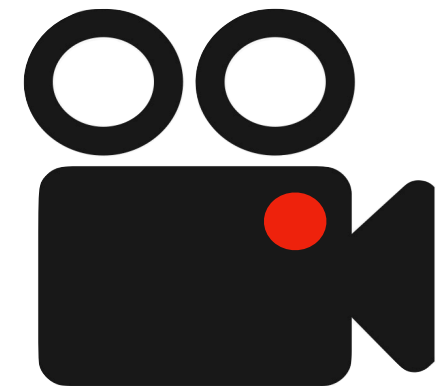
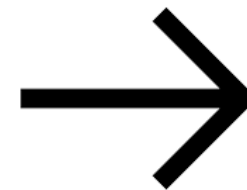
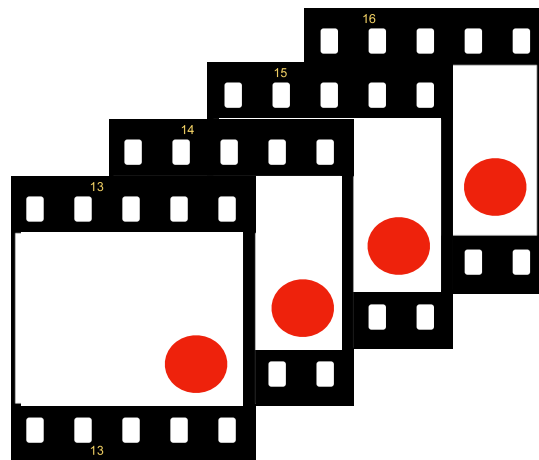
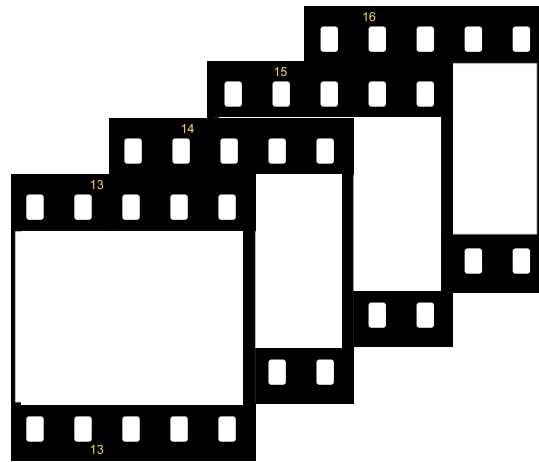
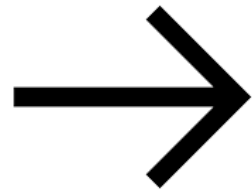
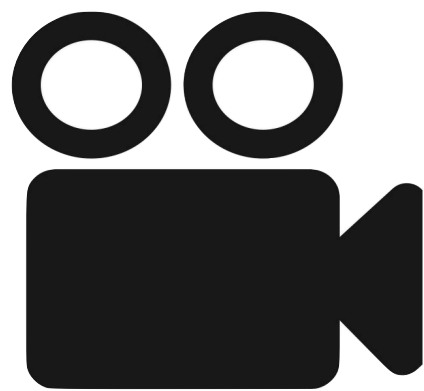


