# Stereo Vision using the OpenCV library
# A glance

Sebastian Dröppelmann
Moos Hueting
Sander Latour
Martijn van der Veen

University of Amsterdam

June 2010

# Goal



## Goal

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

# Intended end-result



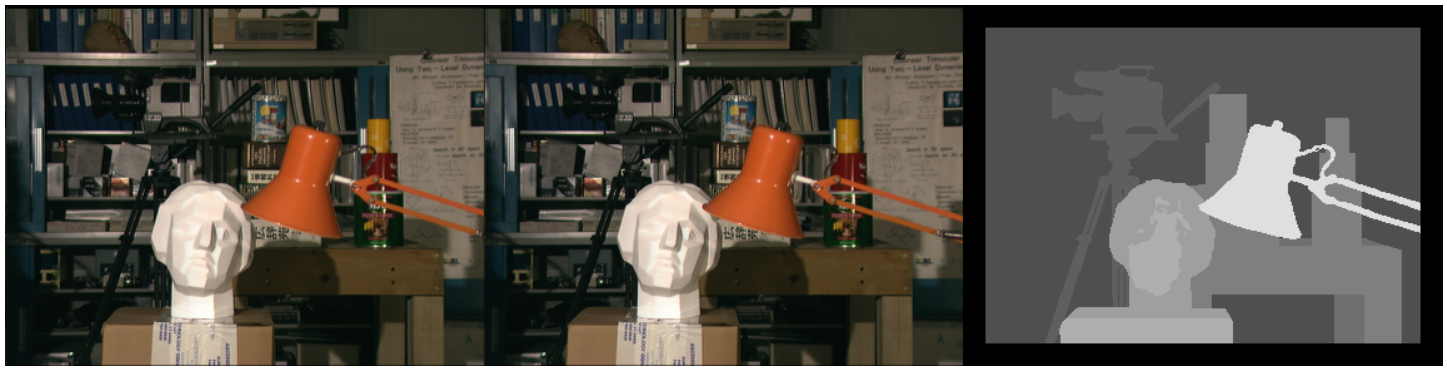
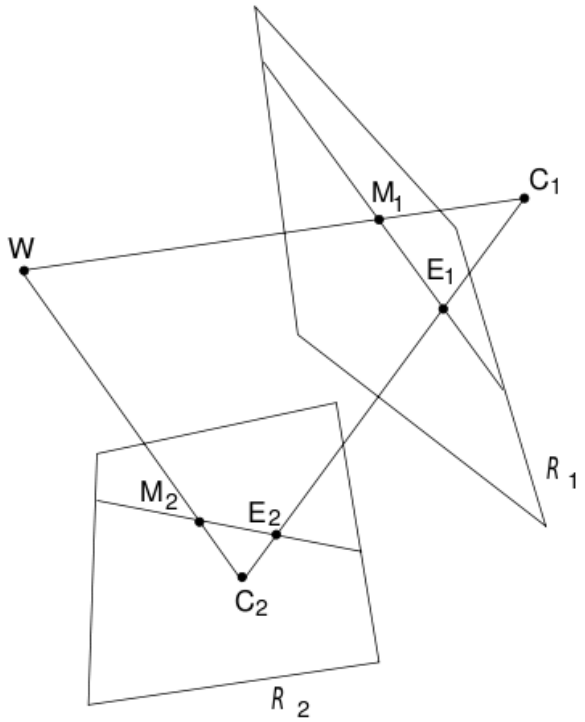


