Stereo Vision using the OpenCV library
A glance

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Goal

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Generating a disparity depth map of the environment using stereo vision.

Intended end-result

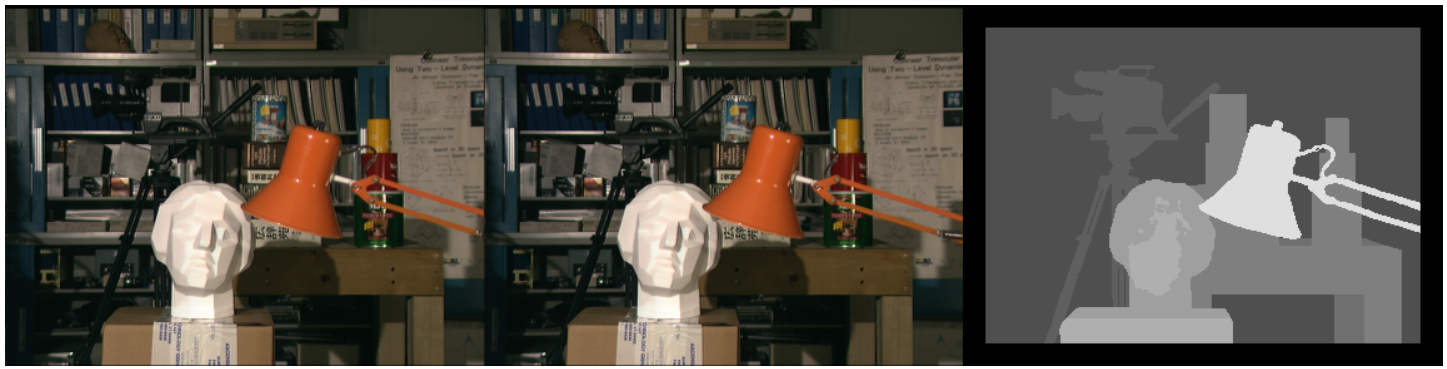


Figure: Stereo images with disparity depth map

Calibration

- Retrieve spatial relation between cameras
- Demo

Epipolar Geometry

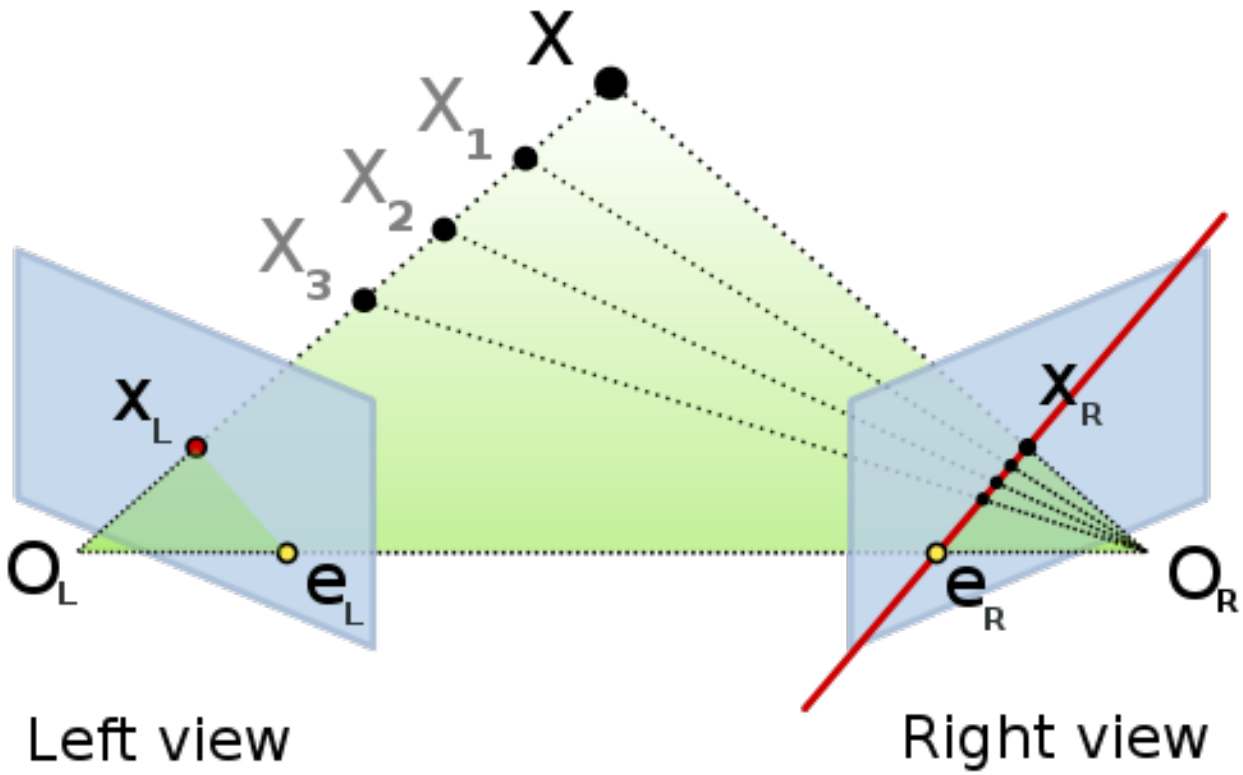
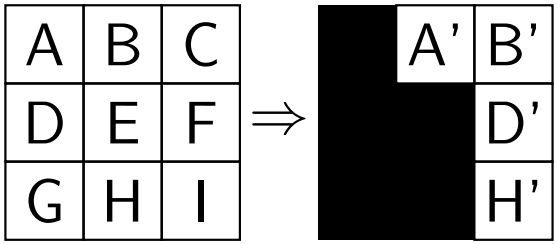


