universität innsbruck

Final Projects - Computer Vision

703089. PS Introduction to Visual Computing

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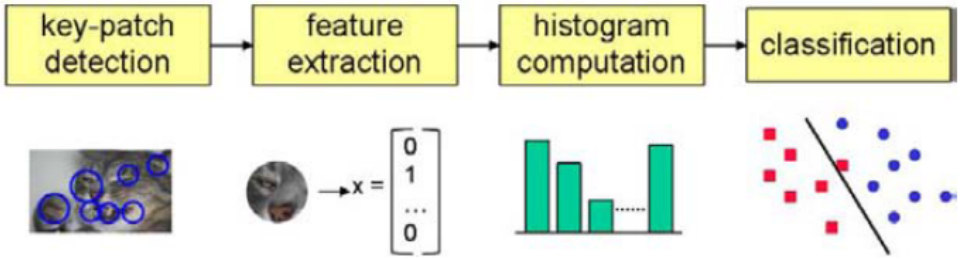
Image classification with SVM



- SVM: Support Vector Machine
- Process:
  1. Download the dataset: http://www.vision.caltech.edu/Image_Datasets/Caltech256/
     And select five classes of animals (for each each class use the same number of images so that the training is balanced)
  2. Extract two types of features that you will compare: SIFT and HoG.
  3. Use 80% of images for training, 20% leave for testing. Images are randomly selected.
  4. Training and test sets must be in a matrix where rows are the images and columns are the N feature histogram values. Each image must be associated with a label.

	Feat. 1	Feat. 2	Feat. 3	Feat. 4	Feat. 5	Feat. 6	Feat. 7	.....	F. N
Image 1									
Image 2									
Image 3									
.....									
Image 400									

  5. Use SVM to classify: https://docs.opencv.org/3.4/d1/d73/tutorial_introduction_to_svm.html
     Each image will be considered a point in N-dimensional space
  6. Write a report that includes: Introduction, the methods and experimental evaluation. Report on the confusion matrix and accuracy for each feature. Discussion: Compare results and comment on strengths and weaknesses of each feature.

Eyes and smile classification

- Use Viola and Jones
- Process:
  1. From the Caltech256 dataset: http://www.vision.caltech.edu/Image_Datasets/Caltech256/ Use the class “159.people”
  2. Use cascade classifiers, there is a number of haar cascades already available: https://github.com/opencv/opencv/tree/master/data/haarcascades Including eye and smile cascades.
  3. Use a process similar to: https://docs.opencv.org/3.4/d2/d99/tutorial_js_face_detection.html to find the eyes and smiles in the pictures.
  4. Another interesting links: https://www.mygreatlearning.com/blog/viola-jones-algorithm/ https://docs.opencv.org/master/dc/d88/tutorial_traincascade.html https://docs.opencv.org/master/db/d28/tutorial_cascade_classifier.html
  5. Write a report that includes: Introduction, the methods and experimental evaluation. Report on the confusion matrix and accuracy for each class.