Video Object Mining : Issues and Perspectives

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Ready Business System

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Issues

High quantity of video data

- Low cost digital camera
- High storage capacity
- High-speed internet
- Ex : YouTube, Dailymotion, ...

User needs content-based tools but

- Video meta-data are not sufficient
- Manual tagging of video is time consuming and error-prone
- There is a semantic gap between video data and what they represent

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How can we introduce semantic in the mining process ?

Video Mining Systems

Video Mining

- Process of extracting information/knowledge from large amounts of video data
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  - A. Anjulan and N. Canagarajah, Signal Processing: Image Communication, 2007
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- Characterize the different systems
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Essential properties to characterize video mining systems

Properties

- Objectives
- Elements
- Descriptors
- Scales
- Supervision levels

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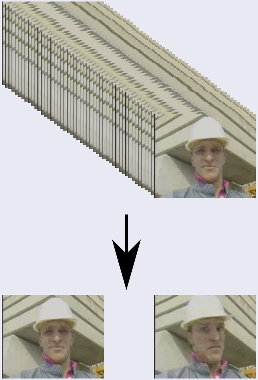
Summarization



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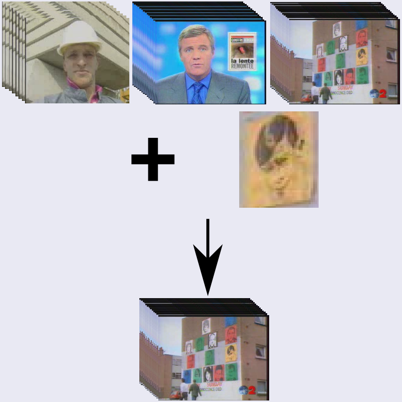
Retrieval



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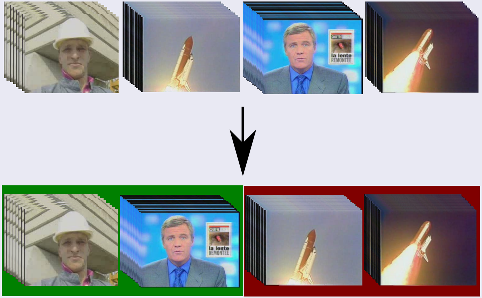
Classification



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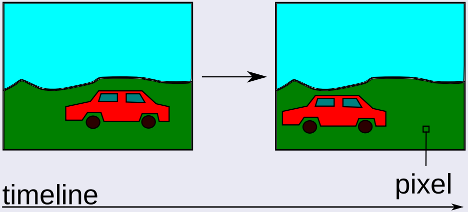

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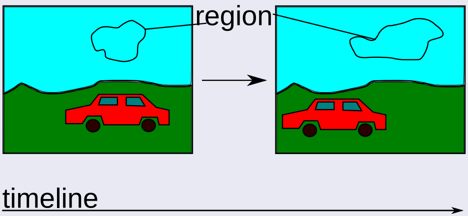
Region



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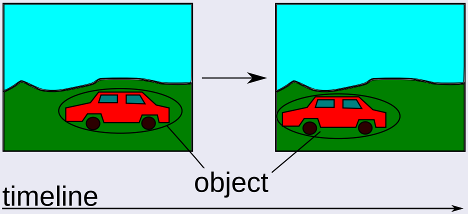
Object



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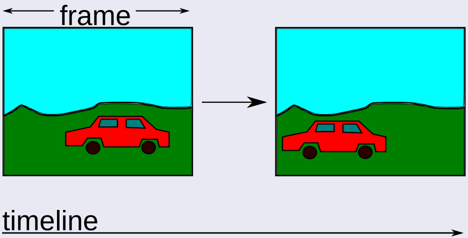
Frame



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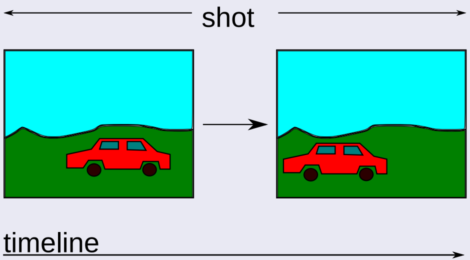
Shot



