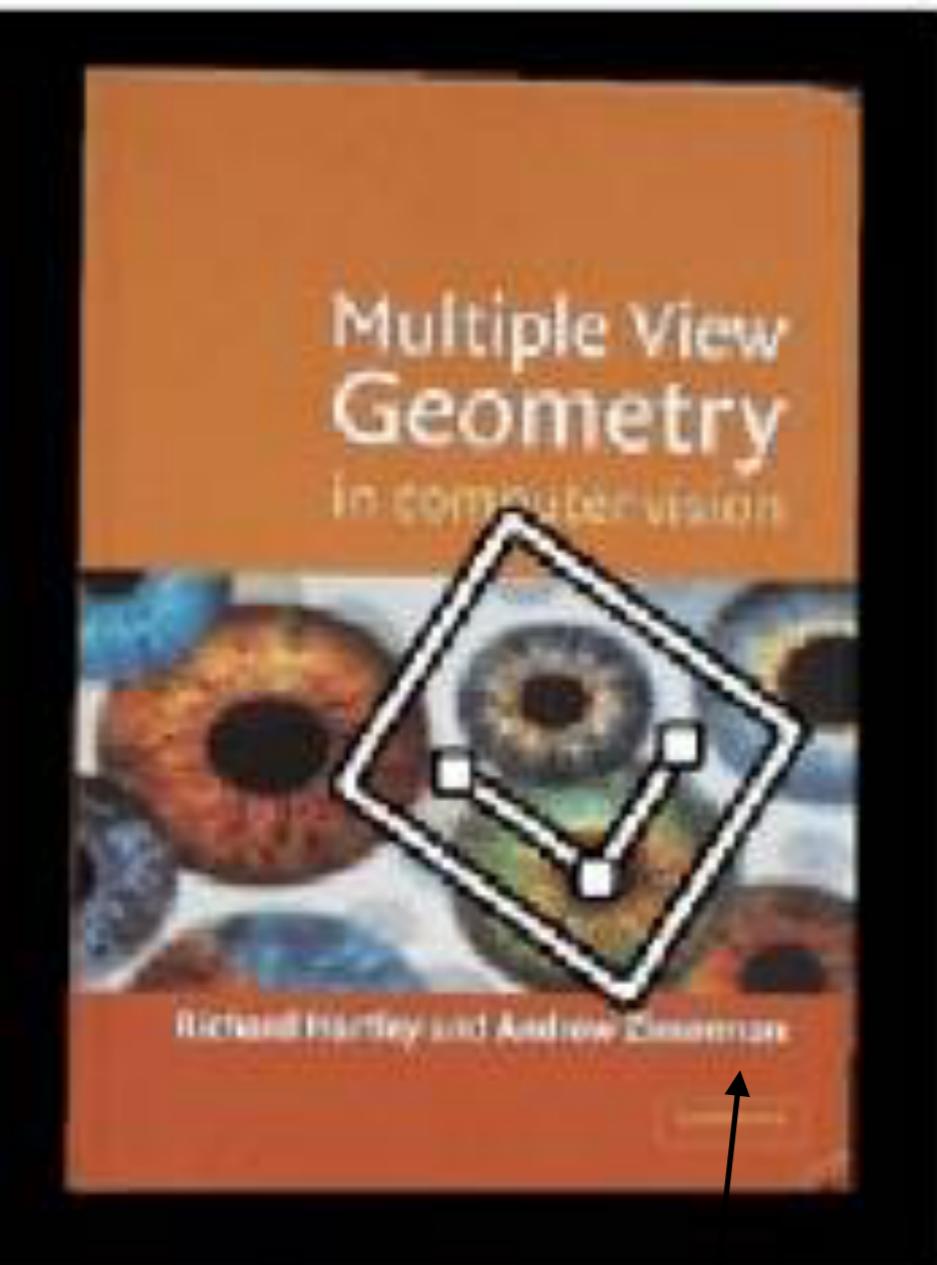


Image Matching



is this thing...



the same as this thing?

