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Speech balloon and speaker association for comics and manga understanding

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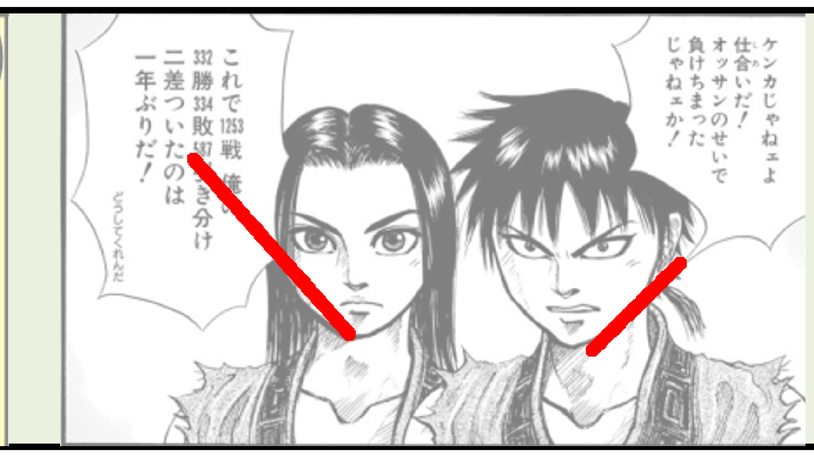
Presentation

Context
- Important cultural heritage
- Scanned and digital-born comics and manga
- Unsupervised approach

Applications
- Character's interaction and situation analysis
- Text-to-speech with adaptive voice and tone

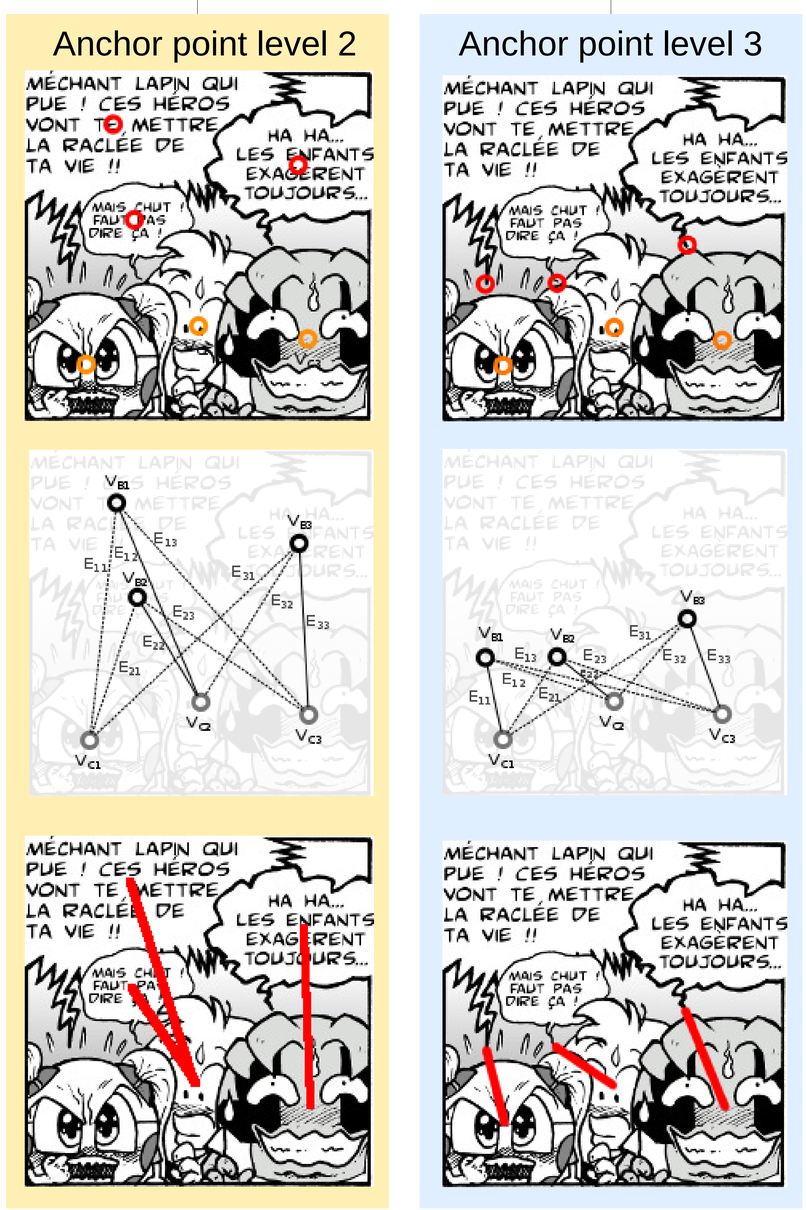


Contributions

Association method

- Prerequisites: anchor points of balloons and characters
- Geometric graph from all anchor point combination
- Optimal 2-tuples considering Euclidean distance (*L**)

