```
C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\python.exe C:\Users\Luka\AppData\Local\JetBrains\Toolbox\apps\PyCharm-P\ch-0\212.5284.44\plugins\python\helpers\pydev\pydevd.py --multiproc --qt-support=auto --client 127.0.0.1 --port 51584 --file "C:/Luka/School/Master/1st Year/(ML) Machine Learning/Article2/Sentiment-Analysis-ML/scripts/evaluation.py"
Connected to pydev debugger (build 212.5284.44)
2021-12-30 05:58:51.630511: I tensorflow/core/platform/cpu_feature_guard.cc:151] This TensorFlow binary is optimized with oneAPI Deep Neural Network Library (oneDNN) to use the following CPU instructions in performance-critical operations:  AVX  AVX2
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
2021-12-30 05:58:54.160446: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1525] Created device  /job:localhost/replica:0/task:0/device:GPU:0 with 4626 MB memory:  -> device: 0, name: NVIDIA GeForce GTX 1060, pci bus id: 0000:01:00.0, compute capability: 6.1
1 Physical GPUs, 1 Logical GPUs
(timer) readData executed in: 3.507477045059204 seconds
(timer) preprocessingData: 34.21279764175415 seconds
(timer) fitClassifier executed in: 50.730093240737915  seconds
{'train': {'accuracy': 0.85459375, 'precision': 0.85483771251932, 'recall': 0.8571162906025291, 'f1_score': 0.8559754851889684}, 'test': {'accuracy': 0.733375, 'precision': 0.7392739273927392, 'recall': 0.7247386759581882, 'f1_score': 0.7319341460349378}, 'cv_train': [{'accuracy': 0.8579861111111111, 'precision': 0.8586956521739131, 'recall': 0.8597602975616476, 'f1_score': 0.8592276450746885}, {'accuracy': 0.8573263888888889, 'precision': 0.8589557900544865, 'recall': 0.8578316572530652, 'f1_score': 0.8583933556191198}, {'accuracy': 0.8565277777777778, 'precision': 0.8575559380378658, 'recall': 0.857910324402507, 'f1_score': 0.
```

```
10 8577330946150667}, {'accuracy': 0.8567361111111111, '
   precision': 0.8571723142484019, 'recall': 0.
   858943453405882, 'f1_score': 0.8580569698637677}, {'
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   8562190423775454, 'recall': 0.8572215717335905, '
   f1_score': 0.8567200137669936}, {'accuracy': 0.
   8566666666666667, 'precision': 0.8563198683217886, '
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   8589160115846091, 'recall': 0.857910324402507, '
   f1_score': 0.858412873436477}, {'accuracy': 0.
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   recall': 0.8608030856119567, 'f1_score': 0.
   8597372222604388}, {'accuracy': 0.8587847222222222, '
   precision': 0.8595211887727022, 'recall': 0.
   8605275845443902, 'f1_score': 0.8600240922388573}], '
   cv_test': [{'accuracy': 0.7359375, 'precision': 0.
   7410658307210032, 'recall': 0.7323420074349443, '
   f1_score': 0.7366780928638206}, {'accuracy': 0.733125
   , 'precision': 0.7380952380952381, 'recall': 0.
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   , 'recall': 0.7420954742715437, 'f1_score': 0.
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   ': 0.7368421052631579, 'recall': 0.755114693118413, '
   f1_score': 0.7458665033680343}, {'accuracy': 0.
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   .7383756974581525, 'f1_score': 0.7446076899030947
   }, {'accuracy': 0.7303125, 'precision': 0.
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   f1_score': 0.7287016661427226}, {'accuracy': 0.
   7321875, 'precision': 0.7296476306196841, 'recall': 0
   .7445753254804711, 'f1_score': 0.737035900583001}, {'
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   , 'recall': 0.7210167389956602, 'f1_score': 0.
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   , 'f1_score': 0.7248073959938367}, {'accuracy': 0.
```

```
10 7371875, 'precision': 0.7382716049382716, 'recall': 0
   .7414755114693118, 'f1_score': 0.7398700896999691}]}
11 Some weights of the model checkpoint at bert-base-
   uncased were not used when initializing BertModel: ['
   cls.predictions.transform.dense.bias', 'cls.
   predictions.transform.LayerNorm.weight', 'cls.
   seq_relationship.weight', 'cls.predictions.bias', '
   cls.predictions.transform.dense.weight', 'cls.
   seq_relationship.bias', 'cls.predictions.decoder.
   weight', 'cls.predictions.transform.LayerNorm.bias']
12 - This IS expected if you are initializing BertModel
   from the checkpoint of a model trained on another
   task or with another architecture (e.g. initializing
   a BertForSequenceClassification model from a
   BertForPreTraining model).
13 - This IS NOT expected if you are initializing
   BertModel from the checkpoint of a model that you
   expect to be exactly identical (initializing a
   BertForSequenceClassification model from a
   BertForSequenceClassification model).
14 Truncation was not explicitly activated but `
   max_length` is provided a specific value, please use
    `truncation=True` to explicitly truncate examples to
    max length. Defaulting to 'longest_first' truncation
    strategy. If you encode pairs of sequences (GLUE-
   style) with the tokenizer you can select this
   strategy more precisely by providing a specific
   strategy to `truncation`.
15 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
   lib\site-packages\transformers\
   tokenization_utils_base.py:2212: FutureWarning: The `
   pad_to_max_length` argument is deprecated and will be
    removed in a future version, use `padding=True` or `
   padding='longest'` to pad to the longest sequence in
   the batch, or use `padding='max_length'` to pad to a
   max length. In this case, you can give a specific
   length with `max_length` (e.g. `max_length=45`) or
   leave max_length to None to pad to the maximal input
   size of the model (e.g. 512 for Bert).
16   warnings.warn(
17  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
```

```
17 Acc  |  Elapsed
18 ------------------------------------------------------------
   -----------------
19    1    |   20    |   0.692231
      |      -       |      -      |   20.94
20    1    |   40    |   0.671560
      |      -       |      -      |   10.09
21    1    |   60    |   0.605120
      |      -       |      -      |   10.12
22    1    |   80    |   0.582032
      |      -       |      -      |   10.22
23    1    |   100   |   0.544844
      |      -       |      -      |   10.19
24    1    |   120   |   0.539230
      |      -       |      -      |   10.23
25    1    |   140   |   0.536396
      |      -       |      -      |   10.26
26    1    |   160   |   0.574289
      |      -       |      -      |   10.27
27    1    |   180   |   0.533550
      |      -       |      -      |   10.28
28    1    |   200   |   0.506550
      |      -       |      -      |   10.31
29    1    |   220   |   0.529257
      |      -       |      -      |   10.36
30    1    |   240   |   0.537700
      |      -       |      -      |   10.57
31    1    |   260   |   0.520680
      |      -       |      -      |   10.90
32    1    |   280   |   0.507867
      |      -       |      -      |   10.75
33    1    |   300   |   0.482791
      |      -       |      -      |   11.03
34    1    |   320   |   0.492750
      |      -       |      -      |   11.30
35    1    |   340   |   0.494016
      |      -       |      -      |   11.02
36    1    |   360   |   0.510996
      |      -       |      -      |   11.02
37    1    |   380   |   0.514771
      |      -       |      -      |   11.49
```

38	1	400	0.512893		
	-		-		11.11
39	1	420	0.483956		
	-		-		11.38
40	1	440	0.459120		
	-		-		11.60
41	1	460	0.479099		
	-		-		11.56
42	1	480	0.497371		
	-		-		11.61
43	1	500	0.492855		
	-		-		11.57
44	1	520	0.496376		
	-		-		11.57
45	1	540	0.505967		
	-		-		11.58
46	1	560	0.502891		
	-		-		11.59
47	1	580	0.494732		
	-		-		11.57
48	1	600	0.497370		
	-		-		11.57
49	1	620	0.450674		
	-		-		11.58
50	1	640	0.499283		
	-		-		11.57
51	1	660	0.461807		
	-		-		12.12
52	1	680	0.446440		
	-		-		12.02
53	1	700	0.482828		
	-		-		11.71
54	1	720	0.481877		
	-		-		11.71
55	1	740	0.454150		
	-		-		11.70
56	1	760	0.474821		
	-		-		12.20
57	1	780	0.488277		
	-		-		12.41
58	1	800	0.460091		

```
58    |      -       |     -      |   12.03
59    1    |   820   |   0.471917
      |      -       |     -      |   11.67
60    1    |   840   |   0.498135
      |      -       |     -      |   11.69
61    1    |   860   |   0.463155
      |      -       |     -      |   12.36
62    1    |   880   |   0.476368
      |      -       |     -      |   11.98
63    1    |   900   |   0.491687
      |      -       |     -      |   11.99
64    1    |   920   |   0.474828
      |      -       |     -      |   11.97
65    1    |   940   |   0.481904
      |      -       |     -      |   11.98
66    1    |   960   |   0.459641
      |      -       |     -      |   11.99
67    1    |   980   |   0.481494
      |      -       |     -      |   11.98
68    1    |   999   |   0.494964
      |      -       |     -      |   11.40
69 ------------------------------------------------------------
   -----------------
70    1    |    -    |   0.506069   |  0.470546  |   77.
   41   |  627.46
71 ------------------------------------------------------------
   -----------------
72
73
74  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
   Acc  |  Elapsed
75 ------------------------------------------------------------
   -----------------
76    2    |   20    |   0.354535
      |      -       |     -      |   12.66
77    2    |   40    |   0.419674
      |      -       |     -      |   12.38
78    2    |   60    |   0.395647
      |      -       |     -      |   12.39
79    2    |   80    |   0.367879
      |      -       |     -      |   12.40
```

80	2	100	0.435273		
		-	-	12.38	
81	2	120	0.397770		
		-	-	12.36	
82	2	140	0.367983		
		-	-	12.38	
83	2	160	0.414592		
		-	-	12.38	
84	2	180	0.441356		
		-	-	12.37	
85	2	200	0.392702		
		-	-	12.19	
86	2	220	0.368070		
		-	-	11.68	
87	2	240	0.431660		
		-	-	12.98	
88	2	260	0.427901		
		-	-	12.61	
89	2	280	0.378858		
		-	-	12.58	
90	2	300	0.396580		
		-	-	12.15	
91	2	320	0.416332		
		-	-	11.81	
92	2	340	0.430674		
		-	-	12.33	
93	2	360	0.382277		
		-	-	12.46	
94	2	380	0.413911		
		-	-	12.42	
95	2	400	0.400895		
		-	-	12.42	
96	2	420	0.399359		
		-	-	12.42	
97	2	440	0.389519		
		-	-	12.43	
98	2	460	0.412689		
		-	-	12.44	
99	2	480	0.367652		
		-	-	12.44	
100	2	500	0.393812		

100		-	-	12.43
101	2	520	0.372851	
		-	-	12.41
102	2	540	0.359460	
		-	-	12.44
103	2	560	0.388363	
		-	-	12.42
104	2	580	0.427738	
		-	-	12.44
105	2	600	0.394736	
		-	-	12.45
106	2	620	0.369067	
		-	-	12.44
107	2	640	0.370288	
		-	-	12.35
108	2	660	0.424661	
		-	-	11.78
109	2	680	0.389776	
		-	-	12.49
110	2	700	0.424625	
		-	-	12.63
111	2	720	0.390484	
		-	-	12.05
112	2	740	0.350804	
		-	-	12.06
113	2	760	0.418630	
		-	-	12.05
114	2	780	0.396031	
		-	-	13.49
115	2	800	0.393759	
		-	-	12.52
116	2	820	0.370503	
		-	-	12.33
117	2	840	0.423114	
		-	-	12.33
118	2	860	0.438496	
		-	-	12.32
119	2	880	0.352830	
		-	-	12.31
120	2	900	0.364824	
		-	-	12.31

```
121    2    |   920   |   0.409276
       |     -       |     -     |   12.31
122    2    |   940   |   0.365490
       |     -       |     -     |   12.33
123    2    |   960   |   0.388702
       |     -       |     -     |   12.32
124    2    |   980   |   0.381814
       |     -       |     -     |   12.34
125    2    |   999   |   0.402730
       |     -       |     -     |   11.71
126 ------------------------------------------------------------
    ------------------
127    2    |    -    |   0.395285   |  0.487144  |   77
    .66   |  670.82
128 ------------------------------------------------------------
    ------------------
129
130
131  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
132 ------------------------------------------------------------
    ------------------
133    3    |   20    |   0.306172
       |     -       |     -     |   12.94
134    3    |   40    |   0.304386
       |     -       |     -     |   12.67
135    3    |   60    |   0.275570
       |     -       |     -     |   12.67
136    3    |   80    |   0.298318
       |     -       |     -     |   12.64
137    3    |   100   |   0.301653
       |     -       |     -     |   12.68
138    3    |   120   |   0.303453
       |     -       |     -     |   12.66
139    3    |   140   |   0.303633
       |     -       |     -     |   12.66
140    3    |   160   |   0.289975
       |     -       |     -     |   12.67
141    3    |   180   |   0.344945
       |     -       |     -     |   12.64
142    3    |   200   |   0.328969
```

142		-	-	12.65
143	3	220	0.260468	
		-	-	12.69
144	3	240	0.271486	
		-	-	12.68
145	3	260	0.290213	
		-	-	12.67
146	3	280	0.282056	
		-	-	12.67
147	3	300	0.297815	
		-	-	12.59
148	3	320	0.280304	
		-	-	11.85
149	3	340	0.307260	
		-	-	13.14
150	3	360	0.295478	
		-	-	12.48
151	3	380	0.317447	
		-	-	12.56
152	3	400	0.271049	
		-	-	12.55
153	3	420	0.306381	
		-	-	12.11
154	3	440	0.347069	
		-	-	12.31
155	3	460	0.338954	
		-	-	12.57
156	3	480	0.293989	
		-	-	12.55
157	3	500	0.275510	
		-	-	12.57
158	3	520	0.268233	
		-	-	12.58
159	3	540	0.267381	
		-	-	12.57
160	3	560	0.270023	
		-	-	12.59
161	3	580	0.278361	
		-	-	12.59
162	3	600	0.341630	
		-	-	12.59

```
163    3    |   620   |   0.333080
       |     -       |     -     |   12.58
164    3    |   640   |   0.345428
       |     -       |     -     |   12.58
165    3    |   660   |   0.289677
       |     -       |     -     |   12.59
166    3    |   680   |   0.258956
       |     -       |     -     |   12.58
167    3    |   700   |   0.315876
       |     -       |     -     |   12.58
168    3    |   720   |   0.291330
       |     -       |     -     |   12.59
169    3    |   740   |   0.303331
       |     -       |     -     |   12.59
170    3    |   760   |   0.288236
       |     -       |     -     |   12.61
171    3    |   780   |   0.272017
       |     -       |     -     |   12.54
172    3    |   800   |   0.313608
       |     -       |     -     |   12.57
173    3    |   820   |   0.304815
       |     -       |     -     |   12.55
174    3    |   840   |   0.308392
       |     -       |     -     |   12.60
175    3    |   860   |   0.291625
       |     -       |     -     |   12.59
176    3    |   880   |   0.283195
       |     -       |     -     |   12.59
177    3    |   900   |   0.294736
       |     -       |     -     |   12.59
178    3    |   920   |   0.289768
       |     -       |     -     |   12.56
179    3    |   940   |   0.260066
       |     -       |     -     |   12.58
180    3    |   960   |   0.348855
       |     -       |     -     |   12.56
181    3    |   980   |   0.315565
       |     -       |     -     |   12.60
182    3    |   999   |   0.287178
       |     -       |     -     |   11.97
183 ------------------------------------------------------
```

```
183 ------------------
184    3    |    -    |   0.298297   |  0.557065  |   77
    .74   |  681.70
185 ----------------------------------------------------
    ------------------
186
187
188  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
189 ----------------------------------------------------
    ------------------
190    4    |   20    |   0.214639
       |      -      |      -     |   13.19
191    4    |   40    |   0.234477
       |      -      |      -     |   12.51
192    4    |   60    |   0.259720
       |      -      |      -     |   12.49
193    4    |   80    |   0.274435
       |      -      |      -     |   12.53
194    4    |   100   |   0.223619
       |      -      |      -     |   12.48
195    4    |   120   |   0.202978
       |      -      |      -     |   12.50
196    4    |   140   |   0.224948
       |      -      |      -     |   12.49
197    4    |   160   |   0.216146
       |      -      |      -     |   12.47
198    4    |   180   |   0.231127
       |      -      |      -     |   12.49
199    4    |   200   |   0.180173
       |      -      |      -     |   12.50
200    4    |   220   |   0.222082
       |      -      |      -     |   12.50
201    4    |   240   |   0.222706
       |      -      |      -     |   12.53
202    4    |   260   |   0.209486
       |      -      |      -     |   12.50
203    4    |   280   |   0.231853
       |      -      |      -     |   12.51
204    4    |   300   |   0.228859
       |      -      |      -     |   12.48
```

