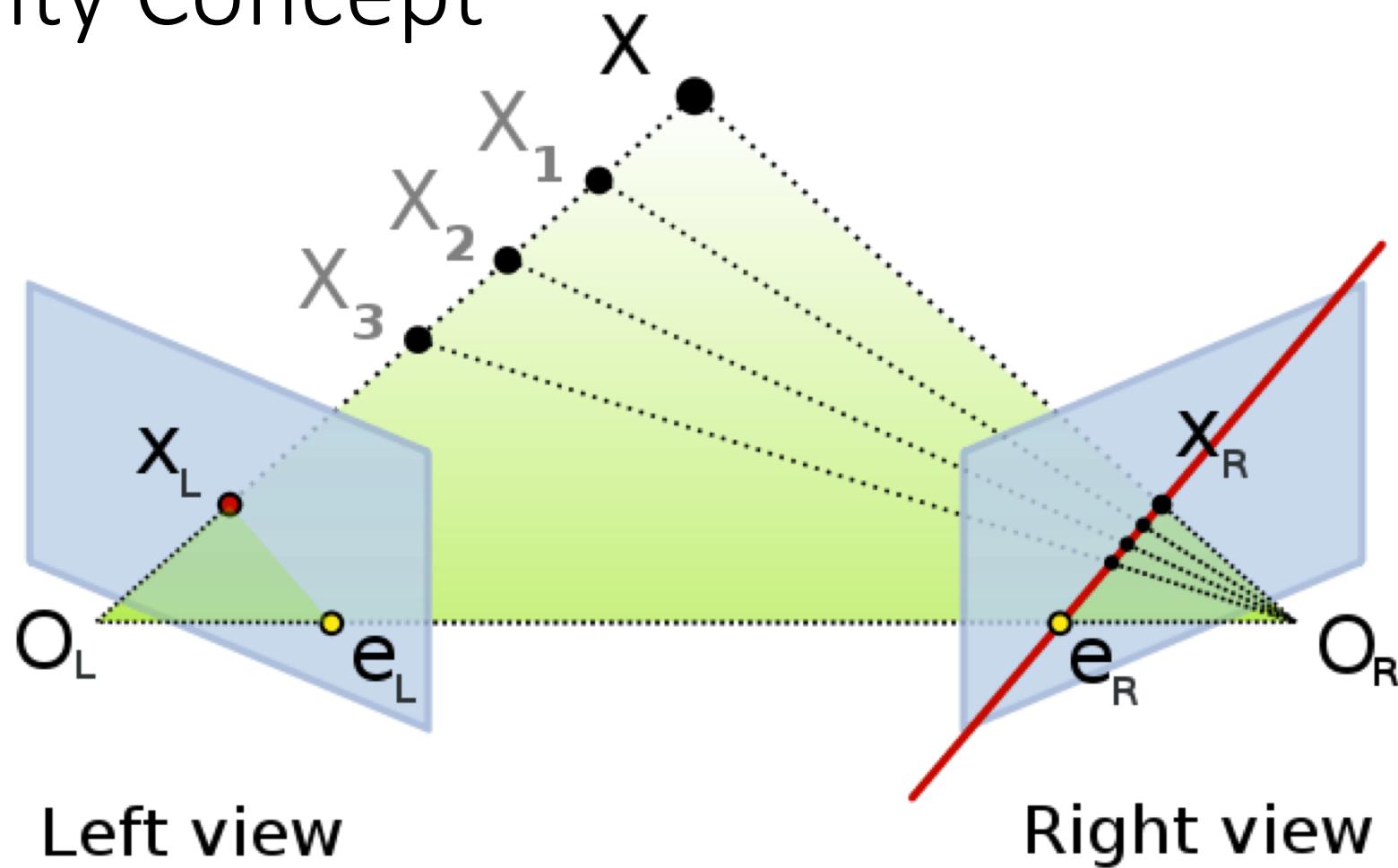


Dense Image Matching

Disparity Mapping

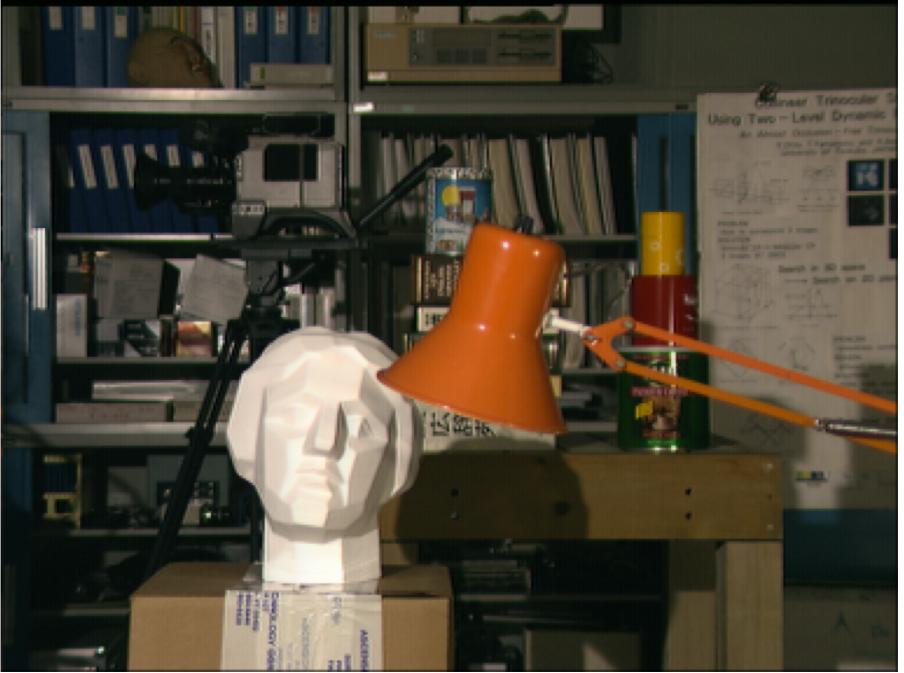
- Concept frequently used when matching images
- The amount of horizontal motion in overlapping images is inversely proportional to distance from the observer.
- A map of this apparent horizontal motion is referred to as a disparity map
