VICKY VICKY
vicky.vicky@fau.de
ze45comu (23231674)
MSc. in AI

Report

Parameters Chosen for all the experiments (due to low computational power):
Number of Cluster: 32
Max Descriptors: 500000

Just for the better error handling and simplicity this code is in **two different files** (skeleton_bonus.py and skeleton_multi.py).

Task (E): Compare the result of given descriptors and newly calculated SIFT descriptors.

DATA	Given Descriptors		Bonus Descriptors	
Descriptors Selected	470776		488415	
Evaluate Test Encodings	Top 1: 0.8075	mAP: 0.606705	Top 1: 0.8027	mAP: 0.605158
Evaluate Train Encodings	Top 1: 0.8637	mAP: 0.782805	Top 1: 0.8680	mAP: 0.786352
Evaluate after ESVM	Top 1: 0.8797	mAP: 0.734852	Top 1: 0.8863	mAP: 0.745487

Normal Descriptors Results:

```
load data
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
train files size: 1182
train labels size: 1182
--------------------------------------------------------------------------------------------------
Going for loading random descriptors
100%|
> loaded 470776 descriptors:
> compute dictionary
Here for clustering the descriptors
Descriptors shape:(470776, 64) and cluster centers shape: (32, 64)
--------------------------------------------------------------------------------------------------
> compute VLAD for test
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
test files size: 3600
test label size: 3600
100%|
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate test encodings
Top-1 accuracy: 0.8075 - mAP: 0.6067051527460282
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> compute VLAD for train
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
train files size: 1182
train labels size: 1182
100%|
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate train encodings
Top-1 accuracy: 0.8637901861252115 - mAP: 0.7828053377219748
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> compute VLAD for train (for E-SVM)
Encodings shape: Test encodings 3600 and Train encodings1182
Number of CPUs:  12
multiprocessing
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate results after ESVM
Top-1 accuracy: 0.8797222222222222 - mAP: 0.7348523015178077
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
PS C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3>
```

Bonus Descriptors Results:

```
Calcuatng new bonus test encodings on bonus images
.............I am into the VLAD Bonus.............
100%|
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
<<<<<<<<<   evaluate test encodings    >>>>>>>>>>
3600 3600
Top-1 accuracy: 0.8027777777777778 - mAP: 0.6051580821267846
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
<<<<<<<<<    compute VLAD for train using BONUS images    >>>>>>>>>>
Calcuatng new bonus train encodings on bonus images
.............I am into the VLAD Bonus.............
100%|
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate train encodings this time with bonus
1182 1182
Top-1 accuracy: 0.868020304568528 - mAP: 0.7863522305442203
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> compute VLAD for train (for E-SVM)
Encodings shape: Test encodings 3600 and Train encodings 1182
Number of CPUs:  12
multiprocessing
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate results after ESVM
3600 3600
Top-1 accuracy: 0.8863888888888889 - mAP: 0.745487680715451
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
PS C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3>
```

Task (F): Compare the effect of GMP with and without Exemplar Classifier.

DATA	WITH GMP	
Descriptors Selected	470766	
Evaluate Test Encodings	Top 1: 0.8077	mAP: 0.606853
Evaluate Train Encodings (No ESVM)	Top 1: 0.8646	mAP: 0.783950
Evaluate after ESVM	Top 1: 0.8802	mAP: 0.735668

Effect of GMP on results:

```
<<<<<<<<<<<<<  TASK (F): The effects of GMP with ESVM  >>>>>>>>>>>>
load data
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
train files size: 1182
train labels size: 1182
---------------------------------------------------------------------------------------------------
Going for loading random descriptors
100%|
> loaded 470776 descriptors:
> compute dictionary
Here for clustering the descriptors
Descriptors shape:(470776, 64) and cluster centers shape: (32, 64)
---------------------------------------------------------------------------------------------------
> compute VLAD for test
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
test files size: 3600
test label size: 3600
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate test encodings
Top-1 accuracy: 0.8077777777777778 - mAP: 0.6068533361036232
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> compute VLAD for train
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
train files size: 1182
train labels size: 1182
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate train encodings
Top-1 accuracy: 0.8646362098138748 - mAP: 0.7839503949990007
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> compute VLAD for train (for E-SVM)
Encodings shape: Test encodings 3600 and Train encodings1182
Number of CPUs:  12
multiprocessing
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate results after ESVM
Top-1 accuracy: 0.8802777777777778 - mAP: 0.7356682565137423
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
PS C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3>
```

Task (G): Compare the effect of Multi-VLAD with VLAD.

DATA	Normal VLAD		MULTI-VLAD with PCA	
Descriptors Selected	470766		466916	
Evaluate Test Encodings	Top 1: 0.8077	mAP: 0.606853	Top 1: 0.8055	mAP: 0.603413
Evaluate Train Encodings (No ESVM)	Top 1: 0.8646	mAP: 0.783950	Top 1: 0.8663	mAP: 0.784507
Evaluate after ESVM	Top 1: 0.8802	mAP: 0.735668	Top 1: 0.7216	mAP: 0.520197

Multi-VLAD Results:

```
> compute VLAD for test
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
test files size: 3600
train files size: 1182
train labels size: 1182
----------------------------------------------------------------------------------------------------
> compute VLAD for test
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
test files size: 3600
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
test files size: 3600
test label size: 3600
test label size: 3600
test label size: 3600
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate test encodings
Top-1 accuracy: 0.8055555555555556 - mAP: 0.6034131935488489
> compute VLAD for train
current directory: C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3
train files size: 1182
train labels size: 1182
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate train encodings
Top-1 accuracy: 0.8663282571912013 - mAP: 0.7845071470761519
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
<<<<<<<<<<<<<   CALCULATNG ESVM   >>>>>>>>>>>>>>>>>>
> compute VLAD for train (for E-SVM)
Encodings shape: Test encodings: 3600 and Train encodings: 1182
<<<<<<<<<<<<<   PCA RUNNING   >>>>>>>>>>>>>>>>>>
Number of CPUs:  12
multiprocessing
-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
> evaluate results after ESVM
Top-1 accuracy: 0.7216666666666667 - mAP: 0.5201977639234663
*|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|**|
PS C:\Users\vicky\Downloads\Project_Computer_Vision\Project_3>
```