

DELOS

NETWORK OF
EXCELLENCE ON
DIGITAL
LIBRARIES

MICHAEL-DELOS DEMO DAY, *Roma 11 aprile 2006*

Video Digital Libraries

Pictorially Enriched Ontology for Video Annotation

&

Mobile Video browsing with semantic adaptation

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Università di Modena e Reggio Emilia, Italy





DELOS Task

➤ T3.6 VAPEON

➤ **Video Annotation with Pictorially enriched ontologies**

- Univ. di Modena, Italy
- Univ di Firenze, Italy
- Univ of Amsterdam, Italy
- Univ of Kania, Crete

➤ PEANO

- Pictorially Enriched video ANnotation with Ontologies

➤ An Environment for manual and automatic video annotation



➤ T 3.7 MIMA

➤ **Multimedia Interface for Mobile Application**

- Univ. di Modena, Italy
- Univ di Firenze, Italy
- La Sapienza, Roma, Italy
- Forth,

➤ MOVA

- MOBILE-based Video Access

➤ Tools for Video Browsing on smart phones and poket-PCs





Video ACCESS



Live Video



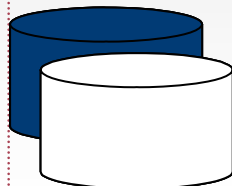
Hand made video



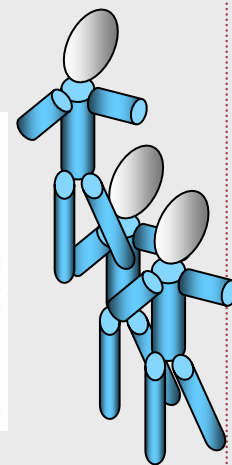
Live Edited video



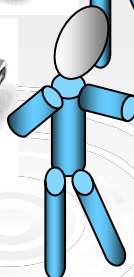
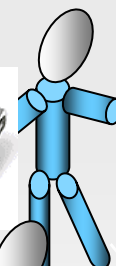
Commercial Edited Video



(Stored) Video Digital Libraries



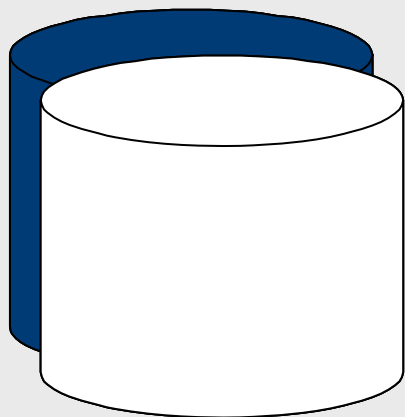
GPRS
UMTS..





Access to Video Digital library

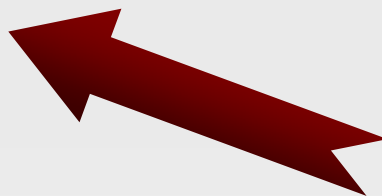
Video
Digital
Libraries



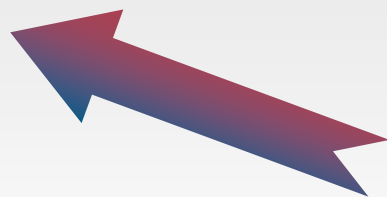
DOWNLOADING



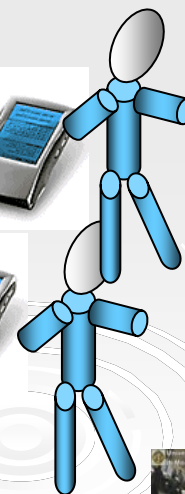
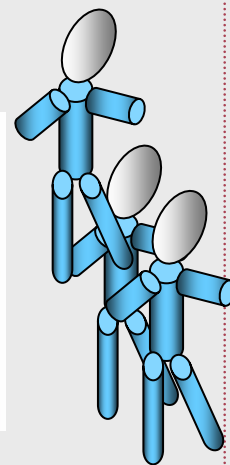
STREAMING