A high performance video segmentation framework

Liudmila Karagyaour
Lorenzo Ferri
Vanessa Braglia

Idea



Clustering

with k-means

Iteratively minimise the distance between each point and the **centroids**

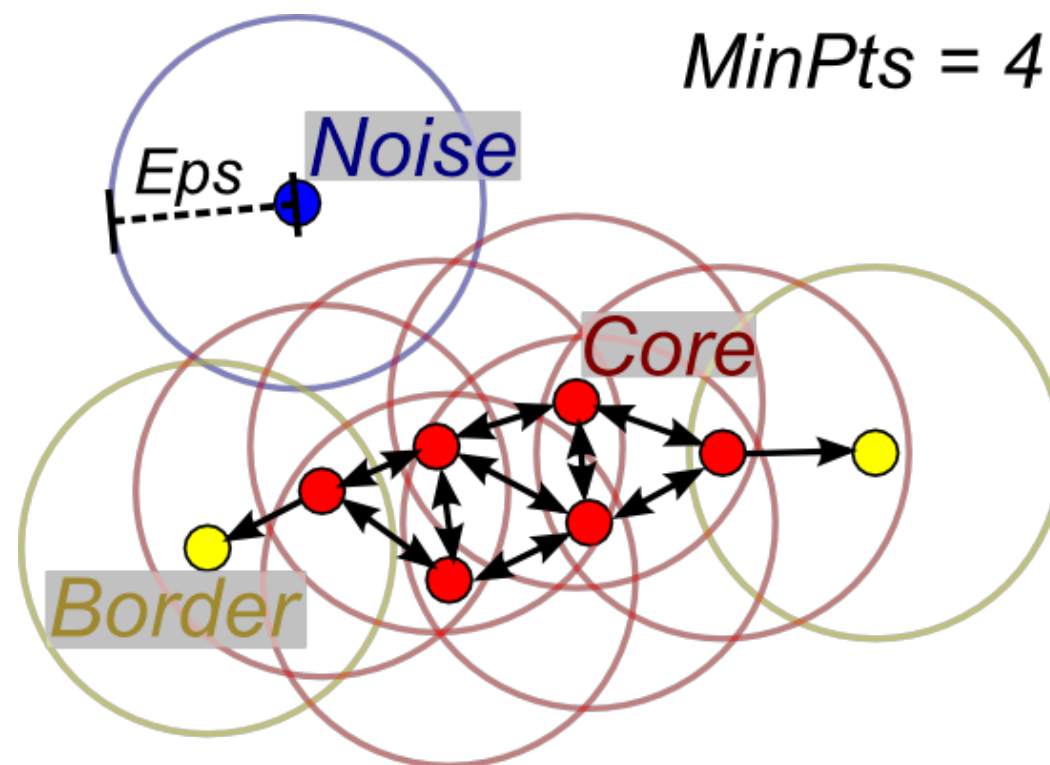
$$\arg \min_j D(x_i, c_j) \quad j = 1, \dots, k$$

and compute the new **centroids** by the mean of the clusters

$$c_j = \frac{1}{n_j} \sum_{x_i \in C_j} x_i$$

Clustering

with DBSCAN



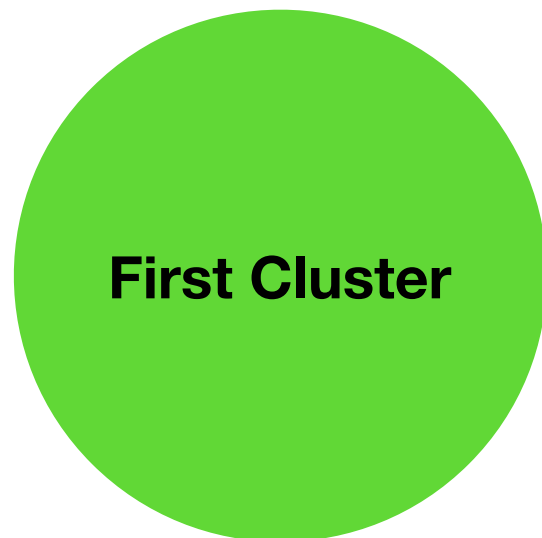
The **core** points together with the **border** points will form the clusters. The **noise** points will be discarded.

Clustering

with Spectral partitioning

This algorithm need the laplacian matrix of the image.
The second smallest eigenvector **x2** is then used to create the clusters.

If $x_2(p) < 0$



If $x_2(p) > 0$

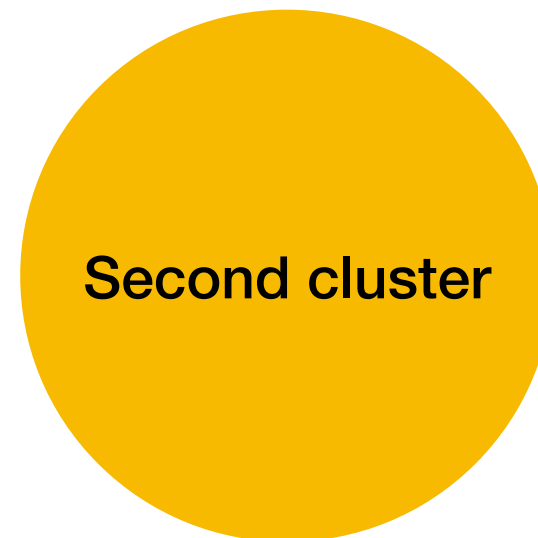
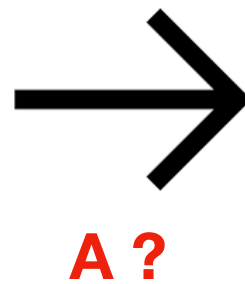