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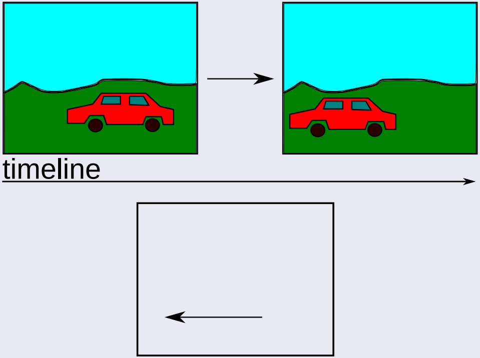
Motion



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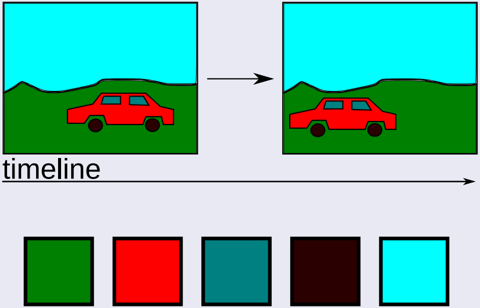
Color



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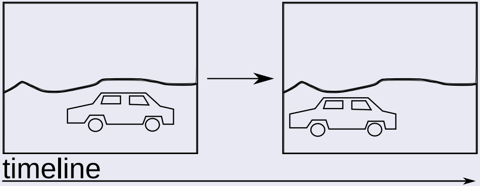
Shape



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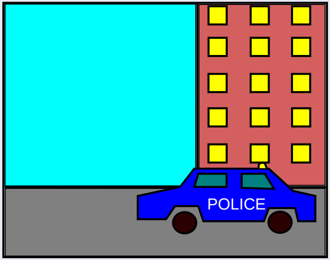
Global



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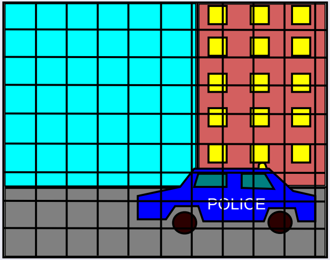
Grid



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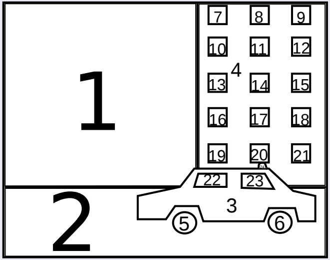

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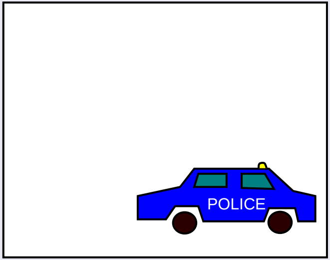

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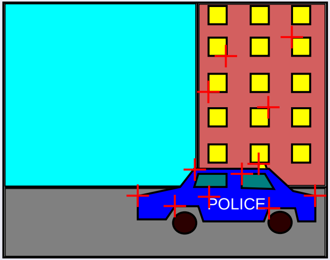
Interest point



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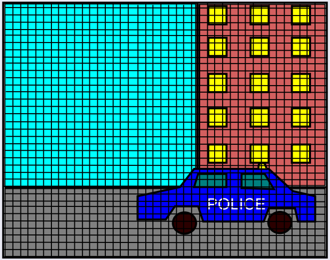

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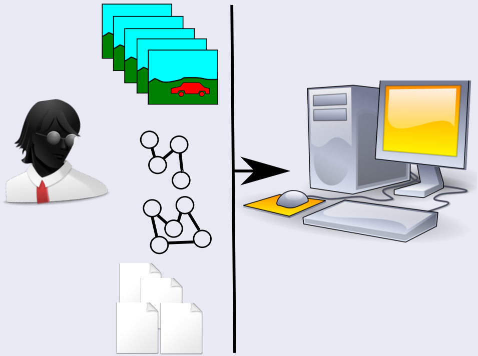
Supervised