Applications: Panorama Stitching

Stitching multiple images into a seamless panorama
(Project 2)



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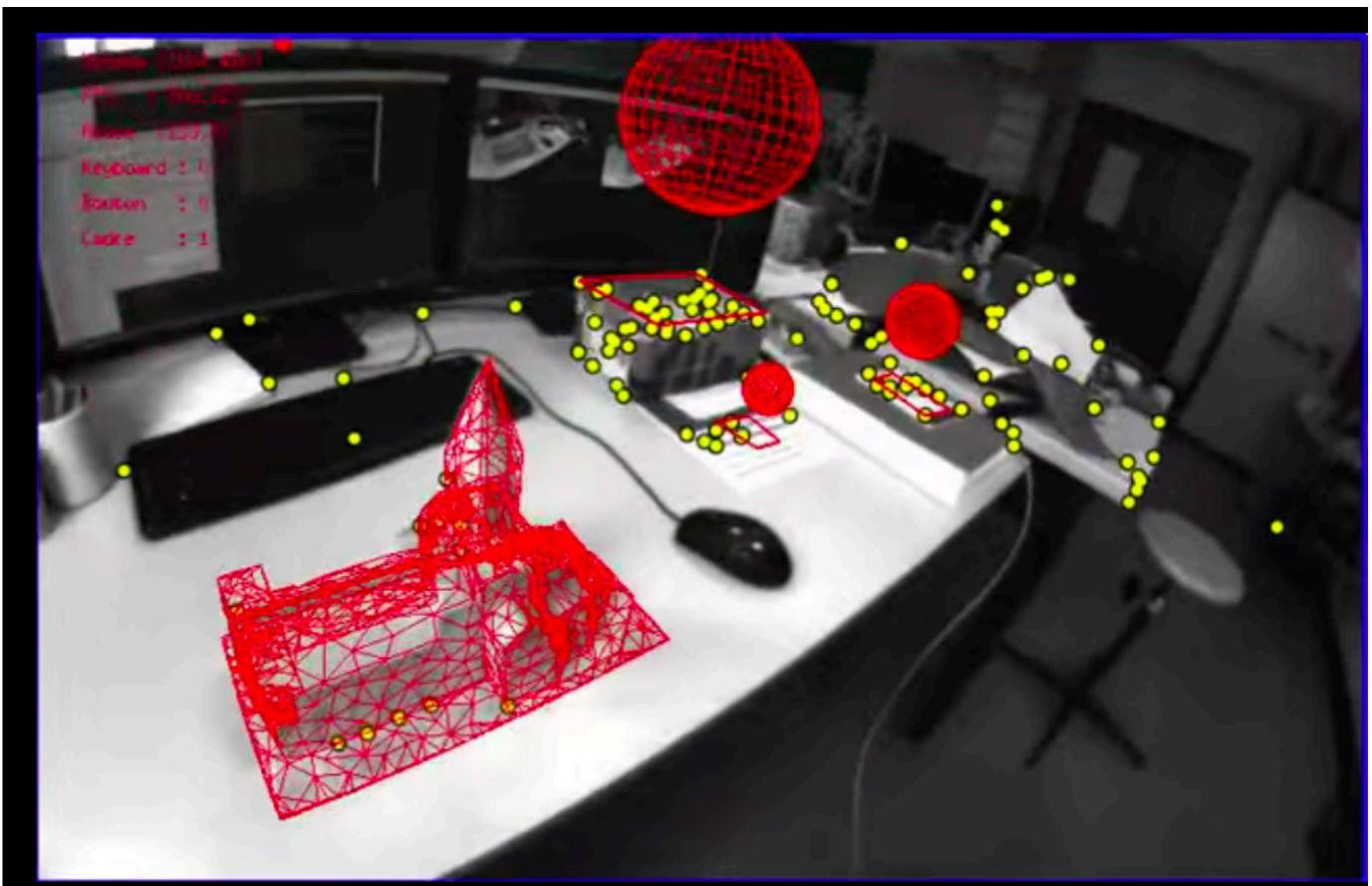
Applications: Panorama Stitching

Stitching multiple image into a seamless panorama
(Project 2)



Applications: Tracking

- Motion analysis
<https://youtu.be/1rZNb-affQg>
- Augmented reality
- Segmentation
- Robot navigation

