

Exercises – Recognition

1. Visual vocabulary

- a) Study the Vocabulary class already available in the initial file (`vocabulary.cpp` or `vocabulary.py`);
- b) Create a vocabulary with 10 visual words, using the method `train` of the Vocabulary class; use all `posterX.jpg` files to train the vocabulary;
- c) Check the dimensions of the trained vocabulary and interpret the result;
- d) Open the image `poster_test.jpg` and extract the local descriptors using the detector and extractor objects;
- e) For each descriptor verify to which word it corresponds in the vocabulary using the method `whichWord` of the Vocabulary class; create a vector of integers containing all the corresponding words;
- f) Draw the keypoints using the `drawKeypoints` function;
- g) Repeat steps d), e) and f) for the `poster4.jpg` image and compare the results;
- h) Test a larger vocabulary, e.g 100 words.

2. Bag of words

- a) Study the functions already available in the initial file (`bow.cpp` or `bow.py`);
- b) Train a BoW vocabulary with all the descriptors extracted from all the `posterX.jpg` images using the `bowTrainer` object;
- c) Set this vocabulary in the `bowExtractor` object;
- d) Extract a BoW descriptor for the test image (`poster_test.jpg`);
- e) Do the same for the other images and for each calculate the normalized scalar product between its descriptor and the test image's descriptor; interpret the results.

These exercises were implemented and tested using OpenCV 3.4.3. Documentation of the BoW classes:

- https://docs.opencv.org/3.4.3/d2/d6b/classcv_1_1BOWImgDescriptorExtractor.html
- https://docs.opencv.org/3.4.3/d5/d14/classcv_1_1BOWTrainer.html