Experiments - Plots and models

Model: "vgg16"

Layer (type)	Output Shape	Param #
input_1 (InputLayer)	(None, 32, 32, 3)	0
block1_conv1 (Conv2D)	(None, 32, 32, 64)	1792
block1_conv2 (Conv2D)	(None, 32, 32, 64)	36928
block1_pool (MaxPooling2D)	(None, 16, 16, 64)	0
block2_conv1 (Conv2D)	(None, 16, 16, 128)	73856
block2_conv2 (Conv2D)	(None, 16, 16, 128)	147584
block2_pool (MaxPooling2D)	(None, 8, 8, 128)	0
block3_conv1 (Conv2D)	(None, 8, 8, 256)	295168
block3_conv2 (Conv2D)	(None, 8, 8, 256)	590080
block3_conv3 (Conv2D)	(None, 8, 8, 256)	590080
block3_pool (MaxPooling2D)	(None, 4, 4, 256)	0
block4_conv1 (Conv2D)	(None, 4, 4, 512)	1180160
block4_conv2 (Conv2D)	(None, 4, 4, 512)	2359808
block4_conv3 (Conv2D)	(None, 4, 4, 512)	2359808
block4_pool (MaxPooling2D)	(None, 2, 2, 512)	0
block5_conv1 (Conv2D)	(None, 2, 2, 512)	2359808
block5_conv2 (Conv2D)	(None, 2, 2, 512)	2359808
block5_conv3 (Conv2D)	(None, 2, 2, 512)	2359808
block5_pool (MaxPooling2D)	(None, 1, 1, 512)	0

Total params: 14,714,688
Trainable params: 14,714,688
Non-trainable params: 0

talgio block5_conv1

exp1 KNN

	precision	recall	f1-score	support
0	0.24	0.77	0.37	1014
1	0.74	0.59	0.66	1014
2	0.58	0.43	0.50	952
3	0.48	0.20	0.28	1016
4	0.51	0.44	0.47	997
5	0.60	0.41	0.49	1025
6	0.68	0.54	0.60	980
7	0.64	0.51	0.57	977
8	0.73	0.62	0.67	1003
9	0.67	0.59	0.63	1022
accuracy			0.51	10000
macro avg	0.59	0.51	0.52	10000
weighted avg	0.59	0.51	0.52	10000

exp2 SVM Linear

- **iter 1000**

	precision	recall	f1-score	support
0	0.65	0.55	0.59	1014
1	0.58	0.71	0.64	1014
2	0.40	0.44	0.42	952
3	0.33	0.49	0.39	1016
4	0.46	0.54	0.50	997
5	0.53	0.37	0.44	1025
6	0.60	0.58	0.59	980
7	0.55	0.52	0.53	977
8	0.82	0.54	0.65	1003
9	0.67	0.60	0.63	1022
accuracy			0.53	10000
macro avg	0.56	0.53	0.54	10000
weighted avg		0.56	0.53	0.54	10000

exp3 Logistic

- **CV 5**
- **iter 100**

	precision	recall	f1-score	support
0	0.72	0.70	0.71	1014
1	0.73	0.74	0.73	1014
2	0.60	0.58	0.59	952
3	0.54	0.49	0.51	1016
4	0.62	0.60	0.61	997
5	0.62	0.60	0.61	1025
6	0.70	0.74	0.72	980
7	0.66	0.70	0.68	977
8	0.74	0.79	0.76	1003
9	0.71	0.74	0.72	1022
accuracy			0.67	10000
macro avg	0.66	0.67	0.67	10000
weighted avg		0.66	0.67	0.67	10000

exp4 XGBoost

https://www.datacamp.com/community/tutorials/xgboost-in-python

	precision	recall	f1-score	support
0	0.67	0.66	0.66	1014
1	0.66	0.70	0.68	1014
2	0.52	0.48	0.50	952
3	0.48	0.46	0.47	1016
4	0.56	0.50	0.53	997
5	0.57	0.54	0.56	1025
6	0.63	0.70	0.66	980
7	0.61	0.62	0.62	977
8	0.68	0.72	0.70	1003
9	0.64	0.69	0.67	1022
accuracy			0.61	10000
macro avg	0.60	0.61	0.61	10000
weighted avg		0.60	0.61	0.61	10000

talgio block3_conv1

exp1

	precision	recall	f1-score	support
5	0.71	0.74	0.73	1022
6	0.82	0.84	0.83	980
7	0.78	0.76	0.77	975
8	0.89	0.86	0.87	1001
9	0.85	0.85	0.85	1022
accuracy			0.81	5000
weighted avg		0.81	0.81	0.81	5000

	precision	recall	f1-score	support
5	0.71	0.76	0.73	1000
6	0.84	0.85	0.84	1000
7	0.78	0.76	0.77	1000
8	0.87	0.86	0.86	1000
9	0.85	0.83	0.84	1000
accuracy			0.81	5000
weighted avg		0.81	0.81	0.81	5000

