

Stereo vision

Dröppelmann,  
Hueting,  
Latour,  
Van der Veen

Recap

Demonstration

Applications

Vragen

# Stereo Vision using the OpenCV library

## A glance

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# Goal

Stereo vision

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## Goal

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

# Intended end-result

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Figure: Stereo images with disparity depth map

# Calibration

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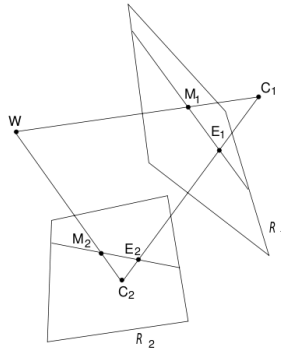
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- Retrieve distortion
- Retrieve spatial relation between cameras



# Calibration

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# Epipolar Geometry

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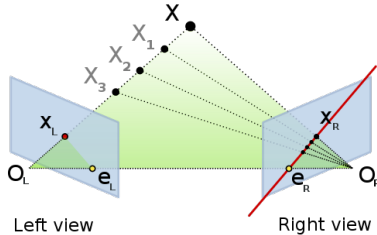


Figure: Epipolar geometry. Point  $X_L$  in the left image has to lie on the epipolar line in the right image

# Rectification

## Stereo vision

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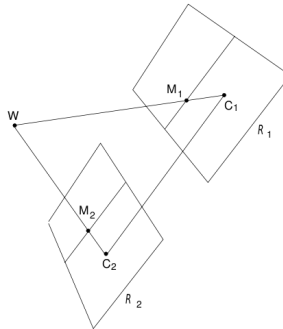
- Calculate rectification parameters
- Reusable

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# Rectification

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# Stereo Matching - A general overview

Stereo vision

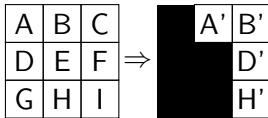
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- Mapping of pixels
- Disparity  $\rightarrow$  Depth
- Occlusion

# Stereo Matching - Depthmap

Stereo vision

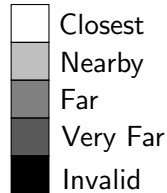
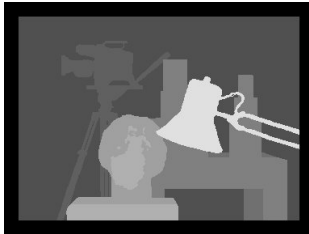
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# Stereo Algorithms - Graph Cut

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- popular
- slow
- smooth
- interlinear consistency



# Stereo Algorithms - Block Matching

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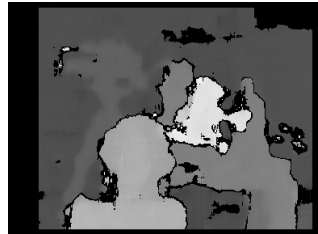
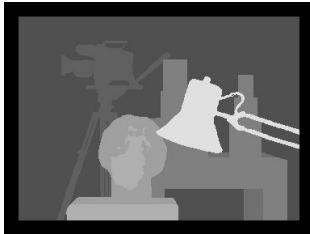
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- fast
- lots of noise



# Stereo Algorithms - Semi Global Block Matching

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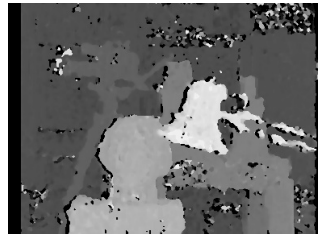
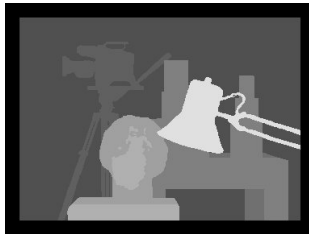
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## Demonstration

## Applications

## Vragen

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



# Demo

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

# Vragen?

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