Image-based Modeling and Rendering

4. Concentric Mosaics

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Outline

- How to “walk” in an image-based environment?
- Extension of cylindrical panorama (+ light fields)

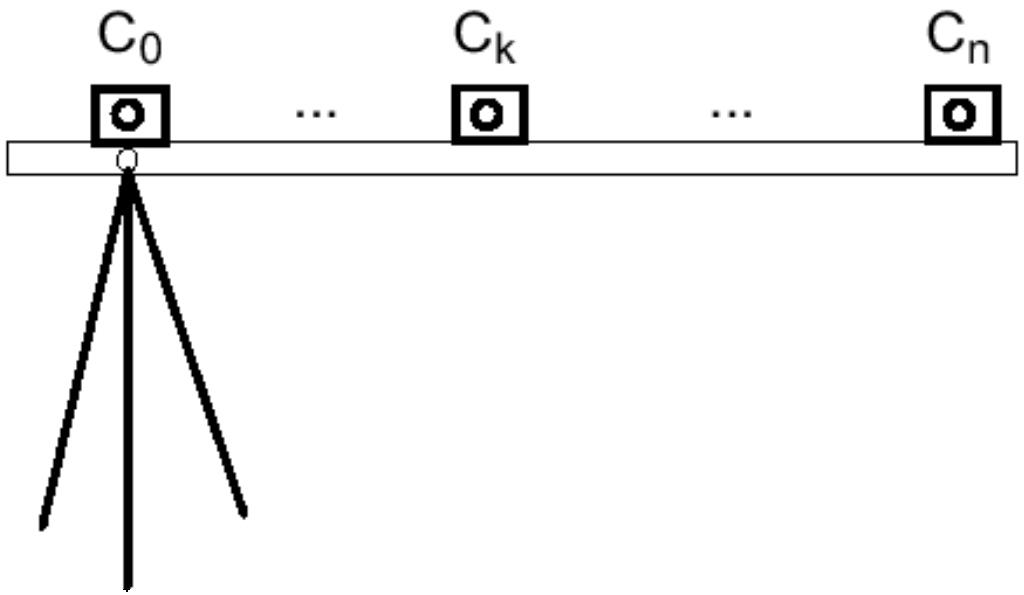
Dimension	Viewing space	Name	Year
7	free	plenoptic function	1991
5	free	plenoptic modeling	1995
4	inside a 3D box	Lightfield/Lumigraph	1996
3	inside a 2D circle	concentric mosaics	1999
2	at a fixed point	panorama	1994

Ref:

• H.-Y. Shum and L.-W. He, “Rendering with concentric mosaics”, Proc. SIGGRAPH’99, pp. 299-306, 1999.