205	4	320	0.181592		
		-	-	12.47	
206	4	340	0.203364		
		-	-	12.46	
207	4	360	0.228251		
		-	-	12.48	
208	4	380	0.206874		
		-	-	12.51	
209	4	400	0.221261		
		-	-	12.49	
210	4	420	0.222559		
		-	-	12.49	
211	4	440	0.248452		
		-	-	12.49	
212	4	460	0.228383		
		-	-	12.47	
213	4	480	0.194865		
		-	-	12.48	
214	4	500	0.273256		
		-	-	12.52	
215	4	520	0.206313		
		-	-	12.48	
216	4	540	0.207024		
		-	-	12.47	
217	4	560	0.213719		
		-	-	12.50	
218	4	580	0.272411		
		-	-	12.49	
219	4	600	0.261201		
		-	-	12.51	
220	4	620	0.205656		
		-	-	12.48	
221	4	640	0.202289		
		-	-	12.49	
222	4	660	0.207915		
		-	-	12.51	
223	4	680	0.223406		
		-	-	12.49	
224	4	700	0.183909		
		-	-	12.50	
225	4	720	0.256024		

```
225     |      -       |      -      |   12.49
226     4     |   740    |   0.198128
        |      -       |      -      |   12.47
227     4     |   760    |   0.257717
        |      -       |      -      |   12.47
228     4     |   780    |   0.221397
        |      -       |      -      |   12.49
229     4     |   800    |   0.235968
        |      -       |      -      |   12.51
230     4     |   820    |   0.198694
        |      -       |      -      |   12.48
231     4     |   840    |   0.217440
        |      -       |      -      |   12.46
232     4     |   860    |   0.239265
        |      -       |      -      |   12.47
233     4     |   880    |   0.209970
        |      -       |      -      |   12.49
234     4     |   900    |   0.218259
        |      -       |      -      |   12.47
235     4     |   920    |   0.203272
        |      -       |      -      |   12.49
236     4     |   940    |   0.266587
        |      -       |      -      |   13.47
237     4     |   960    |   0.231977
        |      -       |      -      |   12.07
238     4     |   980    |   0.208004
        |      -       |      -      |   12.63
239     4     |   999    |   0.256839
        |      -       |      -      |   12.01
240 ------------------------------------------------------
    ------------------
241    4     |    -     |   0.223748   |  0.640918  |   77
    .49   |  677.69
242 ------------------------------------------------------
    ------------------
243
244
245 (timer) fitClassifier executed in: 2695.
    5697576999664 seconds
246 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
    lib\site-packages\transformers\
```

```
246 tokenization_utils_base.py:2212: FutureWarning: The
     `pad_to_max_length` argument is deprecated and will
     be removed in a future version, use `padding=True`
    or `padding='longest'` to pad to the longest
    sequence in the batch, or use `padding='max_length
    '` to pad to a max length. In this case, you can
    give a specific length with `max_length` (e.g. `
    max_length=45`) or leave max_length to None to pad
    to the maximal input size of the model (e.g. 512 for
     Bert).
247   warnings.warn(
248 Some weights of the model checkpoint at bert-base-
    uncased were not used when initializing BertModel
    : ['cls.predictions.transform.dense.bias', 'cls.
    predictions.transform.LayerNorm.weight', 'cls.
    seq_relationship.weight', 'cls.predictions.bias', '
    cls.predictions.transform.dense.weight', 'cls.
    seq_relationship.bias', 'cls.predictions.decoder.
    weight', 'cls.predictions.transform.LayerNorm.bias']
249 - This IS expected if you are initializing BertModel
     from the checkpoint of a model trained on another
    task or with another architecture (e.g. initializing
     a BertForSequenceClassification model from a
    BertForPreTraining model).
250 - This IS NOT expected if you are initializing
    BertModel from the checkpoint of a model that you
    expect to be exactly identical (initializing a
    BertForSequenceClassification model from a
    BertForSequenceClassification model).
251 Truncation was not explicitly activated but `
    max_length` is provided a specific value, please use
     `truncation=True` to explicitly truncate examples
    to max length. Defaulting to 'longest_first'
    truncation strategy. If you encode pairs of
    sequences (GLUE-style) with the tokenizer you can
    select this strategy more precisely by providing a
    specific strategy to `truncation`.
252 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
    lib\site-packages\transformers\
    tokenization_utils_base.py:2212: FutureWarning: The
     `pad_to_max_length` argument is deprecated and will
```

```
252  be removed in a future version, use `padding=True`
    or `padding='longest'` to pad to the longest
    sequence in the batch, or use `padding='max_length
    '` to pad to a max length. In this case, you can
    give a specific length with `max_length` (e.g. `
    max_length=45`) or leave max_length to None to pad
    to the maximal input size of the model (e.g. 512 for
     Bert).
253   warnings.warn(
254  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
255 ----------------------------------------------------
    ------------------
256    1    |   20    |   0.687566
       |      -      |     -     |   10.67
257    1    |   40    |   0.663585
       |      -      |     -     |   10.29
258    1    |   60    |   0.651056
       |      -      |     -     |   11.65
259    1    |   80    |   0.593554
       |      -      |     -     |   11.70
260    1    |   100   |   0.526083
       |      -      |     -     |   11.73
261    1    |   120   |   0.522128
       |      -      |     -     |   11.80
262    1    |   140   |   0.515188
       |      -      |     -     |   12.63
263    1    |   160   |   0.501192
       |      -      |     -     |   12.42
264    1    |   180   |   0.529015
       |      -      |     -     |   11.88
265    1    |   200   |   0.515885
       |      -      |     -     |   12.14
266    1    |   220   |   0.535863
       |      -      |     -     |   12.17
267    1    |   240   |   0.500393
       |      -      |     -     |   12.79
268    1    |   260   |   0.543988
       |      -      |     -     |   12.78
269    1    |   280   |   0.511013
       |      -      |     -     |   12.75
```

270	1	300	0.502357		
	-		-	12.74	
271	1	320	0.482140		
	-		-	12.47	
272	1	340	0.489306		
	-		-	11.92	
273	1	360	0.476733		
	-		-	12.84	
274	1	380	0.499663		
	-		-	12.53	
275	1	400	0.483370		
	-		-	12.16	
276	1	420	0.482391		
	-		-	12.98	
277	1	440	0.491816		
	-		-	12.73	
278	1	460	0.530909		
	-		-	12.57	
279	1	480	0.513058		
	-		-	12.60	
280	1	500	0.421564		
	-		-	12.61	
281	1	520	0.532813		
	-		-	12.55	
282	1	540	0.488893		
	-		-	12.57	
283	1	560	0.522501		
	-		-	12.59	
284	1	580	0.485132		
	-		-	12.54	
285	1	600	0.494432		
	-		-	12.59	
286	1	620	0.522188		
	-		-	12.55	
287	1	640	0.466239		
	-		-	12.57	
288	1	660	0.481575		
	-		-	12.57	
289	1	680	0.486572		
	-		-	12.56	
290	1	700	0.479263		

```
290     |      -       |      -      |   12.61
291     1     |   720    |   0.488359
        |      -       |      -      |   12.57
292     1     |   740    |   0.499139
        |      -       |      -      |   12.58
293     1     |   760    |   0.481544
        |      -       |      -      |   12.62
294     1     |   780    |   0.452302
        |      -       |      -      |   12.56
295     1     |   800    |   0.465144
        |      -       |      -      |   12.59
296     1     |   820    |   0.491525
        |      -       |      -      |   12.61
297     1     |   840    |   0.449895
        |      -       |      -      |   12.58
298     1     |   860    |   0.494376
        |      -       |      -      |   12.59
299     1     |   880    |   0.450728
        |      -       |      -      |   12.58
300     1     |   899    |   0.469337
        |      -       |      -      |   11.97
301 ------------------------------------------------------------
    ------------------
302     1     |    -     |   0.508504    |  0.487157  |   77
    .00    |  577.52
303 ------------------------------------------------------------
    ------------------
304
305
306  Epoch   |  Batch   |  Train Loss   |  Val Loss  |  Val
     Acc   |  Elapsed
307 ------------------------------------------------------------
    ------------------
308     2     |   20     |   0.402851
        |      -       |      -      |   12.85
309     2     |   40     |   0.410972
        |      -       |      -      |   12.57
310     2     |   60     |   0.419373
        |      -       |      -      |   12.55
311     2     |   80     |   0.408111
        |      -       |      -      |   12.59
```

312	2	100	0.399211		
	-		-	12.57	
313	2	120	0.384557		
	-		-	12.58	
314	2	140	0.422244		
	-		-	12.58	
315	2	160	0.409745		
	-		-	12.57	
316	2	180	0.397101		
	-		-	12.60	
317	2	200	0.406557		
	-		-	12.59	
318	2	220	0.385347		
	-		-	12.58	
319	2	240	0.400924		
	-		-	12.56	
320	2	260	0.413336		
	-		-	12.60	
321	2	280	0.404299		
	-		-	12.59	
322	2	300	0.354218		
	-		-	12.57	
323	2	320	0.407293		
	-		-	12.58	
324	2	340	0.405357		
	-		-	12.58	
325	2	360	0.378452		
	-		-	12.59	
326	2	380	0.427261		
	-		-	12.57	
327	2	400	0.372385		
	-		-	12.57	
328	2	420	0.401605		
	-		-	12.56	
329	2	440	0.406123		
	-		-	12.59	
330	2	460	0.368094		
	-		-	12.57	
331	2	480	0.405657		
	-		-	12.55	
332	2	500	0.414187		

332		-	-	12.59
333	2	520	0.360268	
		-	-	12.58
334	2	540	0.385130	
		-	-	12.59
335	2	560	0.384050	
		-	-	12.58
336	2	580	0.387184	
		-	-	12.59
337	2	600	0.336180	
		-	-	12.57
338	2	620	0.389302	
		-	-	12.56
339	2	640	0.411391	
		-	-	12.58
340	2	660	0.382567	
		-	-	12.60
341	2	680	0.417986	
		-	-	12.60
342	2	700	0.393186	
		-	-	12.60
343	2	720	0.388231	
		-	-	12.58
344	2	740	0.388142	
		-	-	12.60
345	2	760	0.415291	
		-	-	12.56
346	2	780	0.381098	
		-	-	12.58
347	2	800	0.406876	
		-	-	12.59
348	2	820	0.414426	
		-	-	12.56
349	2	840	0.416542	
		-	-	12.57
350	2	860	0.393860	
		-	-	12.57
351	2	880	0.389428	
		-	-	12.60
352	2	899	0.383274	
		-	-	11.95

```
353 ------------------------------------------------------------
    ------------------
354    2    |    -    |   0.396237   |  0.490876  |   76
    .94   |  586.70
355 ------------------------------------------------------------
    ------------------
356
357
358  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
359 ------------------------------------------------------------
    ------------------
360    3    |   20    |   0.291074
       |      -      |      -     |   12.85
361    3    |   40    |   0.286291
       |      -      |      -     |   12.60
362    3    |   60    |   0.280726
       |      -      |      -     |   12.61
363    3    |   80    |   0.297927
       |      -      |      -     |   12.58
364    3    |   100   |   0.294966
       |      -      |      -     |   12.60
365    3    |   120   |   0.277407
       |      -      |      -     |   12.59
366    3    |   140   |   0.281326
       |      -      |      -     |   12.56
367    3    |   160   |   0.280161
       |      -      |      -     |   12.58
368    3    |   180   |   0.288106
       |      -      |      -     |   12.57
369    3    |   200   |   0.276228
       |      -      |      -     |   12.60
370    3    |   220   |   0.330185
       |      -      |      -     |   12.59
371    3    |   240   |   0.309840
       |      -      |      -     |   12.58
372    3    |   260   |   0.298168
       |      -      |      -     |   12.59
373    3    |   280   |   0.317542
       |      -      |      -     |   12.57
374    3    |   300   |   0.281399
```

374		-	-	12.60
375	3	320	0.302715	
		-	-	12.59
376	3	340	0.284477	
		-	-	12.60
377	3	360	0.263657	
		-	-	12.58
378	3	380	0.300859	
		-	-	12.59
379	3	400	0.309254	
		-	-	12.61
380	3	420	0.295832	
		-	-	12.59
381	3	440	0.291238	
		-	-	12.59
382	3	460	0.299857	
		-	-	12.60
383	3	480	0.308856	
		-	-	12.59
384	3	500	0.286544	
		-	-	12.60
385	3	520	0.280433	
		-	-	12.61
386	3	540	0.263715	
		-	-	12.58
387	3	560	0.347160	
		-	-	12.59
388	3	580	0.308759	
		-	-	12.59
389	3	600	0.270541	
		-	-	12.59
390	3	620	0.315901	
		-	-	12.60
391	3	640	0.288846	
		-	-	12.56
392	3	660	0.312849	
		-	-	12.57
393	3	680	0.286581	
		-	-	12.58
394	3	700	0.263490	
		-	-	12.61

```
395    3    |   720   |   0.285656
       |     -       |     -     |   12.59
396    3    |   740   |   0.349845
       |     -       |     -     |   12.60
397    3    |   760   |   0.294868
       |     -       |     -     |   12.60
398    3    |   780   |   0.253335
       |     -       |     -     |   12.59
399    3    |   800   |   0.308203
       |     -       |     -     |   12.58
400    3    |   820   |   0.251648
       |     -       |     -     |   12.59
401    3    |   840   |   0.341094
       |     -       |     -     |   12.54
402    3    |   860   |   0.283987
       |     -       |     -     |   12.58
403    3    |   880   |   0.238539
       |     -       |     -     |   12.60
404    3    |   899   |   0.311036
       |     -       |     -     |   11.96
405 ------------------------------------------------------------
    ------------------
406    3    |    -    |   0.293114   |  0.594655  |   76
    .50   |  587.09
407 ------------------------------------------------------------
    ------------------
408
409
410  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
411 ------------------------------------------------------------
    ------------------
412    4    |   20    |   0.228964
       |     -       |     -     |   12.85
413    4    |   40    |   0.207829
       |     -       |     -     |   12.59
414    4    |   60    |   0.271237
       |     -       |     -     |   12.57
415    4    |   80    |   0.195905
       |     -       |     -     |   12.57
416    4    |   100   |   0.221489
```

```
416     |      -       |      -      |   12.62
417     4     |   120    |   0.259342
        |      -       |      -      |   12.58
418     4     |   140    |   0.193910
        |      -       |      -      |   12.55
419     4     |   160    |   0.262748
        |      -       |      -      |   12.57
420     4     |   180    |   0.209725
        |      -       |      -      |   12.57
421     4     |   200    |   0.227861
        |      -       |      -      |   12.61
422     4     |   220    |   0.204253
        |      -       |      -      |   12.63
423     4     |   240    |   0.253467
        |      -       |      -      |   12.67
424     4     |   260    |   0.225060
        |      -       |      -      |   12.56
425     4     |   280    |   0.178964
        |      -       |      -      |   12.60
426     4     |   300    |   0.248202
        |      -       |      -      |   12.61
427     4     |   320    |   0.207839
        |      -       |      -      |   12.81
428     4     |   340    |   0.212159
        |      -       |      -      |   13.28
429     4     |   360    |   0.184884
        |      -       |      -      |   12.59
430     4     |   380    |   0.168733
        |      -       |      -      |   12.55
431     4     |   400    |   0.213473
        |      -       |      -      |   12.63
432     4     |   420    |   0.182900
        |      -       |      -      |   12.57
433     4     |   440    |   0.235523
        |      -       |      -      |   12.61
434     4     |   460    |   0.223632
        |      -       |      -      |   12.57
435     4     |   480    |   0.227448
        |      -       |      -      |   12.59
436     4     |   500    |   0.194338
        |      -       |      -      |   12.59
```

```
437    4    |   520   |   0.234477
       |     -       |     -     |   12.60
438    4    |   540   |   0.218189
       |     -       |     -     |   12.56
439    4    |   560   |   0.190043
       |     -       |     -     |   12.59
440    4    |   580   |   0.205472
       |     -       |     -     |   12.60
441    4    |   600   |   0.218057
       |     -       |     -     |   12.58
442    4    |   620   |   0.213016
       |     -       |     -     |   12.57
443    4    |   640   |   0.227681
       |     -       |     -     |   12.59
444    4    |   660   |   0.208106
       |     -       |     -     |   12.59
445    4    |   680   |   0.232536
       |     -       |     -     |   12.56
446    4    |   700   |   0.240877
       |     -       |     -     |   12.60
447    4    |   720   |   0.240069
       |     -       |     -     |   12.60
448    4    |   740   |   0.223087
       |     -       |     -     |   12.62
449    4    |   760   |   0.209048
       |     -       |     -     |   12.57
450    4    |   780   |   0.224840
       |     -       |     -     |   12.56
451    4    |   800   |   0.236480
       |     -       |     -     |   12.58
452    4    |   820   |   0.243194
       |     -       |     -     |   12.60
453    4    |   840   |   0.202096
       |     -       |     -     |   12.57
454    4    |   860   |   0.192663
       |     -       |     -     |   12.60
455    4    |   880   |   0.231062
       |     -       |     -     |   12.59
456    4    |   899   |   0.189473
       |     -       |     -     |   11.97
457 ------------------------------------------------------
```

```
457 ------------------
458    4    |    -    |   0.218274   |  0.643356  |   76
    .06   |  588.01
459 ----------------------------------------------------
    ------------------
460
461
462 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
    lib\site-packages\transformers\
    tokenization_utils_base.py:2212: FutureWarning: The
     `pad_to_max_length` argument is deprecated and will
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    or `padding='longest'` to pad to the longest
    sequence in the batch, or use `padding='max_length
    '` to pad to a max length. In this case, you can
    give a specific length with `max_length` (e.g. `
    max_length=45`) or leave max_length to None to pad
    to the maximal input size of the model (e.g. 512 for
     Bert).
463   warnings.warn(
464 Some weights of the model checkpoint at bert-base-
    uncased were not used when initializing BertModel
    : ['cls.predictions.transform.dense.bias', 'cls.
    predictions.transform.LayerNorm.weight', 'cls.
    seq_relationship.weight', 'cls.predictions.bias', '
    cls.predictions.transform.dense.weight', 'cls.
    seq_relationship.bias', 'cls.predictions.decoder.
    weight', 'cls.predictions.transform.LayerNorm.bias']
465 - This IS expected if you are initializing BertModel
     from the checkpoint of a model trained on another
    task or with another architecture (e.g. initializing
     a BertForSequenceClassification model from a
    BertForPreTraining model).
466 - This IS NOT expected if you are initializing
    BertModel from the checkpoint of a model that you
    expect to be exactly identical (initializing a
    BertForSequenceClassification model from a
    BertForSequenceClassification model).
467 Truncation was not explicitly activated but `
    max_length` is provided a specific value, please use
     `truncation=True` to explicitly truncate examples
```

```
to max length. Defaulting to 'longest_first'
    truncation strategy. If you encode pairs of
    sequences (GLUE-style) with the tokenizer you can
    select this strategy more precisely by providing a
    specific strategy to `truncation`.
C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
    lib\site-packages\transformers\
    tokenization_utils_base.py:2212: FutureWarning: The
     `pad_to_max_length` argument is deprecated and will
     be removed in a future version, use `padding=True`
    or `padding='longest'` to pad to the longest
    sequence in the batch, or use `padding='max_length
    '` to pad to a max length. In this case, you can
    give a specific length with `max_length` (e.g. `
    max_length=45`) or leave max_length to None to pad
    to the maximal input size of the model (e.g. 512 for
     Bert).
  warnings.warn(
 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
    Acc  |  Elapsed
----------------------------------------------------
    ----------------
   1    |   20    |   0.683091
        |     -       |     -     |   10.76
   1    |   40    |   0.635166
        |     -       |     -     |   10.66
   1    |   60    |   0.600211
        |     -       |     -     |   11.71
   1    |   80    |   0.569784
        |     -       |     -     |   12.00
   1    |   100   |   0.525490
        |     -       |     -     |   11.90
   1    |   120   |   0.519360
        |     -       |     -     |   12.79
   1    |   140   |   0.546349
        |     -       |     -     |   12.47
   1    |   160   |   0.502226
        |     -       |     -     |   12.48
   1    |   180   |   0.504014
        |     -       |     -     |   12.45
   1    |   200   |   0.511119
```