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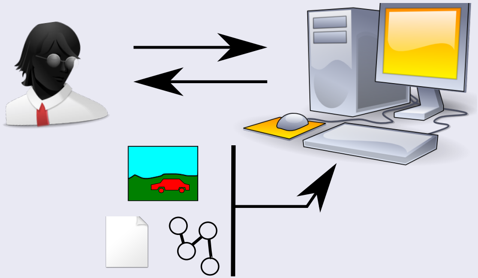
Semi-Supervised



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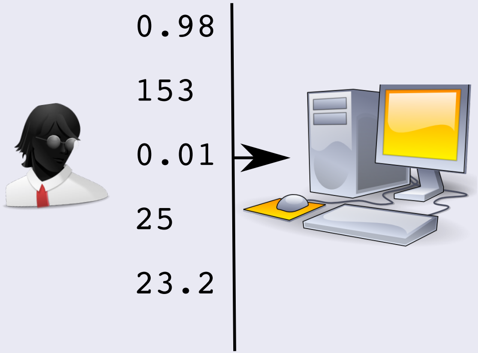
Parameters



Current usages of 11 existing systems (2007-2009)

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Supervision

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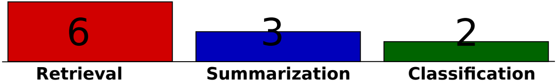

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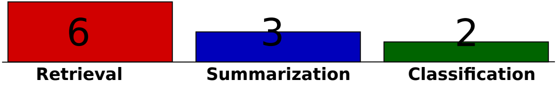

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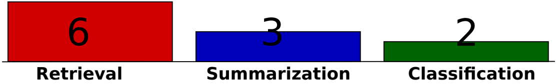

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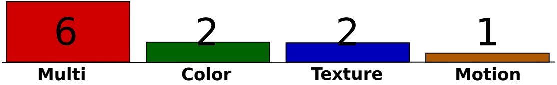

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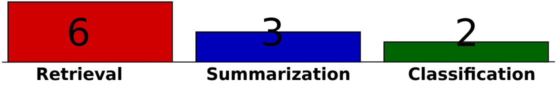

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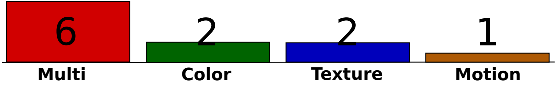

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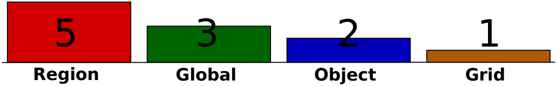

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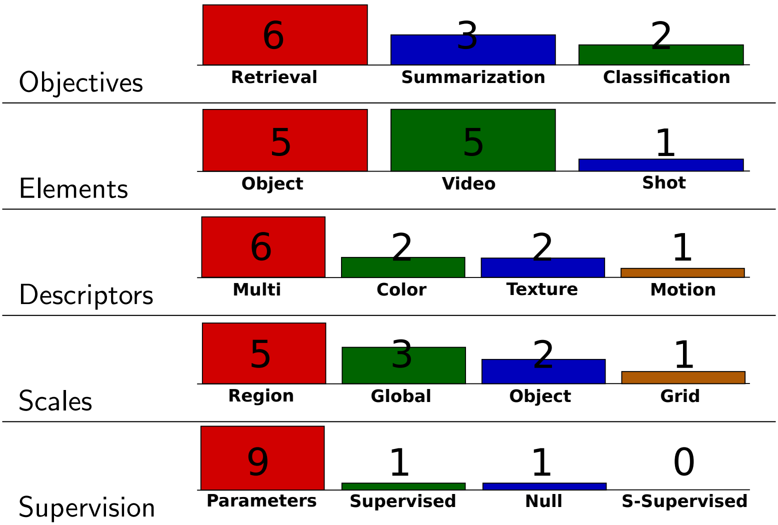
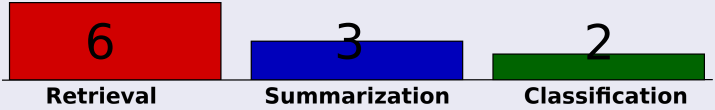


