Master in Computer Vision Barcelona

Project
Module 1

Content based image retrieval

Coordination:

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Week 3

W2 - Homework

<u>Query results evaluation</u>

QST1 (Simple)

Team	method	map@1	TB IoU
Team7	method1	0.900	0.83
Team5	method1	0.833	0.86
Team8	method1	0.767	0.81
Team2	method2	0.667	-
Team9	method1	0.633	0.92
Team9	method2	0.633	0.92
Team8	method2	0.633	0.81
Team2	method1	0.600	0.91
Team1	method1	0.567	0.77
Team4	method1	0.433	0.82
Team3	method1	0.400	0.84
Team4	method2	0.400	0.70
Team7	method2	0.133	0.73

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W2 - Homework

QST2

| Team	method	map@1	TB IoU	Precision	Recall	F1
Team7	method1	0.718	0.83	0.95	0.98	0.97
Team8	method1	0.641	0.81	0.98	0.93	0.95
Team8	method2	0.641	0.81	0.98	0.93	0.95
Team7	method2	0.462	0.64	0.93	0.99	0.96
Team9	method2	0.436	0.92	0.96	0.89	0.93
Team9	method1	0.385	0.92	0.82	0.91	0.86
Team4	method1	0.333	0.80	0.88	0.99	0.93
Team2	method1	0.282	0.87	0.97	0.93	0.95
Team5	method1	0.256	0.85	0.83	0.86	0.85
Team2	method2	0.256	-	0.97	0.93	0.95
Team4	method2	0.231	0.66	0.88	0.99	0.93
Team1	method1	0.000	0.77			
Team3	method1	-	-	-	-	-

Week3 Datasets

Museum datasets

- **Can Framis Museum**
- **Figueres 120 years expo**
- **Kode Bergen**

   original and paintings with

   - superimposed text on a **semitransparent** box (painter name, different fonts, sizes and positions)
   - noise (random samples)
   - color changes (random samples, random Hue changes)
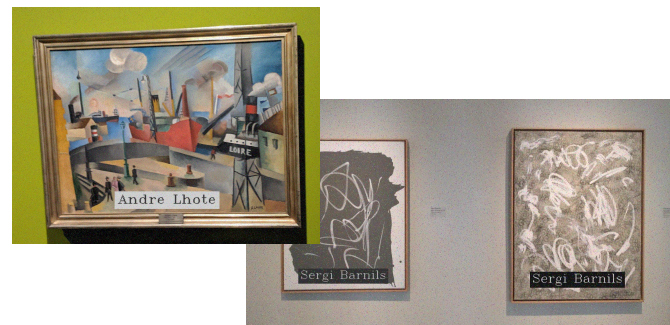
Query datasets (development with GT and test without GT)

- QSD1-W3 (30) / QST1-W3 (50) cropped pictures with overlapping text (name of painter), one painting per image, some paintings with noise, some paintings with changes in color

- QSD2-W3 (30) / QST2-W3 (30) pictures with background and text and in some cases more than one picture per image, some paintings with noise, some paintings with changes in color
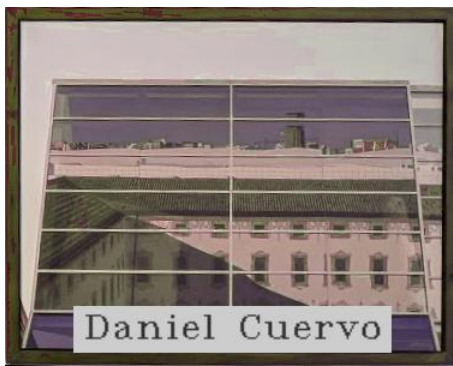
Week3 Datasets
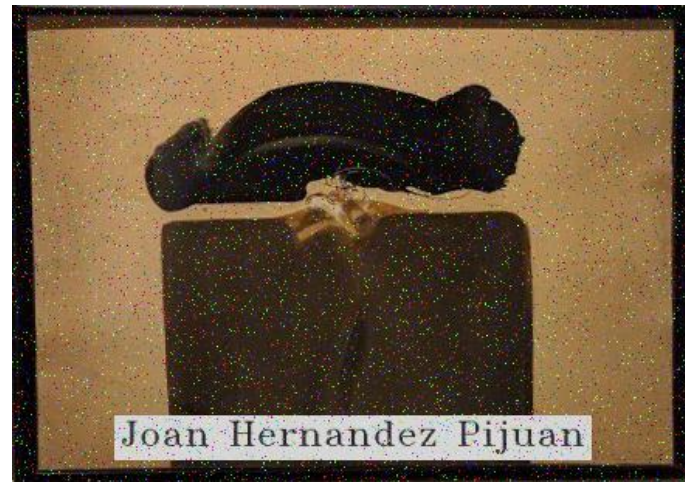
Examples of W3 query set images:

Example of color change:

Original   Changed

Example of image with noise:

W3 - Task1

- Filter noise with linear or non-linear filters
  - unknown noise model
  - only some images are noisy

W3 - Task2

- On denoised images, detect box with overlapping text, (binarize) and apply OCR to get the text

```
import pytesseract
extractedInformation = pytesseract.image_to_string(ima)
```

- Test query system using QSD1-W2 **using only text** and a similarity metric to compare text (ambiguity: several paintings by the same painter)
  - Text comparison metrics: (Levenshtein, others)
    https://www.kdnuggets.com/2019/01/comparison-text-distance-metrics.html
    https://pypi.org/project/textdistance/

- Test retrieval **using only color** descriptors (**best** from week2)

W3 - Task3

- Implement texture descriptors (LBP, DCT, wavelet-based, etc.)
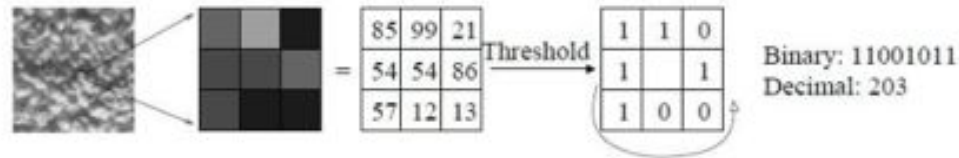- Test query system using QSD1-W2 **using only texture** descriptors

W3 - Task3

- Texture descriptor: Histo-LBP, DCT2D, others (HOG, etc.)

Concatenated feature histogram
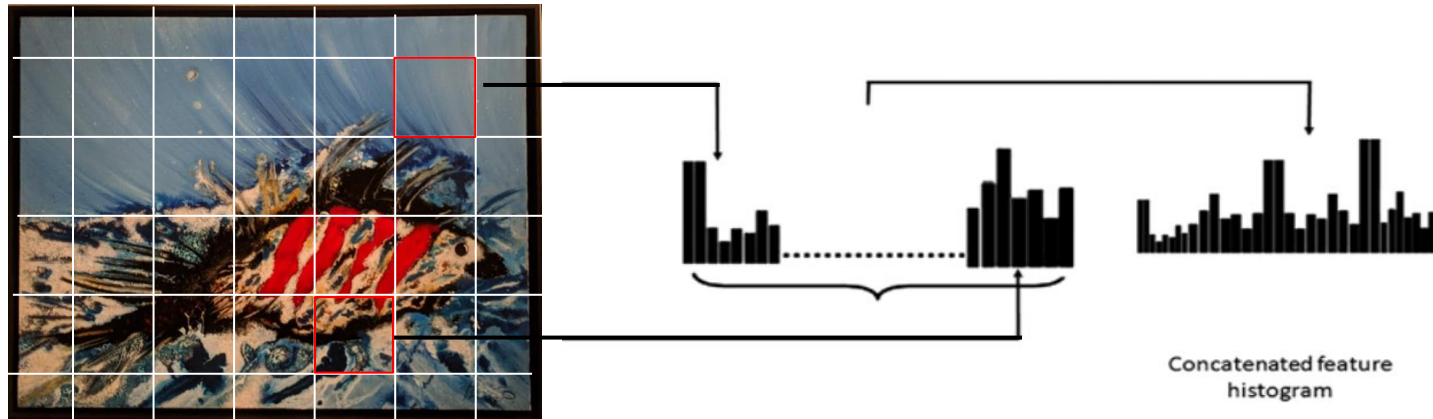
W3 - Task3

- LBP (Local Binary Pattern) descriptor
  - Divide image into blocks, for each pixel in the block compare to its 8 neighbors