481		-	-	12.49
482	1	220	0.522839	
		-	-	12.47
483	1	240	0.501950	
		-	-	12.45
484	1	260	0.493342	
		-	-	12.46
485	1	280	0.522669	
		-	-	12.46
486	1	300	0.527110	
		-	-	12.47
487	1	320	0.542079	
		-	-	12.48
488	1	340	0.502487	
		-	-	12.47
489	1	360	0.535234	
		-	-	12.48
490	1	380	0.515688	
		-	-	12.47
491	1	400	0.502109	
		-	-	12.45
492	1	420	0.474372	
		-	-	12.49
493	1	440	0.471947	
		-	-	12.48
494	1	460	0.471126	
		-	-	12.49
495	1	480	0.470602	
		-	-	12.49
496	1	500	0.514858	
		-	-	12.47
497	1	520	0.486789	
		-	-	12.53
498	1	540	0.494729	
		-	-	12.49
499	1	560	0.508828	
		-	-	12.50
500	1	580	0.554934	
		-	-	12.48
501	1	600	0.478434	
		-	-	12.49

```
    1    |   620   |   0.467609
         |    -    |    -     |   12.49
    1    |   640   |   0.490875
         |    -    |    -     |   12.47
    1    |   660   |   0.481117
         |    -    |    -     |   12.51
    1    |   680   |   0.479843
         |    -    |    -     |   12.46
    1    |   700   |   0.435474
         |    -    |    -     |   12.47
    1    |   720   |   0.481659
         |    -    |    -     |   12.47
    1    |   740   |   0.482930
         |    -    |    -     |   12.50
    1    |   760   |   0.448759
         |    -    |    -     |   12.51
    1    |   780   |   0.503409
         |    -    |    -     |   12.47
    1    |   800   |   0.470100
         |    -    |    -     |   12.49
    1    |   820   |   0.509031
         |    -    |    -     |   12.49
    1    |   840   |   0.470102
         |    -    |    -     |   12.48
    1    |   860   |   0.490798
         |    -    |    -     |   12.48
    1    |   880   |   0.462052
         |    -    |    -     |   12.48
    1    |   899   |   0.480420
         |    -    |    -     |   11.84
 ------------------------------------------------------
 ------------------
    1    |    -    |   0.507850   |  0.489405  |   76
 .75   |  578.63
 ------------------------------------------------------
 ------------------


  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
   Acc  |  Elapsed
 ------------------------------------------------------
```

```
523 ------------------
524    2    |   20    |   0.405432
       |     -       |     -     |   12.94
525    2    |   40    |   0.419051
       |     -       |     -     |   12.61
526    2    |   60    |   0.392700
       |     -       |     -     |   12.60
527    2    |   80    |   0.386218
       |     -       |     -     |   12.61
528    2    |   100   |   0.417159
       |     -       |     -     |   14.57
529    2    |   120   |   0.378338
       |     -       |     -     |   15.39
530    2    |   140   |   0.421569
       |     -       |     -     |   15.42
531    2    |   160   |   0.396103
       |     -       |     -     |   15.43
532    2    |   180   |   0.368456
       |     -       |     -     |   15.34
533    2    |   200   |   0.367784
       |     -       |     -     |   14.04
534    2    |   220   |   0.419555
       |     -       |     -     |   13.47
535    2    |   240   |   0.400065
       |     -       |     -     |   12.41
536    2    |   260   |   0.382310
       |     -       |     -     |   12.42
537    2    |   280   |   0.424513
       |     -       |     -     |   12.41
538    2    |   300   |   0.407363
       |     -       |     -     |   12.51
539    2    |   320   |   0.383447
       |     -       |     -     |   13.00
540    2    |   340   |   0.392395
       |     -       |     -     |   12.99
541    2    |   360   |   0.374739
       |     -       |     -     |   12.83
542    2    |   380   |   0.391677
       |     -       |     -     |   12.08
543    2    |   400   |   0.362723
       |     -       |     -     |   12.45
```

544	2	420	0.384412		
	-		-	12.58	
545	2	440	0.384172		
	-		-	12.54	
546	2	460	0.404108		
	-		-	12.54	
547	2	480	0.400409		
	-		-	12.54	
548	2	500	0.409601		
	-		-	12.58	
549	2	520	0.367167		
	-		-	12.53	
550	2	540	0.358826		
	-		-	12.56	
551	2	560	0.351503		
	-		-	12.54	
552	2	580	0.363901		
	-		-	12.58	
553	2	600	0.432562		
	-		-	12.53	
554	2	620	0.356289		
	-		-	12.57	
555	2	640	0.409138		
	-		-	12.57	
556	2	660	0.352151		
	-		-	12.58	
557	2	680	0.421225		
	-		-	12.51	
558	2	700	0.430892		
	-		-	12.55	
559	2	720	0.404156		
	-		-	12.55	
560	2	740	0.415570		
	-		-	12.56	
561	2	760	0.382716		
	-		-	12.55	
562	2	780	0.393127		
	-		-	12.56	
563	2	800	0.410949		
	-		-	12.52	
564	2	820	0.430798		

```
564    |      -       |      -      |   12.56
565    2    |   840    |   0.369212
       |      -       |      -      |   12.55
566    2    |   860    |   0.395128
       |      -       |      -      |   12.55
567    2    |   880    |   0.375537
       |      -       |      -      |   12.56
568    2    |   899    |   0.428274
       |      -       |      -      |   11.91
569 ------------------------------------------------------------
    ------------------
570    2    |    -     |   0.393828   |  0.500154  |   76
    .59   |  602.23
571 ------------------------------------------------------------
    ------------------
572
573
574  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
575 ------------------------------------------------------------
    ------------------
576    3    |   20     |   0.310445
       |      -       |      -      |   13.74
577    3    |   40     |   0.294719
       |      -       |      -      |   12.55
578    3    |   60     |   0.295121
       |      -       |      -      |   12.60
579    3    |   80     |   0.288914
       |      -       |      -      |   12.62
580    3    |   100    |   0.290405
       |      -       |      -      |   12.57
581    3    |   120    |   0.312281
       |      -       |      -      |   12.57
582    3    |   140    |   0.304744
       |      -       |      -      |   12.59
583    3    |   160    |   0.313022
       |      -       |      -      |   12.60
584    3    |   180    |   0.321014
       |      -       |      -      |   12.61
585    3    |   200    |   0.301738
       |      -       |      -      |   12.60
```

586	3	220	0.248872		
		-	-	12.59	
587	3	240	0.317651		
		-	-	12.59	
588	3	260	0.274359		
		-	-	12.58	
589	3	280	0.317687		
		-	-	12.59	
590	3	300	0.284377		
		-	-	12.61	
591	3	320	0.300821		
		-	-	12.60	
592	3	340	0.342075		
		-	-	12.60	
593	3	360	0.304718		
		-	-	13.03	
594	3	380	0.315352		
		-	-	13.86	
595	3	400	0.325726		
		-	-	12.70	
596	3	420	0.262901		
		-	-	12.67	
597	3	440	0.269925		
		-	-	12.67	
598	3	460	0.287090		
		-	-	12.68	
599	3	480	0.306102		
		-	-	12.46	
600	3	500	0.287213		
		-	-	12.36	
601	3	520	0.277997		
		-	-	12.91	
602	3	540	0.316003		
		-	-	12.42	
603	3	560	0.300921		
		-	-	12.19	
604	3	580	0.322098		
		-	-	13.05	
605	3	600	0.299463		
		-	-	12.46	
606	3	620	0.309116		

```
606     |      -       |      -      |   12.12
607     3     |   640    |   0.240846
        |      -       |      -      |   12.61
608     3     |   660    |   0.301597
        |      -       |      -      |   12.78
609     3     |   680    |   0.322239
        |      -       |      -      |   12.78
610     3     |   700    |   0.271522
        |      -       |      -      |   11.90
611     3     |   720    |   0.338555
        |      -       |      -      |   13.05
612     3     |   740    |   0.317466
        |      -       |      -      |   12.84
613     3     |   760    |   0.259356
        |      -       |      -      |   12.83
614     3     |   780    |   0.293947
        |      -       |      -      |   12.34
615     3     |   800    |   0.259585
        |      -       |      -      |   11.98
616     3     |   820    |   0.304822
        |      -       |      -      |   12.66
617     3     |   840    |   0.253497
        |      -       |      -      |   12.93
618     3     |   860    |   0.302393
        |      -       |      -      |   12.11
619     3     |   880    |   0.295922
        |      -       |      -      |   12.10
620     3     |   899    |   0.279419
        |      -       |      -      |   12.41
621 ------------------------------------------------------------
    ------------------
622     3     |    -     |   0.296569   |  0.572443  |   76
    .94   |  588.80
623 ------------------------------------------------------------
    ------------------
624
625
626  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
627 ------------------------------------------------------------
    ------------------
```

628	4	20	0.192573		
	-	-	-	13.70	
629	4	40	0.247085		
	-	-	-	12.66	
630	4	60	0.238896		
	-	-	-	12.64	
631	4	80	0.234018		
	-	-	-	12.64	
632	4	100	0.210295		
	-	-	-	12.65	
633	4	120	0.240678		
	-	-	-	12.64	
634	4	140	0.218811		
	-	-	-	12.64	
635	4	160	0.222361		
	-	-	-	12.64	
636	4	180	0.234942		
	-	-	-	12.64	
637	4	200	0.254813		
	-	-	-	12.64	
638	4	220	0.184035		
	-	-	-	12.65	
639	4	240	0.193139		
	-	-	-	12.65	
640	4	260	0.197392		
	-	-	-	12.63	
641	4	280	0.208136		
	-	-	-	12.30	
642	4	300	0.216216		
	-	-	-	12.02	
643	4	320	0.207130		
	-	-	-	12.95	
644	4	340	0.190452		
	-	-	-	12.97	
645	4	360	0.224861		
	-	-	-	12.49	
646	4	380	0.210601		
	-	-	-	12.04	
647	4	400	0.253746		
	-	-	-	12.32	
648	4	420	0.206097		

648		-	-	12.88
649	4	440	0.242947	
		-	-	12.86
650	4	460	0.190021	
		-	-	12.45
651	4	480	0.242768	
		-	-	12.15
652	4	500	0.208470	
		-	-	12.88
653	4	520	0.231492	
		-	-	12.31
654	4	540	0.218918	
		-	-	12.32
655	4	560	0.265244	
		-	-	12.30
656	4	580	0.236953	
		-	-	12.29
657	4	600	0.275993	
		-	-	12.32
658	4	620	0.191367	
		-	-	12.32
659	4	640	0.195931	
		-	-	13.80
660	4	660	0.210622	
		-	-	12.90
661	4	680	0.219202	
		-	-	12.75
662	4	700	0.215895	
		-	-	12.73
663	4	720	0.207497	
		-	-	12.02
664	4	740	0.168566	
		-	-	13.51
665	4	760	0.226433	
		-	-	12.21
666	4	780	0.224107	
		-	-	12.21
667	4	800	0.262174	
		-	-	12.22
668	4	820	0.190240	
		-	-	13.51

```
669    4    |   840   |   0.237493
       |     -       |     -     |   12.57
670    4    |   860   |   0.227770
       |     -       |     -     |   12.60
671    4    |   880   |   0.206589
       |     -       |     -     |   12.57
672    4    |   899   |   0.198626
       |     -       |     -     |   11.98
673 ------------------------------------------------------
    ------------------
674    4    |    -    |   0.219584   |  0.653754  |   77
    .31   |  588.15
675 ------------------------------------------------------
    ------------------
676
677
678 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
    lib\site-packages\transformers\
    tokenization_utils_base.py:2212: FutureWarning: The
     `pad_to_max_length` argument is deprecated and will
     be removed in a future version, use `padding=True`
    or `padding='longest'` to pad to the longest
    sequence in the batch, or use `padding='max_length
    '` to pad to a max length. In this case, you can
    give a specific length with `max_length` (e.g. `
    max_length=45`) or leave max_length to None to pad
    to the maximal input size of the model (e.g. 512 for
     Bert).
679   warnings.warn(
680 Some weights of the model checkpoint at bert-base-
    uncased were not used when initializing BertModel
    : ['cls.predictions.transform.dense.bias', 'cls.
    predictions.transform.LayerNorm.weight', 'cls.
    seq_relationship.weight', 'cls.predictions.bias', '
    cls.predictions.transform.dense.weight', 'cls.
    seq_relationship.bias', 'cls.predictions.decoder.
    weight', 'cls.predictions.transform.LayerNorm.bias']
681 - This IS expected if you are initializing BertModel
     from the checkpoint of a model trained on another
    task or with another architecture (e.g. initializing
     a BertForSequenceClassification model from a
```

```
BertForPreTraining model).
- This IS NOT expected if you are initializing BertModel from the checkpoint of a model that you expect to be exactly identical (initializing a BertForSequenceClassification model from a BertForSequenceClassification model).
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' truncation strategy. If you encode pairs of sequences (GLUE-style) with the tokenizer you can select this strategy more precisely by providing a specific strategy to `truncation`.
C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\lib\site-packages\transformers\tokenization_utils_base.py:2212: FutureWarning: The `pad_to_max_length` argument is deprecated and will be removed in a future version, use `padding=True` or `padding='longest'` to pad to the longest sequence in the batch, or use `padding='max_length'` to pad to a max length. In this case, you can give a specific length with `max_length` (e.g. `max_length=45`) or leave max_length to None to pad to the maximal input size of the model (e.g. 512 for Bert).
  warnings.warn(
 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
----------------------------------------------------------------------
   1    |   20    |   0.692291   |     -      |   10.67
   1    |   40    |   0.682577   |     -      |   10.88
   1    |   60    |   0.622670   |     -      |   11.58
   1    |   80    |   0.565707   |     -      |   11.59
   1    |   100   |   0.516982   |     -      |   12.82
```

693	1	120	0.514094		
	-		-	12.13	
694	1	140	0.557838		
	-		-	12.10	
695	1	160	0.534232		
	-		-	12.13	
696	1	180	0.533380		
	-		-	12.14	
697	1	200	0.540490		
	-		-	12.41	
698	1	220	0.500675		
	-		-	12.53	
699	1	240	0.506385		
	-		-	12.52	
700	1	260	0.542987		
	-		-	12.51	
701	1	280	0.506237		
	-		-	12.49	
702	1	300	0.543423		
	-		-	12.52	
703	1	320	0.535136		
	-		-	12.49	
704	1	340	0.500093		
	-		-	12.52	
705	1	360	0.529320		
	-		-	12.47	
706	1	380	0.490364		
	-		-	12.53	
707	1	400	0.493809		
	-		-	12.64	
708	1	420	0.534953		
	-		-	12.82	
709	1	440	0.486613		
	-		-	12.72	
710	1	460	0.469263		
	-		-	12.72	
711	1	480	0.524026		
	-		-	12.68	
712	1	500	0.505416		
	-		-	12.89	
713	1	520	0.459153		

```
713     |      -       |      -      |   12.84
714     1     |   540    |   0.475353
        |      -       |      -      |   12.80
715     1     |   560    |   0.496633
        |      -       |      -      |   12.68
716     1     |   580    |   0.499948
        |      -       |      -      |   13.39
717     1     |   600    |   0.465679
        |      -       |      -      |   12.88
718     1     |   620    |   0.446373
        |      -       |      -      |   12.59
719     1     |   640    |   0.500247
        |      -       |      -      |   12.46
720     1     |   660    |   0.447998
        |      -       |      -      |   13.85
721     1     |   680    |   0.466781
        |      -       |      -      |   12.85
722     1     |   700    |   0.462278
        |      -       |      -      |   12.69
723     1     |   720    |   0.489563
        |      -       |      -      |   12.68
724     1     |   740    |   0.496545
        |      -       |      -      |   12.79
725     1     |   760    |   0.458825
        |      -       |      -      |   12.67
726     1     |   780    |   0.455806
        |      -       |      -      |   12.62
727     1     |   800    |   0.488873
        |      -       |      -      |   12.68
728     1     |   820    |   0.495698
        |      -       |      -      |   12.62
729     1     |   840    |   0.443185
        |      -       |      -      |   12.92
730     1     |   860    |   0.465218
        |      -       |      -      |   12.86
731     1     |   880    |   0.468930
        |      -       |      -      |   13.64
732     1     |   899    |   0.461678
        |      -       |      -      |   12.32
733 ------------------------------------------------------
    ------------------
```

```
    1    |    -    |   0.508561   |  0.464608  |   79.22   |  585.46
-------------------------------------------------------------------

 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
-------------------------------------------------------------------
    2    |   20    |   0.401016   |     -      |   12.93
    2    |   40    |   0.443395   |     -      |   12.65
    2    |   60    |   0.411392   |     -      |   12.64
    2    |   80    |   0.394430   |     -      |   12.64
    2    |   100   |   0.388167   |     -      |   12.65
    2    |   120   |   0.381909   |     -      |   12.65
    2    |   140   |   0.417389   |     -      |   12.64
    2    |   160   |   0.422084   |     -      |   12.65
    2    |   180   |   0.376859   |     -      |   12.64
    2    |   200   |   0.396227   |     -      |   12.65
    2    |   220   |   0.397422   |     -      |   12.65
    2    |   240   |   0.370739   |     -      |   12.63
    2    |   260   |   0.337657   |     -      |   12.65
    2    |   280   |   0.420898   |     -      |   12.66
    2    |   300   |   0.399848   |     -      |   12.65
    2    |   320   |   0.386974
```

755		-	-	12.65
756	2	340	0.411718	
		-	-	12.65
757	2	360	0.404234	
		-	-	12.65
758	2	380	0.354078	
		-	-	12.54
759	2	400	0.426913	
		-	-	11.84
760	2	420	0.382174	
		-	-	13.45
761	2	440	0.374491	
		-	-	12.23
762	2	460	0.375308	
		-	-	12.23
763	2	480	0.420766	
		-	-	12.45
764	2	500	0.377318	
		-	-	12.52
765	2	520	0.414809	
		-	-	12.48
766	2	540	0.385405	
		-	-	12.52
767	2	560	0.410045	
		-	-	12.51
768	2	580	0.388283	
		-	-	12.54
769	2	600	0.375748	
		-	-	12.49
770	2	620	0.372320	
		-	-	12.50
771	2	640	0.402660	
		-	-	12.48
772	2	660	0.376874	
		-	-	12.53
773	2	680	0.428472	
		-	-	12.49
774	2	700	0.381909	
		-	-	12.49
775	2	720	0.410108	
		-	-	12.53

```
776    2    |   740   |   0.375657
       |     -       |     -     |   12.51
777    2    |   760   |   0.418753
       |     -       |     -     |   12.50
778    2    |   780   |   0.404017
       |     -       |     -     |   12.53
779    2    |   800   |   0.415323
       |     -       |     -     |   12.52
780    2    |   820   |   0.437959
       |     -       |     -     |   12.52
781    2    |   840   |   0.337607
       |     -       |     -     |   12.53
782    2    |   860   |   0.384679
       |     -       |     -     |   12.53
783    2    |   880   |   0.369013
       |     -       |     -     |   12.51
784    2    |   899   |   0.381351
       |     -       |     -     |   11.88
785 ------------------------------------------------------------
    ------------------
786    2    |    -    |   0.394342   |  0.476112  |   79
    .34   |  585.47
787 ------------------------------------------------------------
    ------------------
788
789
790  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
791 ------------------------------------------------------------
    ------------------
792    3    |   20    |   0.362422
       |     -       |     -     |   12.82
793    3    |   40    |   0.291046
       |     -       |     -     |   12.54
794    3    |   60    |   0.296991
       |     -       |     -     |   12.51
795    3    |   80    |   0.297025
       |     -       |     -     |   12.50
796    3    |   100   |   0.242374
       |     -       |     -     |   12.52
797    3    |   120   |   0.321359
```