Video Object Mining: A way of introducing semantics

Objectives



Our approach for Video Object Mining

- Generic framework
- Object is the most semantic element
- Combination of object-oriented descriptors
- 2 types of scales : inner and context scale
- User relevance feedback brings semantics

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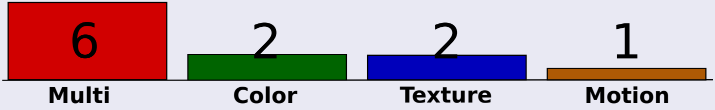

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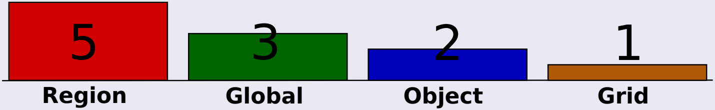

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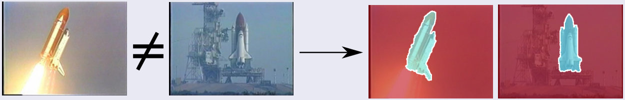

inner
context

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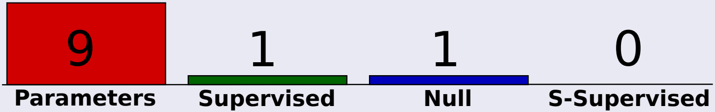
Video Object Mining: A way of introducing semantics

Supervision level



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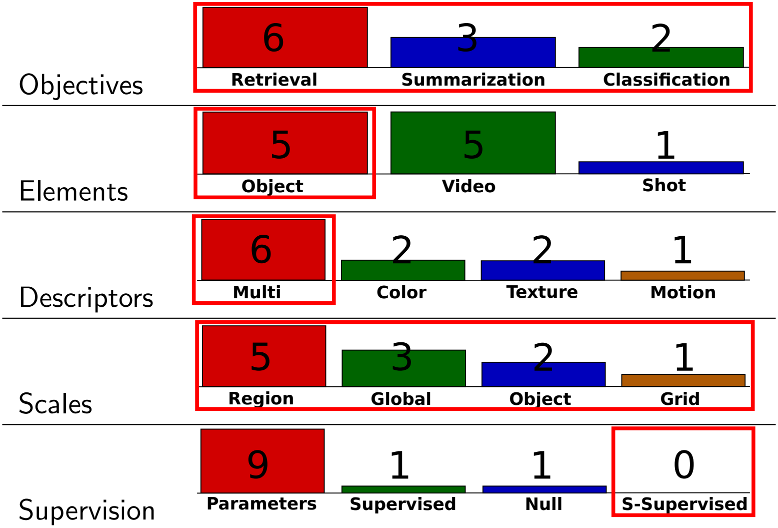
Our approach compared to related works



VOMF: Video Object Mining Framework

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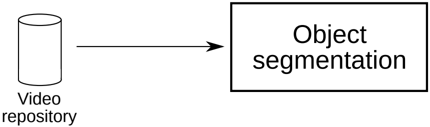

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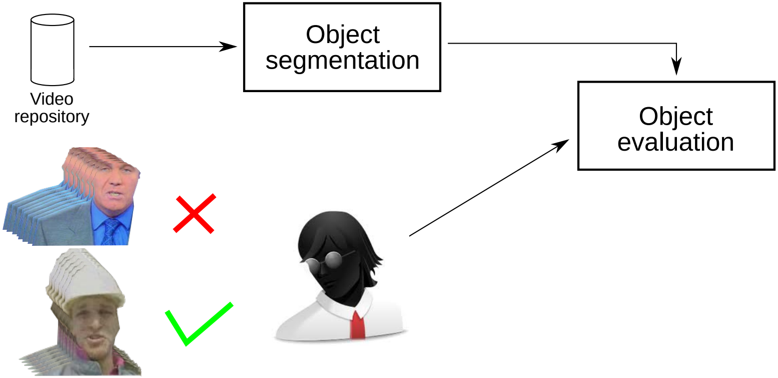