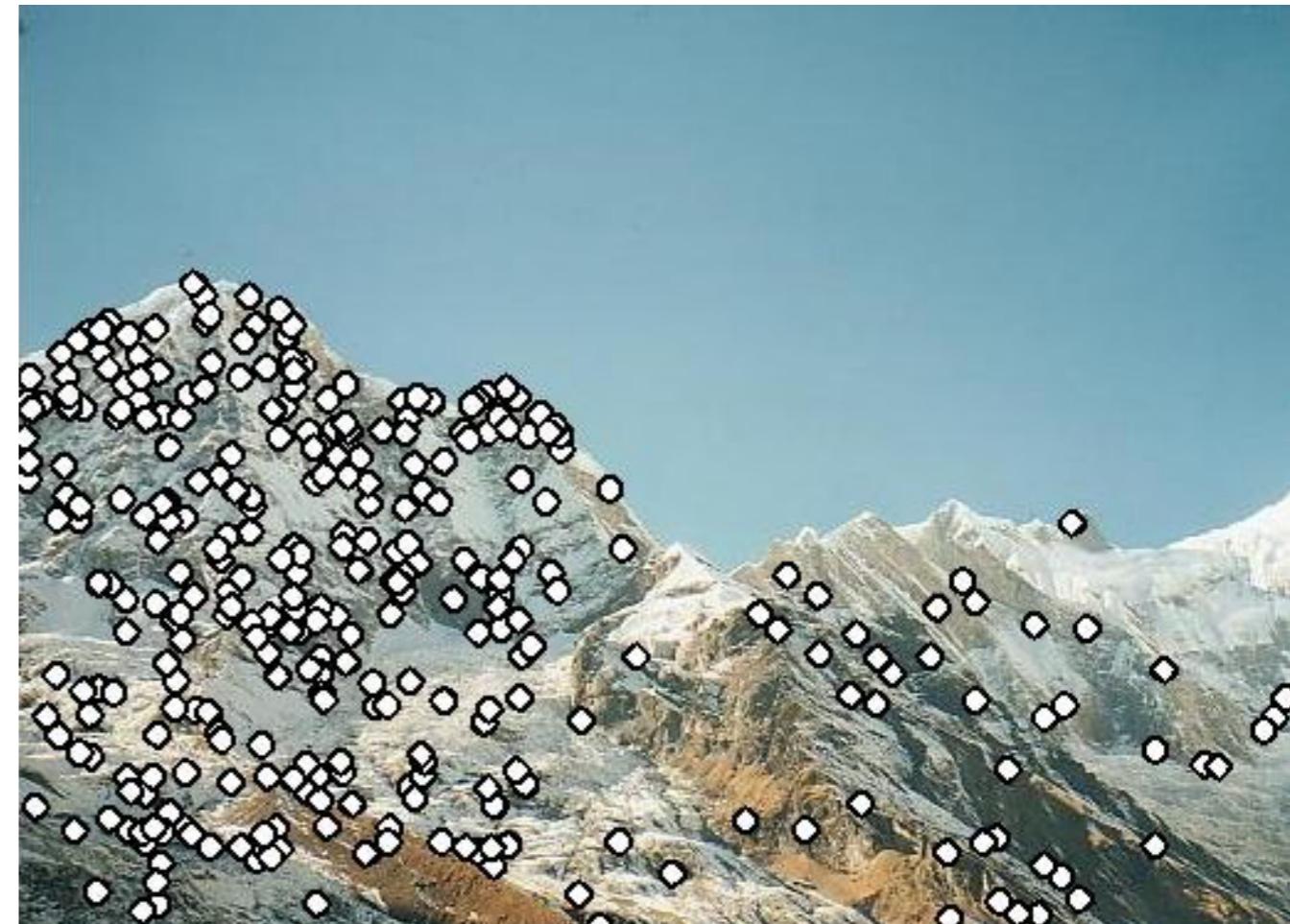