797		-	-	12.53
798	3	140	0.258725	
		-	-	12.56
799	3	160	0.287346	
		-	-	12.54
800	3	180	0.251582	
		-	-	12.52
801	3	200	0.291335	
		-	-	12.53
802	3	220	0.259922	
		-	-	12.50
803	3	240	0.283045	
		-	-	12.54
804	3	260	0.255157	
		-	-	12.50
805	3	280	0.281250	
		-	-	12.53
806	3	300	0.327113	
		-	-	12.54
807	3	320	0.274552	
		-	-	12.53
808	3	340	0.325984	
		-	-	12.55
809	3	360	0.295931	
		-	-	12.51
810	3	380	0.274914	
		-	-	12.50
811	3	400	0.301738	
		-	-	12.53
812	3	420	0.313774	
		-	-	12.56
813	3	440	0.264559	
		-	-	12.52
814	3	460	0.321209	
		-	-	12.53
815	3	480	0.257964	
		-	-	12.52
816	3	500	0.309812	
		-	-	12.53
817	3	520	0.277908	
		-	-	12.52

```
818    3    |   540   |   0.302916
       |     -       |     -     |   12.51
819    3    |   560   |   0.293385
       |     -       |     -     |   12.54
820    3    |   580   |   0.309415
       |     -       |     -     |   12.54
821    3    |   600   |   0.271612
       |     -       |     -     |   12.51
822    3    |   620   |   0.305351
       |     -       |     -     |   12.53
823    3    |   640   |   0.280355
       |     -       |     -     |   12.51
824    3    |   660   |   0.298533
       |     -       |     -     |   12.53
825    3    |   680   |   0.270825
       |     -       |     -     |   12.54
826    3    |   700   |   0.308725
       |     -       |     -     |   12.55
827    3    |   720   |   0.306041
       |     -       |     -     |   12.50
828    3    |   740   |   0.333910
       |     -       |     -     |   12.50
829    3    |   760   |   0.281802
       |     -       |     -     |   12.56
830    3    |   780   |   0.316251
       |     -       |     -     |   12.49
831    3    |   800   |   0.252995
       |     -       |     -     |   12.53
832    3    |   820   |   0.306170
       |     -       |     -     |   12.51
833    3    |   840   |   0.265877
       |     -       |     -     |   12.50
834    3    |   860   |   0.247037
       |     -       |     -     |   12.53
835    3    |   880   |   0.335015
       |     -       |     -     |   12.55
836    3    |   899   |   0.277364
       |     -       |     -     |   11.94
837 ------------------------------------------------------
    ------------------
838    3    |    -    |   0.290953   |  0.548005  |   78
```

```
838 .19   |  584.51
839 ------------------------------------------------------------
    ------------------
840
841
842  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
     Acc  |  Elapsed
843 ------------------------------------------------------------
    ------------------
844    4    |   20    |   0.239673
       |      -      |      -     |   13.31
845    4    |   40    |   0.226022
       |      -      |      -     |   12.40
846    4    |   60    |   0.258857
       |      -      |      -     |   12.43
847    4    |   80    |   0.241290
       |      -      |      -     |   12.39
848    4    |   100   |   0.236291
       |      -      |      -     |   12.39
849    4    |   120   |   0.210944
       |      -      |      -     |   12.42
850    4    |   140   |   0.238046
       |      -      |      -     |   12.42
851    4    |   160   |   0.214135
       |      -      |      -     |   13.80
852    4    |   180   |   0.222828
       |      -      |      -     |   12.59
853    4    |   200   |   0.236336
       |      -      |      -     |   12.56
854    4    |   220   |   0.228123
       |      -      |      -     |   12.58
855    4    |   240   |   0.206265
       |      -      |      -     |   12.59
856    4    |   260   |   0.189551
       |      -      |      -     |   12.57
857    4    |   280   |   0.204483
       |      -      |      -     |   12.58
858    4    |   300   |   0.273063
       |      -      |      -     |   12.57
859    4    |   320   |   0.191387
       |      -      |      -     |   12.55
```

860	4	340	0.187739		
		-	-	12.61	
861	4	360	0.245302		
		-	-	12.58	
862	4	380	0.227069		
		-	-	12.57	
863	4	400	0.158935		
		-	-	12.58	
864	4	420	0.234465		
		-	-	12.59	
865	4	440	0.262164		
		-	-	12.61	
866	4	460	0.242460		
		-	-	12.62	
867	4	480	0.247272		
		-	-	12.58	
868	4	500	0.225579		
		-	-	12.59	
869	4	520	0.183524		
		-	-	12.61	
870	4	540	0.233665		
		-	-	12.61	
871	4	560	0.218019		
		-	-	12.61	
872	4	580	0.199363		
		-	-	12.59	
873	4	600	0.205311		
		-	-	12.58	
874	4	620	0.221038		
		-	-	12.72	
875	4	640	0.216538		
		-	-	12.79	
876	4	660	0.227834		
		-	-	12.74	
877	4	680	0.227920		
		-	-	12.72	
878	4	700	0.208977		
		-	-	12.61	
879	4	720	0.220872		
		-	-	12.58	
880	4	740	0.175304		

```
880    |      -       |      -      |   12.61
881    4    |   760    |   0.233115
       |      -       |      -      |   12.60
882    4    |   780    |   0.239853
       |      -       |      -      |   12.57
883    4    |   800    |   0.220975
       |      -       |      -      |   12.68
884    4    |   820    |   0.162827
       |      -       |      -      |   12.79
885    4    |   840    |   0.195076
       |      -       |      -      |   12.76
886    4    |   860    |   0.233273
       |      -       |      -      |   12.75
887    4    |   880    |   0.206871
       |      -       |      -      |   12.87
888    4    |   899    |   0.198637
       |      -       |      -      |   13.47
889 ------------------------------------------------------
    ------------------
890    4    |    -     |   0.219540   |  0.617905  |   78
    .25   |  591.10
891 ------------------------------------------------------
    ------------------
892
893
894 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\
    lib\site-packages\transformers\
    tokenization_utils_base.py:2212: FutureWarning: The
     `pad_to_max_length` argument is deprecated and will
     be removed in a future version, use `padding=True`
    or `padding='longest'` to pad to the longest
    sequence in the batch, or use `padding='max_length
    '` to pad to a max length. In this case, you can
    give a specific length with `max_length` (e.g. `
    max_length=45`) or leave max_length to None to pad
    to the maximal input size of the model (e.g. 512 for
     Bert).
895   warnings.warn(
896 Some weights of the model checkpoint at bert-base-
    uncased were not used when initializing BertModel
    : ['cls.predictions.transform.dense.bias', 'cls.
```

```
predictions.transform.LayerNorm.weight', 'cls.seq_relationship.weight', 'cls.predictions.bias', 'cls.predictions.transform.dense.weight', 'cls.seq_relationship.bias', 'cls.predictions.decoder.weight', 'cls.predictions.transform.LayerNorm.bias']
- This IS expected if you are initializing BertModel from the checkpoint of a model trained on another task or with another architecture (e.g. initializing a BertForSequenceClassification model from a BertForPreTraining model).
- This IS NOT expected if you are initializing BertModel from the checkpoint of a model that you expect to be exactly identical (initializing a BertForSequenceClassification model from a BertForSequenceClassification model).
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' truncation strategy. If you encode pairs of sequences (GLUE-style) with the tokenizer you can select this strategy more precisely by providing a specific strategy to `truncation`.
C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\lib\site-packages\transformers\tokenization_utils_base.py:2212: FutureWarning: The `pad_to_max_length` argument is deprecated and will be removed in a future version, use `padding=True` or `padding='longest'` to pad to the longest sequence in the batch, or use `padding='max_length'` to pad to a max length. In this case, you can give a specific length with `max_length` (e.g. `max_length=45`) or leave max_length to None to pad to the maximal input size of the model (e.g. 512 for Bert).
  warnings.warn(
 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
----------------------------------------------------------------------
   1    |   20    |   0.686355
```

904		-	-	10.65
905	1	40	0.656993	
		-	-	10.86
906	1	60	0.607944	
		-	-	12.01
907	1	80	0.567142	
		-	-	11.86
908	1	100	0.544348	
		-	-	11.85
909	1	120	0.526289	
		-	-	12.00
910	1	140	0.488311	
		-	-	12.65
911	1	160	0.533367	
		-	-	12.08
912	1	180	0.513112	
		-	-	12.99
913	1	200	0.509484	
		-	-	12.51
914	1	220	0.553186	
		-	-	12.50
915	1	240	0.533022	
		-	-	12.50
916	1	260	0.523619	
		-	-	12.51
917	1	280	0.498352	
		-	-	12.50
918	1	300	0.487060	
		-	-	12.48
919	1	320	0.485152	
		-	-	12.52
920	1	340	0.535260	
		-	-	12.52
921	1	360	0.488570	
		-	-	12.50
922	1	380	0.471181	
		-	-	12.50
923	1	400	0.515406	
		-	-	12.52
924	1	420	0.501494	
		-	-	12.49

925	1	440	0.490419		
	-		-	12.48	
926	1	460	0.497779		
	-		-	12.50	
927	1	480	0.493158		
	-		-	12.52	
928	1	500	0.494806		
	-		-	12.49	
929	1	520	0.504255		
	-		-	12.50	
930	1	540	0.462776		
	-		-	12.51	
931	1	560	0.517898		
	-		-	12.51	
932	1	580	0.477985		
	-		-	12.52	
933	1	600	0.481281		
	-		-	12.51	
934	1	620	0.447942		
	-		-	12.50	
935	1	640	0.509010		
	-		-	12.50	
936	1	660	0.480784		
	-		-	12.49	
937	1	680	0.456143		
	-		-	12.46	
938	1	700	0.474776		
	-		-	12.51	
939	1	720	0.468578		
	-		-	12.51	
940	1	740	0.484417		
	-		-	12.53	
941	1	760	0.458148		
	-		-	12.51	
942	1	780	0.492631		
	-		-	12.49	
943	1	800	0.475512		
	-		-	12.50	
944	1	820	0.453293		
	-		-	12.52	
945	1	840	0.447418		

```
    |      -       |      -      |   12.50
    1    |   860   |   0.463559
    |      -       |      -      |   12.50
    1    |   880   |   0.512116
    |      -       |      -      |   12.47
    1    |   899   |   0.508472
    |      -       |      -      |   12.16
 ------------------------------------------------------------
 ------------------
    1    |    -    |   0.506393   |  0.468278  |   77
 .25   |  578.63
 ------------------------------------------------------------
 ------------------


  Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val
   Acc  |  Elapsed
 ------------------------------------------------------------
 ------------------
    2    |   20    |   0.385060
    |      -       |      -      |   12.79
    2    |   40    |   0.435314
    |      -       |      -      |   12.51
    2    |   60    |   0.411892
    |      -       |      -      |   12.50
    2    |   80    |   0.367915
    |      -       |      -      |   12.53
    2    |   100   |   0.373847
    |      -       |      -      |   12.51
    2    |   120   |   0.411695
    |      -       |      -      |   12.55
    2    |   140   |   0.361201
    |      -       |      -      |   12.49
    2    |   160   |   0.401438
    |      -       |      -      |   12.51
    2    |   180   |   0.323403
    |      -       |      -      |   12.50
    2    |   200   |   0.396241
    |      -       |      -      |   12.52
    2    |   220   |   0.387311
    |      -       |      -      |   12.50
```

967	2	240	0.419099		
	-		-	12.53	
968	2	260	0.409737		
	-		-	12.52	
969	2	280	0.406379		
	-		-	12.53	
970	2	300	0.394482		
	-		-	12.53	
971	2	320	0.410654		
	-		-	12.53	
972	2	340	0.354068		
	-		-	12.51	
973	2	360	0.404168		
	-		-	12.53	
974	2	380	0.344088		
	-		-	12.53	
975	2	400	0.406754		
	-		-	12.52	
976	2	420	0.417430		
	-		-	12.53	
977	2	440	0.413777		
	-		-	12.51	
978	2	460	0.378628		
	-		-	12.53	
979	2	480	0.389885		
	-		-	12.54	
980	2	500	0.397949		
	-		-	12.55	
981	2	520	0.363368		
	-		-	12.51	
982	2	540	0.419107		
	-		-	12.51	
983	2	560	0.380745		
	-		-	12.53	
984	2	580	0.394057		
	-		-	12.71	
985	2	600	0.377409		
	-		-	12.71	
986	2	620	0.431666		
	-		-	12.72	
987	2	640	0.384836		

```
 987    |      -       |     -      |   12.52
 988    2    |   660    |   0.392746
        |      -       |     -      |   12.51
 989    2    |   680    |   0.364880
        |      -       |     -      |   12.67
 990    2    |   700    |   0.355485
        |      -       |     -      |   12.53
 991    2    |   720    |   0.384113
        |      -       |     -      |   12.50
 992    2    |   740    |   0.398826
        |      -       |     -      |   12.51
 993    2    |   760    |   0.453076
        |      -       |     -      |   12.50
 994    2    |   780    |   0.393997
        |      -       |     -      |   12.54
 995    2    |   800    |   0.411834
        |      -       |     -      |   12.64
 996    2    |   820    |   0.374800
        |      -       |     -      |   12.80
 997    2    |   840    |   0.389121
        |      -       |     -      |   12.80
 998    2    |   860    |   0.431245
        |      -       |     -      |   13.10
 999    2    |   880    |   0.362519
        |      -       |     -      |   13.04
1000    2    |   899    |   0.413615
        |      -       |     -      |   12.34
1001 ------------------------------------------------------
     --------------------
1002    2    |    -     |   0.392854   |  0.498022  |
     77.12   |  587.50
1003 ------------------------------------------------------
     --------------------
1004
1005
1006  Epoch  |  Batch   |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1007 ------------------------------------------------------
     --------------------
1008    3    |   20     |   0.282307
        |      -       |     -      |   13.11
```

1009	3	40	0.274079		
	-	-	-	12.79	
1010	3	60	0.297326		
	-	-	-	12.80	
1011	3	80	0.280805		
	-	-	-	12.81	
1012	3	100	0.281017		
	-	-	-	12.47	
1013	3	120	0.271349		
	-	-	-	12.97	
1014	3	140	0.253896		
	-	-	-	12.37	
1015	3	160	0.301846		
	-	-	-	12.47	
1016	3	180	0.315383		
	-	-	-	13.33	
1017	3	200	0.283507		
	-	-	-	13.01	
1018	3	220	0.332587		
	-	-	-	12.31	
1019	3	240	0.279224		
	-	-	-	12.45	
1020	3	260	0.312505		
	-	-	-	14.07	
1021	3	280	0.274246		
	-	-	-	13.03	
1022	3	300	0.313267		
	-	-	-	12.67	
1023	3	320	0.274794		
	-	-	-	12.67	
1024	3	340	0.282745		
	-	-	-	12.68	
1025	3	360	0.280515		
	-	-	-	12.68	
1026	3	380	0.289501		
	-	-	-	12.62	
1027	3	400	0.287339		
	-	-	-	12.98	
1028	3	420	0.330128		
	-	-	-	12.16	
1029	3	440	0.290801		

1029		-	-	12.17
1030	3	460	0.281933	
		-	-	12.57
1031	3	480	0.307043	
		-	-	12.83
1032	3	500	0.271271	
		-	-	12.83
1033	3	520	0.265228	
		-	-	12.71
1034	3	540	0.278775	
		-	-	12.80
1035	3	560	0.309626	
		-	-	12.14
1036	3	580	0.273064	
		-	-	13.28
1037	3	600	0.274724	
		-	-	12.56
1038	3	620	0.334533	
		-	-	12.55
1039	3	640	0.255348	
		-	-	12.55
1040	3	660	0.283150	
		-	-	12.57
1041	3	680	0.330127	
		-	-	12.57
1042	3	700	0.304752	
		-	-	12.57
1043	3	720	0.303317	
		-	-	12.57
1044	3	740	0.260678	
		-	-	12.58
1045	3	760	0.297609	
		-	-	12.58
1046	3	780	0.278034	
		-	-	12.58
1047	3	800	0.265292	
		-	-	12.57
1048	3	820	0.366156	
		-	-	12.59
1049	3	840	0.311243	
		-	-	12.60

```
1050    3    |   860   |   0.292746
        |     -       |     -     |   12.59
1051    3    |   880   |   0.287823
        |     -       |     -     |   12.58
1052    3    |   899   |   0.285595
        |     -       |     -     |   11.96
1053 ----------------------------------------------------
     --------------------
1054    3    |    -    |   0.291268   |  0.565945  |
     77.22   |  591.29
1055 ----------------------------------------------------
     --------------------
1056
1057
1058  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1059 ----------------------------------------------------
     --------------------
1060    4    |   20    |   0.189519
        |     -       |     -     |   12.84
1061    4    |   40    |   0.217463
        |     -       |     -     |   12.58
1062    4    |   60    |   0.219794
        |     -       |     -     |   12.55
1063    4    |   80    |   0.197642
        |     -       |     -     |   12.57
1064    4    |   100   |   0.225453
        |     -       |     -     |   12.57
1065    4    |   120   |   0.237331
        |     -       |     -     |   12.59
1066    4    |   140   |   0.198953
        |     -       |     -     |   12.60
1067    4    |   160   |   0.196543
        |     -       |     -     |   12.58
1068    4    |   180   |   0.203225
        |     -       |     -     |   12.61
1069    4    |   200   |   0.206059
        |     -       |     -     |   12.55
1070    4    |   220   |   0.225833
        |     -       |     -     |   12.54
1071    4    |   240   |   0.209327
```