talgio block4_conv1

val

	precision	recall	f1-score	support
5	0.78	0.76	0.77	1022
6	0.84	0.89	0.87	980
7	0.83	0.77	0.80	975
8	0.88	0.90	0.89	1001
9	0.86	0.87	0.86	1022
accuracy			0.84	5000
weighted avg		0.84	0.84	0.84	5000

test

	precision	recall	f1-score	support
5	0.76	0.79	0.78	1000
6	0.87	0.85	0.86	1000
7	0.82	0.80	0.81	1000
8	0.85	0.90	0.88	1000
9	0.88	0.84	0.86	1000
accuracy			0.84	5000
weighted avg		0.84	0.84	0.84	5000

talgio block5_conv1

	precision	recall	f1-score	support
5	0.79	0.75	0.77	1022
6	0.83	0.87	0.85	980
7	0.79	0.77	0.78	975
8	0.87	0.86	0.87	1001
9	0.81	0.85	0.83	1022
accuracy			0.82	5000
weighted avg	0.82	0.82	0.82	5000

test

	precision	recall	f1-score	support
5	0.81	0.74	0.78	1000
6	0.85	0.89	0.87	1000
7	0.82	0.81	0.81	1000
8	0.86	0.89	0.88	1000
9	0.86	0.87	0.86	1000
accuracy			0.84	5000
weighted avg	0.84	0.84	0.84	5000

Model: ResNet50

Taglio: conv2_block3_out

```
Model: "sequential_1"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
model_1 (Model)              (None, 8, 8, 256)         229760
_________________________________________________________________
flatten_1 (Flatten)          (None, 16384)             0
=================================================================
Total params: 229,760
Trainable params: 226,816
```

```
Non-trainable params: 2,944
```

Normalizzazione delle features

	precision	recall	f1-score	support
5	0.87	0.84	0.85	1022
6	0.92	0.94	0.93	980
7	0.89	0.89	0.89	975
8	0.95	0.94	0.95	1001
9	0.92	0.93	0.93	1022
avg / total	0.91	0.91	0.91	5000

Taglio: conv3_block4_out

```
Model: "sequential_2"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
model_4 (Model)              (None, 4, 4, 512)         1460096
_________________________________________________________________
flatten_2 (Flatten)          (None, 8192)              0
=================================================================
Total params: 1,460,096
Trainable params: 1,449,984
Non-trainable params: 10,112
```

Normalizzazione delle features

	precision	recall	f1-score	support
5	0.88	0.87	0.88	1022
6	0.93	0.94	0.94	980
7	0.90	0.90	0.90	975
8	0.96	0.95	0.95	1001
9	0.94	0.94	0.94	1022
avg / total	0.92	0.92	0.92	5000

Test dopo retrain su intero dataset di features

	precision	recall	f1-score	support
5	0.88	0.86	0.87	1000
6	0.92	0.94	0.93	1000
7	0.90	0.90	0.90	1000
8	0.94	0.95	0.94	1000
9	0.94	0.93	0.94	1000
avg / total	0.92	0.92	0.92	5000

Taglio: conv4_block6_out

```
Model: "sequential_4"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
model_6 (Model)              (None, 1, 1, 2048)        23587712
_________________________________________________________________
flatten_4 (Flatten)          (None, 2048)              0
=================================================================
Total params: 23,587,712
Trainable params: 23,534,592
Non-trainable params: 53,120
```

Normalizzazione features

	precision	recall	f1-score	support
5	0.83	0.81	0.82	1022
6	0.89	0.91	0.90	980
7	0.85	0.84	0.85	975
8	0.91	0.92	0.92	1001
9	0.90	0.90	0.90	1022
avg / total	0.87	0.87	0.87	5000

Test dopo retrain su intero dataset di features

	precision	recall	f1-score	support
5	0.82	0.82	0.82	1000
6	0.90	0.90	0.90	1000
7	0.85	0.84	0.84	1000
8	0.93	0.92	0.92	1000
9	0.90	0.90	0.90	1000
avg / total	0.88	0.88	0.88	5000

Taglio: conv5_block3_out

```
Model
l: "sequential_4"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
model_6 (Model)              (None, 1, 1, 2048)        23587712
_________________________________________________________________
flatten_4 (Flatten)          (None, 2048)              0
=================================================================
Total params: 23,587,712
Trainable params: 23,534,592
Non-trainable params: 53,120
```

Normalizzazione features

	precision	recall	f1-score	support
5	0.73	0.73	0.73	1022
6	0.82	0.86	0.84	980
7	0.81	0.71	0.76	975
8	0.86	0.83	0.84	1001
9	0.79	0.87	0.83	1022
avg / total	0.80	0.80	0.80	5000

Test dopo retrain su intero dataset di features

	precision	recall	f1-score	support
5	0.80	0.70	0.74	1000
6	0.84	0.84	0.84	1000
7	0.74	0.80	0.77	1000
8	0.84	0.87	0.86	1000
9	0.82	0.83	0.83	1000
avg / total	0.81	0.81	0.81	5000