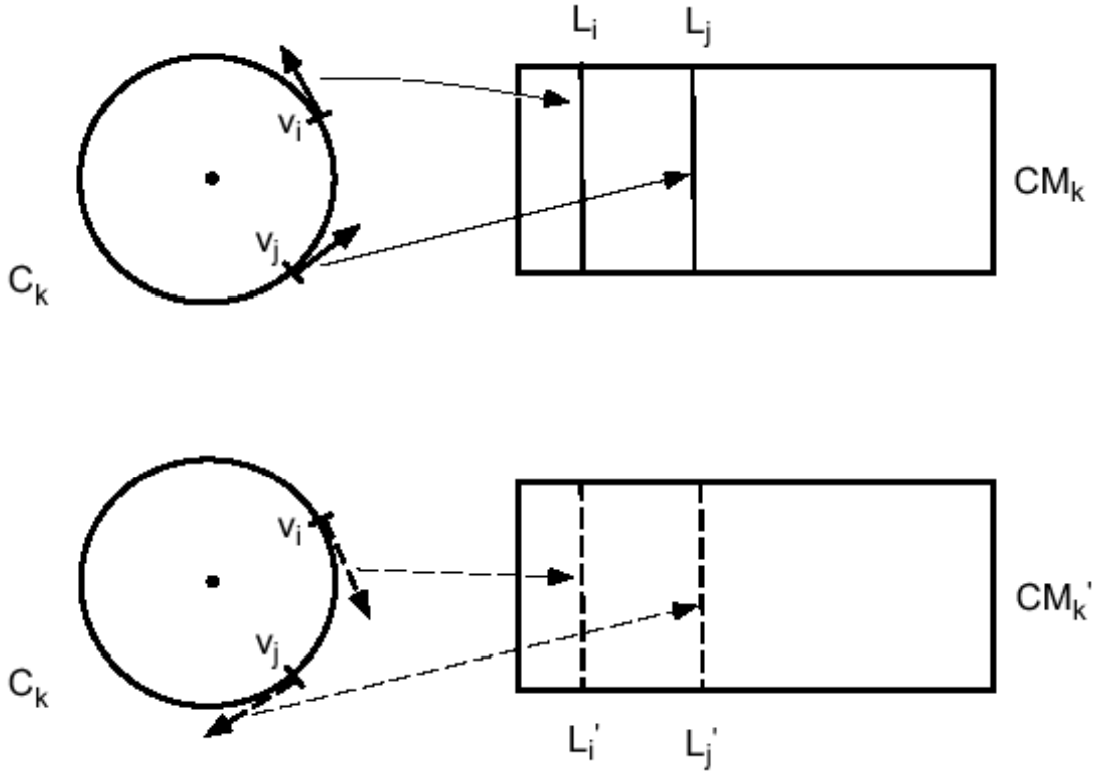
Concentric Mosaics

- Easy to capture: a systematic way.
- Small and regular in storage size

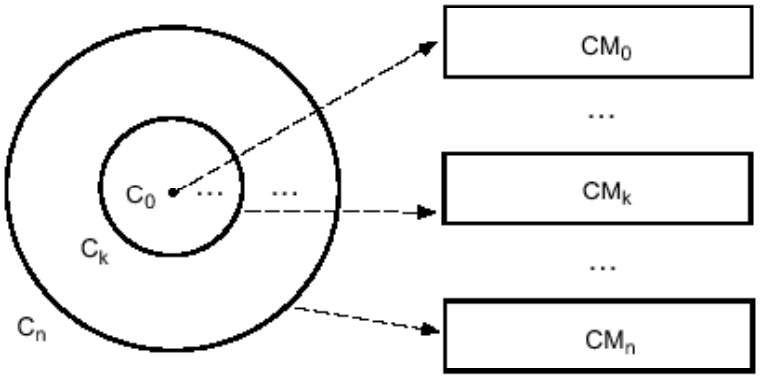