1071		-	-	12.57
1072	4	260	0.231112	
		-	-	12.61
1073	4	280	0.206280	
		-	-	12.58
1074	4	300	0.203915	
		-	-	12.60
1075	4	320	0.167854	
		-	-	12.55
1076	4	340	0.235033	
		-	-	12.59
1077	4	360	0.191253	
		-	-	12.58
1078	4	380	0.213983	
		-	-	12.60
1079	4	400	0.210311	
		-	-	12.60
1080	4	420	0.232563	
		-	-	12.55
1081	4	440	0.217155	
		-	-	12.57
1082	4	460	0.222476	
		-	-	12.60
1083	4	480	0.254452	
		-	-	12.58
1084	4	500	0.211245	
		-	-	12.60
1085	4	520	0.209263	
		-	-	12.61
1086	4	540	0.243532	
		-	-	12.58
1087	4	560	0.202967	
		-	-	12.54
1088	4	580	0.206639	
		-	-	12.59
1089	4	600	0.237698	
		-	-	12.58
1090	4	620	0.231611	
		-	-	12.57
1091	4	640	0.238138	
		-	-	12.59

```
1092    4    |   660   |   0.199940
        |     -       |     -     |   12.61
1093    4    |   680   |   0.216495
        |     -       |     -     |   12.56
1094    4    |   700   |   0.218165
        |     -       |     -     |   12.58
1095    4    |   720   |   0.218276
        |     -       |     -     |   12.60
1096    4    |   740   |   0.227267
        |     -       |     -     |   12.59
1097    4    |   760   |   0.212799
        |     -       |     -     |   12.56
1098    4    |   780   |   0.172236
        |     -       |     -     |   12.60
1099    4    |   800   |   0.210927
        |     -       |     -     |   12.58
1100    4    |   820   |   0.195740
        |     -       |     -     |   12.60
1101    4    |   840   |   0.209371
        |     -       |     -     |   12.59
1102    4    |   860   |   0.214953
        |     -       |     -     |   12.60
1103    4    |   880   |   0.231345
        |     -       |     -     |   12.58
1104    4    |   899   |   0.246790
        |     -       |     -     |   11.96
1105 ----------------------------------------------------
     -------------------
1106    4    |    -    |   0.214801   |  0.655546  |
     76.91   |  586.82
1107 ----------------------------------------------------
     -------------------
1108
1109
1110 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
```

```
1110 '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1111   warnings.warn(
1112 Some weights of the model checkpoint at bert-base-
     uncased were not used when initializing BertModel
     : ['cls.predictions.transform.dense.bias', 'cls.
     predictions.transform.LayerNorm.weight', 'cls.
     seq_relationship.weight', 'cls.predictions.bias', '
     cls.predictions.transform.dense.weight', 'cls.
     seq_relationship.bias', 'cls.predictions.decoder.
     weight', 'cls.predictions.transform.LayerNorm.bias
     ']
1113 - This IS expected if you are initializing
     BertModel from the checkpoint of a model trained on
      another task or with another architecture (e.g.
     initializing a BertForSequenceClassification model
     from a BertForPreTraining model).
1114 - This IS NOT expected if you are initializing
     BertModel from the checkpoint of a model that you
     expect to be exactly identical (initializing a
     BertForSequenceClassification model from a
     BertForSequenceClassification model).
1115 Truncation was not explicitly activated but `
     max_length` is provided a specific value, please
     use `truncation=True` to explicitly truncate
     examples to max length. Defaulting to '
     longest_first' truncation strategy. If you encode
     pairs of sequences (GLUE-style) with the tokenizer
     you can select this strategy more precisely by
     providing a specific strategy to `truncation`.
1116 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
```

```
1116 give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1117   warnings.warn(
1118  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1119 ----------------------------------------------------
     ------------------
1120    1    |   20    |   0.684558
        |     -       |     -      |   10.70
1121    1    |   40    |   0.642018
        |     -       |     -      |   10.77
1122    1    |   60    |   0.615986
        |     -       |     -      |   11.84
1123    1    |   80    |   0.571536
        |     -       |     -      |   11.77
1124    1    |   100   |   0.542886
        |     -       |     -      |   12.81
1125    1    |   120   |   0.544290
        |     -       |     -      |   12.13
1126    1    |   140   |   0.521821
        |     -       |     -      |   12.04
1127    1    |   160   |   0.531584
        |     -       |     -      |   12.04
1128    1    |   180   |   0.552951
        |     -       |     -      |   12.03
1129    1    |   200   |   0.530884
        |     -       |     -      |   13.46
1130    1    |   220   |   0.506114
        |     -       |     -      |   11.92
1131    1    |   240   |   0.556860
        |     -       |     -      |   12.21
1132    1    |   260   |   0.502640
        |     -       |     -      |   12.19
1133    1    |   280   |   0.564074
        |     -       |     -      |   12.95
1134    1    |   300   |   0.547190
        |     -       |     -      |   12.25
1135    1    |   320   |   0.511884
        |     -       |     -      |   12.25
```

1136	1	340	0.501033		
	-		-	12.26	
1137	1	360	0.519258		
	-		-	12.25	
1138	1	380	0.490235		
	-		-	12.27	
1139	1	400	0.520087		
	-		-	13.67	
1140	1	420	0.464194		
	-		-	12.66	
1141	1	440	0.496455		
	-		-	12.64	
1142	1	460	0.492764		
	-		-	12.65	
1143	1	480	0.506146		
	-		-	12.64	
1144	1	500	0.479423		
	-		-	12.65	
1145	1	520	0.497779		
	-		-	12.65	
1146	1	540	0.489413		
	-		-	12.64	
1147	1	560	0.505976		
	-		-	12.64	
1148	1	580	0.485642		
	-		-	12.63	
1149	1	600	0.469925		
	-		-	12.38	
1150	1	620	0.453650		
	-		-	12.04	
1151	1	640	0.478864		
	-		-	13.00	
1152	1	660	0.517400		
	-		-	12.42	
1153	1	680	0.501127		
	-		-	12.09	
1154	1	700	0.457508		
	-		-	13.20	
1155	1	720	0.433666		
	-		-	12.79	
1156	1	740	0.469953		

```
1156    |      -       |      -      |   12.40
1157    1    |   760    |   0.463151
        |      -       |      -      |   12.71
1158    1    |   780    |   0.465834
        |      -       |      -      |   13.25
1159    1    |   800    |   0.470088
        |      -       |      -      |   12.74
1160    1    |   820    |   0.506655
        |      -       |      -      |   12.57
1161    1    |   840    |   0.471372
        |      -       |      -      |   12.54
1162    1    |   860    |   0.478087
        |      -       |      -      |   12.52
1163    1    |   880    |   0.459748
        |      -       |      -      |   12.54
1164    1    |   899    |   0.505386
        |      -       |      -      |   11.88
1165 ----------------------------------------------------
     -------------------
1166    1    |    -     |   0.510823   |  0.440397  |
     79.56   |  580.55
1167 ----------------------------------------------------
     -------------------
1168
1169
1170  Epoch  |  Batch   |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1171 ----------------------------------------------------
     -------------------
1172    2    |   20     |   0.396201
        |      -       |      -      |   13.05
1173    2    |   40     |   0.385931
        |      -       |      -      |   12.64
1174    2    |   60     |   0.388176
        |      -       |      -      |   12.64
1175    2    |   80     |   0.388071
        |      -       |      -      |   12.64
1176    2    |   100    |   0.395330
        |      -       |      -      |   12.61
1177    2    |   120    |   0.382858
        |      -       |      -      |   12.64
```

1178	2	140	0.374347		
	-		-	12.64	
1179	2	160	0.431252		
	-		-	12.59	
1180	2	180	0.422431		
	-		-	11.91	
1181	2	200	0.442737		
	-		-	12.32	
1182	2	220	0.393918		
	-		-	12.47	
1183	2	240	0.410857		
	-		-	12.48	
1184	2	260	0.410059		
	-		-	12.47	
1185	2	280	0.427222		
	-		-	12.51	
1186	2	300	0.364993		
	-		-	12.49	
1187	2	320	0.407310		
	-		-	12.48	
1188	2	340	0.403175		
	-		-	12.47	
1189	2	360	0.336567		
	-		-	12.46	
1190	2	380	0.412936		
	-		-	12.47	
1191	2	400	0.398782		
	-		-	12.47	
1192	2	420	0.395719		
	-		-	12.49	
1193	2	440	0.400489		
	-		-	12.49	
1194	2	460	0.414548		
	-		-	12.49	
1195	2	480	0.365189		
	-		-	12.48	
1196	2	500	0.407507		
	-		-	12.48	
1197	2	520	0.369855		
	-		-	12.48	
1198	2	540	0.412271		

```
1198    |      -       |      -      |   12.48
1199    2    |   560    |   0.386174
        |      -       |      -      |   12.49
1200    2    |   580    |   0.432710
        |      -       |      -      |   12.51
1201    2    |   600    |   0.375721
        |      -       |      -      |   12.49
1202    2    |   620    |   0.386000
        |      -       |      -      |   12.51
1203    2    |   640    |   0.393019
        |      -       |      -      |   12.49
1204    2    |   660    |   0.442356
        |      -       |      -      |   12.47
1205    2    |   680    |   0.422419
        |      -       |      -      |   12.47
1206    2    |   700    |   0.404287
        |      -       |      -      |   12.48
1207    2    |   720    |   0.361919
        |      -       |      -      |   12.51
1208    2    |   740    |   0.393299
        |      -       |      -      |   12.49
1209    2    |   760    |   0.419679
        |      -       |      -      |   12.48
1210    2    |   780    |   0.380917
        |      -       |      -      |   12.47
1211    2    |   800    |   0.403441
        |      -       |      -      |   12.49
1212    2    |   820    |   0.462836
        |      -       |      -      |   12.51
1213    2    |   840    |   0.393089
        |      -       |      -      |   12.48
1214    2    |   860    |   0.414578
        |      -       |      -      |   12.49
1215    2    |   880    |   0.343403
        |      -       |      -      |   12.50
1216    2    |   899    |   0.396334
        |      -       |      -      |   11.87
1217 ------------------------------------------------------------
     --------------------
1218    2    |    -     |   0.398909   |  0.457468  |
     79.22   |  583.93
```

```
1219 ------------------------------------------------------------
     -------------------
1220
1221
1222  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1223 ------------------------------------------------------------
     -------------------
1224    3    |   20    |   0.285192
        |      -      |      -     |   13.17
1225    3    |   40    |   0.284929
        |      -      |      -     |   12.63
1226    3    |   60    |   0.255873
        |      -      |      -     |   12.63
1227    3    |   80    |   0.302736
        |      -      |      -     |   12.64
1228    3    |   100   |   0.301797
        |      -      |      -     |   12.65
1229    3    |   120   |   0.314604
        |      -      |      -     |   12.62
1230    3    |   140   |   0.325138
        |      -      |      -     |   12.64
1231    3    |   160   |   0.305851
        |      -      |      -     |   12.64
1232    3    |   180   |   0.303035
        |      -      |      -     |   12.64
1233    3    |   200   |   0.323428
        |      -      |      -     |   12.64
1234    3    |   220   |   0.301365
        |      -      |      -     |   12.64
1235    3    |   240   |   0.330014
        |      -      |      -     |   12.64
1236    3    |   260   |   0.283363
        |      -      |      -     |   12.64
1237    3    |   280   |   0.291063
        |      -      |      -     |   12.64
1238    3    |   300   |   0.281970
        |      -      |      -     |   12.65
1239    3    |   320   |   0.318734
        |      -      |      -     |   12.62
1240    3    |   340   |   0.329204
```

1240		-	-	12.64
1241	3	360	0.306300	
		-	-	12.64
1242	3	380	0.276892	
		-	-	12.17
1243	3	400	0.310754	
		-	-	12.25
1244	3	420	0.272490	
		-	-	13.01
1245	3	440	0.325584	
		-	-	13.02
1246	3	460	0.302059	
		-	-	12.33
1247	3	480	0.304455	
		-	-	12.09
1248	3	500	0.290583	
		-	-	12.07
1249	3	520	0.237731	
		-	-	12.47
1250	3	540	0.318554	
		-	-	13.03
1251	3	560	0.271555	
		-	-	12.74
1252	3	580	0.280460	
		-	-	12.09
1253	3	600	0.268887	
		-	-	12.81
1254	3	620	0.272352	
		-	-	13.04
1255	3	640	0.305721	
		-	-	12.47
1256	3	660	0.319160	
		-	-	12.44
1257	3	680	0.298341	
		-	-	12.45
1258	3	700	0.298338	
		-	-	12.41
1259	3	720	0.292435	
		-	-	12.49
1260	3	740	0.302307	
		-	-	12.45

```
1261    3    |   760   |   0.252823
       |      -       |     -     |   12.51
1262    3    |   780   |   0.340030
       |      -       |     -     |   12.44
1263    3    |   800   |   0.287741
       |      -       |     -     |   12.48
1264    3    |   820   |   0.324600
       |      -       |     -     |   12.48
1265    3    |   840   |   0.292832
       |      -       |     -     |   12.47
1266    3    |   860   |   0.305818
       |      -       |     -     |   13.14
1267    3    |   880   |   0.317264
       |      -       |     -     |   12.67
1268    3    |   899   |   0.282504
       |      -       |     -     |   12.03
1269 ------------------------------------------------------
     --------------------
1270    3    |    -    |   0.297711   |  0.510029  |
     79.38   |  587.20
1271 ------------------------------------------------------
     --------------------
1272
1273
1274  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1275 ------------------------------------------------------
     --------------------
1276    4    |   20    |   0.219228
       |      -       |     -     |   12.95
1277    4    |   40    |   0.219062
       |      -       |     -     |   12.66
1278    4    |   60    |   0.239501
       |      -       |     -     |   12.66
1279    4    |   80    |   0.226837
       |      -       |     -     |   12.66
1280    4    |   100   |   0.227752
       |      -       |     -     |   12.66
1281    4    |   120   |   0.214650
       |      -       |     -     |   12.65
1282    4    |   140   |   0.226953
```

1282		-	-	12.65
1283	4	160	0.237364	
		-	-	12.67
1284	4	180	0.225893	
		-	-	12.65
1285	4	200	0.199751	
		-	-	12.65
1286	4	220	0.195588	
		-	-	12.69
1287	4	240	0.245571	
		-	-	12.67
1288	4	260	0.222427	
		-	-	12.65
1289	4	280	0.207342	
		-	-	12.64
1290	4	300	0.227629	
		-	-	12.65
1291	4	320	0.224041	
		-	-	12.67
1292	4	340	0.239562	
		-	-	12.67
1293	4	360	0.220292	
		-	-	12.67
1294	4	380	0.252596	
		-	-	12.68
1295	4	400	0.250970	
		-	-	12.65
1296	4	420	0.236766	
		-	-	12.66
1297	4	440	0.259321	
		-	-	12.65
1298	4	460	0.253631	
		-	-	12.69
1299	4	480	0.214193	
		-	-	12.66
1300	4	500	0.258722	
		-	-	12.37
1301	4	520	0.211558	
		-	-	12.63
1302	4	540	0.213426	
		-	-	12.94

```
1303    4    |   560   |   0.231117
        |     -       |     -     |   12.12
1304    4    |   580   |   0.195616
        |     -       |     -     |   12.09
1305    4    |   600   |   0.244285
        |     -       |     -     |   12.95
1306    4    |   620   |   0.221438
        |     -       |     -     |   12.96
1307    4    |   640   |   0.238748
        |     -       |     -     |   12.95
1308    4    |   660   |   0.189223
        |     -       |     -     |   12.65
1309    4    |   680   |   0.230988
        |     -       |     -     |   12.06
1310    4    |   700   |   0.206419
        |     -       |     -     |   12.38
1311    4    |   720   |   0.233569
        |     -       |     -     |   12.56
1312    4    |   740   |   0.206529
        |     -       |     -     |   12.53
1313    4    |   760   |   0.228784
        |     -       |     -     |   13.06
1314    4    |   780   |   0.240984
        |     -       |     -     |   12.79
1315    4    |   800   |   0.195143
        |     -       |     -     |   12.47
1316    4    |   820   |   0.208265
        |     -       |     -     |   12.45
1317    4    |   840   |   0.180640
        |     -       |     -     |   12.45
1318    4    |   860   |   0.199298
        |     -       |     -     |   13.59
1319    4    |   880   |   0.213600
        |     -       |     -     |   12.59
1320    4    |   899   |   0.240983
        |     -       |     -     |   11.95
1321 ------------------------------------------------------
     --------------------
1322    4    |    -    |   0.223893   |  0.585596  |
     78.91   |  589.65
1323 ------------------------------------------------------
```

```
1323 --------------------
1324
1325
1326 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1327   warnings.warn(
1328 Some weights of the model checkpoint at bert-base-
     uncased were not used when initializing BertModel
     : ['cls.predictions.transform.dense.bias', 'cls.
     predictions.transform.LayerNorm.weight', 'cls.
     seq_relationship.weight', 'cls.predictions.bias', '
     cls.predictions.transform.dense.weight', 'cls.
     seq_relationship.bias', 'cls.predictions.decoder.
     weight', 'cls.predictions.transform.LayerNorm.bias
     ']
1329 - This IS expected if you are initializing
     BertModel from the checkpoint of a model trained on
      another task or with another architecture (e.g.
     initializing a BertForSequenceClassification model
     from a BertForPreTraining model).
1330 - This IS NOT expected if you are initializing
     BertModel from the checkpoint of a model that you
     expect to be exactly identical (initializing a
     BertForSequenceClassification model from a
     BertForSequenceClassification model).
1331 Truncation was not explicitly activated but `
     max_length` is provided a specific value, please
     use `truncation=True` to explicitly truncate
     examples to max length. Defaulting to '
     longest_first' truncation strategy. If you encode
     pairs of sequences (GLUE-style) with the tokenizer
```

```
you can select this strategy more precisely by providing a specific strategy to `truncation`.
C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\lib\site-packages\transformers\tokenization_utils_base.py:2212: FutureWarning: The `pad_to_max_length` argument is deprecated and will be removed in a future version, use `padding=True` or `padding='longest'` to pad to the longest sequence in the batch, or use `padding='max_length'` to pad to a max length. In this case, you can give a specific length with `max_length` (e.g. `max_length=45`) or leave max_length to None to pad to the maximal input size of the model (e.g. 512 for Bert).
  warnings.warn(
 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
-------------------------------------------------------------------
   1    |   20    |   0.689468   |     -      |     -     |   10.72
   1    |   40    |   0.672097   |     -      |     -     |   10.81
   1    |   60    |   0.634659   |     -      |     -     |   11.86
   1    |   80    |   0.598498   |     -      |     -     |   11.86
   1    |   100   |   0.527076   |     -      |     -     |   12.87
   1    |   120   |   0.539612   |     -      |     -     |   12.32
   1    |   140   |   0.546305   |     -      |     -     |   12.25
   1    |   160   |   0.584276   |     -      |     -     |   12.25
   1    |   180   |   0.539442   |     -      |     -     |   12.25
   1    |   200   |   0.524038   |     -      |     -     |   12.49
   1    |   220   |   0.523446   |     -      |     -     |   12.84
```

1347	1	240	0.479229		
	-		-	12.79	
1348	1	260	0.555331		
	-		-	12.82	
1349	1	280	0.515372		
	-		-	12.78	
1350	1	300	0.477047		
	-		-	12.77	
1351	1	320	0.521036		
	-		-	12.16	
1352	1	340	0.504212		
	-		-	13.31	
1353	1	360	0.498521		
	-		-	12.27	
1354	1	380	0.475810		
	-		-	12.24	
1355	1	400	0.480544		
	-		-	13.22	
1356	1	420	0.482119		
	-		-	12.36	
1357	1	440	0.501418		
	-		-	12.31	
1358	1	460	0.526672		
	-		-	12.32	
1359	1	480	0.531014		
	-		-	12.32	
1360	1	500	0.443870		
	-		-	13.16	
1361	1	520	0.489087		
	-		-	13.12	
1362	1	540	0.523946		
	-		-	12.63	
1363	1	560	0.484919		
	-		-	12.66	
1364	1	580	0.481630		
	-		-	12.65	
1365	1	600	0.485340		
	-		-	12.65	
1366	1	620	0.472879		
	-		-	12.66	
1367	1	640	0.514853		

```
1367    |     -       |     -     |   12.66
1368    1    |   660    |   0.450161
        |     -       |     -     |   12.65
1369    1    |   680    |   0.463468
        |     -       |     -     |   12.64
1370    1    |   700    |   0.474074
        |     -       |     -     |   12.65
1371    1    |   720    |   0.472655
        |     -       |     -     |   12.64
1372    1    |   740    |   0.506526
        |     -       |     -     |   12.64
1373    1    |   760    |   0.485269
        |     -       |     -     |   12.65
1374    1    |   780    |   0.491714
        |     -       |     -     |   12.65
1375    1    |   800    |   0.457396
        |     -       |     -     |   12.64
1376    1    |   820    |   0.509934
        |     -       |     -     |   12.64
1377    1    |   840    |   0.499655
        |     -       |     -     |   12.66
1378    1    |   860    |   0.459967
        |     -       |     -     |   12.65
1379    1    |   880    |   0.484511
        |     -       |     -     |   12.68
1380    1    |   899    |   0.461231
        |     -       |     -     |   12.01
1381 ----------------------------------------------------
    -------------------
1382    1    |    -    |   0.512261   |  0.479366  |
    76.72   |  583.32
1383 ----------------------------------------------------
    -------------------
1384
1385
1386  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
    Val Acc  |  Elapsed
1387 ----------------------------------------------------
    -------------------
1388    2    |   20    |   0.426577
        |     -       |     -     |   12.93
```