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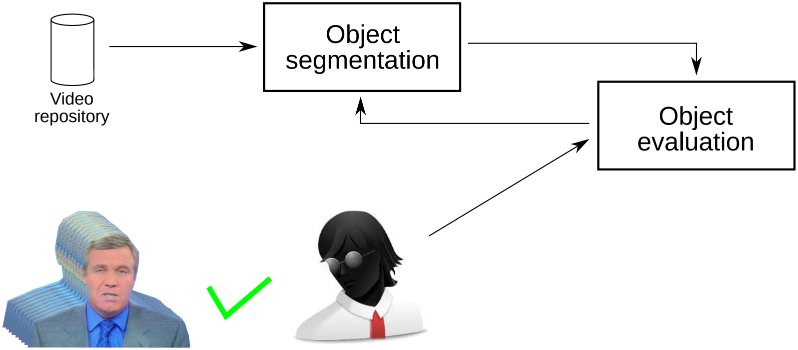

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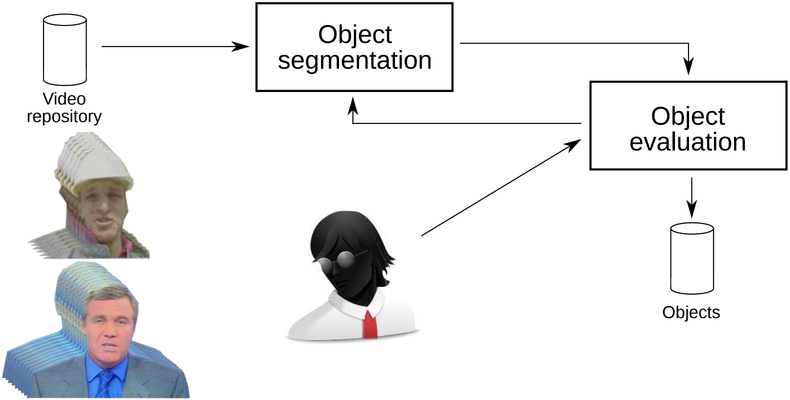
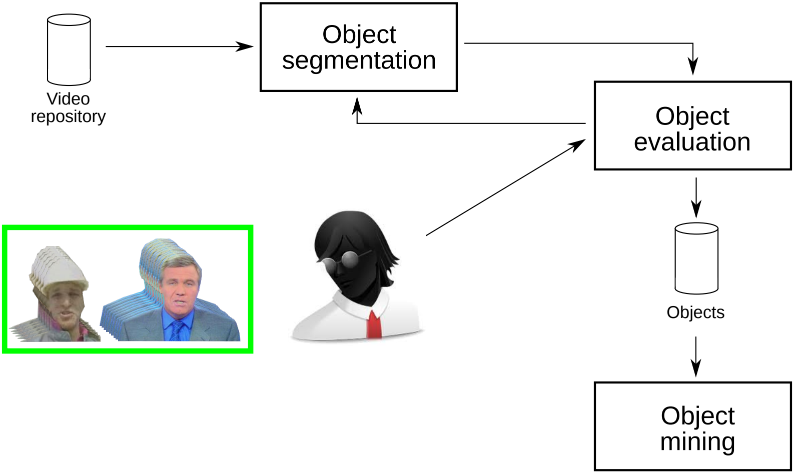