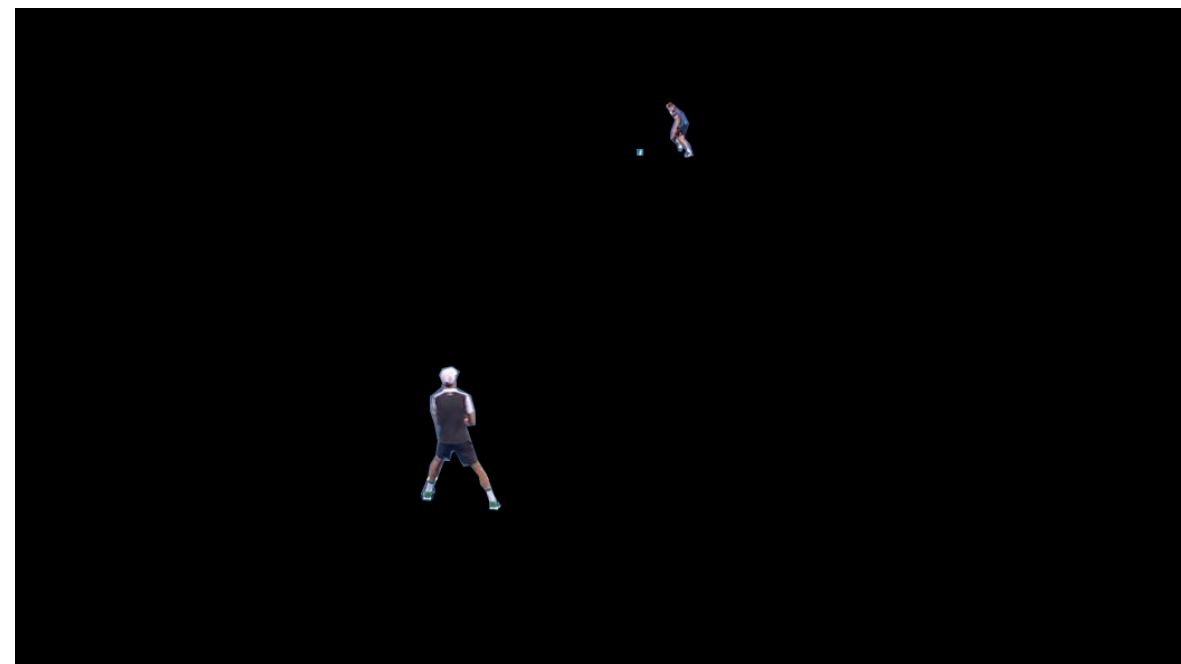
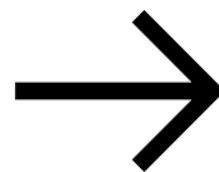
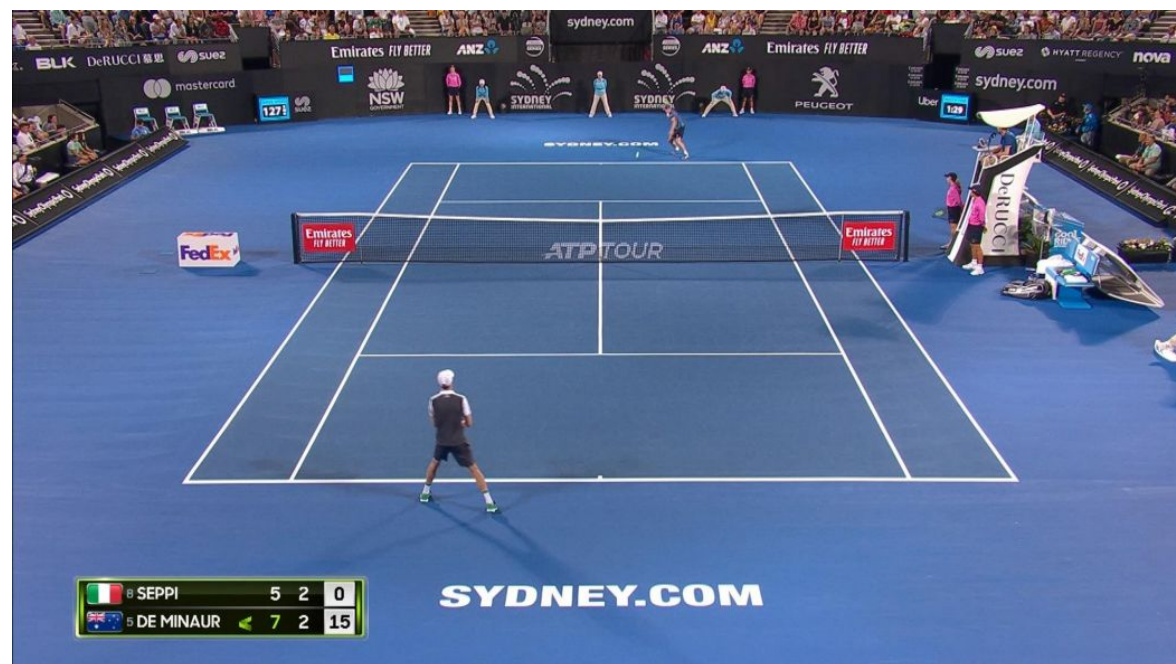
Image Sharpening



