

# A Spatial Algebra for Multimedia Document Adaptation

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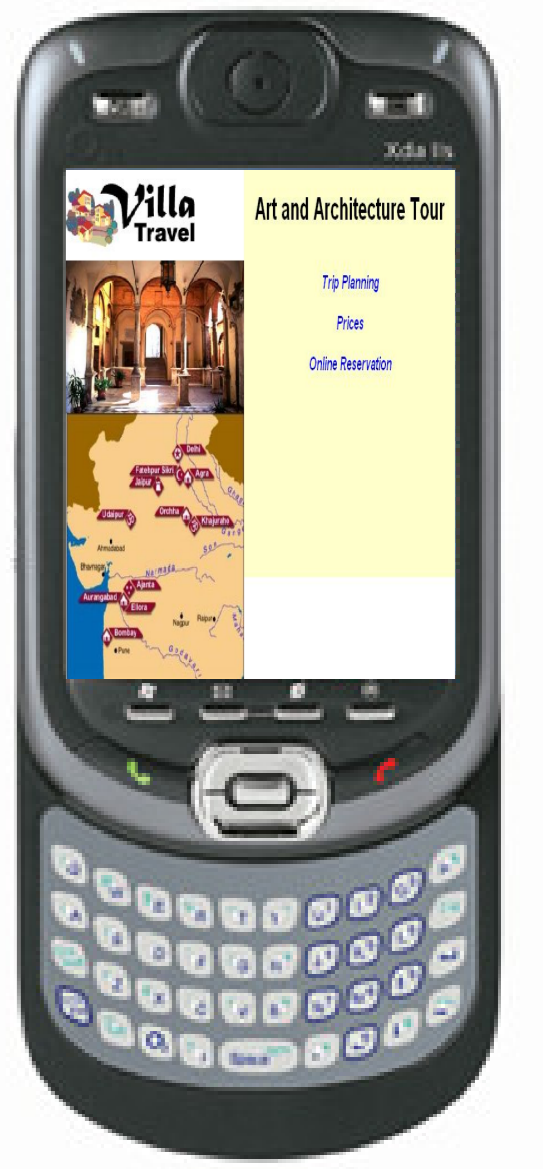
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## Problem



Adaptation of the spatial layout

Device constraints:  
images are not  
allowed to overlap



Initial SMIL document [2]

Impossible

Adapted

## Document representation

A new spatial representation (ABLR) with 36 spatial relations ensures a compromise between expressiveness and computation speed.