1389	2	40	0.408704		
		-	-	12.65	
1390	2	60	0.380352		
		-	-	12.64	
1391	2	80	0.352497		
		-	-	12.67	
1392	2	100	0.408017		
		-	-	12.64	
1393	2	120	0.418892		
		-	-	12.66	
1394	2	140	0.380754		
		-	-	12.66	
1395	2	160	0.352188		
		-	-	12.65	
1396	2	180	0.426544		
		-	-	12.65	
1397	2	200	0.417209		
		-	-	12.65	
1398	2	220	0.398406		
		-	-	12.64	
1399	2	240	0.444636		
		-	-	12.65	
1400	2	260	0.361216		
		-	-	12.65	
1401	2	280	0.401424		
		-	-	12.65	
1402	2	300	0.422224		
		-	-	12.66	
1403	2	320	0.386076		
		-	-	12.66	
1404	2	340	0.378689		
		-	-	12.66	
1405	2	360	0.392322		
		-	-	12.66	
1406	2	380	0.405824		
		-	-	12.65	
1407	2	400	0.442062		
		-	-	12.64	
1408	2	420	0.436960		
		-	-	12.66	
1409	2	440	0.409011		

1409		-	-	12.66
1410	2	460	0.370522	
		-	-	12.65
1411	2	480	0.433658	
		-	-	12.65
1412	2	500	0.388610	
		-	-	12.64
1413	2	520	0.427943	
		-	-	12.65
1414	2	540	0.399498	
		-	-	12.67
1415	2	560	0.356893	
		-	-	12.64
1416	2	580	0.395666	
		-	-	12.67
1417	2	600	0.356796	
		-	-	12.66
1418	2	620	0.368382	
		-	-	12.67
1419	2	640	0.385685	
		-	-	12.67
1420	2	660	0.432142	
		-	-	12.65
1421	2	680	0.378054	
		-	-	12.64
1422	2	700	0.414887	
		-	-	12.65
1423	2	720	0.342505	
		-	-	12.66
1424	2	740	0.417314	
		-	-	12.69
1425	2	760	0.406923	
		-	-	12.64
1426	2	780	0.362400	
		-	-	12.65
1427	2	800	0.373757	
		-	-	12.66
1428	2	820	0.382675	
		-	-	12.65
1429	2	840	0.397273	
		-	-	12.66

```
1430    2    |   860   |   0.394131
        |     -       |     -     |   12.65
1431    2    |   880   |   0.408121
        |     -       |     -     |   12.65
1432    2    |   899   |   0.364843
        |     -       |     -     |   12.02
1433 ----------------------------------------------------
     --------------------
1434    2    |    -    |   0.395830   |  0.485049  |
     78.06   |  590.18
1435 ----------------------------------------------------
     --------------------
1436
1437
1438  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1439 ----------------------------------------------------
     --------------------
1440    3    |   20    |   0.315027
        |     -       |     -     |   12.96
1441    3    |   40    |   0.315576
        |     -       |     -     |   12.67
1442    3    |   60    |   0.334112
        |     -       |     -     |   12.64
1443    3    |   80    |   0.296315
        |     -       |     -     |   12.64
1444    3    |   100   |   0.325444
        |     -       |     -     |   12.63
1445    3    |   120   |   0.281419
        |     -       |     -     |   12.65
1446    3    |   140   |   0.295686
        |     -       |     -     |   12.65
1447    3    |   160   |   0.278384
        |     -       |     -     |   12.67
1448    3    |   180   |   0.320265
        |     -       |     -     |   12.64
1449    3    |   200   |   0.300578
        |     -       |     -     |   12.67
1450    3    |   220   |   0.277932
        |     -       |     -     |   12.65
1451    3    |   240   |   0.303787
```

1451		-	-	12.66
1452	3	260	0.316247	
		-	-	12.64
1453	3	280	0.354430	
		-	-	12.67
1454	3	300	0.284829	
		-	-	12.64
1455	3	320	0.271598	
		-	-	12.66
1456	3	340	0.270685	
		-	-	12.64
1457	3	360	0.293612	
		-	-	12.64
1458	3	380	0.284128	
		-	-	12.65
1459	3	400	0.286983	
		-	-	12.68
1460	3	420	0.292926	
		-	-	12.66
1461	3	440	0.315960	
		-	-	12.66
1462	3	460	0.288748	
		-	-	12.64
1463	3	480	0.248287	
		-	-	12.65
1464	3	500	0.274944	
		-	-	12.65
1465	3	520	0.311516	
		-	-	12.67
1466	3	540	0.268481	
		-	-	13.13
1467	3	560	0.322310	
		-	-	13.56
1468	3	580	0.321172	
		-	-	12.65
1469	3	600	0.312022	
		-	-	12.64
1470	3	620	0.285858	
		-	-	12.65
1471	3	640	0.308385	
		-	-	12.65

```
1472    3    |   660   |   0.254979
        |     -       |     -     |   12.64
1473    3    |   680   |   0.273820
        |     -       |     -     |   12.64
1474    3    |   700   |   0.339736
        |     -       |     -     |   12.63
1475    3    |   720   |   0.263600
        |     -       |     -     |   12.64
1476    3    |   740   |   0.305562
        |     -       |     -     |   12.64
1477    3    |   760   |   0.292033
        |     -       |     -     |   12.64
1478    3    |   780   |   0.250929
        |     -       |     -     |   12.65
1479    3    |   800   |   0.295061
        |     -       |     -     |   12.65
1480    3    |   820   |   0.260527
        |     -       |     -     |   12.64
1481    3    |   840   |   0.284330
        |     -       |     -     |   12.69
1482    3    |   860   |   0.251838
        |     -       |     -     |   12.67
1483    3    |   880   |   0.268793
        |     -       |     -     |   12.64
1484    3    |   899   |   0.251670
        |     -       |     -     |   12.01
1485 ----------------------------------------------------
     --------------------
1486    3    |    -    |   0.292304   |  0.561440  |
     77.84   |  591.51
1487 ----------------------------------------------------
     --------------------
1488
1489
1490  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1491 ----------------------------------------------------
     --------------------
1492    4    |   20    |   0.211517
        |     -       |     -     |   12.92
1493    4    |   40    |   0.225103
```

1493	-	-	-	12.64
1494	4	60	0.226833	
	-	-	-	14.16
1495	4	80	0.215651	
	-	-	-	13.13
1496	4	100	0.221599	
	-	-	-	12.68
1497	4	120	0.209837	
	-	-	-	12.71
1498	4	140	0.228636	
	-	-	-	12.67
1499	4	160	0.241720	
	-	-	-	12.67
1500	4	180	0.197024	
	-	-	-	12.71
1501	4	200	0.219880	
	-	-	-	12.69
1502	4	220	0.199021	
	-	-	-	12.69
1503	4	240	0.263976	
	-	-	-	12.73
1504	4	260	0.189024	
	-	-	-	12.68
1505	4	280	0.191110	
	-	-	-	12.66
1506	4	300	0.193994	
	-	-	-	12.69
1507	4	320	0.226368	
	-	-	-	12.68
1508	4	340	0.178325	
	-	-	-	12.69
1509	4	360	0.280820	
	-	-	-	12.68
1510	4	380	0.199536	
	-	-	-	12.69
1511	4	400	0.212015	
	-	-	-	12.68
1512	4	420	0.273288	
	-	-	-	12.67
1513	4	440	0.256192	
	-	-	-	12.70

1514	4	460	0.216598		
	-	-	-	12.69	
1515	4	480	0.222642		
	-	-	-	12.69	
1516	4	500	0.256766		
	-	-	-	12.69	
1517	4	520	0.244267		
	-	-	-	12.66	
1518	4	540	0.197318		
	-	-	-	12.69	
1519	4	560	0.183720		
	-	-	-	12.71	
1520	4	580	0.175022		
	-	-	-	12.67	
1521	4	600	0.212194		
	-	-	-	12.69	
1522	4	620	0.221562		
	-	-	-	12.69	
1523	4	640	0.204612		
	-	-	-	12.69	
1524	4	660	0.228049		
	-	-	-	12.70	
1525	4	680	0.245390		
	-	-	-	12.68	
1526	4	700	0.198161		
	-	-	-	12.68	
1527	4	720	0.196007		
	-	-	-	12.69	
1528	4	740	0.221738		
	-	-	-	12.70	
1529	4	760	0.219042		
	-	-	-	12.68	
1530	4	780	0.188007		
	-	-	-	12.70	
1531	4	800	0.199055		
	-	-	-	12.68	
1532	4	820	0.178780		
	-	-	-	12.61	
1533	4	840	0.206203		
	-	-	-	12.70	
1534	4	860	0.207552		

```
1534    |     -       |     -     |   12.99
1535    4    |   880   |   0.220286
        |     -       |     -     |   14.04
1536    4    |   899   |   0.208029
        |     -       |     -     |   11.86
1537 ------------------------------------------------------
     -------------------
1538    4    |    -    |   0.215837   |  0.610230  |
     78.09   |  595.28
1539 ------------------------------------------------------
     -------------------
1540
1541
1542 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1543   warnings.warn(
1544 Some weights of the model checkpoint at bert-base-
     uncased were not used when initializing BertModel
     : ['cls.predictions.transform.dense.bias', 'cls.
     predictions.transform.LayerNorm.weight', 'cls.
     seq_relationship.weight', 'cls.predictions.bias', '
     cls.predictions.transform.dense.weight', 'cls.
     seq_relationship.bias', 'cls.predictions.decoder.
     weight', 'cls.predictions.transform.LayerNorm.bias
     ']
1545 - This IS expected if you are initializing
     BertModel from the checkpoint of a model trained on
      another task or with another architecture (e.g.
     initializing a BertForSequenceClassification model
     from a BertForPreTraining model).
1546 - This IS NOT expected if you are initializing
```

```
1546 BertModel from the checkpoint of a model that you
     expect to be exactly identical (initializing a
     BertForSequenceClassification model from a
     BertForSequenceClassification model).
1547 Truncation was not explicitly activated but `
     max_length` is provided a specific value, please
     use `truncation=True` to explicitly truncate
     examples to max length. Defaulting to '
     longest_first' truncation strategy. If you encode
     pairs of sequences (GLUE-style) with the tokenizer
     you can select this strategy more precisely by
     providing a specific strategy to `truncation`.
1548 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1549   warnings.warn(
1550  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1551 ----------------------------------------------------
     -------------------
1552    1    |   20    |   0.686081
        |     -       |     -      |   10.79
1553    1    |   40    |   0.662932
        |     -       |     -      |   11.19
1554    1    |   60    |   0.629050
        |     -       |     -      |   11.60
1555    1    |   80    |   0.542461
        |     -       |     -      |   12.05
1556    1    |   100   |   0.547773
        |     -       |     -      |   12.67
1557    1    |   120   |   0.531497
        |     -       |     -      |   12.94
```

1558	1	140	0.531505		
	-		-	12.19	
1559	1	160	0.504577		
	-		-	13.10	
1560	1	180	0.533418		
	-		-	12.32	
1561	1	200	0.494272		
	-		-	12.58	
1562	1	220	0.509999		
	-		-	13.71	
1563	1	240	0.551531		
	-		-	12.77	
1564	1	260	0.479197		
	-		-	12.79	
1565	1	280	0.539305		
	-		-	12.78	
1566	1	300	0.493291		
	-		-	12.76	
1567	1	320	0.477311		
	-		-	12.78	
1568	1	340	0.503783		
	-		-	12.77	
1569	1	360	0.518147		
	-		-	12.44	
1570	1	380	0.488056		
	-		-	12.51	
1571	1	400	0.470781		
	-		-	13.07	
1572	1	420	0.494746		
	-		-	12.21	
1573	1	440	0.475998		
	-		-	13.34	
1574	1	460	0.517597		
	-		-	12.47	
1575	1	480	0.468152		
	-		-	12.43	
1576	1	500	0.507890		
	-		-	12.42	
1577	1	520	0.481658		
	-		-	13.10	
1578	1	540	0.484176		

```
1578    |      -       |      -      |   12.48
1579    1    |   560    |   0.479863
        |      -       |      -      |   12.45
1580    1    |   580    |   0.497912
        |      -       |      -      |   13.51
1581    1    |   600    |   0.481273
        |      -       |      -      |   12.69
1582    1    |   620    |   0.481606
        |      -       |      -      |   12.44
1583    1    |   640    |   0.488815
        |      -       |      -      |   12.60
1584    1    |   660    |   0.518677
        |      -       |      -      |   12.85
1585    1    |   680    |   0.500850
        |      -       |      -      |   12.82
1586    1    |   700    |   0.468727
        |      -       |      -      |   12.83
1587    1    |   720    |   0.504841
        |      -       |      -      |   12.84
1588    1    |   740    |   0.498152
        |      -       |      -      |   12.86
1589    1    |   760    |   0.467844
        |      -       |      -      |   12.81
1590    1    |   780    |   0.469156
        |      -       |      -      |   12.84
1591    1    |   800    |   0.503511
        |      -       |      -      |   12.83
1592    1    |   820    |   0.488760
        |      -       |      -      |   12.82
1593    1    |   840    |   0.464321
        |      -       |      -      |   12.83
1594    1    |   860    |   0.465307
        |      -       |      -      |   12.84
1595    1    |   880    |   0.458319
        |      -       |      -      |   12.83
1596    1    |   899    |   0.466244
        |      -       |      -      |   12.18
1597 ------------------------------------------------------------
     --------------------
1598    1    |    -     |   0.507563   |  0.490918  |
     77.09   |  589.40
```

```
1599 ---------------------------------------------------
     -------------------
1600
1601
1602  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1603 ---------------------------------------------------
     -------------------
1604    2    |   20    |   0.382916
        |     -       |     -      |   13.13
1605    2    |   40    |   0.390117
        |     -       |     -      |   12.82
1606    2    |   60    |   0.395484
        |     -       |     -      |   12.84
1607    2    |   80    |   0.402826
        |     -       |     -      |   12.84
1608    2    |   100   |   0.378383
        |     -       |     -      |   12.84
1609    2    |   120   |   0.357315
        |     -       |     -      |   12.84
1610    2    |   140   |   0.409645
        |     -       |     -      |   13.01
1611    2    |   160   |   0.398101
        |     -       |     -      |   13.03
1612    2    |   180   |   0.406787
        |     -       |     -      |   12.98
1613    2    |   200   |   0.369544
        |     -       |     -      |   12.83
1614    2    |   220   |   0.382788
        |     -       |     -      |   12.85
1615    2    |   240   |   0.373821
        |     -       |     -      |   12.81
1616    2    |   260   |   0.393900
        |     -       |     -      |   12.85
1617    2    |   280   |   0.380339
        |     -       |     -      |   12.83
1618    2    |   300   |   0.395744
        |     -       |     -      |   12.83
1619    2    |   320   |   0.413331
        |     -       |     -      |   12.81
1620    2    |   340   |   0.407674
```

1620		-	-	12.83
1621	2	360	0.382210	
		-	-	12.86
1622	2	380	0.355170	
		-	-	12.79
1623	2	400	0.401735	
		-	-	12.81
1624	2	420	0.390631	
		-	-	12.83
1625	2	440	0.404769	
		-	-	12.81
1626	2	460	0.420862	
		-	-	12.82
1627	2	480	0.406762	
		-	-	12.82
1628	2	500	0.390276	
		-	-	12.84
1629	2	520	0.410844	
		-	-	12.82
1630	2	540	0.397761	
		-	-	12.81
1631	2	560	0.370246	
		-	-	12.83
1632	2	580	0.411991	
		-	-	12.82
1633	2	600	0.371855	
		-	-	12.82
1634	2	620	0.420988	
		-	-	12.84
1635	2	640	0.397845	
		-	-	12.84
1636	2	660	0.344462	
		-	-	12.83
1637	2	680	0.402580	
		-	-	12.82
1638	2	700	0.409344	
		-	-	12.82
1639	2	720	0.373751	
		-	-	12.84
1640	2	740	0.368220	
		-	-	12.84

```
1641    2    |   760   |   0.378089
        |     -       |     -     |   12.85
1642    2    |   780   |   0.369063
        |     -       |     -     |   12.82
1643    2    |   800   |   0.381384
        |     -       |     -     |   12.85
1644    2    |   820   |   0.361956
        |     -       |     -     |   12.01
1645    2    |   840   |   0.407516
        |     -       |     -     |   13.07
1646    2    |   860   |   0.397785
        |     -       |     -     |   13.26
1647    2    |   880   |   0.389472
        |     -       |     -     |   12.98
1648    2    |   899   |   0.425366
        |     -       |     -     |   12.29
1649 ------------------------------------------------------------
     --------------------
1650    2    |    -    |   0.390656   |  0.515099  |
     77.12   |  598.52
1651 ------------------------------------------------------------
     --------------------
1652
1653
1654  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1655 ------------------------------------------------------------
     --------------------
1656    3    |   20    |   0.282834
        |     -       |     -     |   13.39
1657    3    |   40    |   0.263792
        |     -       |     -     |   12.82
1658    3    |   60    |   0.278428
        |     -       |     -     |   12.20
1659    3    |   80    |   0.287034
        |     -       |     -     |   12.33
1660    3    |   100   |   0.266915
        |     -       |     -     |   12.71
1661    3    |   120   |   0.267183
        |     -       |     -     |   12.69
1662    3    |   140   |   0.300999
```