- Producing these maps through dense and accurate inter-image (pixel-by-pixel) correspondence is a challenging task

Disparity Concept





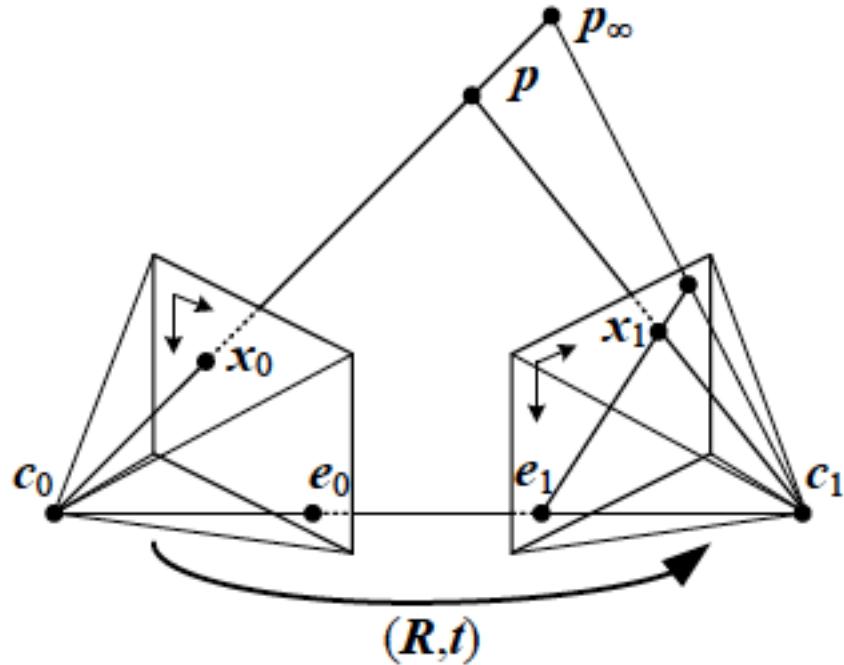
Left Image



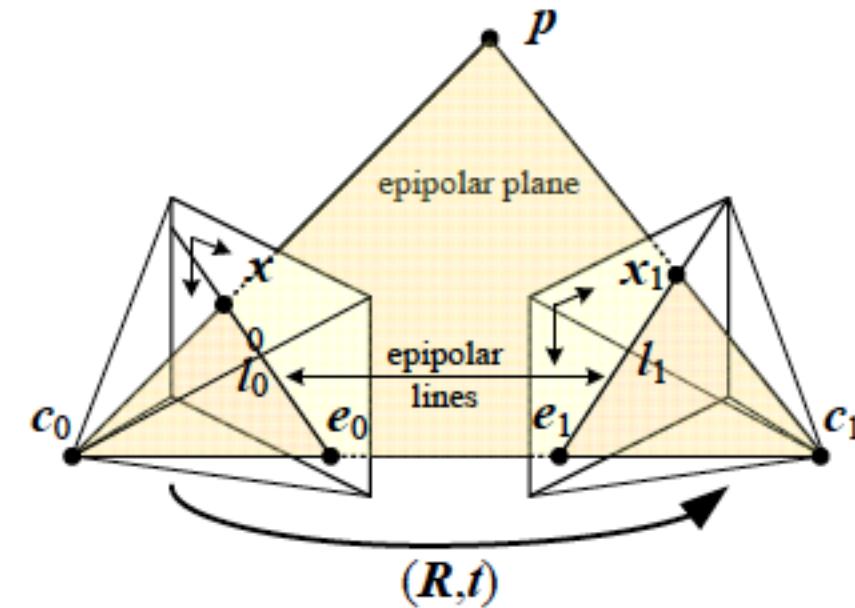
Right Image

Disparity Map





(a)



(b)

Figure 11.3 Epipolar geometry: (a) epipolar line segment corresponding to one ray; (b) corresponding set of epipolar lines and their epipolar plane.