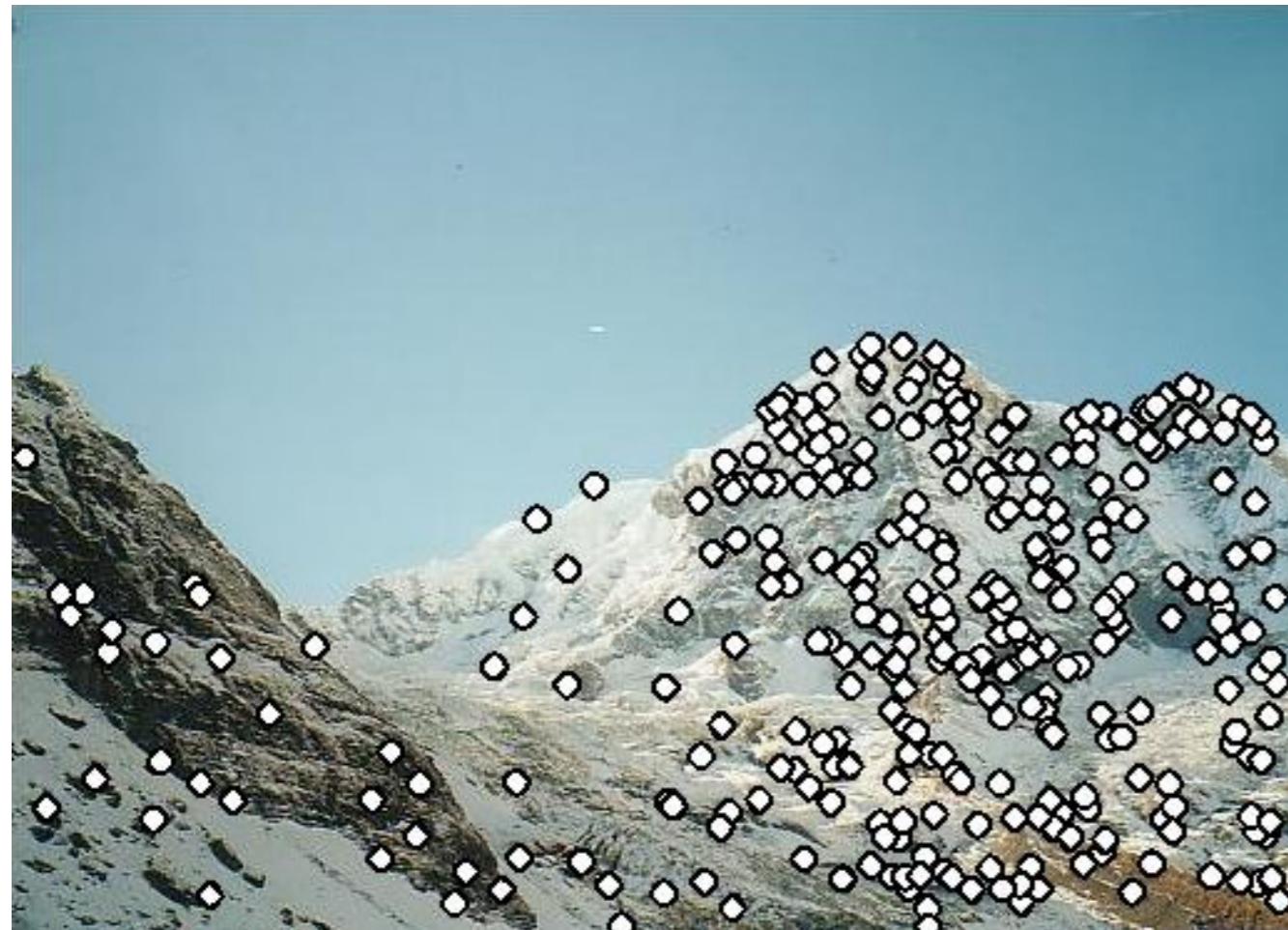


