



# Segmentation and indexation of complex objects: detection and recognition of complex objects in comic books

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## Presentation

### Context

- Comics represent an important part of cultural heritage
- Digitization of thousands of comic books
- Content Based Image Retrieval

### Objectives

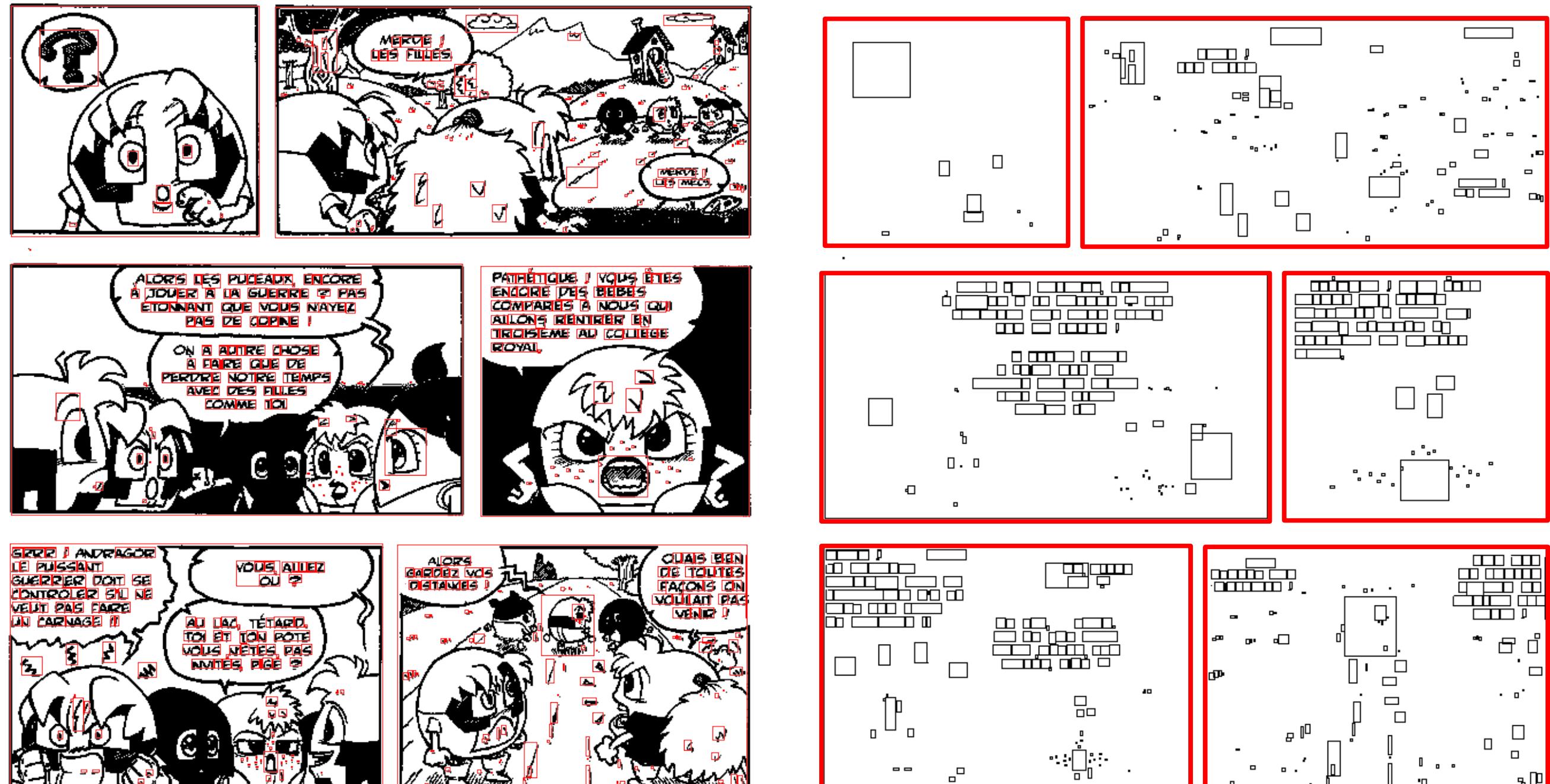
- Information retrieval (semantic query, full text)
- Augmented reading experience