Figure: Stereo images with disparity depth map

# Calibration



- Retrieve distortion
- Retrieve spatial relation between cameras



# Calibration



Demo

# Epipolar Geometry



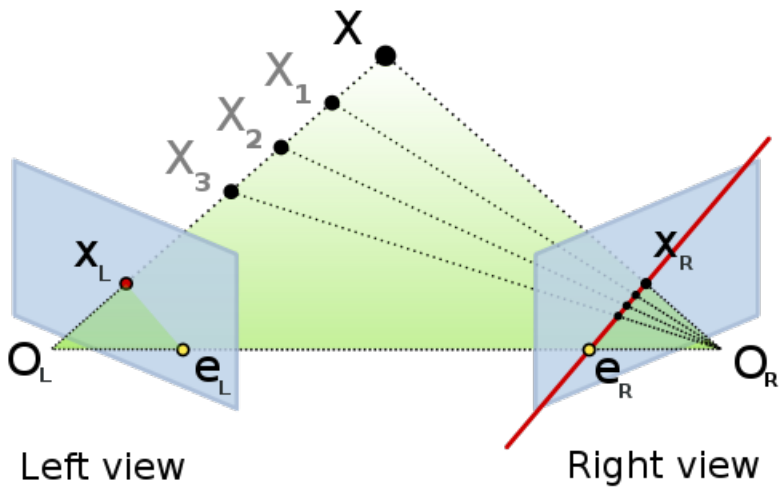
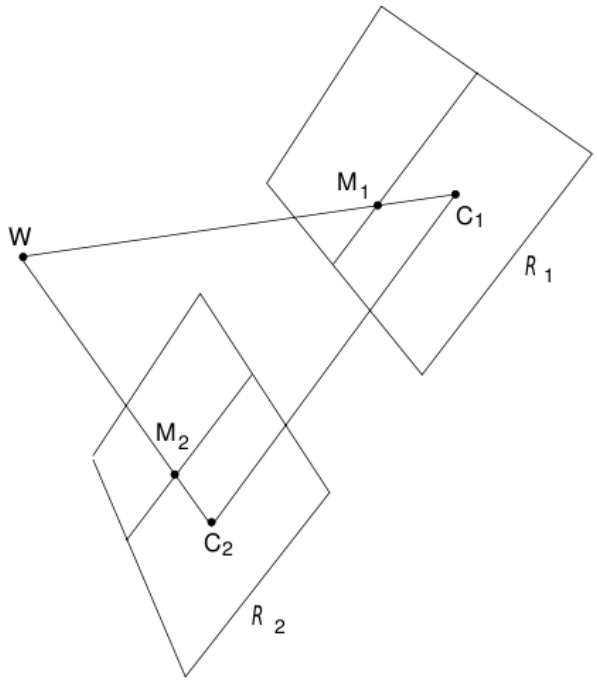



Figure: Epipolar geometry. Point $X_L$ in the left image has to lie on the epipolar line in the right image