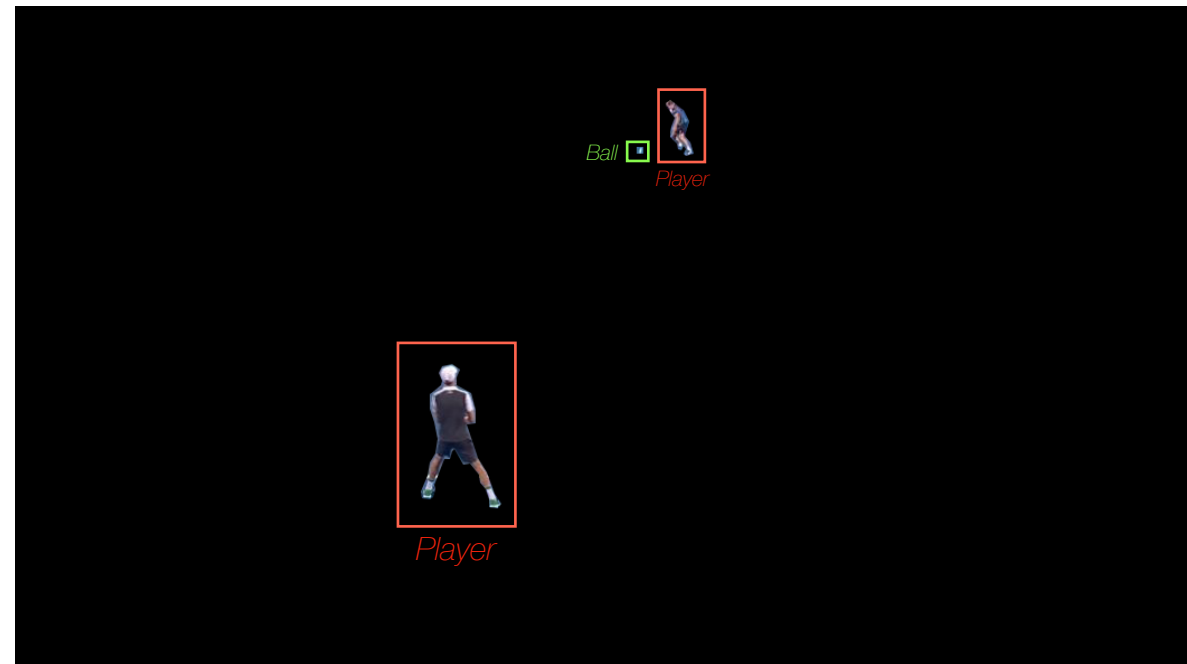
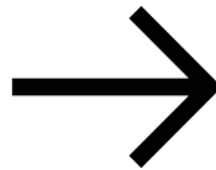
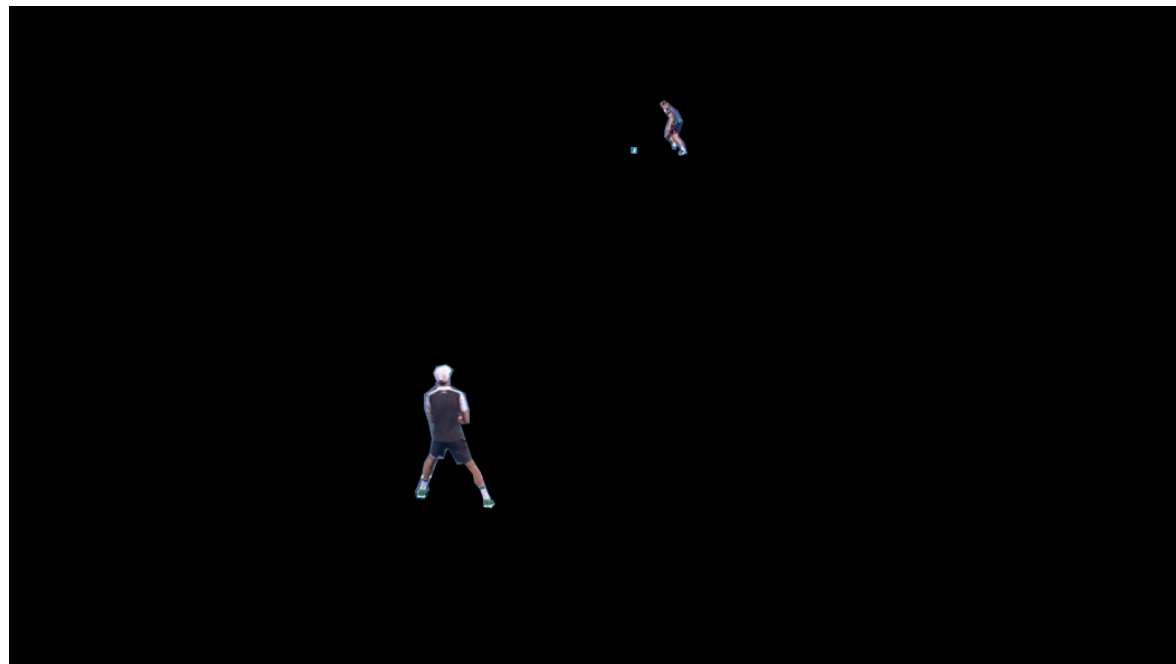
$$\mathbf{A} \mathbf{x} = \mathbf{b}$$