Textual based
querying



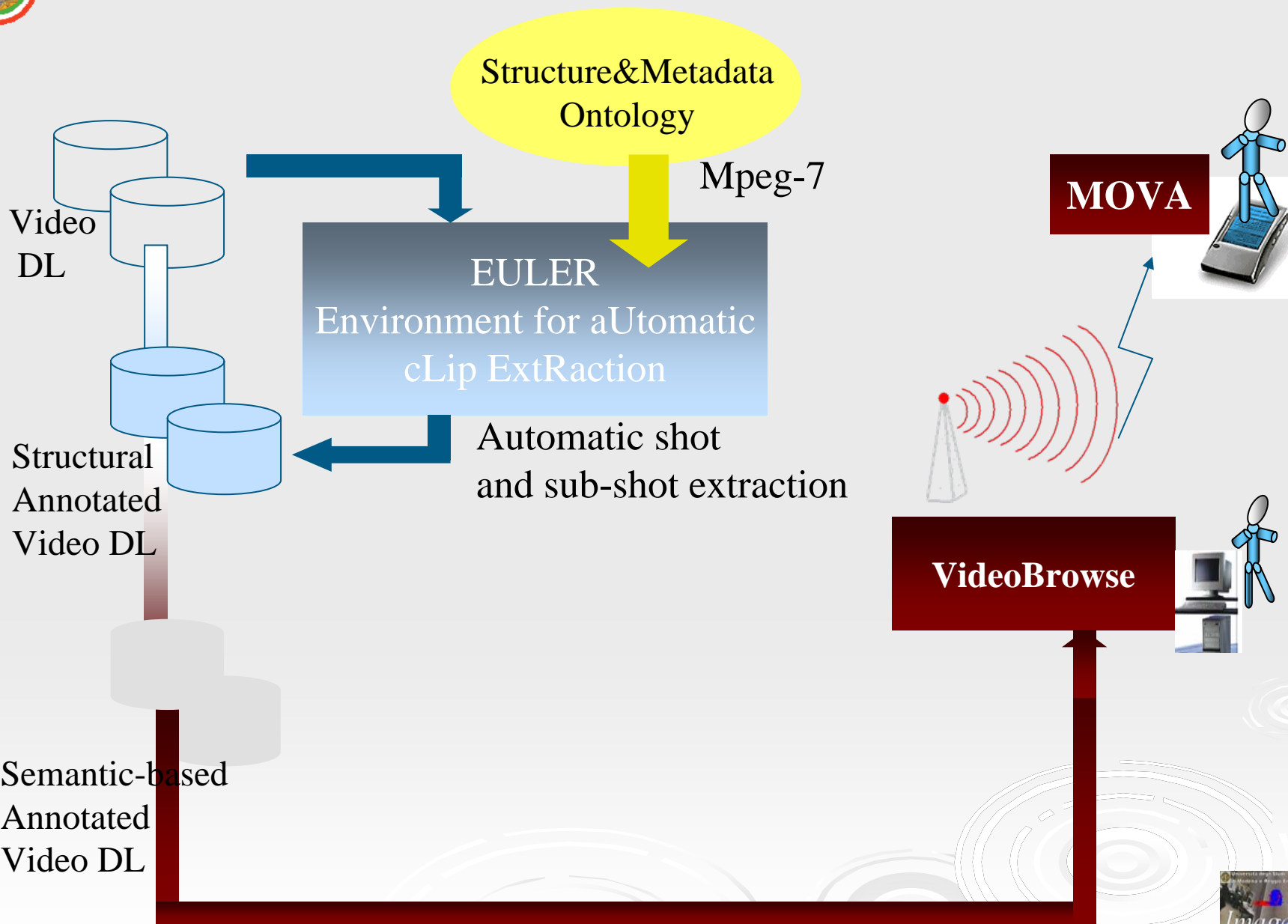
Content based
(similarity-based)
querying

