

Hough Pyramid Matching for Large Scale Image Retrieval

Version 0.1

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1 License

This software is meant to accompany [\[1\]](#), and may be used freely for research purposes only. Please cite [\[1\]](#) if you use this software.

2 Environment, installation

No intallation and no pre-installed libraries are needed. We provide binary code for Linux 64-bit.

3 Contents

Main files:

hpm	HPM Linux 64-bit executable
params	sample parameters text file

4 Syntax, command list

Use the following syntax to execute HPM for the creation of inverted file:

```
hpm -nvw vs -ofile if -p pf -vw fvw -feat fft
```

vs	vocabulary size
if	output inverted file
pf	parameter file
fvw	text file with list of visual word files
fft	text file with list of feature files

Use the following syntax to execute HPM for the retrieval process:

```
hpm -nvw vs -ofile if -p pf -qvw qfvw -qfeat qfft [-slmin mn -slmax  
mx]
```

qfvw text file with list of visual word files for queries
qfft text file with list of feature files for queries
mn number of less frequent words to remove (stop list)
mx number of more frequent words to remove (stop list)

Alternatively, to see information about HPM and its syntax above, simply type

```
hpm
```

parameter file content: A text file is used to define more parameter values. **QUANT_MIN_SCALE** and **QUANT_MAX_SCALE** correspond to the minimum and maximum values of local feature scale of the database images. **QSZ** and **DBSZ** are two binary files with the maximum image dimension for query images and database images respectively. Those two files can be created using the **save_array** MATLAB function with **UINT32** precision. Number of images to be re-ranked with HPM is defined by parameter **NR**.

Arguments **-vw**, **-feat**, **-q_feat**, **-q_vw** correspond to filenames of text files containing one line per filename. Pairs of **-vw**, **-feat** and **-q_vw**, **-q_feat** should contain filenames in the same ordering.

5 Description

We provide binary code which implements the method described in our paper for large scale image retrieval. The filtering phase is performed with Bag-of-Words and the re-ranking phase with the proposed Hough Pyramid Match algorithm performed on the top matching images. An inverted file structure is initially created, loading visual word and local features information for selected images. Then, queries can be performed for selected images and the final ranking of all database images is given as output. HPM is executed using 5 levels and each local feature parameter is quantized using 4 bits, similarly to the experiments of [1].

Input/output files of our executable are binary files which can be created/read with the MATLAB functions provided into the supplementary files folder. For each image 2 binary files are needed; one containing the visual word ids for each local feature and the other containing local feature shape parameters for each feature in the form [x,y,strength,scale,orientation] (strength is not used in the algorithm and orientation is in $[0, 2\pi]$). The output is again a binary file containing rankings for each query.

Use **save_array** MATLAB function with **UINT32** precision to save file of visual words and **save_double_array** MATLAB function with **FLOAT** precision to save file of local feature shape parameters. Output binary file can be loaded using **load_double_array** MATLAB function with **UINT32** precision.

Contact

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References

- [1] G. Tolas and Y. Avrithis. Speeded-up, Relaxed Spatial Matching. In *Proceedings of International Conference on Computer Vision*, Barcelona, Spain, November 2011.