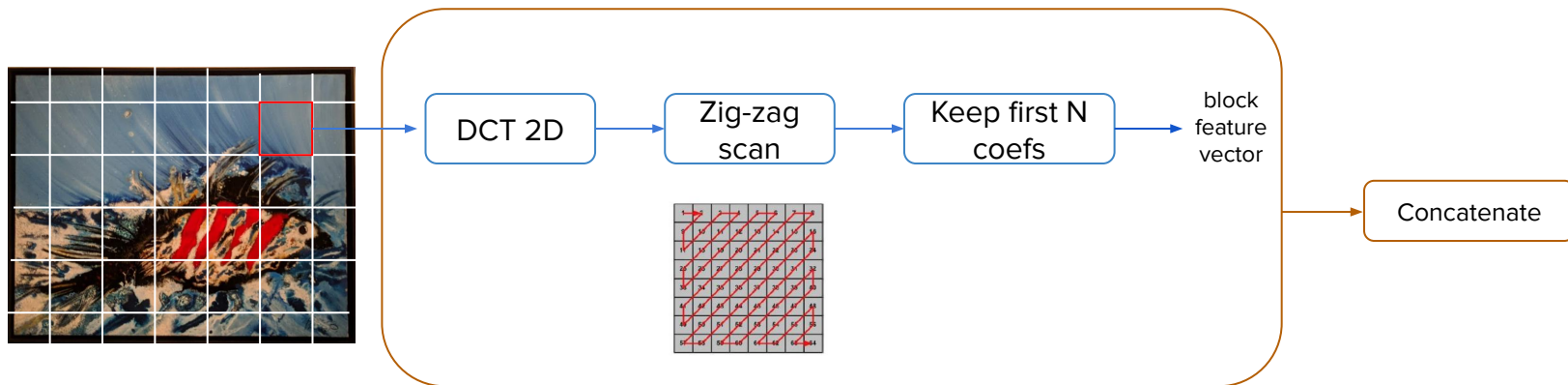
  - If the center pixel's value is greater than the neighbor's value, write 0, otherwise, write 1. The result is a 8-digit binary number. Compute histogram, over the block, of the frequency of each number
  - **Multiscale LBP:** different local neighborhoods. Bilineal interpolation is performed for points which are not centered on pixel
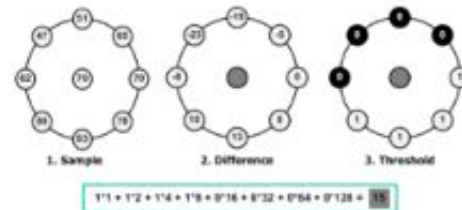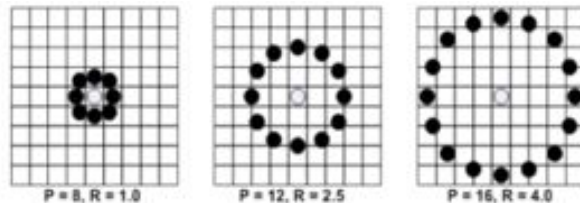
W3 - Task3

DCT descriptor:

W3 - Task4

- Combine descriptors
  - Test retrieval on QSD1-W3 using **all combinations** of descriptors (text + color, text + texture, texture + color, text + color + texture), you can try different contributions of each

- Include **in report slides** results for QSD1-W3:
  - using only text, only color, only texture (just one descriptor), best combination of two or three descriptors [4 methods]

W3 - Task5

- Repeat the previous analysis for QSD2-W2: ~~remove noise~~, remove background, find 1 or 2 paintings per image, return correspondences for each painting. **Only retrieval is evaluated**
  - use combinations of text, texture and color descriptors

- Include **in report slides** results for QSD2-W2:
  - using the best combination of two or three

W3 - Submissions

- For each query test (QST1-W3 (50), QST2-W3 (30)) a list of the K best results (K=10).
  - Only best method (only one for each test set)!
- For each query image, a text file with the text transcription (one line for each painting)

> **Note**: Delive pkl files to:
> /home/dlcv0X/m1-results/week3/QST1/**method1**/result.pkl
> /home/dlcv0X/m1-results/week3/QST1/**method1**/text_boxes.pkl
> /home/dlcv0X/m1-results/week3/QST1/**method1**/*.txt
>
> ...
> /home/dlcv0X/m1-results/week3/QST2/**method1**/result.pkl
> /home/dlcv0X/m1-results/week3/QST2/**method1**/text_boxes.pkl
> /home/dlcv0X/m1-results/week3/QST2/**method1**/*.txt

- Tests sets delivered on Sunday 30 Oct 2022 at 14h
- Submit progress slides
  - Deadline slides: Sunday 30 Oct 2022 at 19:00
  - Deadline results: Sunday 30 Oct 2022 19:00
  - Deadline questions to teams: Monday 01 Nov 2022 at 12:00