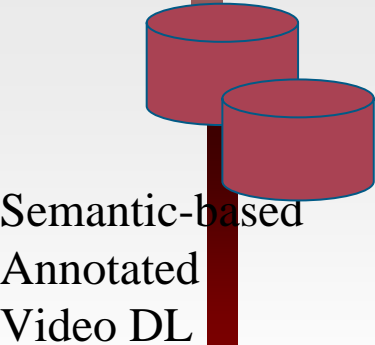
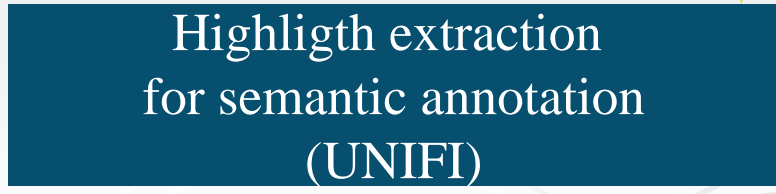
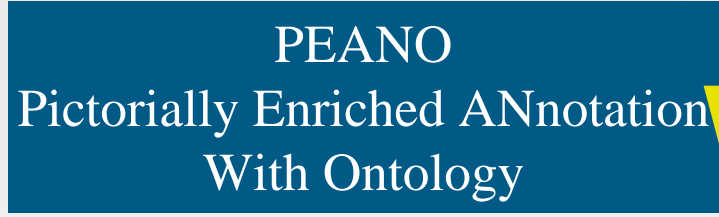
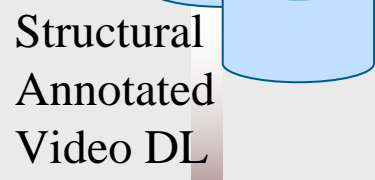
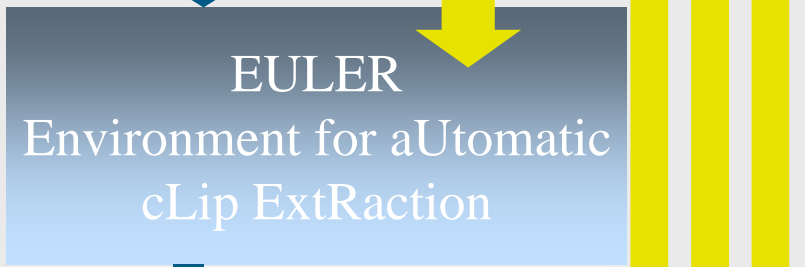
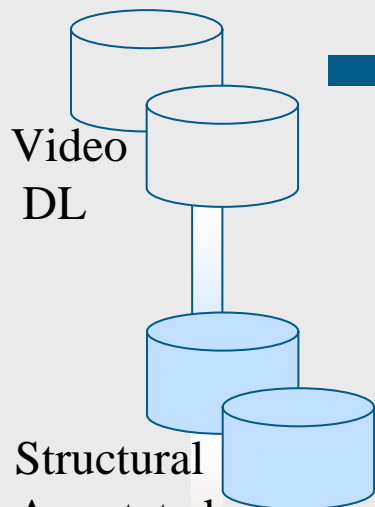
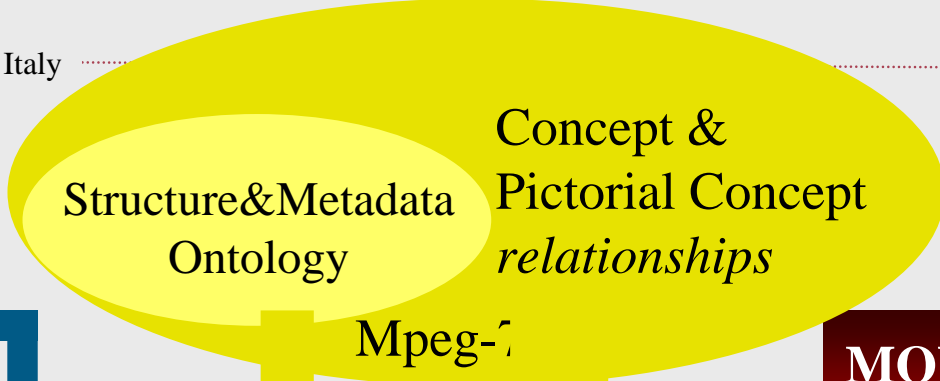