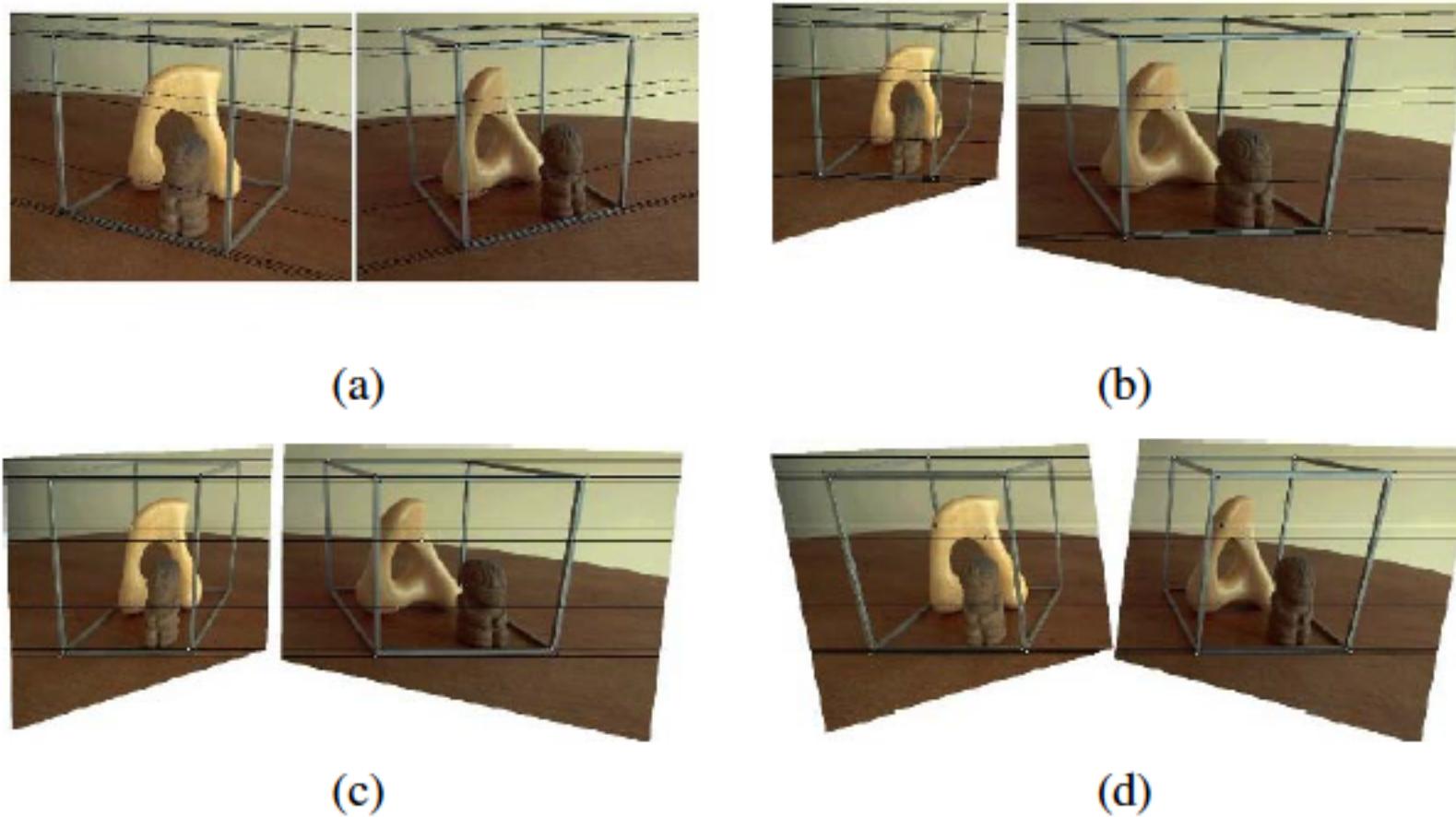


Figure 11.4 The multi-stage stereo rectification algorithm of Loop and Zhang (1999) © 1999 IEEE. (a) Original image pair overlaid with several epipolar lines; (b) images transformed so that epipolar lines are parallel; (c) images rectified so that epipolar lines are horizontal and in vertical correspondence; (d) final rectification that minimizes horizontal distortions.

Dense Correspondence

- Dense 3D models require estimation of disparity map on a pixel by pixel basis
- Textureless areas require a significant amount of assumptions or guesswork.
- Even though we now only have a 1D search, we still need:
 - Efficient way to generate pixel candidates in other images
 - Metric for assessing likelihood of correct match
- Variations of techniques to do this are an active area of research.