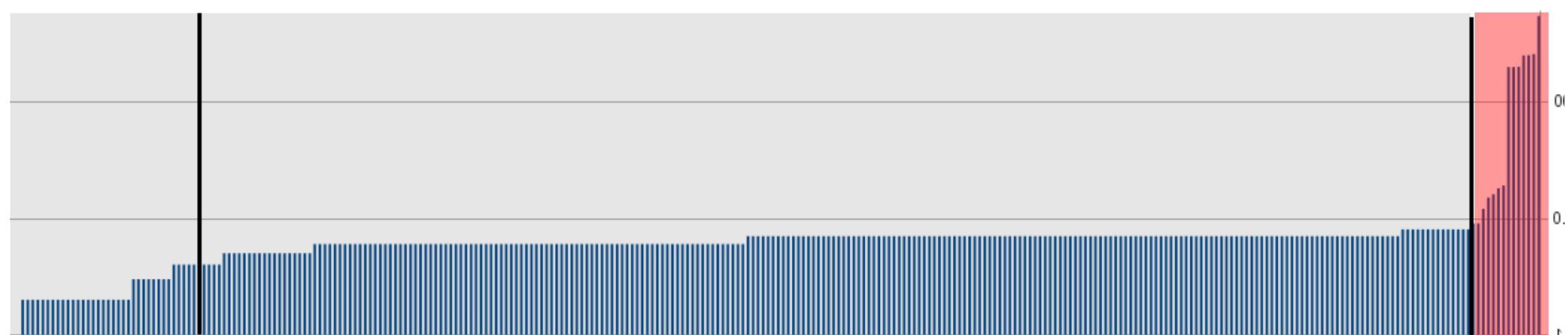
## Contributions

### Frame detection<sup>[1]</sup>

- Connected component bounding box
- Height classification (3 class k-mean)
- Topological filtering



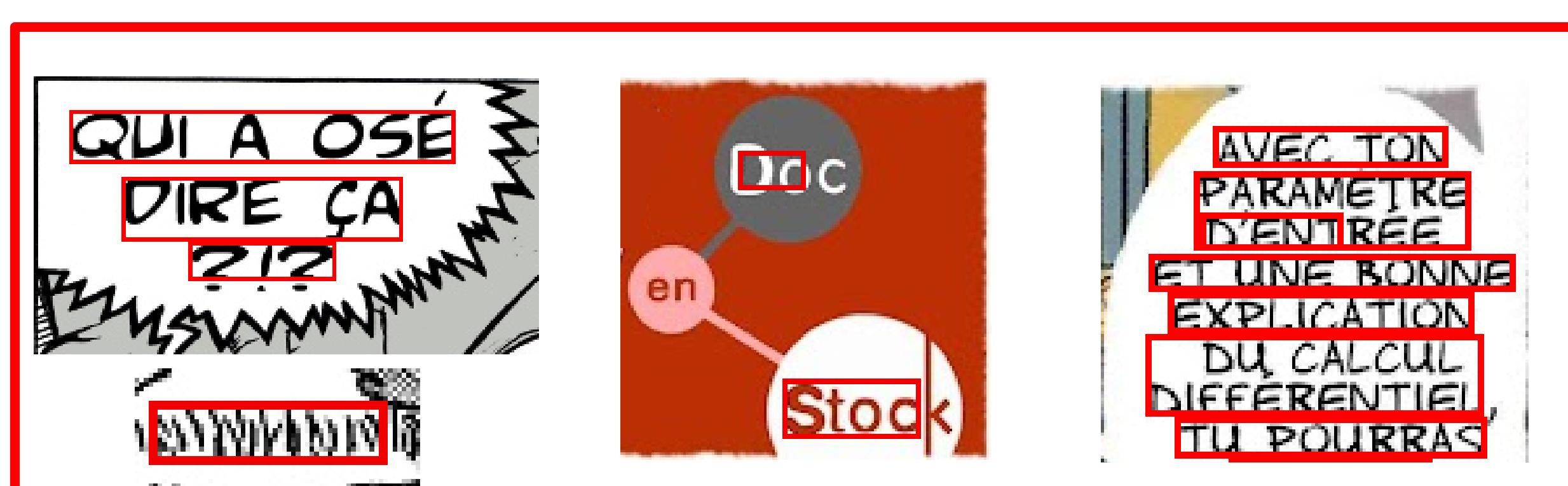
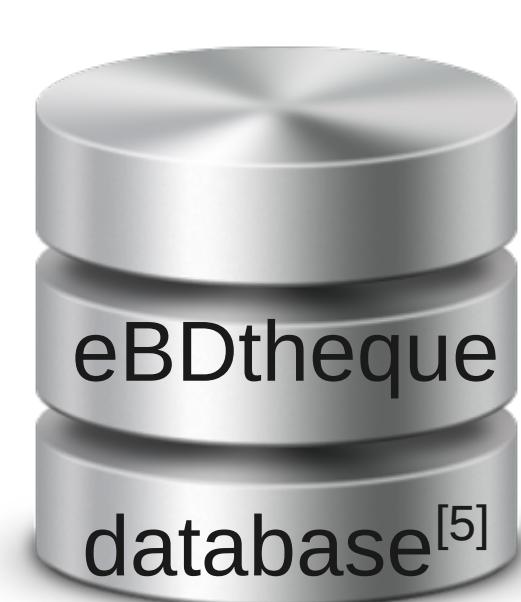
Connected component detection and selection. Image credit: Cyb, Studio Cyborga.