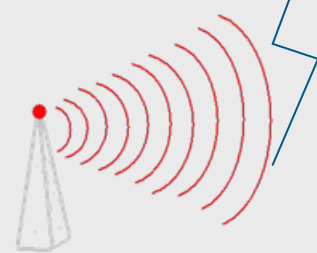
OUr solution







Mpeg-7





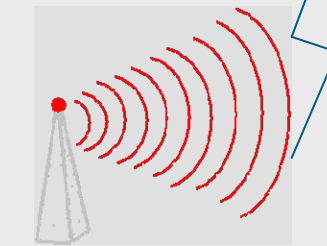
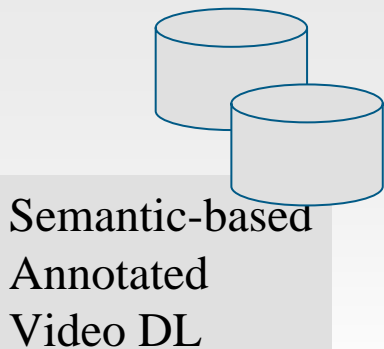
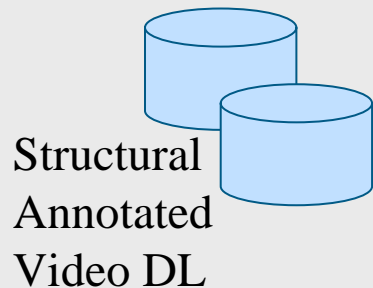
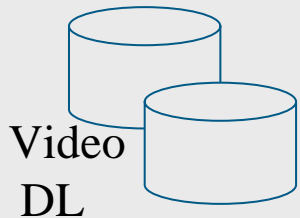
EULER

Structure&Metadata
Ontology

Concept &
Pictorial Concept
relationships

Mpeg-7

EULER
Environment for aUtomatic
cLip ExtRaction



Manual Clip Annotation



PEANO
Pictorially Enriched ANnotation
With Ontology

Highligh extraction
for semantic annotation
(UNIFI)





EULER

Structure & Metadata
Ontology

EULER

Video
DL

Structural
Annotated
Video DL

Shot detection
LTD tool

Sub-Shot
extraction

MPEG 7
Annotation

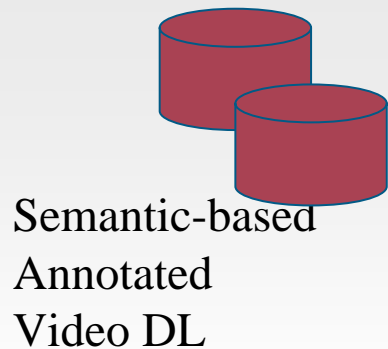
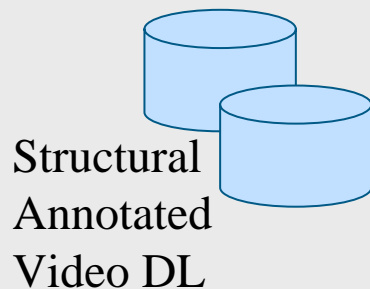
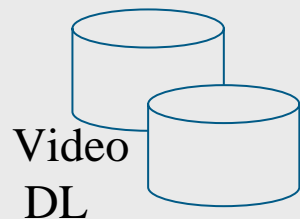




annotation

Structure&Metadata
Ontology

Mpeg-7



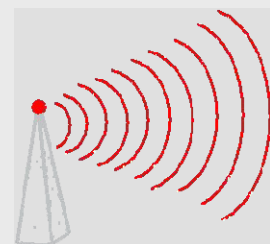
EULER
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for semantic annotation
(UNIFI)

MOVA



VideoBrowse





MANUAL ANNOTATION

ImageLab VideoBrowse -> Peano - 3.0.0.3646

File Processing Window Index Tools ?