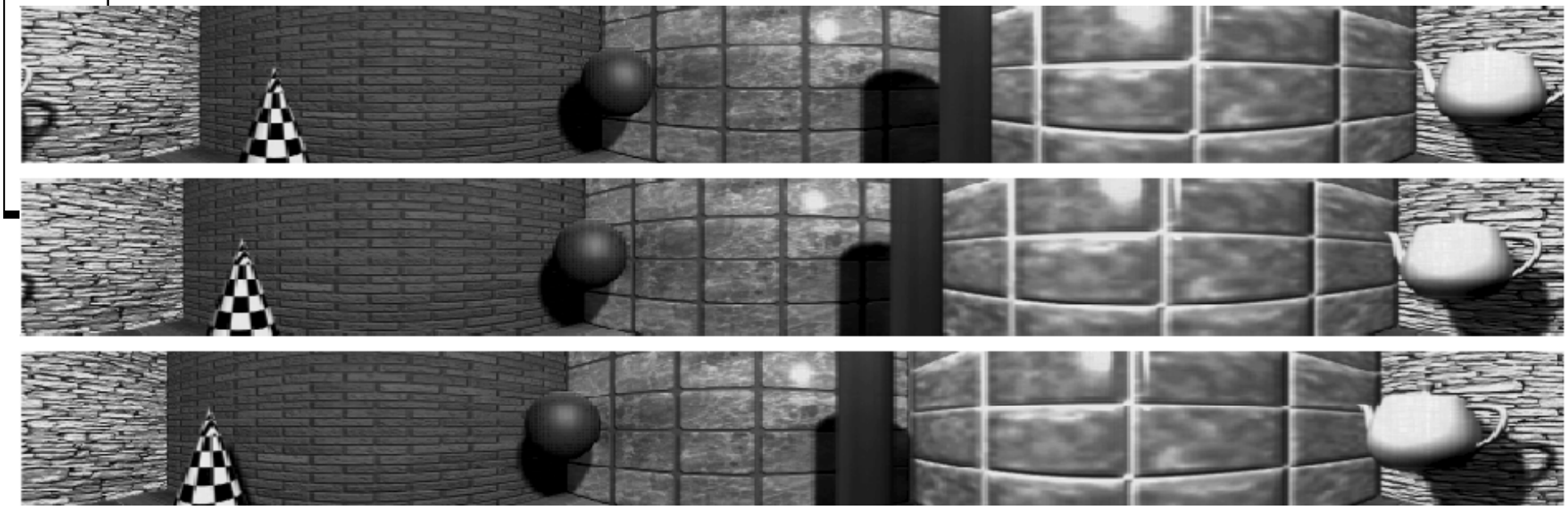
Concentric Mosaics

- A set of manifold mosaics constructed from slit images taken by cameras rotating on concentric circles

