Objectives

- Retrieve object instances from a large video repository starting from minimum, user-provided textual information
- Leverage on users’ affinity for textual queries and crawl images from the Internet
- Remove outliers from retrieved data and identify representative instances for the topic given by the user
- Build visual descriptors from filtered representative instances and use them for querying the video repository

Approach overview

1. Issue textual query
2. Extract local features
3. Match images
4. Build query graph
5. Determine representative images
6. Build query descriptors
7. Aggregate query descriptors
8. Aggregate query results

Evaluation

- Trecvid 2012 Instance Search Task Flickr dataset
- 74,958 videos mined from Flickr
- 22 query topic with up to 9 example images with precise object annotation and basic textual description: 102 query images
- Hessian Affine regions + RootSIFT descriptors from 683,433 keyframes
- Bag-of-Words with vocabulary of 1M visual words

Results

- Retrieval performance (mean Average Precision)
  - Centered representative query: Consists of the union of all points from the representative image that have been matched/shared with at least one neighboring image from the query graph.
  - Distributed representative query: Consists of the union of all points from every neighboring image that have been matched with points from the representative image

<table>
<thead>
<tr>
<th>Expansion method</th>
<th>Number of mined images</th>
<th>Aggregation strategy</th>
<th>mean Average Precision</th>
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</thead>
<tbody>
<tr>
<td>Centered representative query</td>
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<td>Distributed representative query</td>
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<td>0.0671</td>
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TRECVID 2012 Median mean Average Precision 0.0795
Baseline Bag-of-Words 0.095

Representative images

- U.S. Capitol exterior
- Stonehenge
- Empire State Building
- Mercedes star

Examples

- Individual queries
- A posteriori aggregation
- A priori aggregation

Conclusion and perspectives

- Novel multi-modal query definition and expansion method: text \(\rightarrow\) image \(\rightarrow\) video
- Good object retrieval performance even when using only textual data
- Distributed query descriptors with a priori aggregation provide better results while reducing the number of query operations
- Extend method for multiple Internet sources
- Use an ad-hoc SVM classifier on representative images
- Integrate other image metadata for validating positive instances (geotags, image popularity, uploader reputation)