

CLAN Photo Presenter

A Multi-modal Summarization Tool for Image Collections

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Motivation

- Amount of images produced is huge
- Summarization tools are needed
 - Available for **visual-only summaries**
 - Difficult to **index and search**

Objectives

- Automatic **multi-modal image summarization**
- Various algorithms for **visual clustering**
- **Automatic keyword annotation**
 - Summary annotation for each cluster
- Intuitive, **user-friendly interface**
 - Results presented as a web page

Solution

Preprocessing



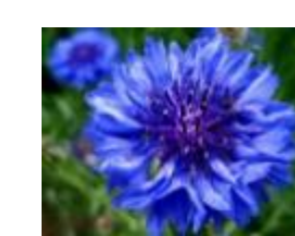
- Resize images
- Extract MPEG7 descriptors

Clustering



- Run clustering algorithm
- Params: number of clusters, clustering algorithm, number of repetitions, cluster optimality measure, postprocessing options

Annotation



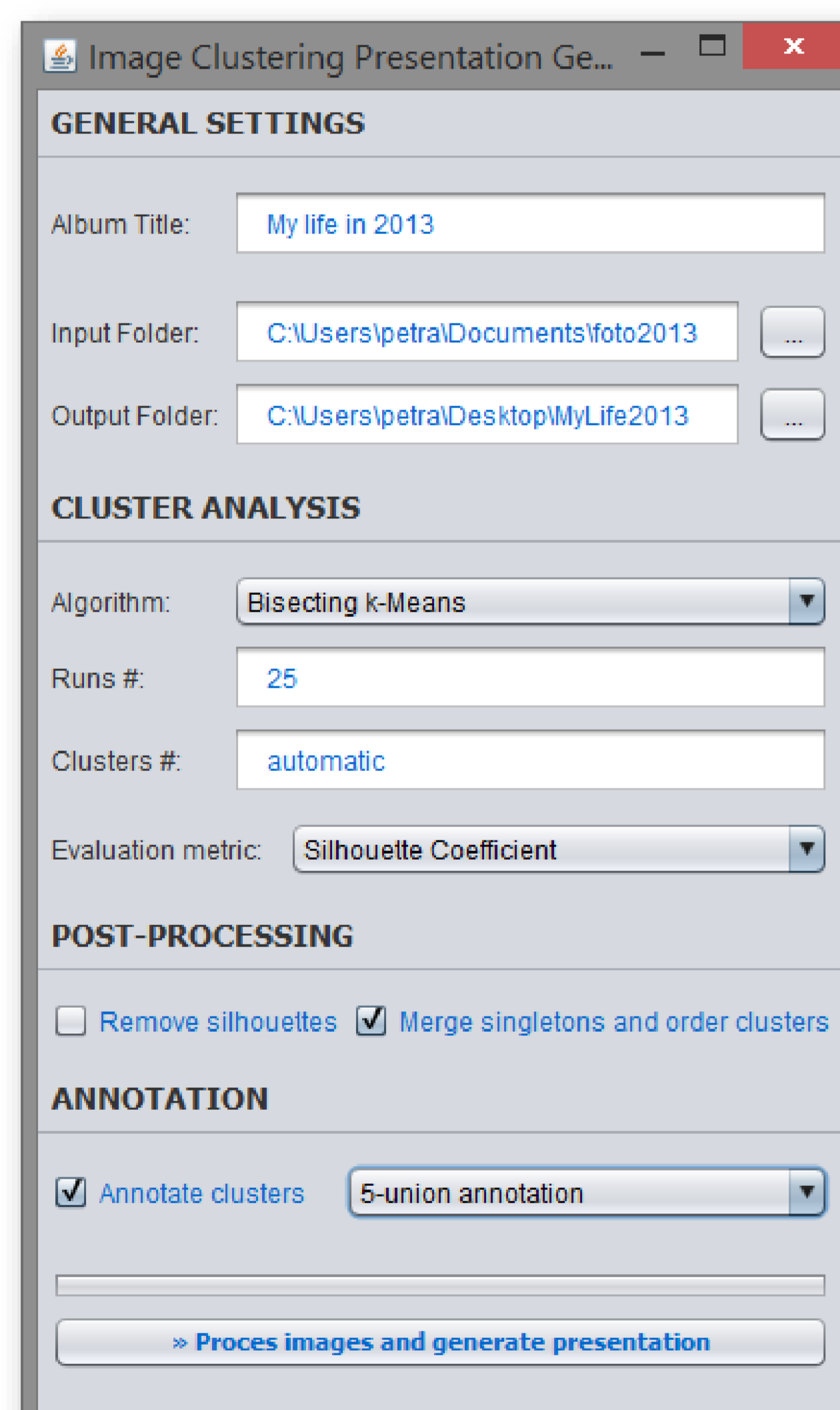
Plants, flower, garden, summer, blue, blossom, ...

- Retrieve annotations for cluster representants
- Params: number of images from each cluster to be annotated
- External web service: MUFIN image annotation

Presentation



- Create the web presentation



<http://disa.fi.muni.cz/clan>

CLAN Photo Presenter Application

- Desktop application written in Java
- Visual clustering methods based on **MPEG7 global visual descriptors**
 - k-Means, Bisecting k-Means, Distinct kNN
- **Repeated clustering** to increase the quality
 - Quality measures: Davies Bouldin Index, Silhouette Coefficient, Dunn Index
- Postprocessing methods to **compensate for clustering anomalies**
 - Single-member clusters removal, outliers merging
- **Annotation of clusters**
 - Selection of cluster representatives, **MUFIN Annotation Web Service**

Processing times

Collection size	Clustering method	# of clusters	Preprocessing time [s]	Clustering time [s] (25 repetitions)	Annotation time [s] (5-union)	Overall costs [min]
160/500/1000	Bisecting k-means	16/20/30	76/214/471	12/138/610	229/299/418	5.3/10.9/25.0
160/500/1000	K-means	16/20/30	76/214/471	3/18/69	229/299/418	5.1/8.9/16.0
160/500/1000	Distinct kNN	25/50/100	76/214/471	3/20/82	373/696/1428	7.5/15.5/33.0

Sample output – Barcelona

- Collection description** 426 high-resolution photos from a trip to Barcelona
- Clustering method** Distinct kNN clustering – Centroid, 25 runs, Davies Bouldin Index
- Postprocessing** Singleton merging
- Annotation method** 2-union annotation
- Processing time** 32 minutes (costly preprocessing of large photos – 26 minutes)