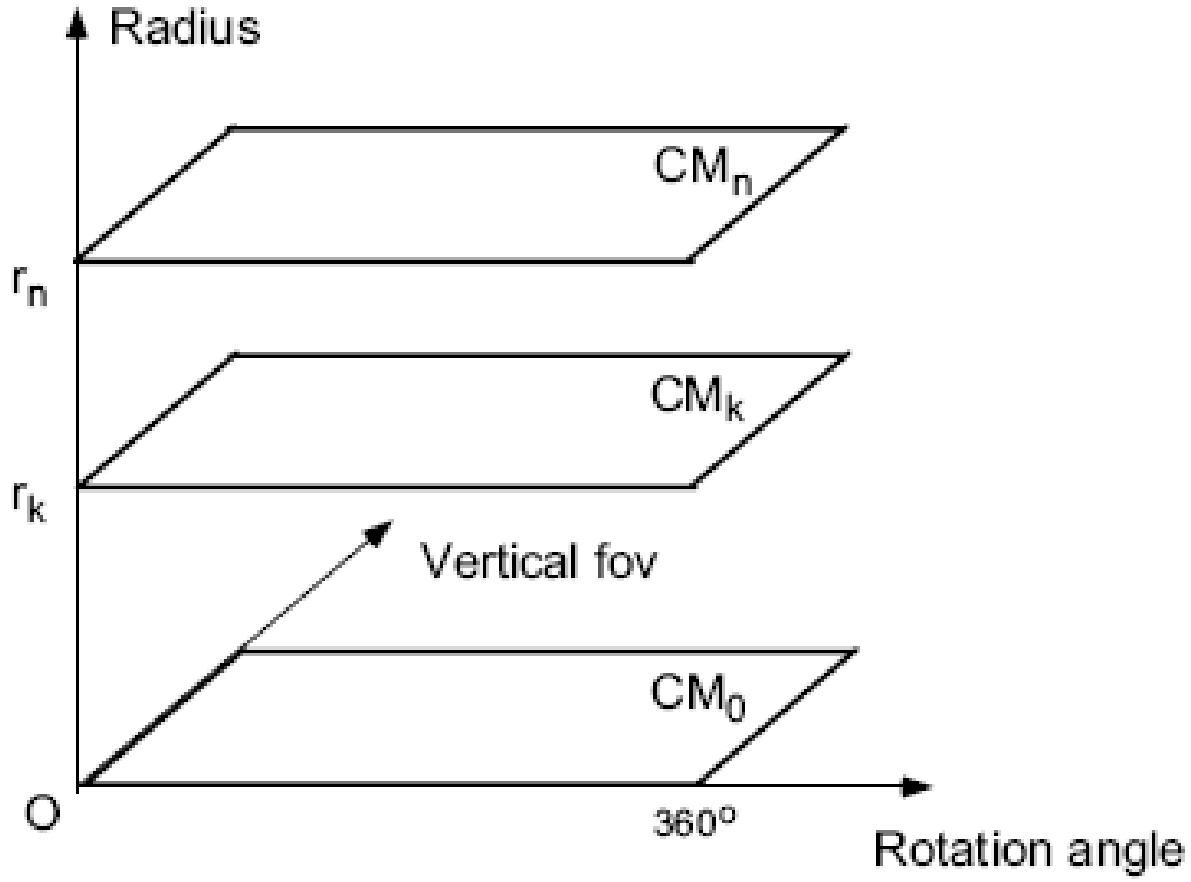


Concentric Mosaics



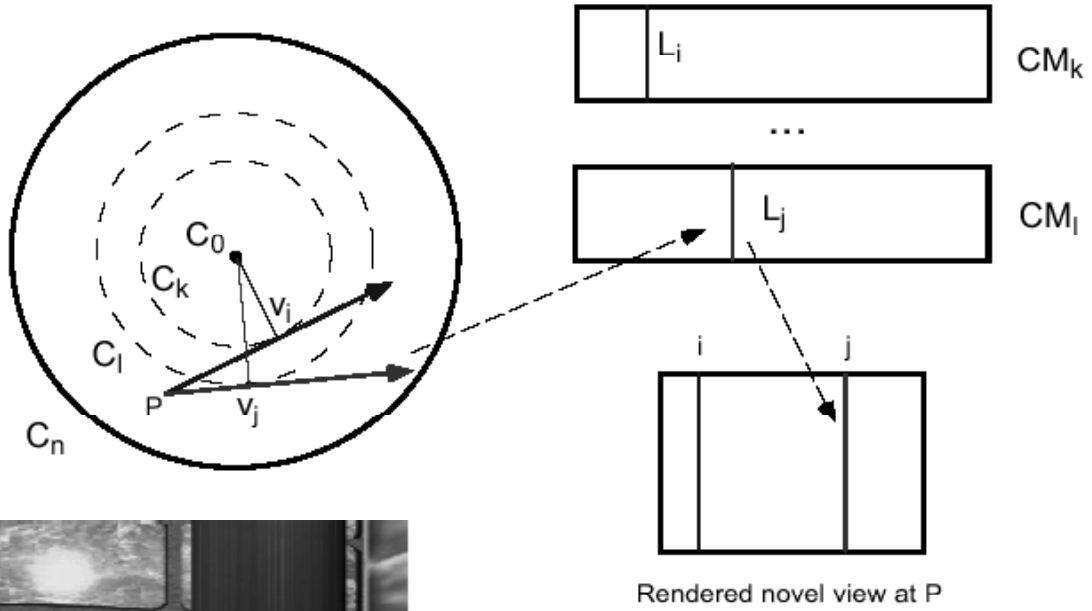


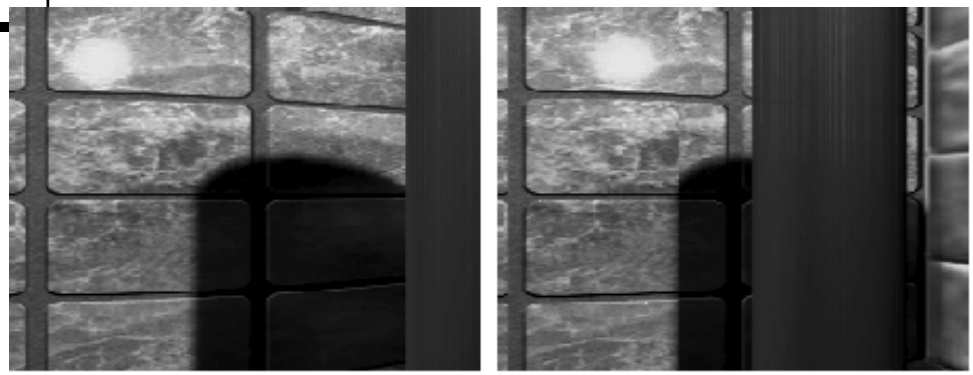
