Project acronym: POPART Project number: 644874 Work package: 3D Visual Database Deliverable number and name: D1.2: Final DB management library	Title: Final DB management library Work Package: WP1 Version: 1 Date: 31/07/2015 Author: Simone Gasparini
Type: [ ] Report [ ] Demonstrator, pilot, prototype [ ] Website, patent filings, videos, etc. [X] Other	Co-Author(s): To: Albert Gauthier, Project Officer
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Revision: Final	
Contents: Deliverable 1.2: Final DB management library.	

Deliverable description

A first version of the 3D visual database has been delivered as deliverable D1.1 In this new release, several improvements have been addressed in order to speed up the vocabulary tree creation, and query and to maintain the compatibility with the OpenMVG data format. In particular most of the code is now parallelized on CPU, which can reduce the time required to generate the vocabulary tree. Also, optimizations for training large and finer vocabulary trees have been put in place in order to support the generation of vocabulary trees that could support the VocMatch method recently introduced by [Havlena2014]. The main idea of this approach is to train a large visual vocabulary from a large set of images in order to obtain a large set of visual words (16 million visual words from a vocabulary tree with 2 levels and a branching factor of 4000): this allows a finer classification of the SIFT features into visual words, where, ideally, each visual word corresponds to an unique feature. Thus the feature matching problem can be cast as image indexing problem: beside evaluating the similarity of two images using the usual approach of comparing the visual word histogram, the methods allows to recover the potential matching features between the two images. This allows to reduce significantly the computational cost of the matching process.

As for the input data format, OpenMVG 0.81, released on May 30th, introduced a new improved data format to collect the data of the SfM pipeline, which in turn required to adapt the voctree library to use the same data format.

Code description

createVoctree

This is an utility to create and save a vocabulary tree out of a set of images

Usage

It takes as input either the `list.txt` (OpenMVG < 0.8) or the `sfm_data.json` file generated by OpenMVG in the `matches` directory containing the descriptors in `.desc` format. Both the `.txt` and the `.json` must be in the same directory as the `.desc` (e.g. `matches`). Usage:

```
Options::
  -h [ --help ]             Print this message
  -v [ --verbose ] arg (=2) Verbosity level, 3 should be just enough, 0 to mute
  -w [ --weights ] arg      Output name for the weight file
```

```
  -t [ --tree ] arg          Output name for the tree file
  -l [ --keylist ] arg       Path to the list file (list.txt or sfm_data.json) generated
by OpenMVG
  -k arg (=10)               The branching factor of the tree
   -r [ --restart ] arg (=5) Number of times that the kmean is launched for each
cluster, the best solution is kept
  -L arg (=6)                Number of levels of the tree
```

Testers

The directory `./applications/voctree/src/testers/` contains a series of utilis that can be used to query and test the vocabulary tree. This are particularly meant for developers to rapidly tests the data and to use these sources as templates to rapidly develop command line applications to test the vocabulary tree and the 3D database. Refer to the `README.md` for more information.

Code download

The code can be downloaded here
https://drive.google.com/file/d/0B1xIYr4Ku8luNGNZdGZ5ZmRESm8/view?usp=sharing
and it will be available in opensource at:
https://github.com/poparteu/cameraLocalization