A diagram illustrating the image sharpening process as a linear system. A blue line connects the label \mathbf{b} (representing the blurry image) to the \mathbf{b} in the equation. A green line connects the label \mathbf{x} (representing the sharp image) to the \mathbf{x} in the equation. The matrix \mathbf{A} is shown in red.

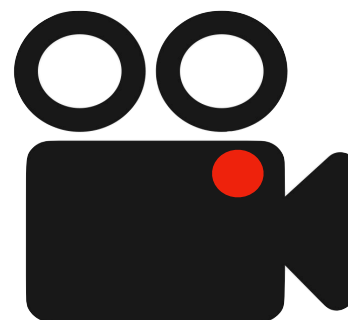
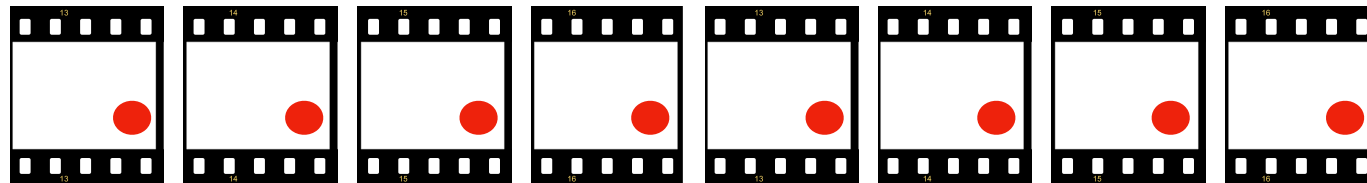
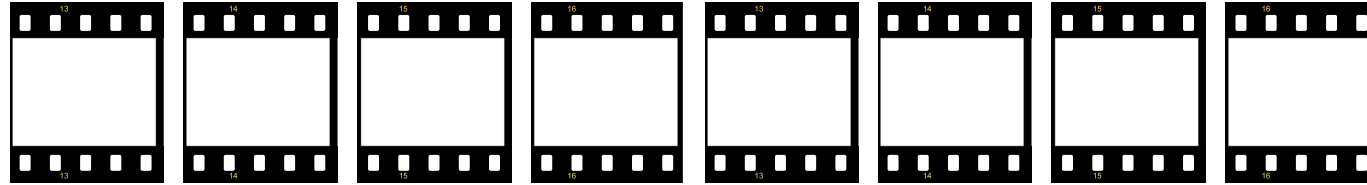
Feature Extraction



Machine Learning



Parallelising



Project Time Line

Project TimeLine															
	W1 18.02 — 22.02	W2 25.02 — 1.03	W3 4.03 — 8.03	W4 11.03 — 15.03	W5 18.03 — 22.03	W6 25.03 — 29.03	W7 1.04 — 5.04	W8 8.04 — 12.04	W9 15.04 — 19.04	W10 21.04 — 26.04	W11 29.04 — 3.05	W12 6.05 — 10.05	W13 13.05 — 17.05	W14 20.05 — 24.05	W15 27.05 — 29.05
Project setup	X	X								Holydays					
Project Plan			X	X											
From video to frame															
Clustering															
Algorithms															
Convergence analysis															
Sharpening															
Operators															
Analysis															
Machine Learning															
Parallelization															
Video Assembly															
Report															
Final Presentation															