Connected component bounding box histogram, ordered by height.

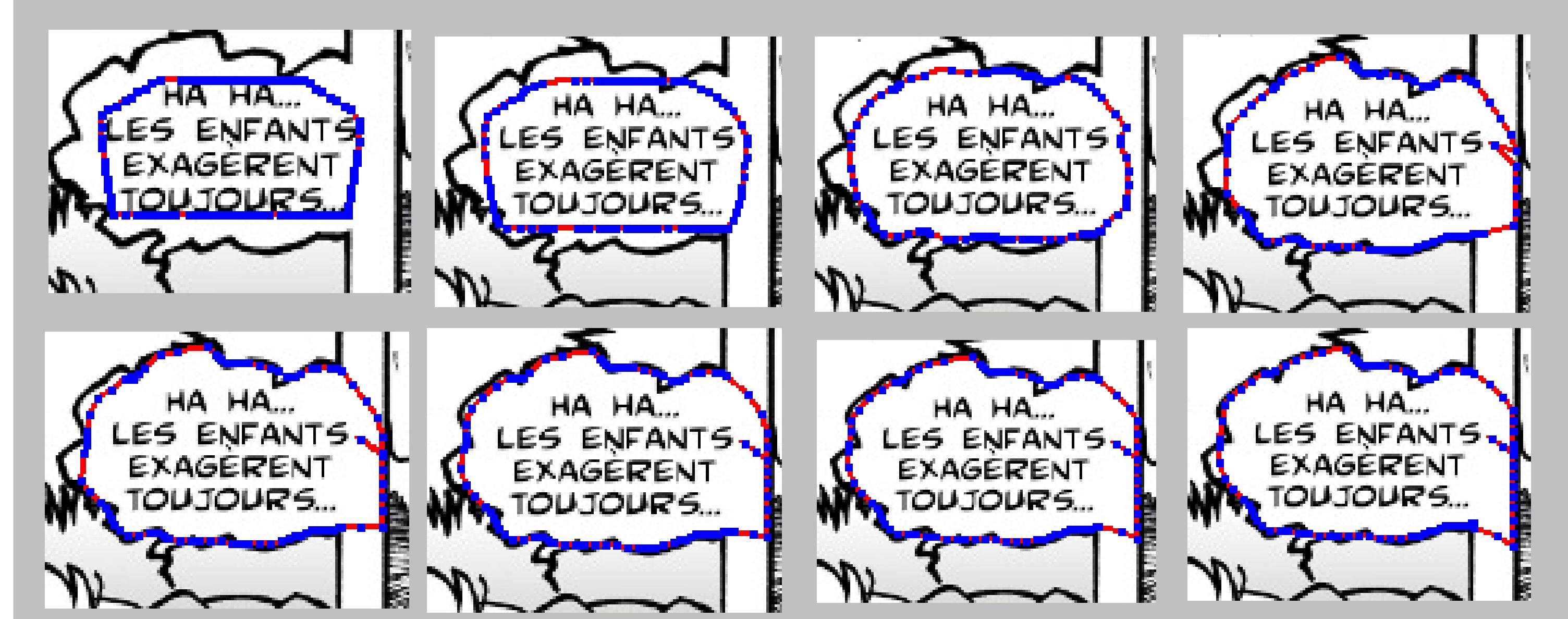
### Text localisation<sup>[2]</sup>

- Minimum Connected Component Thresholding (MCCT)
- Text/graphic separation
- Text line localisation
- Recall and precision > 75%