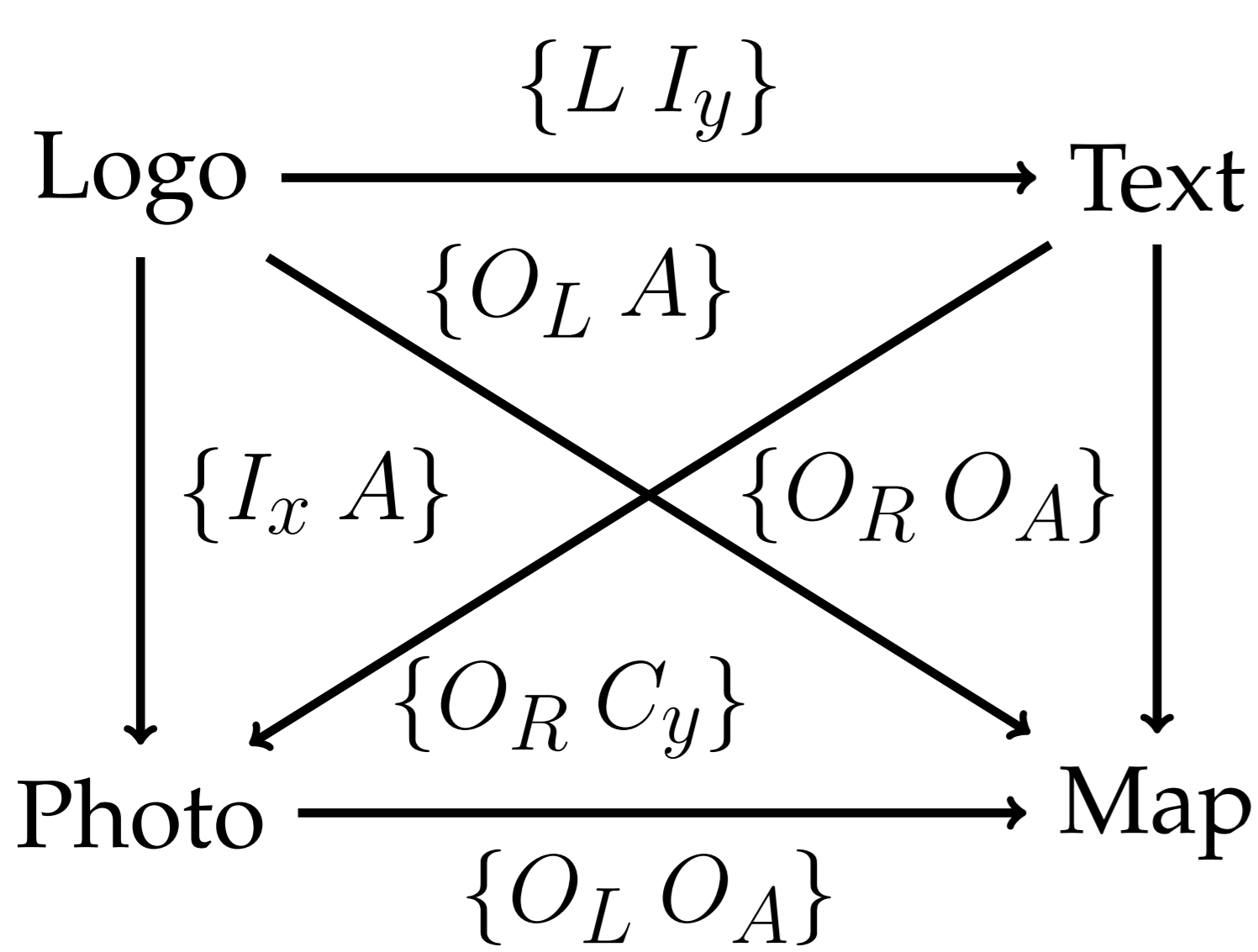
### The ABLR algebra

|                  |                                 |                           |                         |                                 |                  |
|------------------|---------------------------------|---------------------------|-------------------------|---------------------------------|------------------|
| $\frac{X}{Y}$    | $\frac{X}{Y}$                   | $\frac{X}{Y}$             | $\frac{X}{Y}$           | $\frac{Y}{X}$                   | $\frac{Y}{X}$    |
| $\frac{X}{Y}$    | $\frac{X}{Y}$                   | $\frac{X}{Y}$             | $\frac{X}{Y}$           | $\frac{X}{Y}$                   | $\frac{X}{Y}$    |
| X left Y<br>(L)  | X overlaps-left Y<br>( $O_L$ )  | X contains Y<br>( $C_x$ ) | X inside Y<br>( $I_x$ ) | X overlaps-right Y<br>( $O_R$ ) | X right Y<br>(R) |
| X above Y<br>(A) | X overlaps-above Y<br>( $O_A$ ) | X contains Y<br>( $C_y$ ) | X inside Y<br>( $I_y$ ) | X overlaps-below Y<br>( $O_B$ ) | X below Y<br>(B) |