VOMF: Video Object Mining Framework



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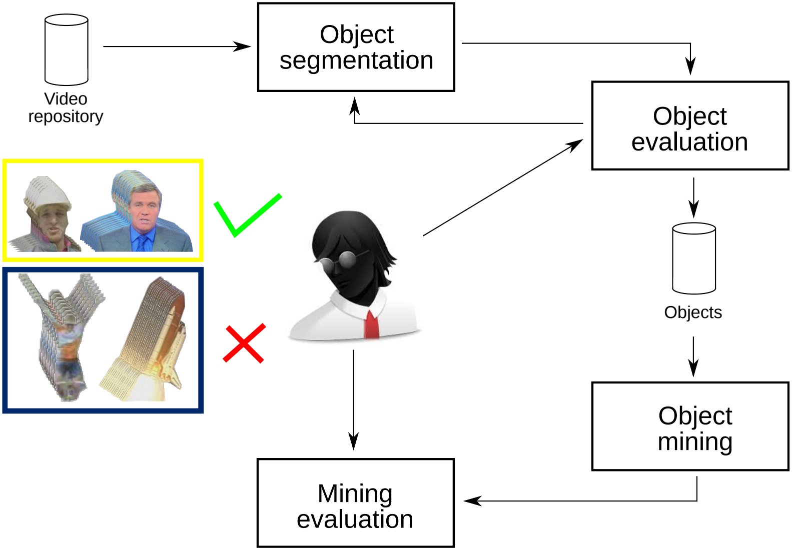

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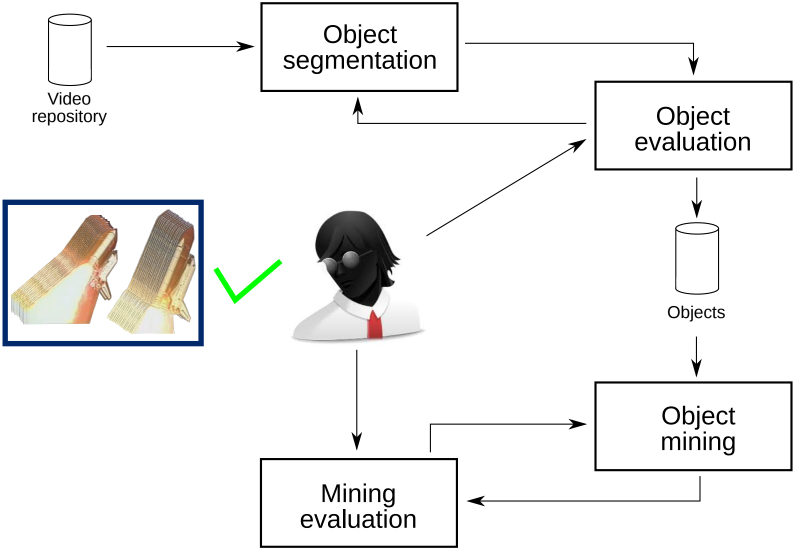

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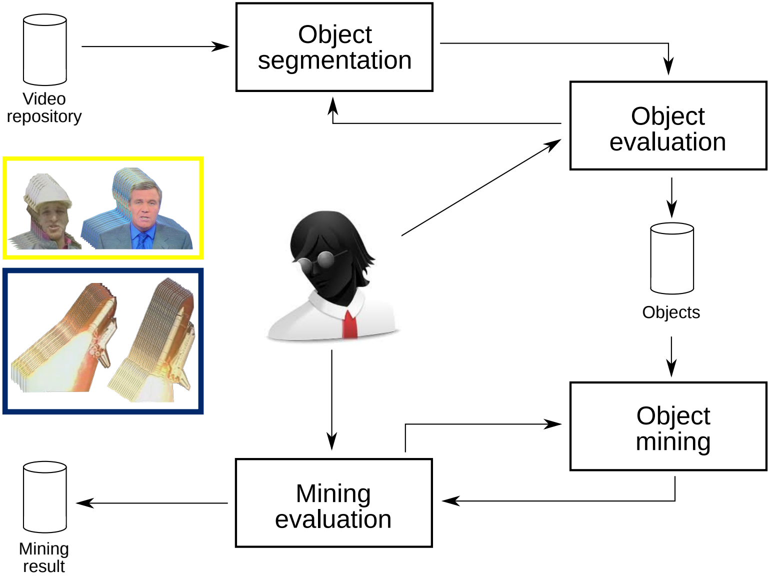

Conclusion

Issues

- Massive video repositories need new data mining schemes
- Semantics have to be considered to achieve user goals
- These are still open problems

Perspectives

- Video Object Mining has to be explored
- Semi-supervised learning limits user's workload
- A new generic framework has been proposed
- *This framework is currently being implemented*

Difficulties

- Object segmentation
- Interactive mining (involving user relevance feedback)

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