MLRF Lecture 03

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Agenda for lecture 3

1. Introduction
2. Finish lecture about local feature **detectors**
3. Local feature descriptors (part 1?)
4. Descriptor matching and indexing
5. Projective transformations
6. Homography estimation and geometric validation

Introduction

Lecture 03 part 01

Previously, in MLRF…

Summary of last lecture

Global image descriptors

- Color histogram
- Limited descriptive power
- Which distance function?

Clustering

- K-Means
- Hierarchical Agglomerative Clustering

Local feature detectors

- Image gradients
- Edge detector: Sobel, Canny
- Corner detector: Harris
  - Large image gradient in two directions
- Corner detector: FAST
- Corner detectors: LoG, DoG, DoH
- Blob detector: MSER

Debriefing of practice session 2

PS2 content

1. Color histograms
2. Implement Harris
3. Extract simple descriptors
4. Match descriptors and solve *Twin it!*

Discussion

- Who completed part 1? 2? 3? 4?
- Any remarks, comments, questions?
- Things to keep, change, remove?

You can work on that for 1 hour during practice session 3.

Practice session 2: Take home messages

Color histogram

- Very lightweight
- Good filtering stage
- But limited descriptive power

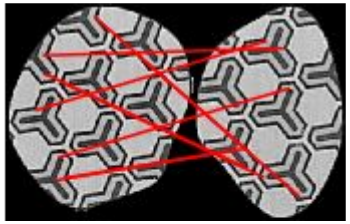
Harris-Stephens

- Many little tricks: **can you list some?**
- Classical approach
- Can be used to detect local maxima in some DoG image (level)

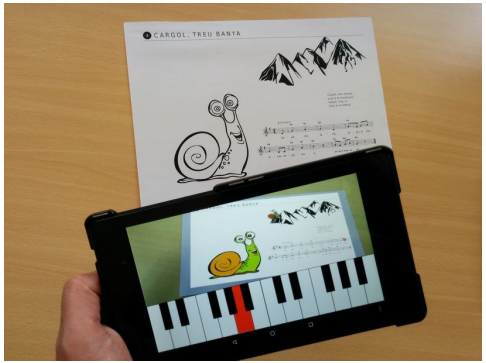
Next practice session(s)

Next practice session

Compute and match descriptors
for max. 1 hour (from practice session 2)

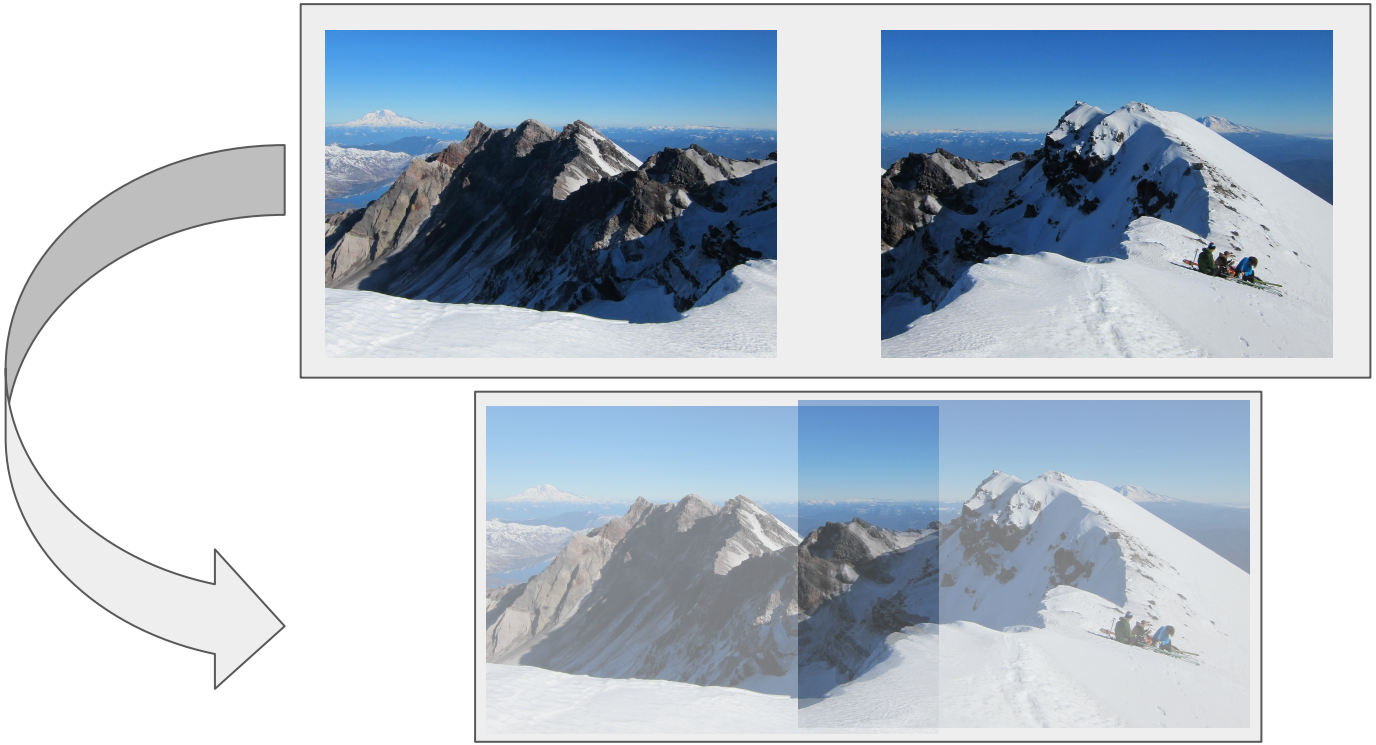


Play with **ORB keypoint matching**
to implement a simple AR technique
(practice session 3)



