CENG 483

Introduction to Computer Vision

Fall 2022-2023

Take Home Exam 1

Instance Recognition with Color Histograms

Student ID:

Please fill in the sections below only with the requested information. If you have additional things you want to mention, you can use the last section. For all of the configurations make sure that your quantization interval is divisible by 256 in order to obtain equal bins.

1 3D Color Histogram

In this section, give your results without dividing the images into grids. Your histogram must have at most 4096 bins. E.g. Assume that you choose 16 for quantization interval then you will have 16 bins for each channel and 4096 bins for your 3D color histogram.

- Pick 4 different quantization intervals and give your top-1 accuracy results for each of them on every query dataset.
- Explain the differences in results and possible causes of them if there are any.

2 Per Channel Color histogram

In this section, give your results without dividing the images into grids.

- Pick 5 different quantization intervals and give your top-1 accuracy results for each of them on every query dataset.
- Explain the differences in results and possible causes of them if there are any.

Before starting the next section, please pick up the best configuration for two properties above and continue with them.

3 Grid Based Feature Extraction - Query set 1

Give your top-1 accuracy for all of the configurations below.

3.1 2×2 spatial grid

- 3d color histogram:
- per-channel histogram:

3.2 4×4 spatial grid

- 3d color histogram:
- per-channel histogram:

3.3 6×6 spatial grid

- 3d color histogram:
- per-channel histogram:

3.4 8×8 spatial grid

- 3d color histogram:
- per-channel histogram:

3.5 Questions

- What do you think about the cause of the difference between the results?
- Explain the advantages/disadvantages of using grids in both types of histograms if there are any.

4 Grid Based Feature Extraction - Query set 2

Give your top-1 accuracy for all of the configurations below.

4.1 2×2 spatial grid

- 3d color histogram:
- per-channel histogram:

4.2 4×4 spatial grid

- 3d color histogram:
- per-channel histogram:

4.3 6×6 spatial grid

- 3d color histogram:
- per-channel histogram:

4.4 8×8 spatial grid

- 3d color histogram:
- per-channel histogram:

4.5 Questions

- What do you think about the cause of the difference between the results?
- Explain the advantages/disadvantages of using grids in both types of histograms if there are any.

5 Grid Based Feature Extraction - Query set 3

Give your top-1 accuracy for all of the configurations below.

5.1 2×2 spatial grid

- 3d color histogram:
- per-channel histogram:

5.2 4×4 spatial grid

- 3d color histogram:
- per-channel histogram:

5.3 6×6 spatial grid

- 3d color histogram:
- per-channel histogram:

5.4 8×8 spatial grid

- 3d color histogram:
- per-channel histogram:

5.5 Questions

- What do you think about the cause of the difference between the results?
- Explain the advantages/disadvantages of using grids in both types of histograms if there are any.

6 Additional Comments and References

(if there any)