<https://youtu.be/5I5pbSs-yrU>

Running motivating example: Panorama Stitching



Running motivating example: Panorama Stitching



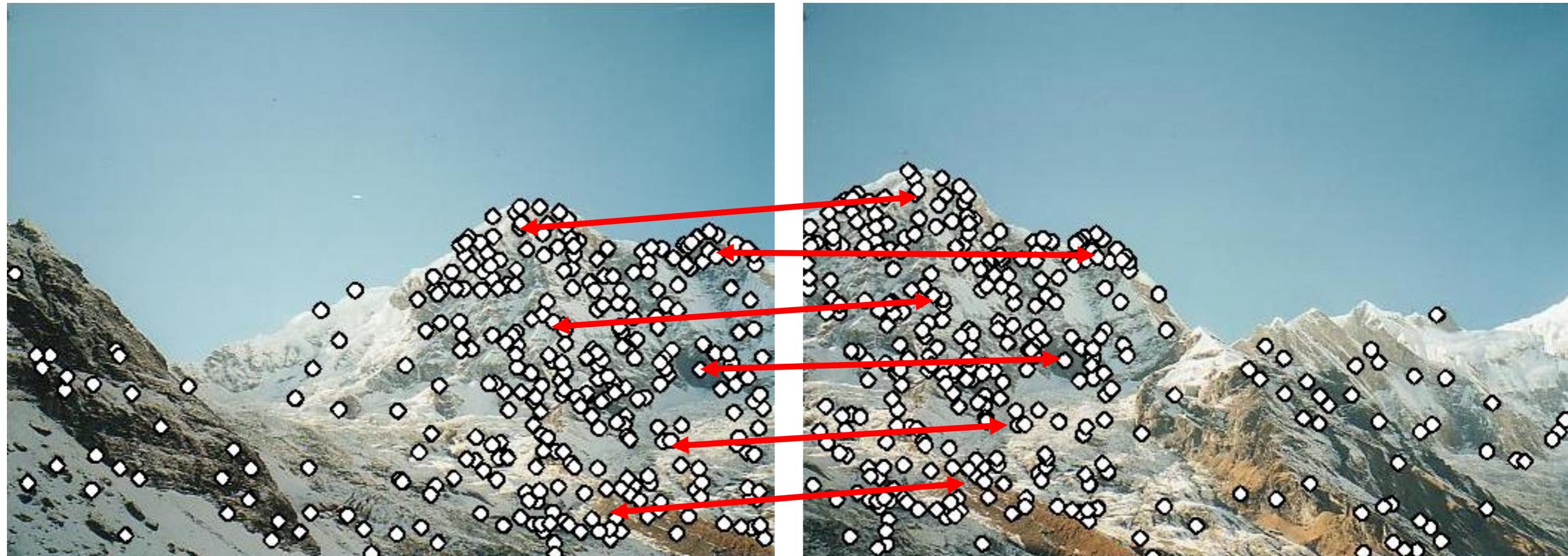
1. **Detect** corner features

Running motivating example: Panorama Stitching



2. Compute feature **descriptors**

Running motivating example: Panorama Stitching



3. **Match** features based on their descriptors.

Running motivating example: Panorama Stitching



4. **Warp** images into alignment

Running motivating example: Panorama Stitching



5. **Blend** images to eliminate seams

Panorama Stitching: Steps

feature matching

1. **Detect** features
2. Compute feature **descriptors**
3. **Match** features based on their descriptors

geometric transformations

4. **Warp** images into alignment

photometric transformations

5. **Blend** images to eliminate seams

Image features

- Can be *global* or *local*
- Global features "distill" the whole image. examples:
 - average brightness
 - histogram of image intensity values
 - a tiny version of the image itself?
 - a vector ("embedding") produced by a neural network

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(our focus)

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Image features

- Local features identify salient / distinctive / useful points in the image. Examples:

