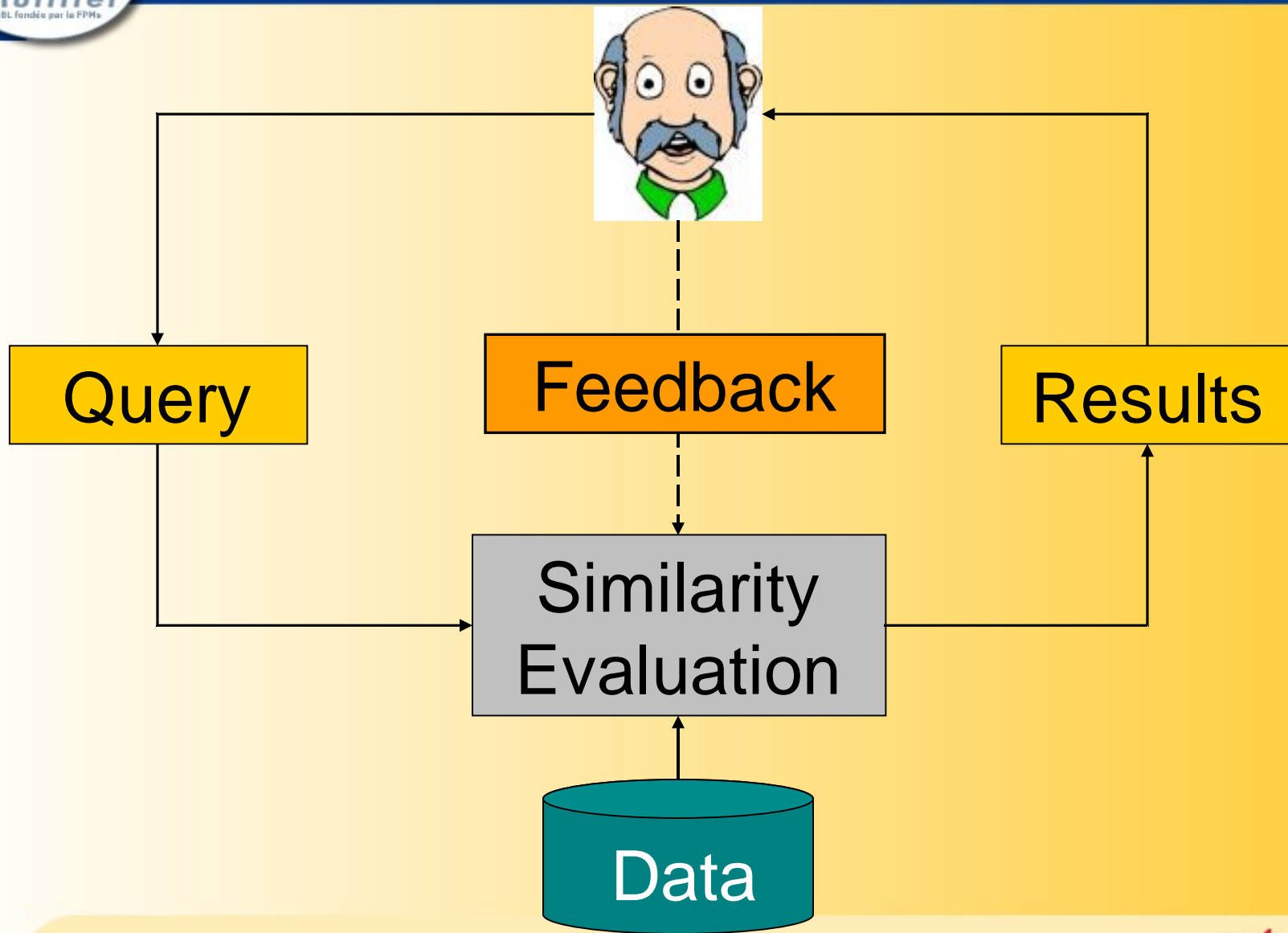


# Content-Based Retrieval of Surveillance Scenes

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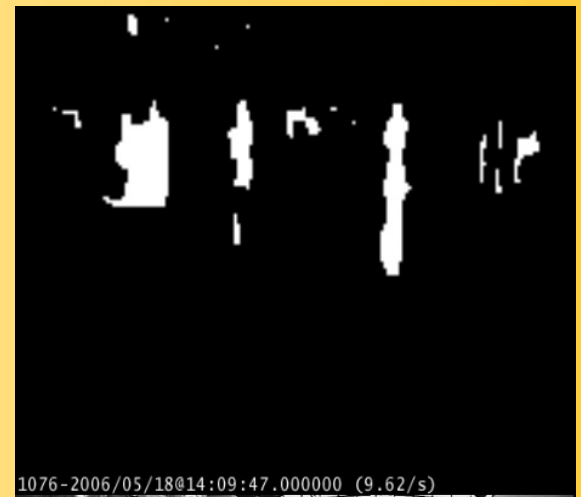
1. Context
2. Inspiration from still images retrieval
3. Surveillance scenes representation
4. Hypotheses
5. Dissimilarity measure
6. Validation
7. Future work

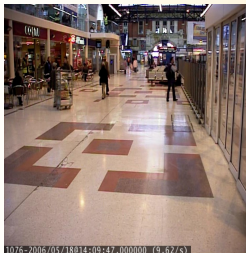
- ✓ ‘ IRMA’ : Interface de Recherche Multi-modale en contenu Audiovisuel
  - Content-based retrieval of A/V content
    - Surveillance
    - TV Broadcast archives
  - Multimodal Interfaces = focus on user intuition
- ✓ Mining surveillance data
  - Forensic
  - Infrastructure maintenance
  - Behaviour study, statistics
  - Performance evaluation