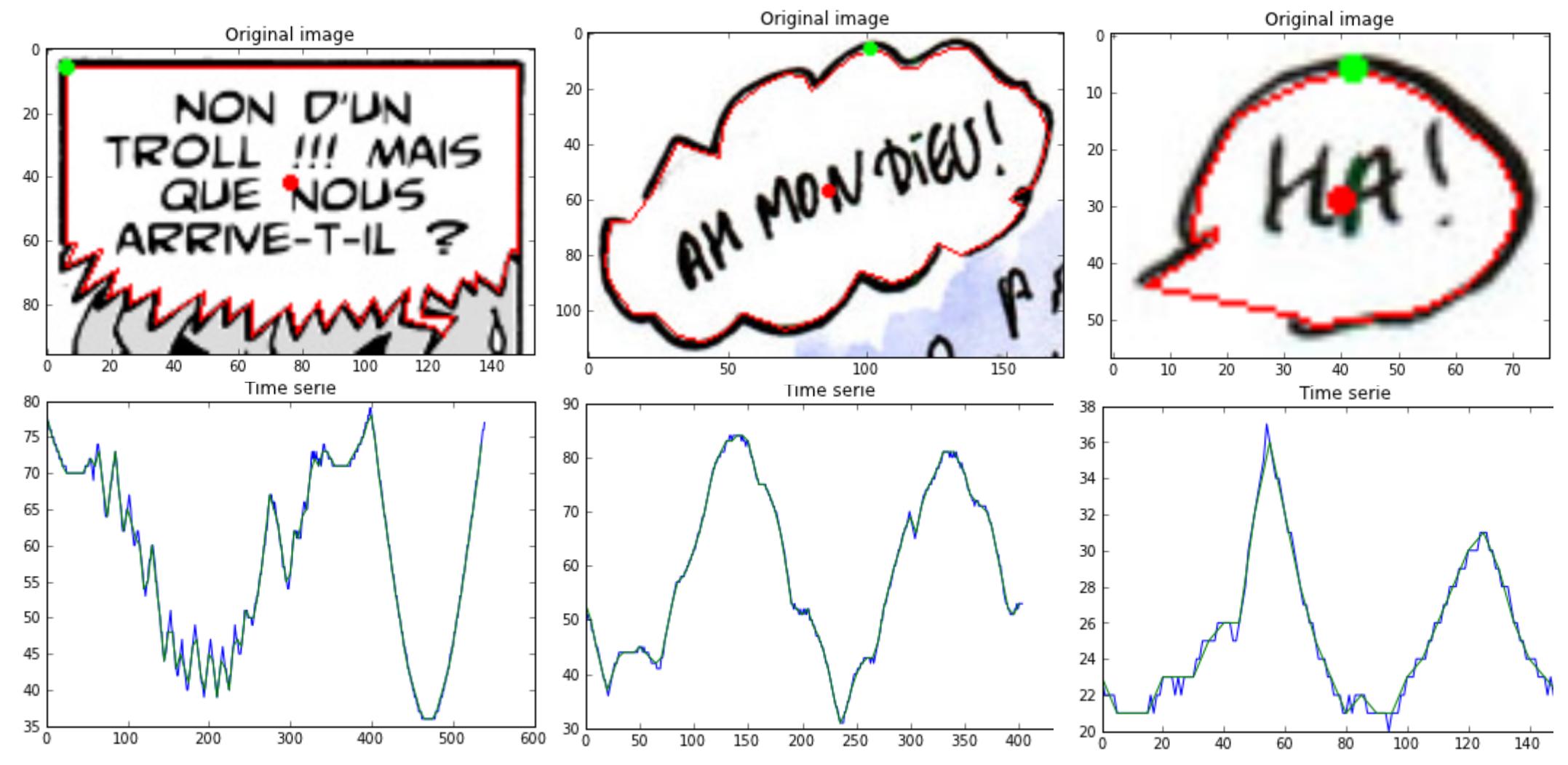


### Balloon detection<sup>[3]</sup> and classification<sup>[4]</sup>

- Active contour model adaptation
- Based on previous text localisation
- Contour time series classification



Active contour initialisation and detection evolution



Contour time series. Barycentre in red, start point in green, anticlockwise.