Edges

Blobs

Corners

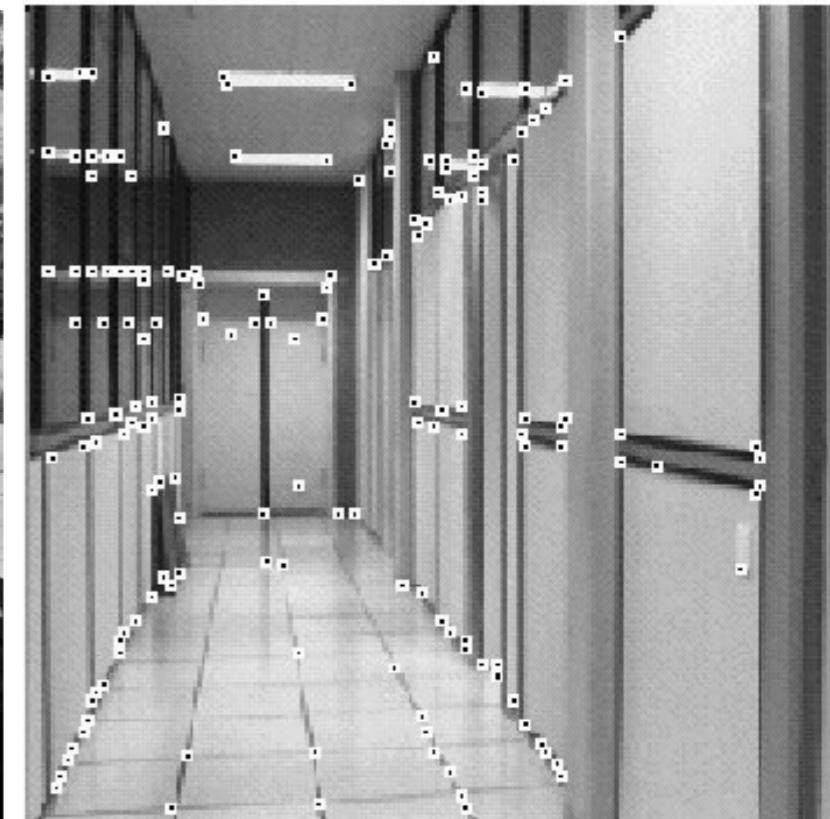
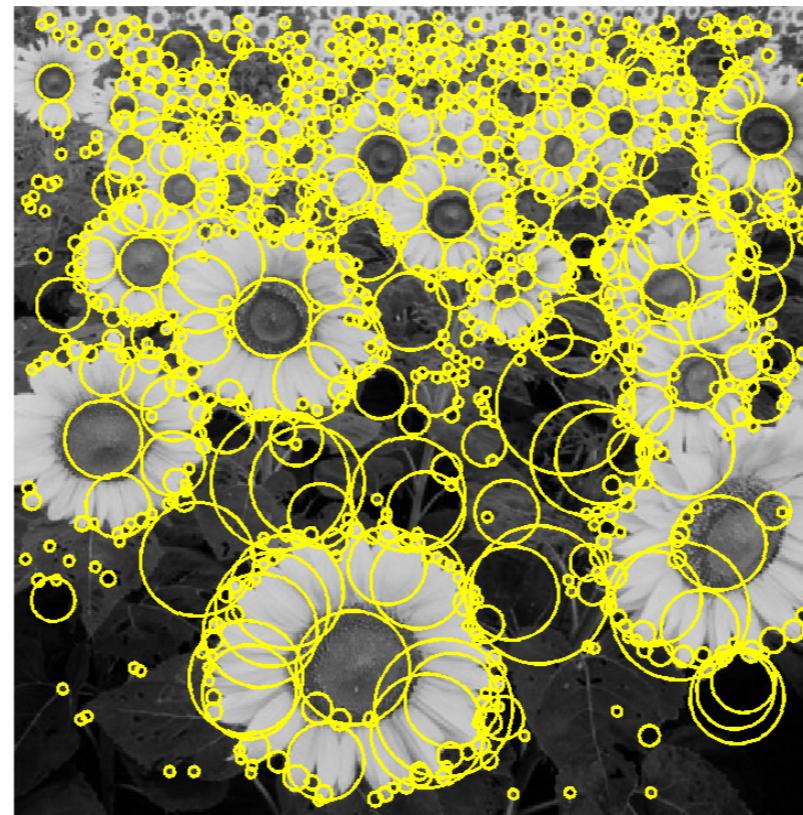
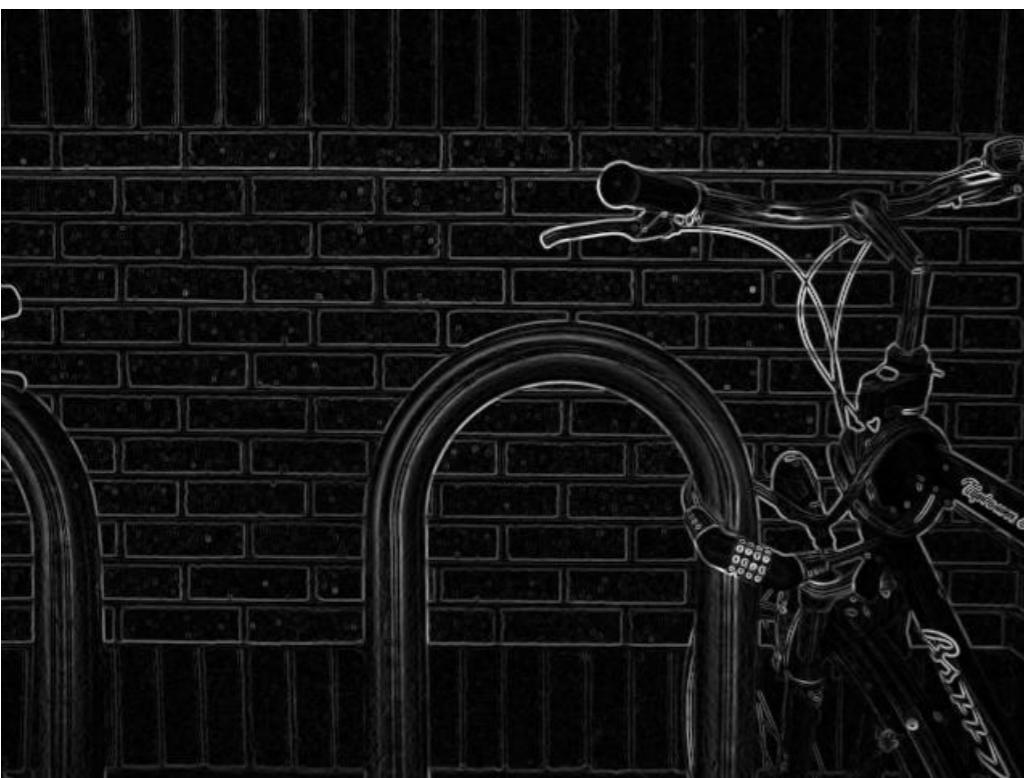


