

Photo-realistic synthesis of 3D city using Image-Based Rendering

In this research, we present an efficient method to synthesize large-scale scenes, such as broad city landscapes. To date, model based approaches have mainly been adopted for this purpose, and some fairly convincing polygon cities have been successfully generated. However, the shapes of real world objects are usually very complicated and it is infeasible to model an entire city realistically. On the other hand, image based methods are effective for realistic rendering, but their huge data sets and restrictions on interactivity pose serious problems for an actual application. Thus, we propose a hybrid method, which uses simple shapes such as planes to model the city, and applies image based techniques to add realism. It can be performed automatically through a simple image capturing process. Further, We also analyze the relationship between error and number of needed images to reduce the data size.

Publications

- [1] Takuji Takahashi, Hiroshi Kawasaki, Katsushi Ikeuchi, and Masao Sakauchi: “Arbitrary view position and direction rendering for large-scale scenes”, in *Computer Vision and Pattern Recognition*, Vol. 2, pp. 296–303 (June 2000).
- [2] Hiroshi Kawasaki, Katsushi Ikeuchi, and Masao Sakauchi: “Light field rendering for large-scale scenes”, in *Computer Vision and Pattern Recognition*, Vol. 2, pp. 64–71, Kauai, Hawaii, USA (Dec. 2001).
- [3] Hiroshi Kawasaki, Katsushi Ikeuchi, and Masao Sakauchi: “Arbitrary view synthesis of real-world environment”, in *Asian Conference on Computer Vision*, Vol. 1, pp. 386–393, Melbourne, Australia (Jan. 2002).

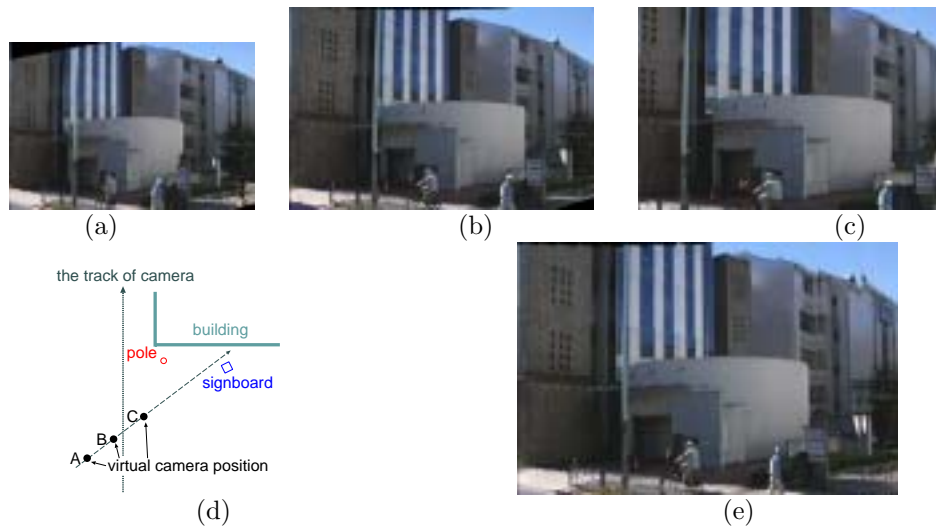


Figure 1: (a)(b)(c): Rendered images by our method,(d):camera position. (e): rendered images by other method

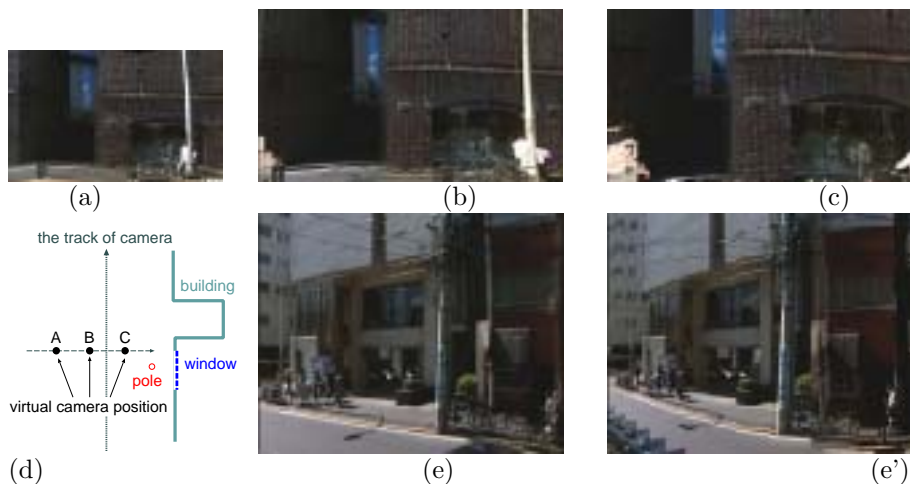


Figure 2: (a)(b)(c)(e): Rendered images by our method,(d):camera position. (e'): rendered images by other method