Video Retrieval using Spatio - Temporal Descriptors

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Outline

• Introduction

• Overview of approach

• Space-Time descriptors

• Hierarchical mean shift analysis

• Voting for labels

• Experimental results

• Conclusions
Introduction

• Current video retrieval methods
  – not analyze video structure at the object level
  – Color, shape and texture features
  – Temporal and spatio features >>ignored
  – **Space-Time Descriptor**
Overview of approach

**INDEXING**
- Video feed
  - Video Chopper
    - 1/2 sec. clips
  - Space-Time Segmentation
    - Labeled 7D points
  - Addition into database tree

**RETRIEVAL**
- Video example feed
  - Video Chopper
    - 1/2 sec. clips
  - Space-Time Segmentation
    - 7D points
  - k-NN retrieval
    - Labels of NNs
    - Voting for labels
    - Show winning clips
Space-Time Descriptors
Space-Time Descriptors

7D points:

- Frame $t$
- Position $(O_x, O_y)$
- Motion distances $(D_x, D_y)$
- Move speed $(\alpha_x, \alpha_y)$ angle
Hierarchical mean shift analysis

Labeling of segmented regions

Principle of hierarchical mean shift analysis
Example of hierarchical clustering

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<thead>
<tr>
<th>Pixel Array with Cluster Ages</th>
<th>Hierarchical Clustering</th>
<th>Final Array with Stable Clusters</th>
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</table>
Voting for labels

Database of labeled strands

New video clip

Query

Space-time strands

- Class 1: 4 votes
- Class 2: 0 votes
- Class 3: 1 vote
Experimental results
Experimental results

Queries

Retrieved
Part action recognition
Part action recognition
Conclusions

• Space-time segmentation
• Dynamic content of video clips
• Geometric patterns
• $k$-nearest neighbors search
• Voting on the retrieved labels
• Recognition of body parts and objects
~~The End~~
Thank you