- ✓ Extract visual features for representing data
- ✓ Design similarity measure
  - Necessary for pattern recognition techniques
  - Flexible enough for integrating user feedback
- ✓ Surveillance data present particularities
  - Static background, moving objects

- ✓ No temporal analysis, no tracking
  - Only segmentation and low-cost filtering
  - Reduced complexity of the target
  - Matches a wide panel of scenarios
- ✓ Target = A (class of ) frame(s), with specific configuration of objects





→ [Frame Features ; Objects list]

[Low-level ; High-Level]

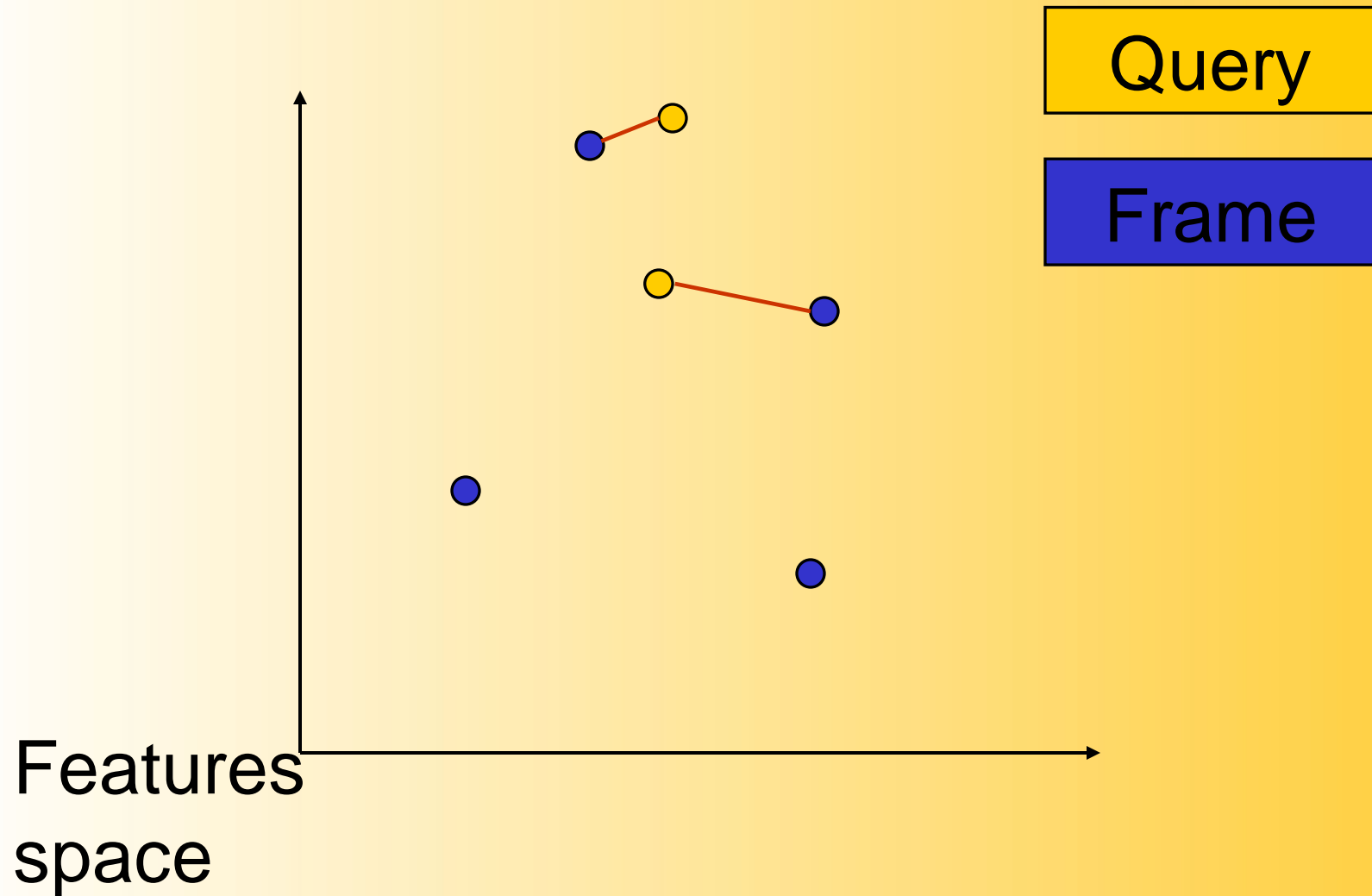
Query

→ [Frame Features ; Objects list]

$$D(Q, F) = W_f \cdot D_f(Q, F) + W_o \cdot D_o(Q, F)$$

$$D_o(Q, F) = W_l \cdot D_l(Q, F) + W_h \cdot D_h(Q, F)$$

*Weighted standardized Euclidean distances*  
*Each feature weighted independently*



- ✓ Key-frames selection
  - When dissimilarity with last key-frame  $> \vartheta$
- ✓ User potential requests
  - Query by example or by object
  - Display  $N$  best frames
  - Update of scaling factors ( $W_f, W_o, W_l, W_h, \dots$ )
  - Play a scene
  - ...
- ✓ Various real sequences
  - Underground platform, road crossing, station hall etc
  - Up to 20596 frames

- ✓ Relevance feedback
  - Semi-supervised update of scaling factors ( $W_f$ ,  $W_o$ ,  $W_l$ ,  $W_h$ , ...)
- ✓ Active learning
  - Optimal selection of key-frames to be presented to the user
- ✓ Integration with multi-modal interface
  - Explore new paradigms for relevance feedback



**Thanks for your attention !**