# MLRF Lecture 04

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# Agenda for lecture 4

1. Introduction
2. Local feature detectors (part 2, continued)
3. Local feature descriptors
4. Content-based image retrieval (CBIR) using bags of features
5. Evaluating CBIR / Ranked Retrieval (RR) systems

# Introduction

Lecture 03 part 01

# Previously, in MLRF…

# Summary of last lecture

Descriptor matching
- 1-way
- Cross check
- Ratio test
- Radius threshold

Descriptor indexing

- Indexing pipeline: train/query
- Linear matching
- kD-Trees
- FLANN / hierarchical k-Means
- LSH
- Approximate NN problem

Projective transformations
- Translation
- Rotation
- Scaling
- …
- Projective

Homography estimation
- Least square
- RANSAC

Geometric validation

# Debriefing of practice session 3

**PS2 content**

1. Implement Harris
2. Descriptor matching using OpenCV and homography estimation

**Discussion**

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

# Practice session 3: Take home messages

Harris-Stephens

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

*Extracting descriptors, matching them **by hand***

- *Detect keypoints and extract surrounding pixels to flat vector*
- *Normalize them and compare them using cross correlation ($\Sigma_i f_i \cdot g_i$)*

Projective transforms and Homography estimation

- OpenCV provides the solver machinery: list of matches → 3x3 matrix
- Just some coordinate transform (2D → 2D transform)
- Remember the classical matrix forms: **translation, rotation…**

# Next practice session

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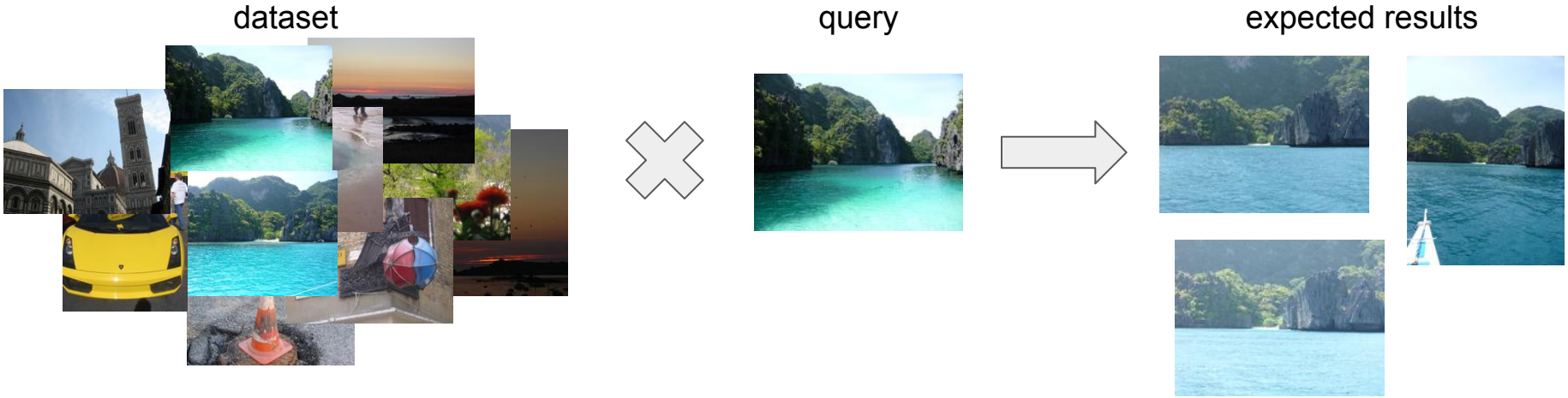
Implement a simple **image search engine.**




**Will be graded.**

Submission due by FIXME on moodle.cri.epita.fr.