Open Restart Fast Back... Prev. One Play Next One Fast Forward Lock Restart Fast Backward Prev. One Play Next One Fast Forw

Ontology Manager

Concept Tree

- face
- red picture
- black

Selected Clips

Add Clip Annotation Automatic Annotation

Load New Save Config Create Concepts Exit

Ontology
Name: burr_taxonomy Update
Description:

Classes
Name: red picture
Description:

Insert Modify Delete

Browse

| | | | | |
|-----|-----|-----|-----|-----|
| 100 | 101 | 102 | 103 | 104 |
| 105 | 106 | 107 | 108 | 109 |
| 110 | 111 | 112 | 113 | 114 |
| 115 | 116 | 117 | 118 | 119 |
| 120 | 121 | 122 | 123 | 124 |

Sub-Shots

| | | |
|-------------|-------------|-------------|
| red picture | red picture | red picture |
|-------------|-------------|-------------|

Source: burri_mpeg1_resize.mpg 2nd Source: not loaded Index loaded Frame: 0 Time:0:00:00.00 Session Time:0:00:00.00

start Microsoft Off... Peano Start Apache in ... FREE SURF_1.d... ImageLab Vide... IT 8.25

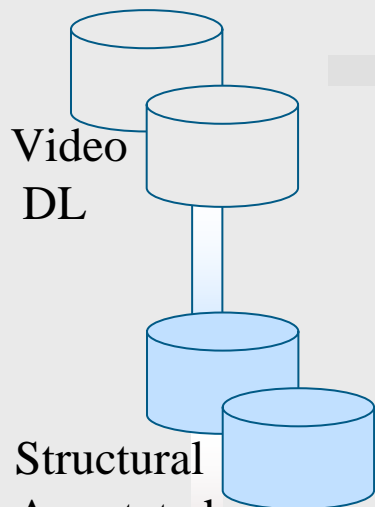


PEano

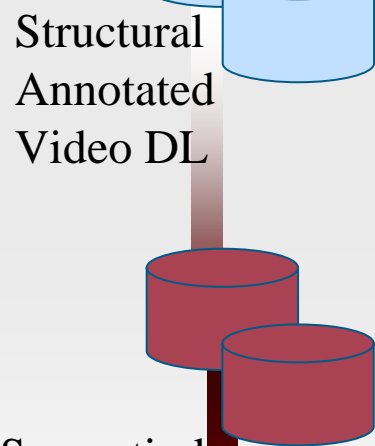
Concept & Pictorial Concept relationships

Structure&Metadata Ontology

Mpeg-7



EULER Environment for aUtomatic cLip ExtRaction



Manual Clip Annotation

PEANO
Pictorially Enriched ANnotation With Ontology



Highligh extraction for semantic annotation (UNIFI)