### Complex object detection (hero)

#### Current issues:

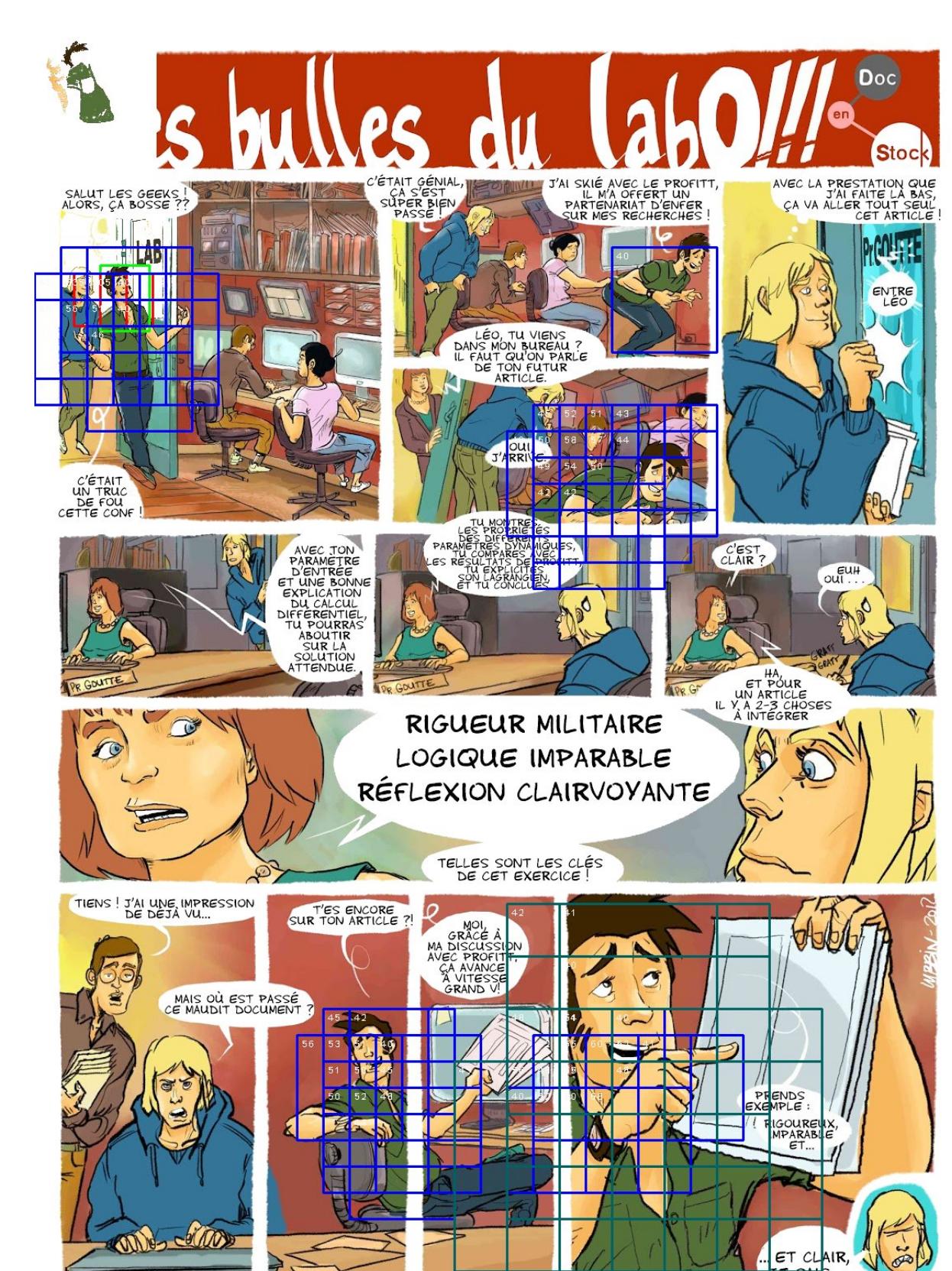
- Define the object (query)
- Robust to scale, rotation, translation, deformation, occlusion

#### Proposed method:

- Binary colour descriptor (colour presence/absence)
- Part-based description
- Spatial relation “between”
- Colour to shape learning and retrieval
- ...

#### Aims:

- Speech and speaker association
- Content reflowing
- Comics colorization



## Publications

- [1] C. Rigaud, N. Tsopze, J-C. Burie and J-M Ogier, Robust Frame and text extraction from comic books, *Graphics Recognition. New Trends and Challenges*, volume 7423 of Lecture Notes in Computer Science (LNCS), pp. 129-138. Springer Berlin Heidelberg, 2013
- [2] C. Rigaud, D. Karatzas, J. Van de Weijer, J-C Burie and J-M Ogier. Automatic text localisation in scanned comic books. *International Conference on Computer Vision Theory and Applications (VISAPP)*, pp. 814-819. SCITEPRESS Digital Library, 2013.
- [3] C. Rigaud, D. Karatzas, J. Van de Weijer, J-C Burie, J-M Ogier, An active contour model for speech balloon detection in comics. In proceedings of the 12<sup>th</sup> International Conference on Document Analysis and Recognition (ICDAR), 2013
- [4] C. Rigaud, D. Karatzas, J-C Burie, J-M Ogier, Speech balloon contour classification in comics. In proceedings of the 10th IAPR International Workshop on Graphics Recognition (GREC), 2013
- [5] C. Guérin, C. Rigaud, A. Mercier et al., eBDtheque: a representative database of comics. In proceedings of the 12th International Conference on Document Analysis and Recognition (ICDAR), 2013