1662		-	-	12.66
1663	3	160	0.325481	
		-	-	12.69
1664	3	180	0.278709	
		-	-	12.68
1665	3	200	0.308014	
		-	-	12.68
1666	3	220	0.311835	
		-	-	12.69
1667	3	240	0.276372	
		-	-	12.69
1668	3	260	0.300658	
		-	-	12.68
1669	3	280	0.321065	
		-	-	12.70
1670	3	300	0.232856	
		-	-	12.70
1671	3	320	0.301251	
		-	-	12.67
1672	3	340	0.256662	
		-	-	12.67
1673	3	360	0.322876	
		-	-	12.68
1674	3	380	0.258921	
		-	-	12.66
1675	3	400	0.291202	
		-	-	12.70
1676	3	420	0.264805	
		-	-	12.66
1677	3	440	0.338300	
		-	-	12.71
1678	3	460	0.308552	
		-	-	12.68
1679	3	480	0.296763	
		-	-	12.68
1680	3	500	0.284567	
		-	-	12.68
1681	3	520	0.366539	
		-	-	12.69
1682	3	540	0.302129	
		-	-	12.69

```
1683    3    |   560   |   0.272268
        |     -       |     -     |   12.69
1684    3    |   580   |   0.290357
        |     -       |     -     |   12.67
1685    3    |   600   |   0.265600
        |     -       |     -     |   12.68
1686    3    |   620   |   0.298977
        |     -       |     -     |   12.70
1687    3    |   640   |   0.330761
        |     -       |     -     |   12.67
1688    3    |   660   |   0.307820
        |     -       |     -     |   12.69
1689    3    |   680   |   0.306228
        |     -       |     -     |   12.71
1690    3    |   700   |   0.344332
        |     -       |     -     |   12.67
1691    3    |   720   |   0.283957
        |     -       |     -     |   12.69
1692    3    |   740   |   0.284303
        |     -       |     -     |   12.69
1693    3    |   760   |   0.249826
        |     -       |     -     |   12.69
1694    3    |   780   |   0.306720
        |     -       |     -     |   12.67
1695    3    |   800   |   0.256666
        |     -       |     -     |   12.67
1696    3    |   820   |   0.285900
        |     -       |     -     |   12.69
1697    3    |   840   |   0.258013
        |     -       |     -     |   12.68
1698    3    |   860   |   0.271070
        |     -       |     -     |   12.69
1699    3    |   880   |   0.328895
        |     -       |     -     |   12.68
1700    3    |   899   |   0.287030
        |     -       |     -     |   12.03
1701 ------------------------------------------------------
     -------------------
1702    3    |    -    |   0.291628   |  0.580493  |
     76.66   |  592.02
1703 ------------------------------------------------------
```

```
------------------

 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
-------------------------------------------------------------------
   4    |   20    |   0.226567   |     -      |     -     |   14.38
   4    |   40    |   0.199351   |     -      |     -     |   12.79
   4    |   60    |   0.238350   |     -      |     -     |   12.81
   4    |   80    |   0.235122   |     -      |     -     |   12.82
   4    |   100   |   0.224837   |     -      |     -     |   12.83
   4    |   120   |   0.202193   |     -      |     -     |   12.82
   4    |   140   |   0.222656   |     -      |     -     |   12.81
   4    |   160   |   0.214057   |     -      |     -     |   12.82
   4    |   180   |   0.220375   |     -      |     -     |   12.79
   4    |   200   |   0.217094   |     -      |     -     |   12.84
   4    |   220   |   0.237028   |     -      |     -     |   12.81
   4    |   240   |   0.254469   |     -      |     -     |   12.82
   4    |   260   |   0.203701   |     -      |     -     |   12.82
   4    |   280   |   0.203062   |     -      |     -     |   12.83
   4    |   300   |   0.200891   |     -      |     -     |   12.81
   4    |   320   |   0.234385   |     -      |     -     |   12.84
   4    |   340   |   0.218728   |     -      |     -     |   12.81
```

1725	4	360	0.226160		
	-	-	-	12.79	
1726	4	380	0.177452		
	-	-	-	12.79	
1727	4	400	0.262632		
	-	-	-	12.83	
1728	4	420	0.242845		
	-	-	-	12.80	
1729	4	440	0.232002		
	-	-	-	12.82	
1730	4	460	0.229823		
	-	-	-	12.80	
1731	4	480	0.235409		
	-	-	-	12.78	
1732	4	500	0.235175		
	-	-	-	12.81	
1733	4	520	0.190692		
	-	-	-	12.80	
1734	4	540	0.216224		
	-	-	-	12.81	
1735	4	560	0.215847		
	-	-	-	12.81	
1736	4	580	0.184433		
	-	-	-	12.37	
1737	4	600	0.157869		
	-	-	-	12.81	
1738	4	620	0.233918		
	-	-	-	13.30	
1739	4	640	0.189265		
	-	-	-	12.67	
1740	4	660	0.198974		
	-	-	-	12.59	
1741	4	680	0.239185		
	-	-	-	12.71	
1742	4	700	0.208378		
	-	-	-	13.00	
1743	4	720	0.211460		
	-	-	-	12.98	
1744	4	740	0.250336		
	-	-	-	12.96	
1745	4	760	0.205827		

```
1745    |     -       |     -     |   12.48
1746    4    |   780   |   0.256598
        |     -       |     -     |   12.34
1747    4    |   800   |   0.198491
        |     -       |     -     |   13.24
1748    4    |   820   |   0.208389
        |     -       |     -     |   13.53
1749    4    |   840   |   0.251749
        |     -       |     -     |   12.55
1750    4    |   860   |   0.231907
        |     -       |     -     |   12.59
1751    4    |   880   |   0.193711
        |     -       |     -     |   12.54
1752    4    |   899   |   0.195769
        |     -       |     -     |   11.92
1753 ----------------------------------------------------
     -------------------
1754    4    |    -    |   0.218554   |  0.670967  |
     76.94   |  599.95
1755 ----------------------------------------------------
     -------------------
1756
1757
1758 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1759   warnings.warn(
1760 Some weights of the model checkpoint at bert-base-
     uncased were not used when initializing BertModel
     : ['cls.predictions.transform.dense.bias', 'cls.
     predictions.transform.LayerNorm.weight', 'cls.
     seq_relationship.weight', 'cls.predictions.bias', '
```

```
cls.predictions.transform.dense.weight', 'cls.seq_relationship.bias', 'cls.predictions.decoder.weight', 'cls.predictions.transform.LayerNorm.bias']
- This IS expected if you are initializing BertModel from the checkpoint of a model trained on another task or with another architecture (e.g. initializing a BertForSequenceClassification model from a BertForPreTraining model).
- This IS NOT expected if you are initializing BertModel from the checkpoint of a model that you expect to be exactly identical (initializing a BertForSequenceClassification model from a BertForSequenceClassification model).
Truncation was not explicitly activated but `max_length` is provided a specific value, please use `truncation=True` to explicitly truncate examples to max length. Defaulting to 'longest_first' truncation strategy. If you encode pairs of sequences (GLUE-style) with the tokenizer you can select this strategy more precisely by providing a specific strategy to `truncation`.
C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3\lib\site-packages\transformers\tokenization_utils_base.py:2212: FutureWarning: The `pad_to_max_length` argument is deprecated and will be removed in a future version, use `padding=True` or `padding='longest'` to pad to the longest sequence in the batch, or use `padding='max_length'` to pad to a max length. In this case, you can give a specific length with `max_length` (e.g. `max_length=45`) or leave max_length to None to pad to the maximal input size of the model (e.g. 512 for Bert).
  warnings.warn(
 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
----------------------------------------------------------------------
   1    |   20    |   0.687426   |     -      |     -     |   10.71
```

1769	1	40	0.654389	
	-	-	-	11.20
1770	1	60	0.593740	
	-	-	-	12.07
1771	1	80	0.586061	
	-	-	-	12.04
1772	1	100	0.549189	
	-	-	-	12.07
1773	1	120	0.551531	
	-	-	-	12.54
1774	1	140	0.531044	
	-	-	-	12.65
1775	1	160	0.500339	
	-	-	-	12.64
1776	1	180	0.543917	
	-	-	-	12.67
1777	1	200	0.515053	
	-	-	-	12.65
1778	1	220	0.517666	
	-	-	-	12.65
1779	1	240	0.485258	
	-	-	-	12.64
1780	1	260	0.541943	
	-	-	-	12.66
1781	1	280	0.524691	
	-	-	-	12.66
1782	1	300	0.511817	
	-	-	-	12.65
1783	1	320	0.463401	
	-	-	-	12.66
1784	1	340	0.506923	
	-	-	-	12.66
1785	1	360	0.460026	
	-	-	-	12.65
1786	1	380	0.478067	
	-	-	-	12.68
1787	1	400	0.502455	
	-	-	-	12.66
1788	1	420	0.490074	
	-	-	-	12.65
1789	1	440	0.470996	

1789		-	-	12.65
1790	1	460	0.510204	
		-	-	12.64
1791	1	480	0.530224	
		-	-	12.66
1792	1	500	0.479676	
		-	-	12.65
1793	1	520	0.468238	
		-	-	12.67
1794	1	540	0.459685	
		-	-	12.67
1795	1	560	0.490925	
		-	-	12.67
1796	1	580	0.477955	
		-	-	12.66
1797	1	600	0.513527	
		-	-	12.67
1798	1	620	0.523532	
		-	-	12.65
1799	1	640	0.494341	
		-	-	12.66
1800	1	660	0.469494	
		-	-	12.67
1801	1	680	0.463674	
		-	-	12.65
1802	1	700	0.508823	
		-	-	12.66
1803	1	720	0.483612	
		-	-	12.67
1804	1	740	0.481330	
		-	-	12.65
1805	1	760	0.508148	
		-	-	12.68
1806	1	780	0.450472	
		-	-	12.64
1807	1	800	0.515240	
		-	-	12.69
1808	1	820	0.492974	
		-	-	12.67
1809	1	840	0.475209	
		-	-	12.66

```
1810    1    |   860   |   0.528501
        |     -       |     -     |   12.66
1811    1    |   880   |   0.470372
        |     -       |     -     |   12.67
1812    1    |   899   |   0.456745
        |     -       |     -     |   12.04
1813 ----------------------------------------------------
     --------------------
1814    1    |    -    |   0.509565   |  0.460280  |
     78.31   |  584.87
1815 ----------------------------------------------------
     --------------------
1816
1817
1818  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1819 ----------------------------------------------------
     --------------------
1820    2    |   20    |   0.409697
        |     -       |     -     |   12.95
1821    2    |   40    |   0.385273
        |     -       |     -     |   12.67
1822    2    |   60    |   0.385539
        |     -       |     -     |   12.66
1823    2    |   80    |   0.390956
        |     -       |     -     |   12.68
1824    2    |   100   |   0.407909
        |     -       |     -     |   12.66
1825    2    |   120   |   0.464646
        |     -       |     -     |   12.63
1826    2    |   140   |   0.399382
        |     -       |     -     |   12.66
1827    2    |   160   |   0.378049
        |     -       |     -     |   12.67
1828    2    |   180   |   0.400159
        |     -       |     -     |   12.66
1829    2    |   200   |   0.378773
        |     -       |     -     |   12.64
1830    2    |   220   |   0.412600
        |     -       |     -     |   12.66
1831    2    |   240   |   0.415986
```

1831		-	-	12.67
1832	2	260	0.400316	
		-	-	12.66
1833	2	280	0.369252	
		-	-	12.65
1834	2	300	0.415646	
		-	-	12.67
1835	2	320	0.404684	
		-	-	12.66
1836	2	340	0.398072	
		-	-	12.66
1837	2	360	0.371282	
		-	-	12.66
1838	2	380	0.409077	
		-	-	12.68
1839	2	400	0.447762	
		-	-	12.66
1840	2	420	0.366570	
		-	-	12.64
1841	2	440	0.407464	
		-	-	12.66
1842	2	460	0.401469	
		-	-	12.66
1843	2	480	0.404865	
		-	-	12.66
1844	2	500	0.368052	
		-	-	12.67
1845	2	520	0.437972	
		-	-	12.67
1846	2	540	0.391163	
		-	-	12.65
1847	2	560	0.405783	
		-	-	12.66
1848	2	580	0.401274	
		-	-	12.69
1849	2	600	0.397610	
		-	-	12.68
1850	2	620	0.395270	
		-	-	12.66
1851	2	640	0.441117	
		-	-	12.66

```
1852    2    |   660    |   0.386670
        |     -       |     -     |   12.65
1853    2    |   680    |   0.386736
        |     -       |     -     |   12.65
1854    2    |   700    |   0.419651
        |     -       |     -     |   12.68
1855    2    |   720    |   0.403162
        |     -       |     -     |   12.69
1856    2    |   740    |   0.395580
        |     -       |     -     |   12.67
1857    2    |   760    |   0.384703
        |     -       |     -     |   12.66
1858    2    |   780    |   0.409520
        |     -       |     -     |   12.64
1859    2    |   800    |   0.383896
        |     -       |     -     |   12.65
1860    2    |   820    |   0.398355
        |     -       |     -     |   12.67
1861    2    |   840    |   0.421430
        |     -       |     -     |   12.67
1862    2    |   860    |   0.383723
        |     -       |     -     |   12.67
1863    2    |   880    |   0.374840
        |     -       |     -     |   12.66
1864    2    |   899    |   0.344201
        |     -       |     -     |   12.03
1865 ------------------------------------------------------
     --------------------
1866    2    |    -     |   0.399098   |  0.489915  |
     77.97   |  590.62
1867 ------------------------------------------------------
     --------------------
1868
1869
1870  Epoch  |  Batch   |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1871 ------------------------------------------------------
     --------------------
1872    3    |   20     |   0.307363
        |     -       |     -     |   12.95
1873    3    |   40     |   0.317756
```

1873		-	-	12.64
1874	3	60	0.321528	
		-	-	12.66
1875	3	80	0.291257	
		-	-	12.68
1876	3	100	0.311975	
		-	-	12.63
1877	3	120	0.285816	
		-	-	12.66
1878	3	140	0.280681	
		-	-	12.67
1879	3	160	0.319346	
		-	-	12.65
1880	3	180	0.285948	
		-	-	12.65
1881	3	200	0.280762	
		-	-	12.67
1882	3	220	0.284144	
		-	-	12.64
1883	3	240	0.276846	
		-	-	12.66
1884	3	260	0.322780	
		-	-	12.66
1885	3	280	0.281679	
		-	-	12.67
1886	3	300	0.308400	
		-	-	12.67
1887	3	320	0.305200	
		-	-	12.65
1888	3	340	0.242530	
		-	-	12.67
1889	3	360	0.281199	
		-	-	12.64
1890	3	380	0.283862	
		-	-	12.66
1891	3	400	0.297353	
		-	-	12.66
1892	3	420	0.291889	
		-	-	12.66
1893	3	440	0.329092	
		-	-	12.66

1894	3	460	0.311175	
	-	-	-	12.66
1895	3	480	0.318548	
	-	-	-	12.65
1896	3	500	0.278963	
	-	-	-	12.66
1897	3	520	0.298277	
	-	-	-	12.68
1898	3	540	0.316231	
	-	-	-	12.65
1899	3	560	0.267179	
	-	-	-	12.66
1900	3	580	0.299236	
	-	-	-	12.65
1901	3	600	0.297825	
	-	-	-	12.65
1902	3	620	0.329928	
	-	-	-	12.63
1903	3	640	0.331973	
	-	-	-	12.67
1904	3	660	0.338029	
	-	-	-	12.68
1905	3	680	0.331852	
	-	-	-	12.67
1906	3	700	0.255580	
	-	-	-	12.66
1907	3	720	0.279376	
	-	-	-	12.81
1908	3	740	0.357331	
	-	-	-	13.56
1909	3	760	0.301260	
	-	-	-	12.70
1910	3	780	0.292231	
	-	-	-	12.70
1911	3	800	0.290958	
	-	-	-	12.71
1912	3	820	0.281033	
	-	-	-	12.68
1913	3	840	0.291091	
	-	-	-	12.71
1914	3	860	0.267801	

```
1914    |      -       |      -      |   12.71
1915    3    |   880    |   0.268700
        |      -       |      -      |   12.71
1916    3    |   899    |   0.289119
        |      -       |      -      |   12.06
1917 ------------------------------------------------------
     --------------------
1918    3    |    -     |   0.297823   |  0.532419  |
     78.16   |  591.86
1919 ------------------------------------------------------
     --------------------
1920
1921
1922  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
1923 ------------------------------------------------------
     --------------------
1924    4    |   20    |   0.234485
        |      -       |      -      |   13.00
1925    4    |   40    |   0.245995
        |      -       |      -      |   12.68
1926    4    |   60    |   0.241966
        |      -       |      -      |   12.71
1927    4    |   80    |   0.203153
        |      -       |      -      |   12.70
1928    4    |   100   |   0.209424
        |      -       |      -      |   12.71
1929    4    |   120   |   0.199119
        |      -       |      -      |   12.72
1930    4    |   140   |   0.254205
        |      -       |      -      |   12.70
1931    4    |   160   |   0.193953
        |      -       |      -      |   12.70
1932    4    |   180   |   0.238731
        |      -       |      -      |   12.72
1933    4    |   200   |   0.210428
        |      -       |      -      |   12.71
1934    4    |   220   |   0.214902
        |      -       |      -      |   12.69
1935    4    |   240   |   0.245601
        |      -       |      -      |   12.70
```