PICTORIAL CONCEPTS

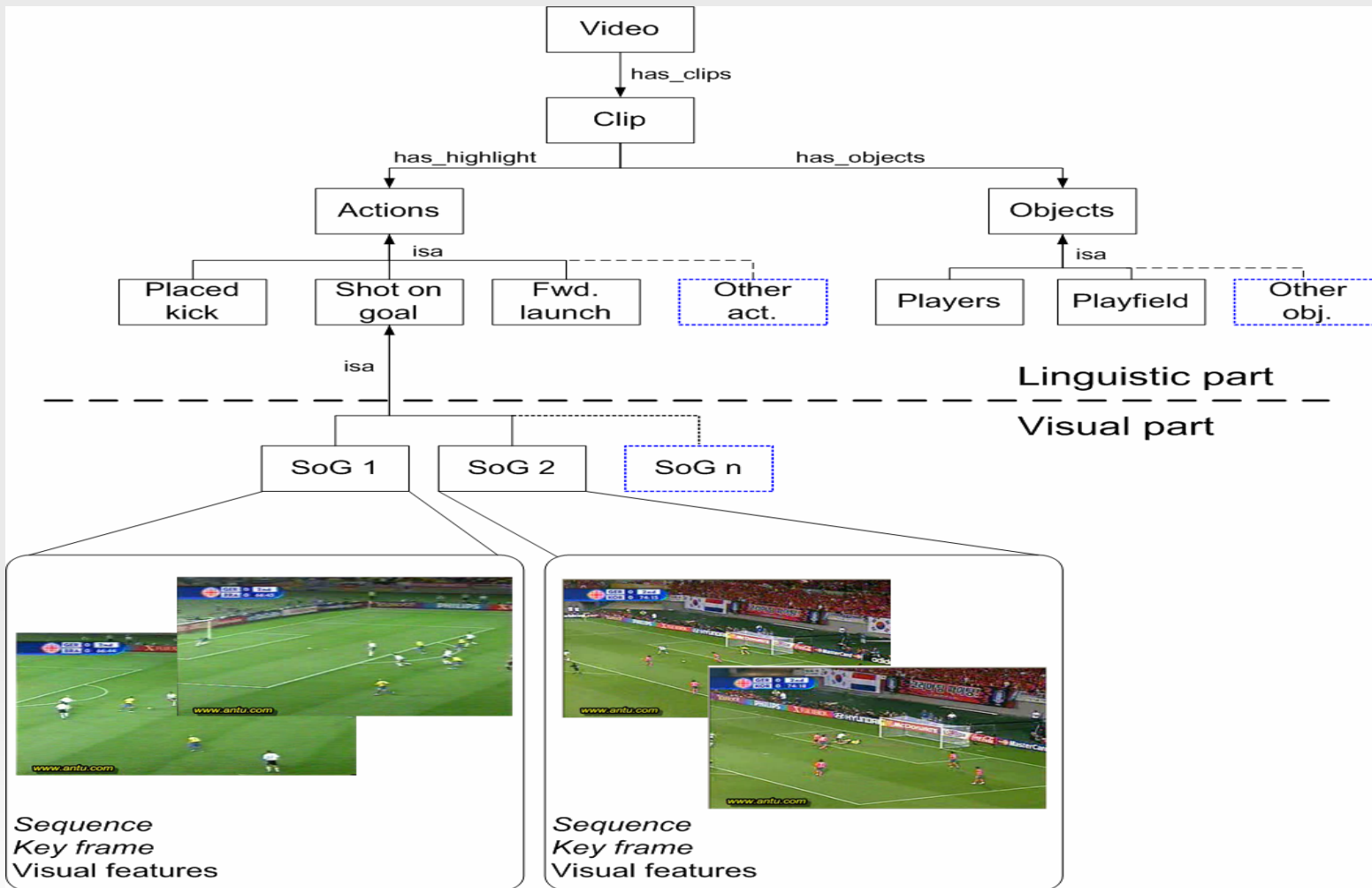


- **Pictorially Enriched Ontologies** are an extension of linguistic domain ontologies.