Modeling Plenoptic Functions



For A Novel View

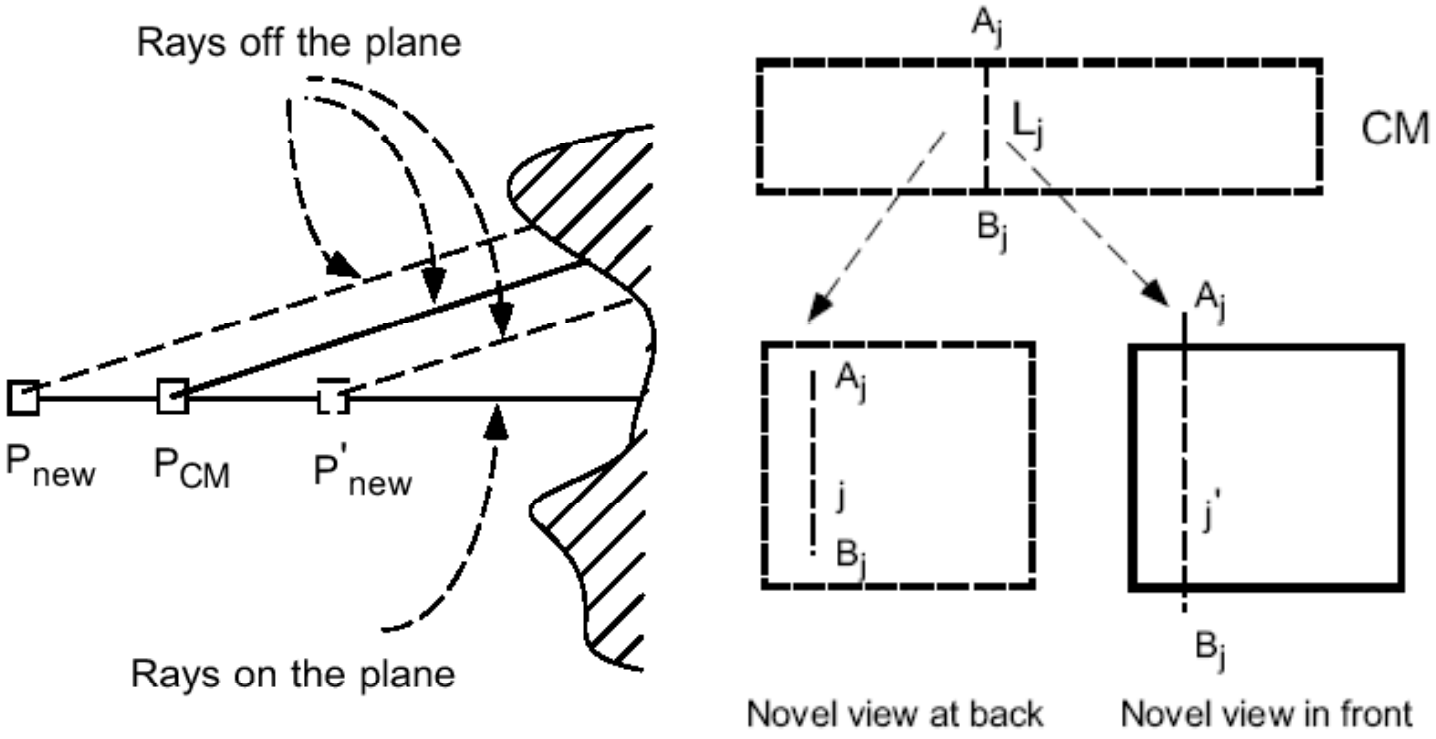
- Find tangents at proper locations.