Introduction

How are panorama pictures created from multiple pictures?



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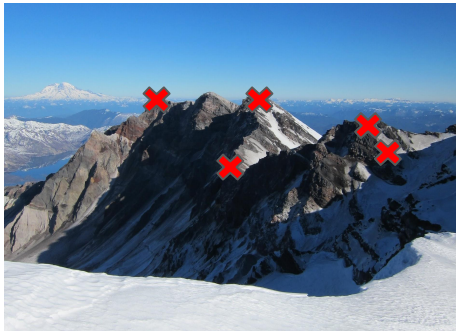

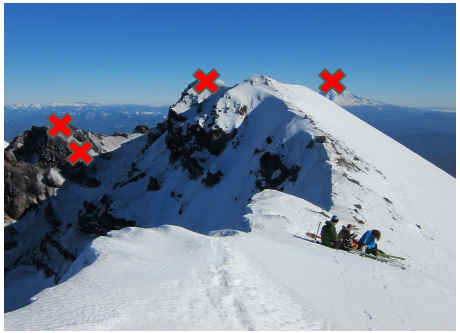

1. Detect small parts invariant under viewpoint change: “Keypoints”

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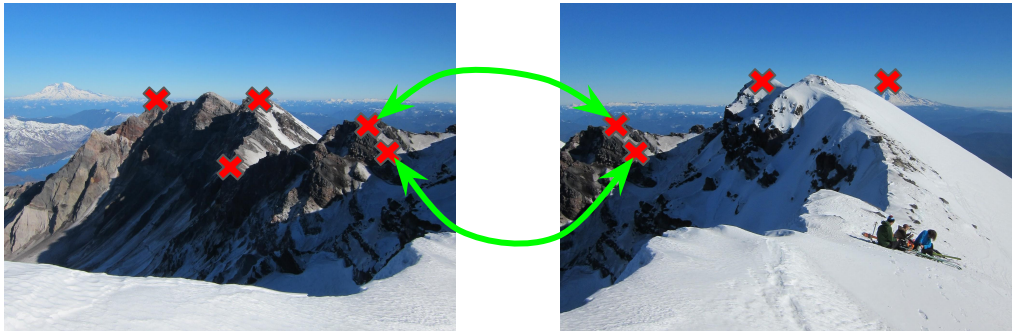

1. Detect small parts invariant under viewpoint change: **keypoints**
2. Find pairs of matching keypoints using a **description** of their neighborhood

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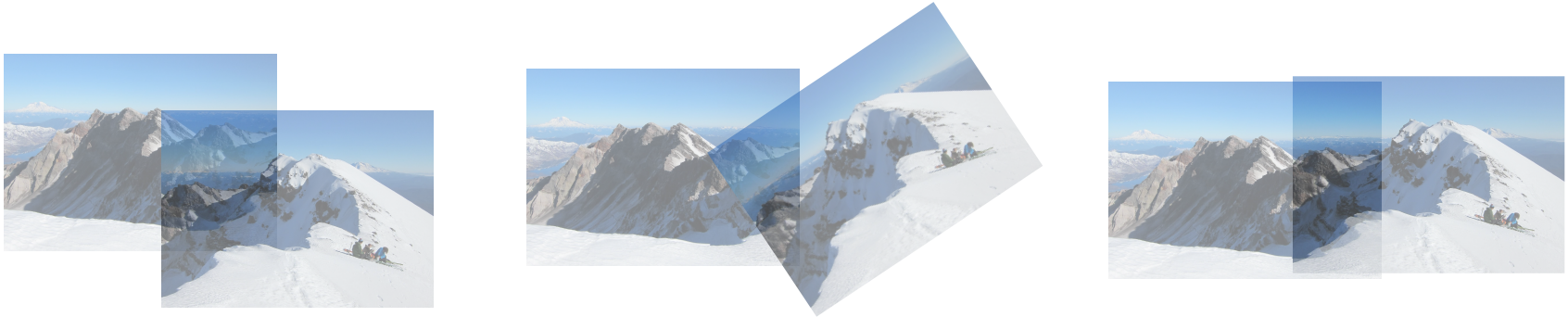

1. Detect small parts invariant under viewpoint change: **keypoints**
2. Find pairs of matching keypoints using a **description** of their neighborhood
3. Compute the **most likely transformation** to blend images together