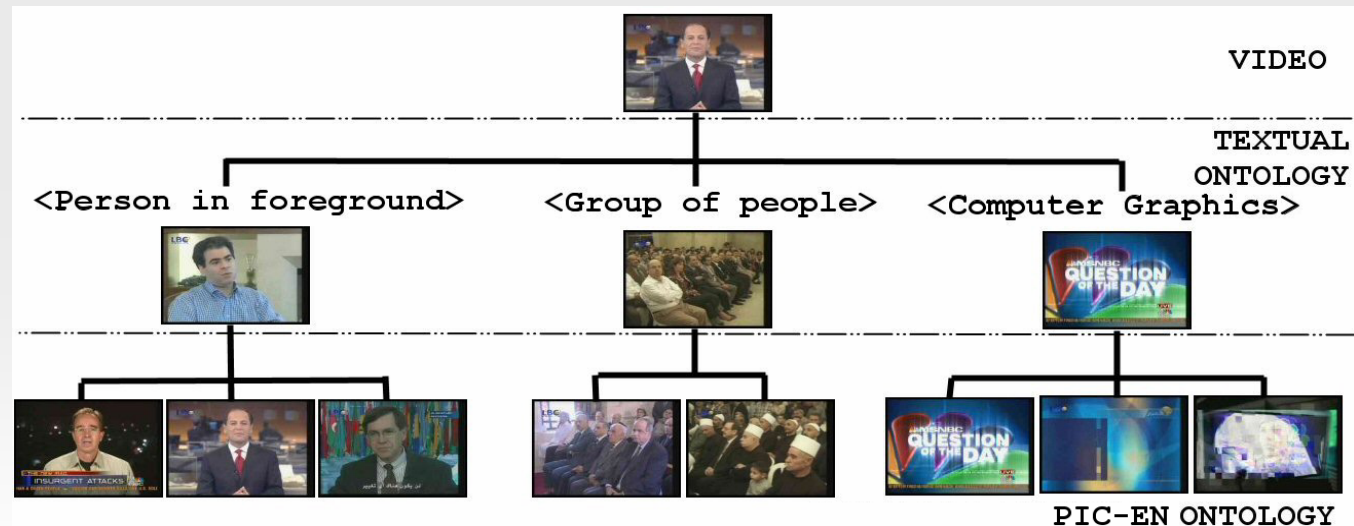
Pictorially enriched ontology





Pictorially enriched ontology

- Ontologies or taxonomies enriched with pictorial concepts
 - Prototype clips
 - keyframe or objects





PEANO: Automatic annotation

1) Pictorial concept extraction

- (manual) annotation into ontology's classes
- Clip Clustering and prototypes extraction
- Enriched ontology creation in MPEG-7

2) New video annotation

- Automatic Structural annotation
- Automatic search for similarity to pictorial concepts
- Final annotation in MPEG-7