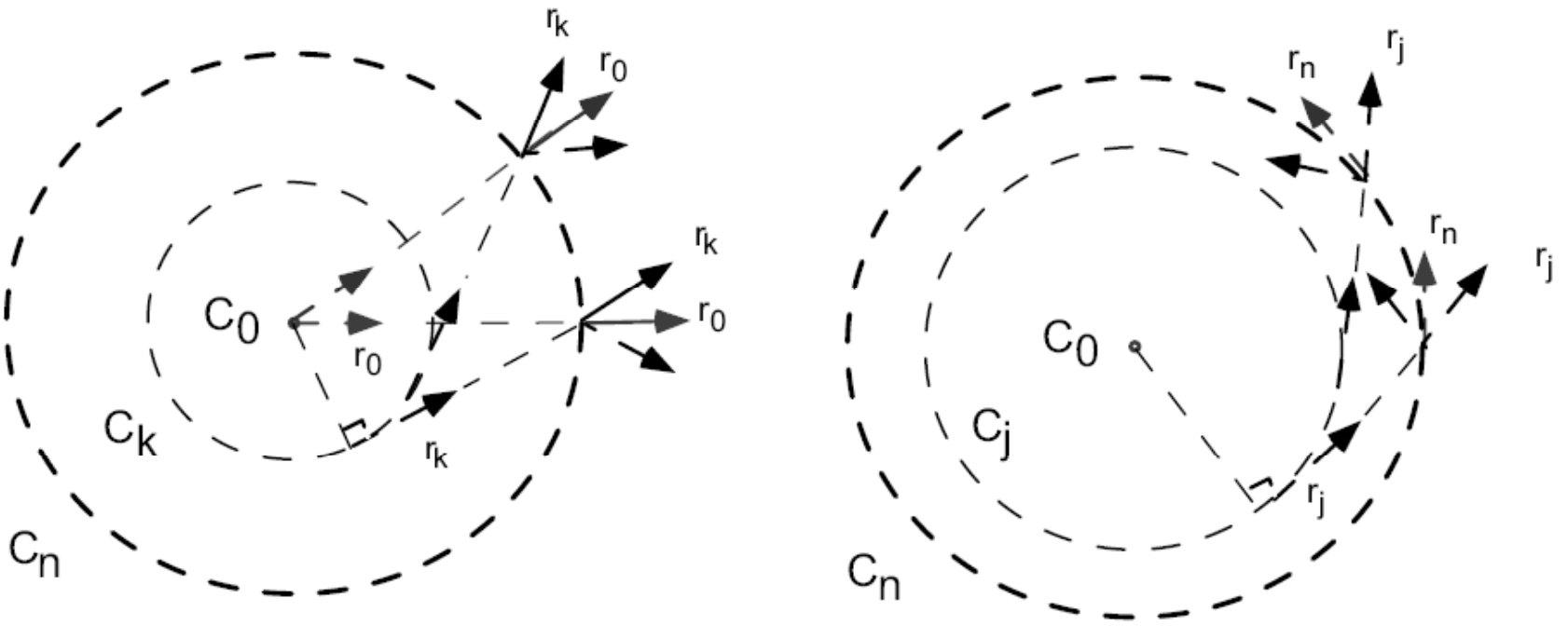
Depth Correction

- They manually selected a depth and did weak perspective approximation.



Constructing the Mosaic

- Using standard cameras: tangential or radial.



Results (the mosaics)

Results (with motion parallax)