Figure: Epipolar geometry. Point X_L in the left image has to lie on the epipolar line in the right image

Rectification

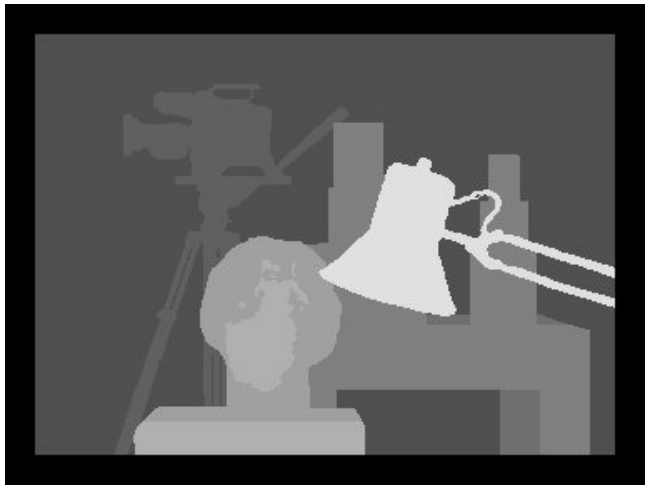
- Calculate rectification parameters
- Reusable
- Demo

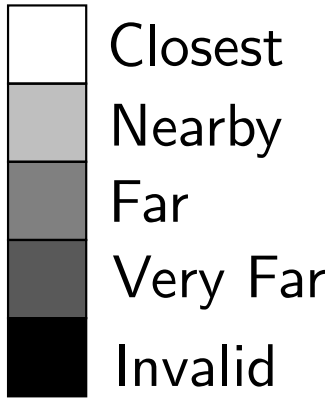
Stereo Matching - A general overview



- Mapping of pixels
- Disparity → Depth
- Occlusion

Stereo Matching - Depthmap





Stereo Algorithms - Block Matching

Stereo Algorithms - SGBM

Stereo Algorithms - Graph Cut

Demo

- 3D mapping of a 2D image
- Live Depthmap
- Background Removal