3) Retrieval

- query for similarity
- query from concepts





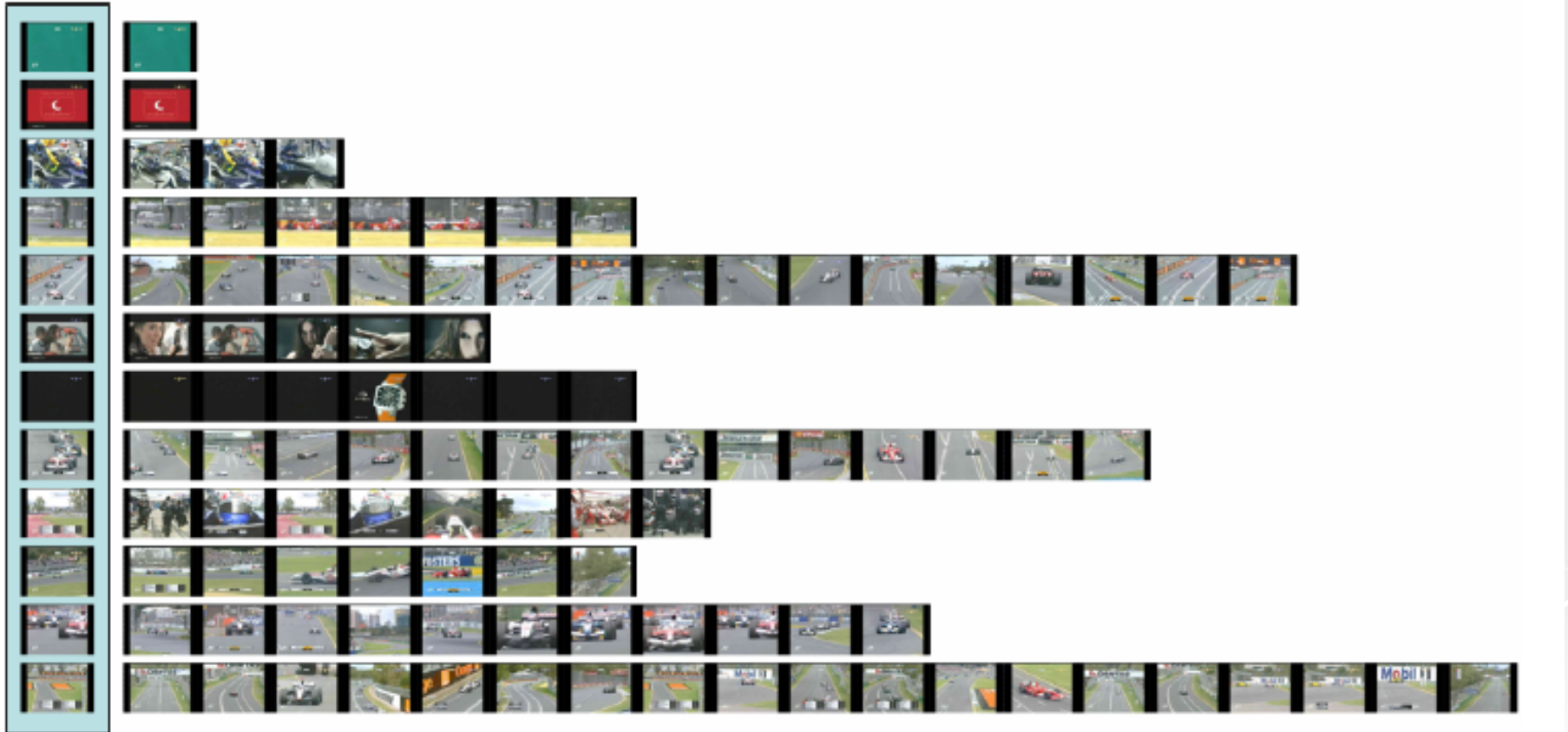
PEANO

➤ Clip clustering with color, motion, texture cues





PictorialL conceptS extraction





AUTOMATIC ANNOTATION

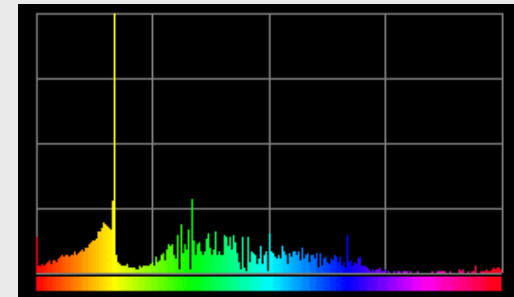
- Search for similarity in the pictorial concepts
- MPEG-7 annotation with the features of the selected class
- MPEG-7 description can be used for
 - Hierarchical summarization
 - Querying for a specific class
 - Querying for similarity





VISUAL FEATURES

- PERCEPTUAL VISUAL FEATURE ONLY
- Color
- Texture
- Motion
- At level of clip (not only on keyframes)





VIDEObrowse

ImageLab VideoBrowse -> Peano - 3.0.0.3646

File Processing Window Index Tools ?

Open Restart Fast Back... Prev. One Play Next One Fast Forward Lock Restart Fast Backward Prev. One Play Next One Fast Forw

Input

Browse

125 126 127 128 129

130 131 132 133 134

135 136 137 138 139

140 141 142 143 144

145 146 147 148 149

Sub-Shots

Source: burri_mpeg1_resize.mpg 2nd Source: not loaded Index loaded Frame: 37368 Time: 0:20:46.85 Session Time: 0:20:46.85

start Microsoft Office roma_micael Start Apache in C... FREE SURF_1.doc... ImageLab Video... IT 8.39





MOVA

- Mobile browsing
- UMTS video streaming
- Link to stored clip summarization
- Link to live streaming
- Video adaptation
 - Selection of video format
 - Selection of temporal-spatial downscaling
 - Selection of quantization
 - Selection of semantic- transcoding

<http://localhost:8080/mima/mima/index.php>





Università di Modena e Reggio Emilia- Italy

MORE INFORMATION

Imagelab

<http://imagelab.ing.unimo.it>

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Demo

<http://imagelab.ing.unimo.it>