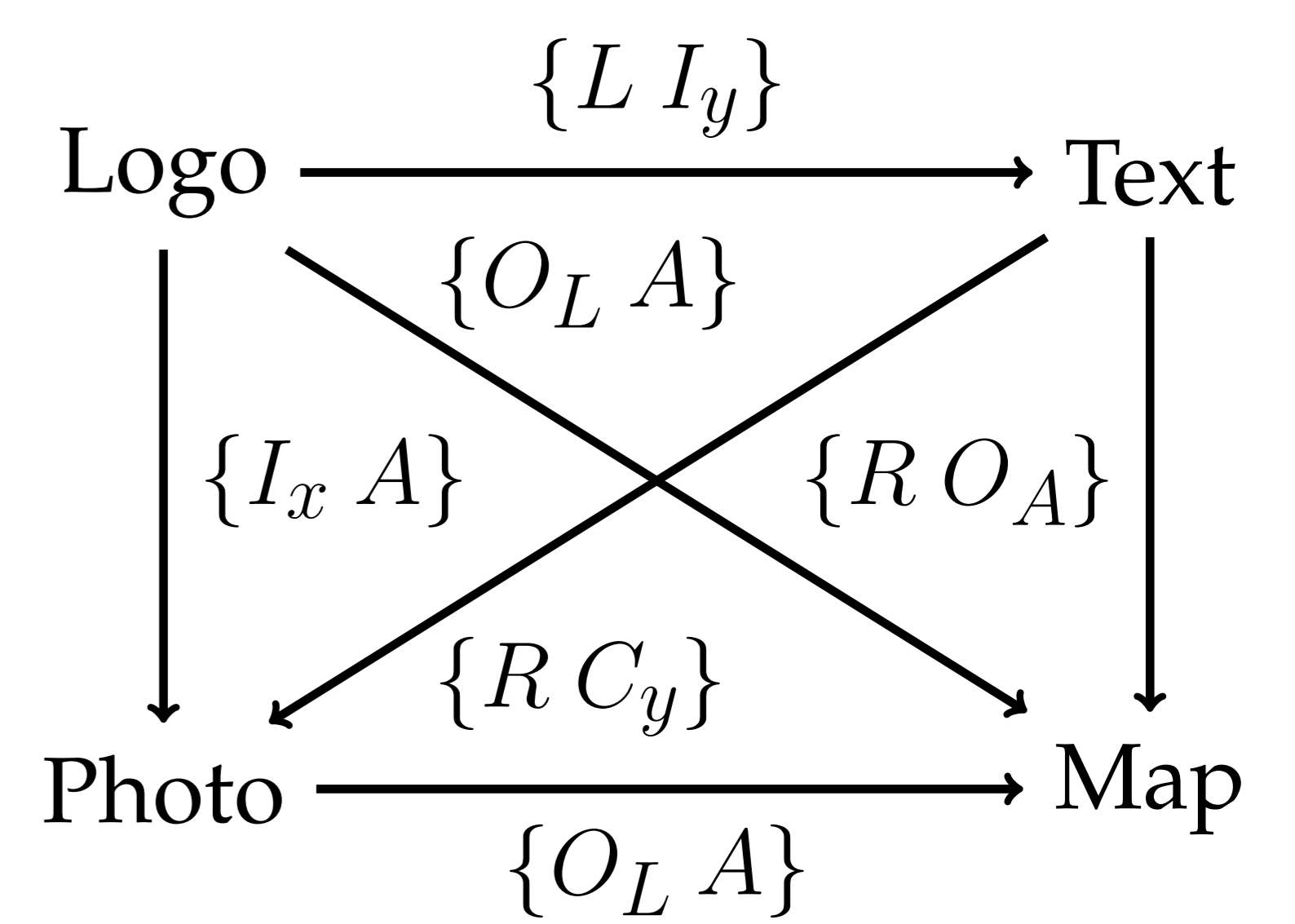
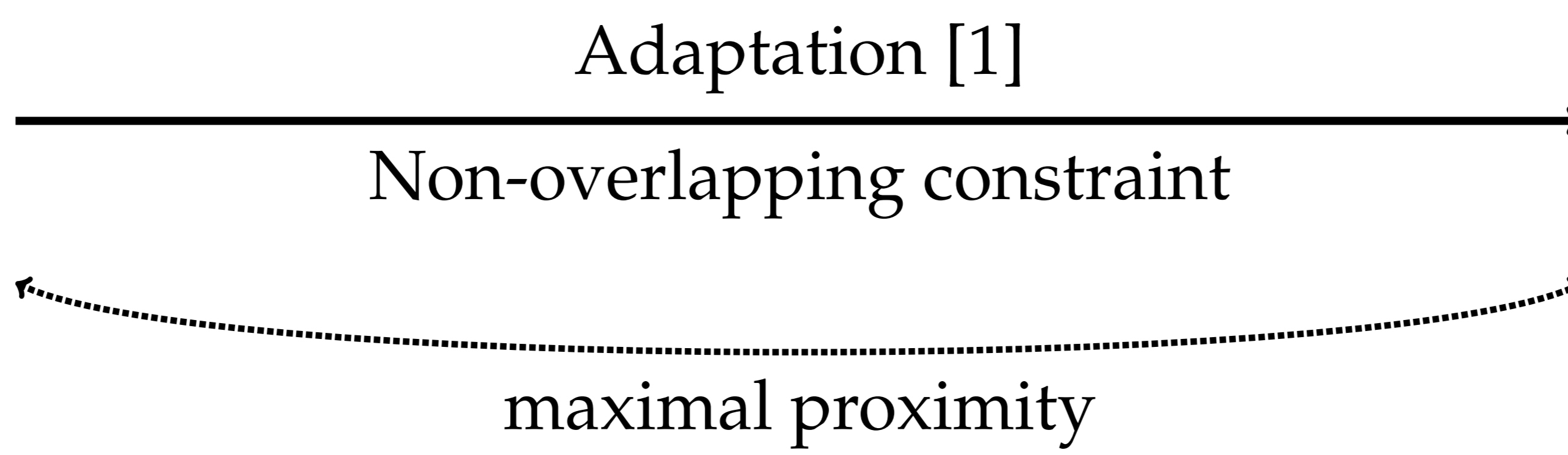
generalization

