How Can I Index My Thousands of Photos Effectively and Automatically?
An Unsupervised Feature Selection Approach
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Motivation
Which photo should I share? Where is it?

Where are those photos I am interested? Where are my photos?

If given only one photo as

Sky, mountain, car and map with us.
Em, a good photo to share!

What if it is hidden in thousands of photos as

Seriously? I need to check them one by one!

Great! Computer will figure out what you have Effectively and automatically!

Tell what you have SEMANTICALLY
Meaningful tags for human beings like “sky”

Multi-instance multi-label learning [Zhou et al., AI 2012]
Image segmentation [Wang et al., PAMI 2001]

Empirical study
Example of the 1st selected dimension

#dimensions used

<table>
<thead>
<tr>
<th>Data set</th>
<th>#Images</th>
<th>#Candidates</th>
<th>Our</th>
<th>RSF</th>
<th>RSB</th>
<th>CPU time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

Tell what you have DISCRIMINATIVELY & INFORMATIVELY

Problem formulation
– Candidate dimension set \( D \)
– Photo representation \( O \in \{0,1\}^{n \times |D|} \)
– Assume each photo is unique on \( D \)

Minimum subset introduces largest #different pairs

Greedy algorithm:

Add the dimension that can increase the largest #different pairs

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