$$L^*(V_{Bi}, V_{Cj}) = \text{ArgMin}(E_{ij})$$



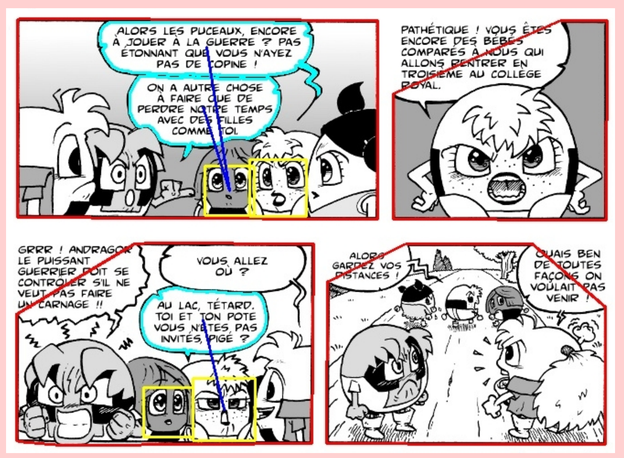
Anchor points

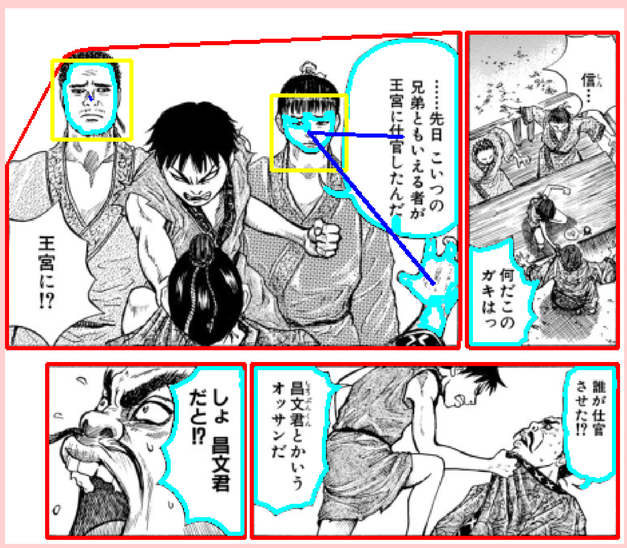
- Related to previously extracted elements (e.g. balloons, characters)
- From coarse (level 1) to fine (level 4) and more

Level	Speech balloon V_B	Comic character V_C
1	Bounding box center	Bounding box center
2	Balloon centroid	Character centroid
3	Tail tip position	Face center [1]
4	Tail position and direction	Mouth center

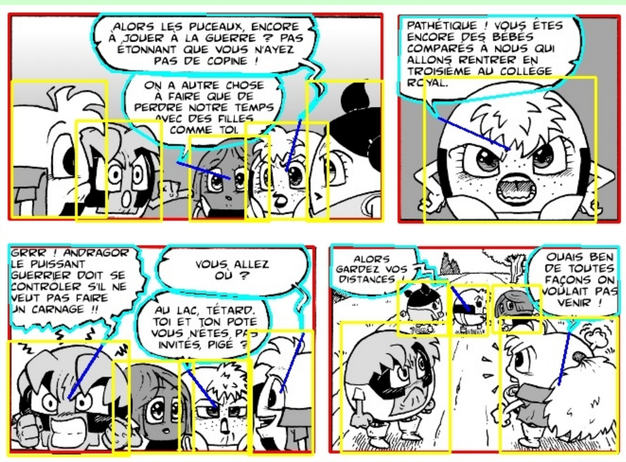
Evaluation

Prerequisites extracted automatically





Prerequisites loaded from GT



Anchors	eBDtheque[2]	Kingdom
Level 2	78.58%	76.35%
Level 3	93.32%	87.74%

Anchors	eBDtheque	Kingdom
Level 2	4.33%	18.60%
Level 3	18.01%	19.41%

References

[1] W. Sun and K. Kise, “Similar partial copy recognition for line drawings using concentric multi-region histograms of oriented gradients,” in Proceedings of the IAPR Conference on Machine Vision Applications, ser. MVA2011, Nara Japan, 2011.
[2] C. Guérin, C. Rigaud, A. Mercier, and al., “ebdtheque: a representative database of comics,” in Proceedings of International Conference on Document Analysis and Recognition (ICDAR), Washington DC, 2013.

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Conclusion

Contribution
- One-to-one speech balloon/comic character link
- Robust against missing panels
- Adaptive to different level of information (tail)

Perspectives
- Consider tail direction
- Handle out-of-panel speakers and multi-speakers

Source: https://github.com/crigaud/publication/tree/master/2015/ICDAR/speech_balloon_and_speaker_association_for_comics_and_manga_understanding