instantiation

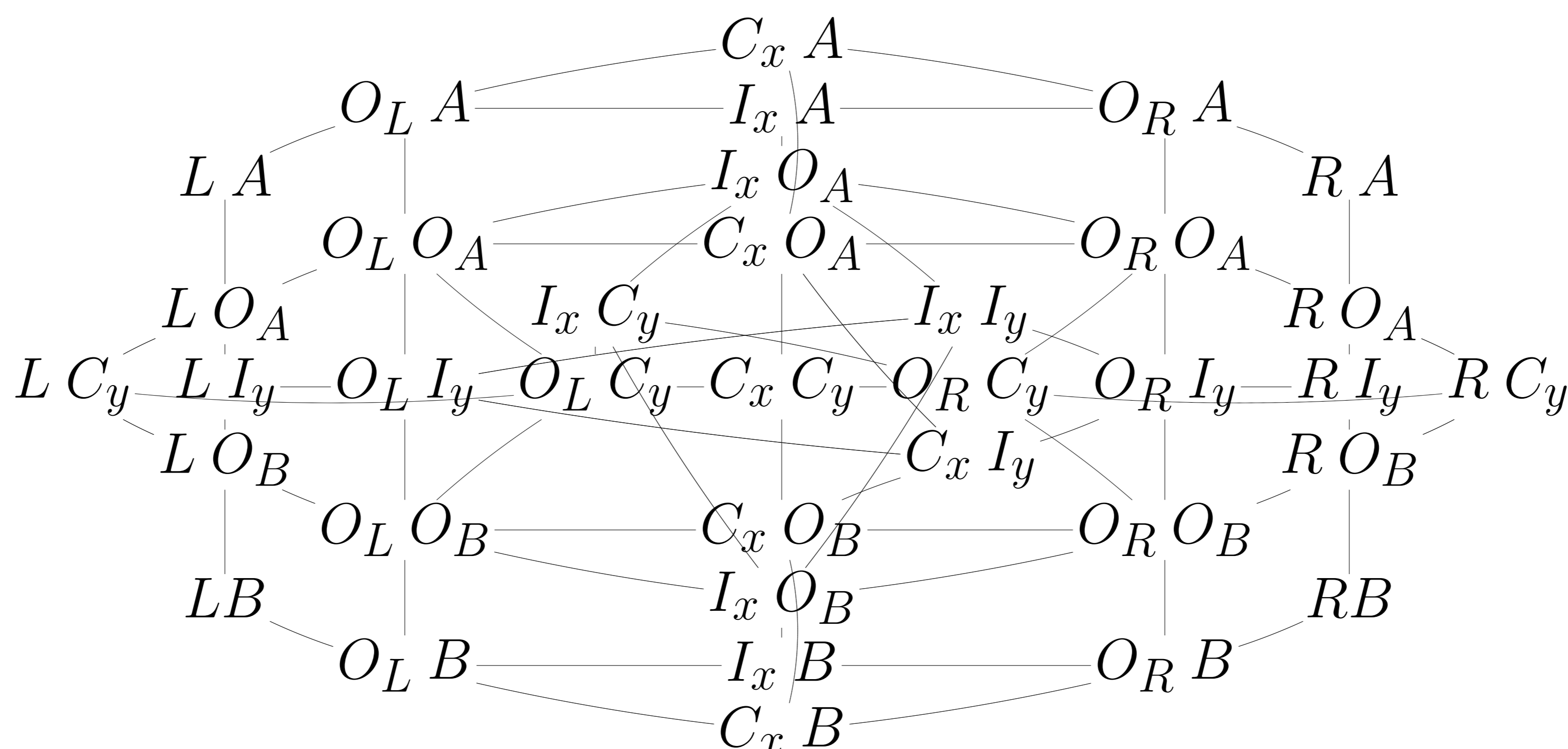
## Document adaptation



Initial qualitative representation



Adapted qualitative representation



Proximity between ABLR relations

## References

- [1] Jérôme Euzenat, Nabil Layaida, and Victor Dias. A semantic framework for multimedia document adaptation. In *Proc. of IJCAI'03*, pages 31–36. Morgan Kaufman, 2003.
- [2] W3C. *Synchronized Multimedia Integration Language (SMIL 2.0) Specification*, 2001.