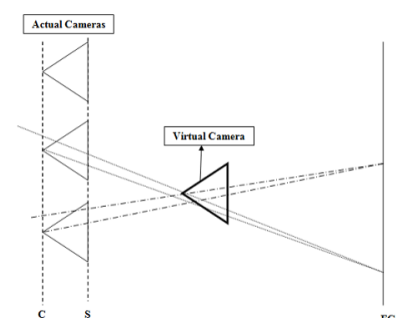


Figure 2.3: Ray Tracing for true zoom