# Rectification



- Calculate rectification parameters
- Reusable



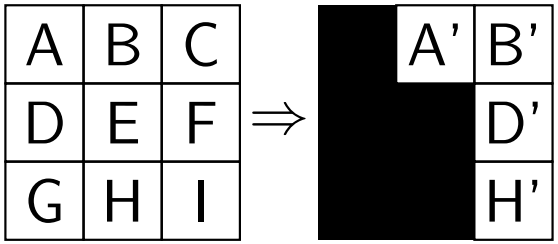
# Rectification



Demo

# Stereo Matching - A general overview

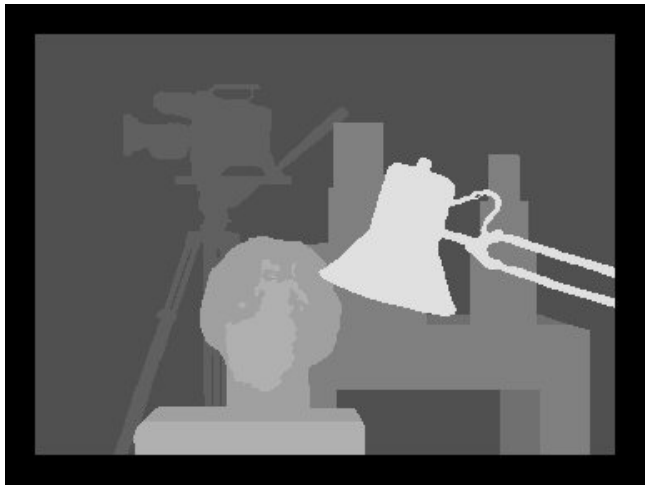


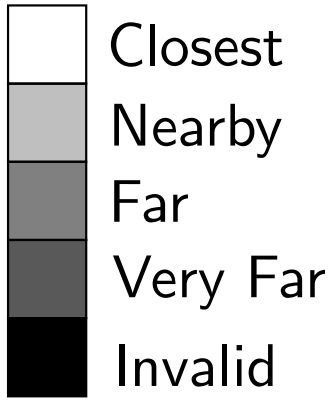



- Mapping of pixels
- Disparity → Depth
- Occlusion

# Stereo Matching - Depthmap



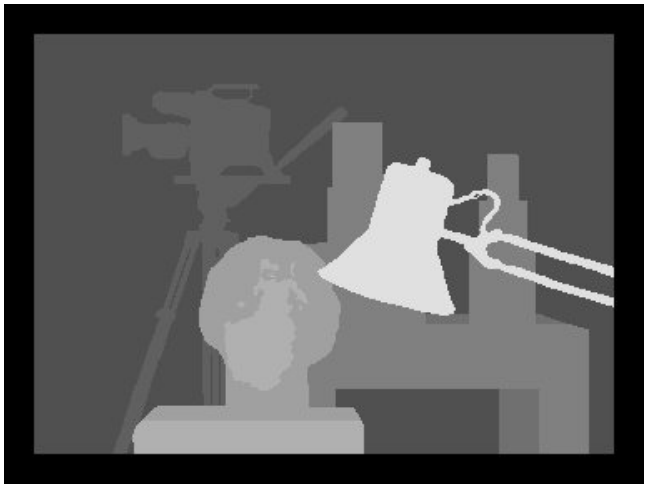




# Stereo Algorithms - Graph Cut



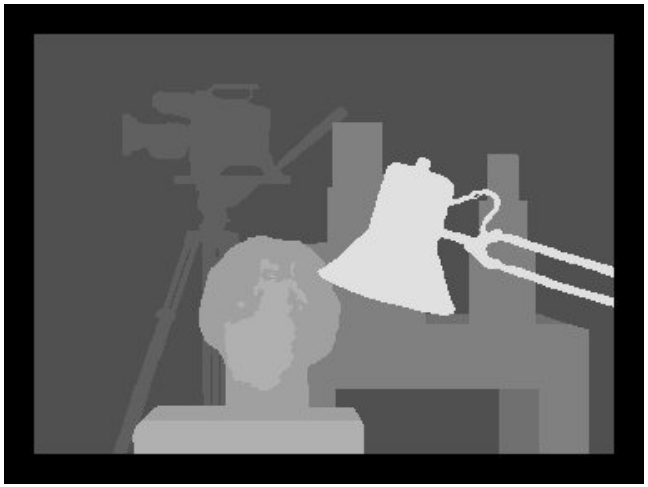
- popular
- slow
- smooth
- interlinear consistency

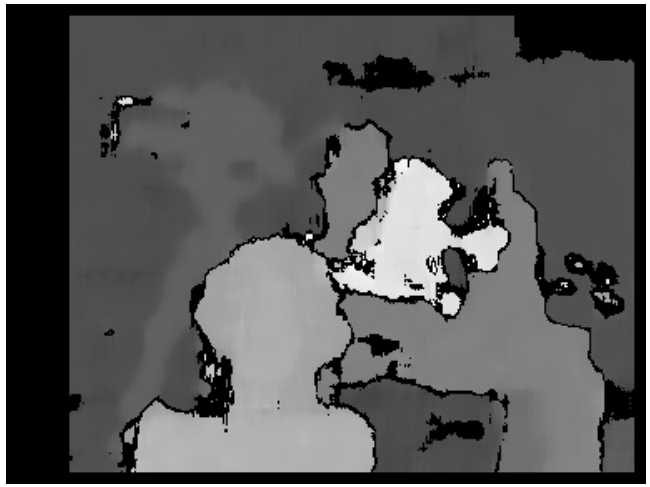


# Stereo Algorithms - Block Matching



- fast
- lots of noise

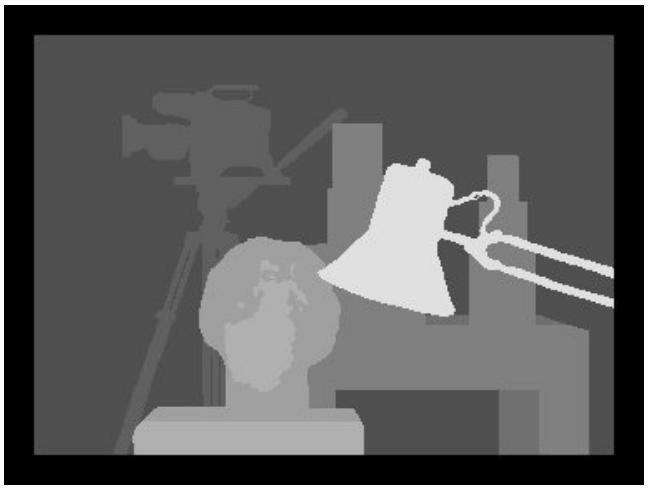


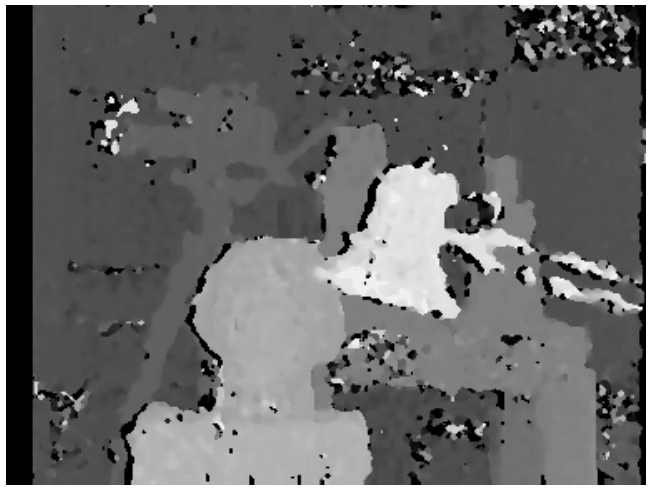


# Stereo Algorithms - Semi Global Block Matching



- not in Python
- good in speed/quality
- good depthmap
- noise





# DEMO



Now follows a demonstration of

- SGBM
- GC

# Demo



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