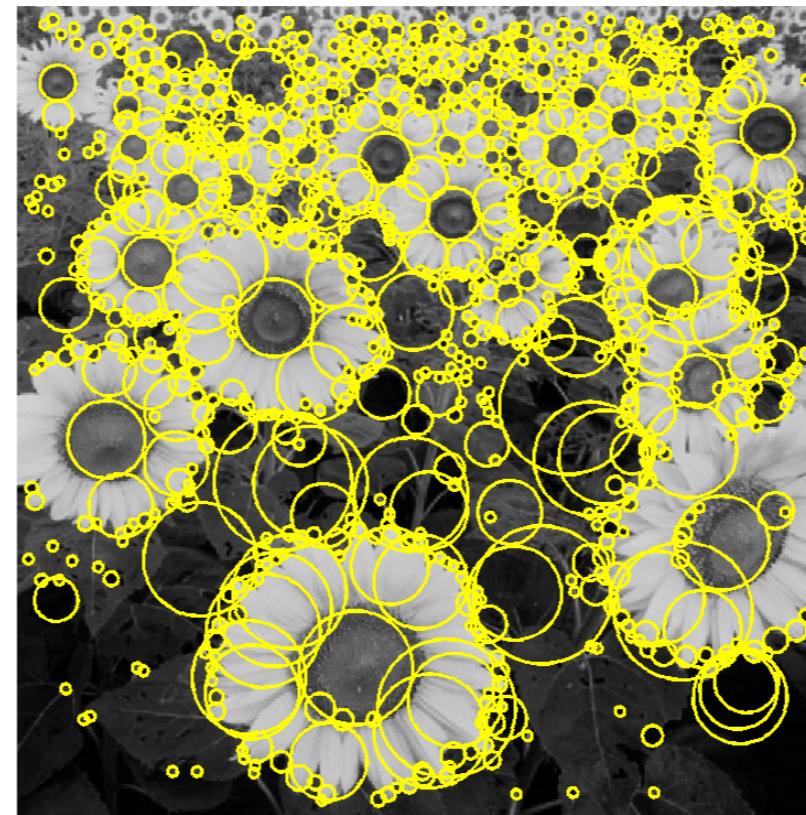
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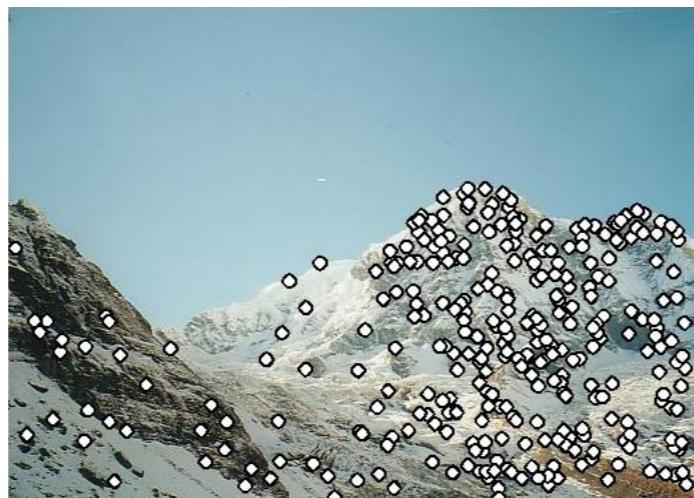
(our focus)

Corners

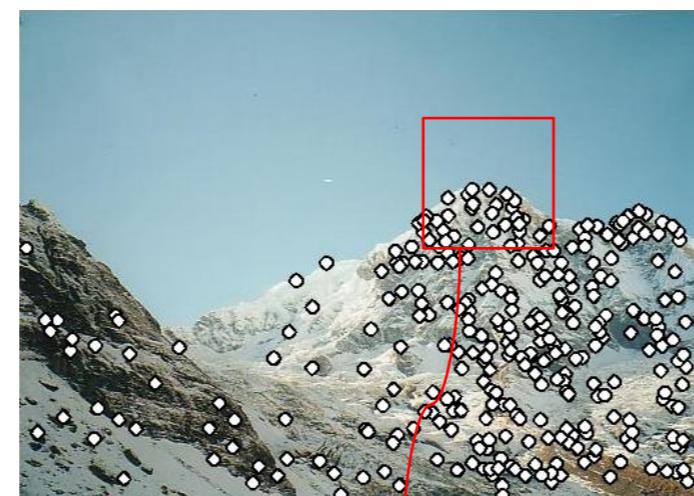


Features - Overview

1. Detect

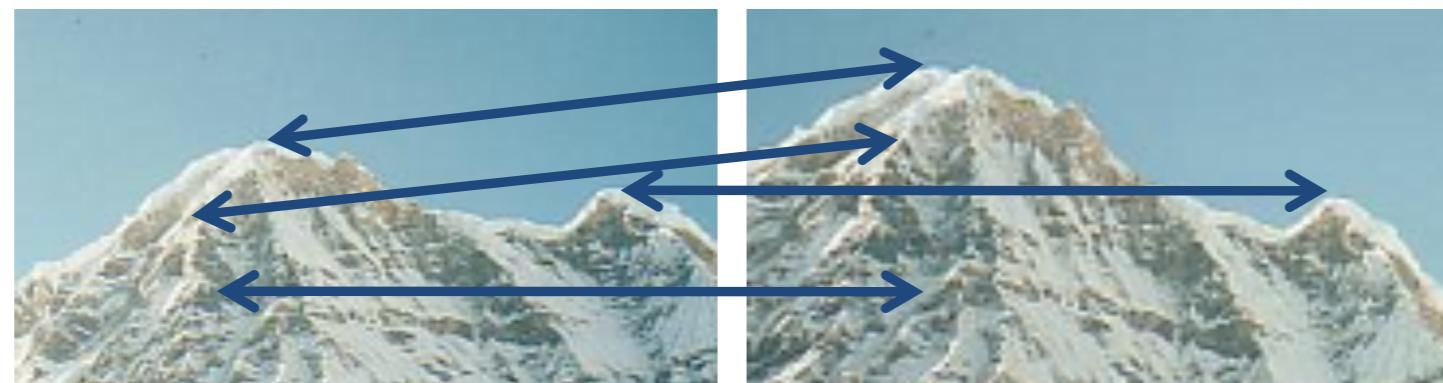


2. Describe



$$\mathbf{x}_2 = [x_1^{(2)}, \dots, x_d^{(2)}]$$

3. Match



Next time: What makes a good feature?