1936	4	260	0.236803	
	-	-	-	12.70
1937	4	280	0.221796	
	-	-	-	12.72
1938	4	300	0.232145	
	-	-	-	12.72
1939	4	320	0.215521	
	-	-	-	12.70
1940	4	340	0.212672	
	-	-	-	12.71
1941	4	360	0.219077	
	-	-	-	12.68
1942	4	380	0.241288	
	-	-	-	12.72
1943	4	400	0.196325	
	-	-	-	12.70
1944	4	420	0.231816	
	-	-	-	12.60
1945	4	440	0.231986	
	-	-	-	11.99
1946	4	460	0.241380	
	-	-	-	12.67
1947	4	480	0.225787	
	-	-	-	12.65
1948	4	500	0.250600	
	-	-	-	12.67
1949	4	520	0.196061	
	-	-	-	12.68
1950	4	540	0.214718	
	-	-	-	12.66
1951	4	560	0.228888	
	-	-	-	12.67
1952	4	580	0.243989	
	-	-	-	12.65
1953	4	600	0.216091	
	-	-	-	12.69
1954	4	620	0.191947	
	-	-	-	12.64
1955	4	640	0.196683	
	-	-	-	12.66
1956	4	660	0.191859	

```
1956    |     -       |     -     |   12.64
1957    4    |   680    |   0.238721
        |     -       |     -     |   12.67
1958    4    |   700    |   0.216005
        |     -       |     -     |   12.66
1959    4    |   720    |   0.215846
        |     -       |     -     |   12.66
1960    4    |   740    |   0.255699
        |     -       |     -     |   12.67
1961    4    |   760    |   0.228685
        |     -       |     -     |   12.67
1962    4    |   780    |   0.230246
        |     -       |     -     |   12.67
1963    4    |   800    |   0.224491
        |     -       |     -     |   12.68
1964    4    |   820    |   0.197756
        |     -       |     -     |   12.66
1965    4    |   840    |   0.224892
        |     -       |     -     |   12.66
1966    4    |   860    |   0.206443
        |     -       |     -     |   12.67
1967    4    |   880    |   0.223971
        |     -       |     -     |   12.65
1968    4    |   899    |   0.204206
        |     -       |     -     |   12.02
1969 ------------------------------------------------------
     --------------------
1970    4    |    -    |   0.222175   |  0.605166  |
     77.88   |  590.73
1971 ------------------------------------------------------
     --------------------
1972
1973
1974 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
```

```
1974 give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
1975   warnings.warn(
1976 Some weights of the model checkpoint at bert-base-
     uncased were not used when initializing BertModel
     : ['cls.predictions.transform.dense.bias', 'cls.
     predictions.transform.LayerNorm.weight', 'cls.
     seq_relationship.weight', 'cls.predictions.bias', '
     cls.predictions.transform.dense.weight', 'cls.
     seq_relationship.bias', 'cls.predictions.decoder.
     weight', 'cls.predictions.transform.LayerNorm.bias
     ']
1977 - This IS expected if you are initializing
     BertModel from the checkpoint of a model trained on
      another task or with another architecture (e.g.
     initializing a BertForSequenceClassification model
     from a BertForPreTraining model).
1978 - This IS NOT expected if you are initializing
     BertModel from the checkpoint of a model that you
     expect to be exactly identical (initializing a
     BertForSequenceClassification model from a
     BertForSequenceClassification model).
1979 Truncation was not explicitly activated but `
     max_length` is provided a specific value, please
     use `truncation=True` to explicitly truncate
     examples to max length. Defaulting to '
     longest_first' truncation strategy. If you encode
     pairs of sequences (GLUE-style) with the tokenizer
     you can select this strategy more precisely by
     providing a specific strategy to `truncation`.
1980 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
```

```
max_length=45`) or leave max_length to None to pad to the maximal input size of the model (e.g. 512 for Bert).
  warnings.warn(
 Epoch  |  Batch  |  Train Loss  |  Val Loss  |  Val Acc  |  Elapsed
-------------------------------------------------------------------
   1    |   20    |   0.684268   |     -      |     -     |   10.80
   1    |   40    |   0.665093   |     -      |     -     |   10.88
   1    |   60    |   0.616034   |     -      |     -     |   11.85
   1    |   80    |   0.548074   |     -      |     -     |   12.03
   1    |   100   |   0.576537   |     -      |     -     |   12.02
   1    |   120   |   0.519689   |     -      |     -     |   12.98
   1    |   140   |   0.571468   |     -      |     -     |   12.46
   1    |   160   |   0.542512   |     -      |     -     |   12.27
   1    |   180   |   0.517500   |     -      |     -     |   12.29
   1    |   200   |   0.508961   |     -      |     -     |   12.28
   1    |   220   |   0.510599   |     -      |     -     |   12.28
   1    |   240   |   0.543079   |     -      |     -     |   13.39
   1    |   260   |   0.504659   |     -      |     -     |   12.42
   1    |   280   |   0.497393   |     -      |     -     |   12.43
   1    |   300   |   0.485661   |     -      |     -     |   12.44
   1    |   320   |   0.470333   |     -      |     -     |   12.48
   1    |   340   |   0.492059
```

```
2000    |     -      |     -     |   12.43
2001    1    |  360   |  0.486446
        |     -      |     -     |   12.65
2002    1    |  380   |  0.469126
        |     -      |     -     |   12.84
2003    1    |  400   |  0.463018
        |     -      |     -     |   12.84
2004    1    |  420   |  0.511115
        |     -      |     -     |   12.81
2005    1    |  440   |  0.485861
        |     -      |     -     |   12.83
2006    1    |  460   |  0.534917
        |     -      |     -     |   12.81
2007    1    |  480   |  0.477577
        |     -      |     -     |   12.03
2008    1    |  500   |  0.504285
        |     -      |     -     |   12.30
2009    1    |  520   |  0.485226
        |     -      |     -     |   13.13
2010    1    |  540   |  0.498767
        |     -      |     -     |   13.04
2011    1    |  560   |  0.489798
        |     -      |     -     |   12.20
2012    1    |  580   |  0.480553
        |     -      |     -     |   12.99
2013    1    |  600   |  0.468926
        |     -      |     -     |   12.77
2014    1    |  620   |  0.526734
        |     -      |     -     |   12.64
2015    1    |  640   |  0.487479
        |     -      |     -     |   12.62
2016    1    |  660   |  0.506903
        |     -      |     -     |   12.62
2017    1    |  680   |  0.504068
        |     -      |     -     |   12.63
2018    1    |  700   |  0.498741
        |     -      |     -     |   12.64
2019    1    |  720   |  0.469396
        |     -      |     -     |   12.64
2020    1    |  740   |  0.464821
        |     -      |     -     |   12.61
```

```
2021    1    |   760   |   0.479540
        |     -       |     -     |   12.64
2022    1    |   780   |   0.472662
        |     -       |     -     |   12.63
2023    1    |   800   |   0.451534
        |     -       |     -     |   12.63
2024    1    |   820   |   0.459788
        |     -       |     -     |   12.63
2025    1    |   840   |   0.455871
        |     -       |     -     |   12.64
2026    1    |   860   |   0.456405
        |     -       |     -     |   12.63
2027    1    |   880   |   0.458490
        |     -       |     -     |   12.64
2028    1    |   899   |   0.467249
        |     -       |     -     |   12.01
2029 ------------------------------------------------------------
     --------------------
2030    1    |    -    |   0.506224   |  0.510757  |
     76.81   |  582.91
2031 ------------------------------------------------------------
     --------------------
2032
2033
2034  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2035 ------------------------------------------------------------
     --------------------
2036    2    |   20    |   0.396852
        |     -       |     -     |   12.90
2037    2    |   40    |   0.399763
        |     -       |     -     |   12.64
2038    2    |   60    |   0.390752
        |     -       |     -     |   12.64
2039    2    |   80    |   0.427849
        |     -       |     -     |   12.63
2040    2    |   100   |   0.409253
        |     -       |     -     |   12.64
2041    2    |   120   |   0.418531
        |     -       |     -     |   12.63
2042    2    |   140   |   0.385256
```

2042		-	-	12.64
2043	2	160	0.443032	
		-	-	12.64
2044	2	180	0.395004	
		-	-	12.64
2045	2	200	0.385298	
		-	-	12.64
2046	2	220	0.400191	
		-	-	12.63
2047	2	240	0.386565	
		-	-	12.87
2048	2	260	0.406091	
		-	-	12.79
2049	2	280	0.373398	
		-	-	12.64
2050	2	300	0.435159	
		-	-	12.65
2051	2	320	0.398497	
		-	-	12.63
2052	2	340	0.366413	
		-	-	12.65
2053	2	360	0.433784	
		-	-	12.63
2054	2	380	0.356186	
		-	-	12.73
2055	2	400	0.377341	
		-	-	13.21
2056	2	420	0.409571	
		-	-	12.49
2057	2	440	0.391174	
		-	-	12.57
2058	2	460	0.398931	
		-	-	12.62
2059	2	480	0.341364	
		-	-	12.63
2060	2	500	0.392865	
		-	-	12.62
2061	2	520	0.384575	
		-	-	12.64
2062	2	540	0.409005	
		-	-	12.64

```
2063    2    |   560   |   0.382025
        |     -       |     -     |   12.64
2064    2    |   580   |   0.411754
        |     -       |     -     |   12.63
2065    2    |   600   |   0.385314
        |     -       |     -     |   12.65
2066    2    |   620   |   0.396614
        |     -       |     -     |   12.64
2067    2    |   640   |   0.364907
        |     -       |     -     |   12.65
2068    2    |   660   |   0.398471
        |     -       |     -     |   12.85
2069    2    |   680   |   0.408236
        |     -       |     -     |   12.83
2070    2    |   700   |   0.387136
        |     -       |     -     |   12.82
2071    2    |   720   |   0.359274
        |     -       |     -     |   12.82
2072    2    |   740   |   0.386506
        |     -       |     -     |   12.82
2073    2    |   760   |   0.379233
        |     -       |     -     |   12.85
2074    2    |   780   |   0.394667
        |     -       |     -     |   12.82
2075    2    |   800   |   0.418646
        |     -       |     -     |   12.81
2076    2    |   820   |   0.385186
        |     -       |     -     |   12.60
2077    2    |   840   |   0.443422
        |     -       |     -     |   12.84
2078    2    |   860   |   0.370668
        |     -       |     -     |   12.24
2079    2    |   880   |   0.377240
        |     -       |     -     |   13.38
2080    2    |   899   |   0.404212
        |     -       |     -     |   12.17
2081 ----------------------------------------------------
     -------------------
2082    2    |    -    |   0.394797   |  0.513669  |
     76.81   |  592.88
2083 ----------------------------------------------------
```

```
2083 -------------------
2084
2085
2086  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2087 ----------------------------------------------------
     -------------------
2088    3    |   20    |   0.321666
        |      -       |      -     |   13.03
2089    3    |   40    |   0.287308
        |      -       |      -     |   12.77
2090    3    |   60    |   0.243097
        |      -       |      -     |   12.76
2091    3    |   80    |   0.255681
        |      -       |      -     |   12.76
2092    3    |   100   |   0.321887
        |      -       |      -     |   12.73
2093    3    |   120   |   0.333225
        |      -       |      -     |   12.75
2094    3    |   140   |   0.279939
        |      -       |      -     |   12.75
2095    3    |   160   |   0.255720
        |      -       |      -     |   12.73
2096    3    |   180   |   0.302660
        |      -       |      -     |   12.76
2097    3    |   200   |   0.323421
        |      -       |      -     |   12.75
2098    3    |   220   |   0.266331
        |      -       |      -     |   12.75
2099    3    |   240   |   0.286801
        |      -       |      -     |   12.74
2100    3    |   260   |   0.323836
        |      -       |      -     |   12.75
2101    3    |   280   |   0.255039
        |      -       |      -     |   12.47
2102    3    |   300   |   0.314004
        |      -       |      -     |   11.91
2103    3    |   320   |   0.305199
        |      -       |      -     |   12.93
2104    3    |   340   |   0.310777
        |      -       |      -     |   13.20
```

2105	3	360	0.273477		
	-	-	-	12.30	
2106	3	380	0.278893		
	-	-	-	12.81	
2107	3	400	0.271614		
	-	-	-	13.21	
2108	3	420	0.331338		
	-	-	-	12.57	
2109	3	440	0.327580		
	-	-	-	12.57	
2110	3	460	0.312816		
	-	-	-	12.60	
2111	3	480	0.263366		
	-	-	-	12.58	
2112	3	500	0.323407		
	-	-	-	12.56	
2113	3	520	0.283882		
	-	-	-	12.60	
2114	3	540	0.301055		
	-	-	-	12.69	
2115	3	560	0.323407		
	-	-	-	12.88	
2116	3	580	0.309037		
	-	-	-	13.73	
2117	3	600	0.261341		
	-	-	-	13.01	
2118	3	620	0.325470		
	-	-	-	12.78	
2119	3	640	0.280044		
	-	-	-	12.78	
2120	3	660	0.272089		
	-	-	-	12.73	
2121	3	680	0.329913		
	-	-	-	12.72	
2122	3	700	0.269704		
	-	-	-	12.71	
2123	3	720	0.311142		
	-	-	-	12.73	
2124	3	740	0.306186		
	-	-	-	12.71	
2125	3	760	0.300651		

```
2125    |     -      |     -     |   12.71
2126    3    |   780   |   0.279089
        |     -      |     -     |   12.70
2127    3    |   800   |   0.279707
        |     -      |     -     |   12.75
2128    3    |   820   |   0.327991
        |     -      |     -     |   13.00
2129    3    |   840   |   0.293605
        |     -      |     -     |   12.80
2130    3    |   860   |   0.237537
        |     -      |     -     |   12.83
2131    3    |   880   |   0.328984
        |     -      |     -     |   12.97
2132    3    |   899   |   0.302110
        |     -      |     -     |   12.16
2133 ----------------------------------------------------------
     --------------------
2134    3    |    -    |   0.295400   |  0.594143  |
     76.25   |  594.89
2135 ----------------------------------------------------------
     --------------------
2136
2137
2138  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2139 ----------------------------------------------------------
     --------------------
2140    4    |   20    |   0.207090
        |     -      |     -     |   13.02
2141    4    |   40    |   0.256015
        |     -      |     -     |   12.71
2142    4    |   60    |   0.238771
        |     -      |     -     |   12.73
2143    4    |   80    |   0.238215
        |     -      |     -     |   12.72
2144    4    |   100   |   0.231115
        |     -      |     -     |   12.71
2145    4    |   120   |   0.252302
        |     -      |     -     |   12.70
2146    4    |   140   |   0.225563
        |     -      |     -     |   12.74
```

2147	4	160	0.272333		
	-	-	-	12.73	
2148	4	180	0.216967		
	-	-	-	12.71	
2149	4	200	0.210016		
	-	-	-	12.74	
2150	4	220	0.210032		
	-	-	-	12.70	
2151	4	240	0.229294		
	-	-	-	12.72	
2152	4	260	0.223957		
	-	-	-	12.71	
2153	4	280	0.210647		
	-	-	-	12.72	
2154	4	300	0.224666		
	-	-	-	12.73	
2155	4	320	0.225661		
	-	-	-	12.72	
2156	4	340	0.230160		
	-	-	-	12.70	
2157	4	360	0.215665		
	-	-	-	12.71	
2158	4	380	0.232018		
	-	-	-	12.71	
2159	4	400	0.201390		
	-	-	-	12.72	
2160	4	420	0.262524		
	-	-	-	12.70	
2161	4	440	0.177183		
	-	-	-	12.72	
2162	4	460	0.200734		
	-	-	-	12.71	
2163	4	480	0.206734		
	-	-	-	12.73	
2164	4	500	0.233264		
	-	-	-	12.69	
2165	4	520	0.179910		
	-	-	-	12.73	
2166	4	540	0.217314		
	-	-	-	12.71	
2167	4	560	0.249078		

```
2167    |      -       |      -      |   12.71
2168    4    |   580    |   0.193802
        |      -       |      -      |   12.71
2169    4    |   600    |   0.268849
        |      -       |      -      |   12.70
2170    4    |   620    |   0.188003
        |      -       |      -      |   12.70
2171    4    |   640    |   0.191903
        |      -       |      -      |   12.71
2172    4    |   660    |   0.186014
        |      -       |      -      |   12.70
2173    4    |   680    |   0.205143
        |      -       |      -      |   12.69
2174    4    |   700    |   0.214818
        |      -       |      -      |   12.73
2175    4    |   720    |   0.208508
        |      -       |      -      |   12.69
2176    4    |   740    |   0.215128
        |      -       |      -      |   12.72
2177    4    |   760    |   0.205562
        |      -       |      -      |   12.70
2178    4    |   780    |   0.226130
        |      -       |      -      |   12.72
2179    4    |   800    |   0.208074
        |      -       |      -      |   12.68
2180    4    |   820    |   0.190203
        |      -       |      -      |   12.72
2181    4    |   840    |   0.204828
        |      -       |      -      |   12.71
2182    4    |   860    |   0.245296
        |      -       |      -      |   12.70
2183    4    |   880    |   0.238964
        |      -       |      -      |   12.70
2184    4    |   899    |   0.192961
        |      -       |      -      |   12.07
2185 ------------------------------------------------------
     --------------------
2186    4    |    -     |   0.219189   |  0.684072  |
     76.75   |  592.86
2187 ------------------------------------------------------
     --------------------
```

```
2188
2189
2190 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
2191   warnings.warn(
2192 Some weights of the model checkpoint at bert-base-
     uncased were not used when initializing BertModel
     : ['cls.predictions.transform.dense.bias', 'cls.
     predictions.transform.LayerNorm.weight', 'cls.
     seq_relationship.weight', 'cls.predictions.bias', '
     cls.predictions.transform.dense.weight', 'cls.
     seq_relationship.bias', 'cls.predictions.decoder.
     weight', 'cls.predictions.transform.LayerNorm.bias
     ']
2193 - This IS expected if you are initializing
     BertModel from the checkpoint of a model trained on
      another task or with another architecture (e.g.
     initializing a BertForSequenceClassification model
     from a BertForPreTraining model).
2194 - This IS NOT expected if you are initializing
     BertModel from the checkpoint of a model that you
     expect to be exactly identical (initializing a
     BertForSequenceClassification model from a
     BertForSequenceClassification model).
2195 Truncation was not explicitly activated but `
     max_length` is provided a specific value, please
     use `truncation=True` to explicitly truncate
     examples to max length. Defaulting to '
     longest_first' truncation strategy. If you encode
     pairs of sequences (GLUE-style) with the tokenizer
     you can select this strategy more precisely by
```

```
2195 providing a specific strategy to `truncation`.
2196 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
2197   warnings.warn(
2198  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2199 ----------------------------------------------------
     -------------------
2200    1    |   20    |   0.690965
        |     -       |     -      |   10.82
2201    1    |   40    |   0.668855
        |     -       |     -      |   11.01
2202    1    |   60    |   0.640371
        |     -       |     -      |   11.90
2203    1    |   80    |   0.583458
        |     -       |     -      |   11.89
2204    1    |   100   |   0.544965
        |     -       |     -      |   13.66
2205    1    |   120   |   0.593996
        |     -       |     -      |   12.51
2206    1    |   140   |   0.541128
        |     -       |     -      |   12.63
2207    1    |   160   |   0.531806
        |     -       |     -      |   12.39
2208    1    |   180   |   0.508371
        |     -       |     -      |   12.49
2209    1    |   200   |   0.495174
        |     -       |     -      |   13.85
2210    1    |   220   |   0.527826
        |     -       |     -      |   12.96
2211    1    |   240   |   0.539397
```

2211		-	-	12.41
2212	1	260	0.503483	
		-	-	12.40
2213	1	280	0.508666	
		-	-	12.39
2214	1	300	0.508991	
		-	-	12.43
2215	1	320	0.512199	
		-	-	13.11
2216	1	340	0.495556	
		-	-	12.99
2217	1	360	0.502330	
		-	-	12.59
2218	1	380	0.481475	
		-	-	12.56
2219	1	400	0.495290	
		-	-	12.58
2220	1	420	0.455117	
		-	-	12.56
2221	1	440	0.489422	
		-	-	12.59
2222	1	460	0.492666	
		-	-	12.71
2223	1	480	0.482806	
		-	-	12.83
2224	1	500	0.490774	
		-	-	14.38
2225	1	520	0.466753	
		-	-	12.90
2226	1	540	0.455635	
		-	-	12.74
2227	1	560	0.490749	
		-	-	12.74
2228	1	580	0.486753	
		-	-	12.73
2229	1	600	0.467547	
		-	-	12.73
2230	1	620	0.495267	
		-	-	12.74
2231	1	640	0.507788	
		-	-	12.74

```
2232    1    |   660   |   0.477786
        |     -       |     -     |   12.74
2233    1    |   680   |   0.463133
        |     -       |     -     |   12.74
2234    1    |   700   |   0.474577
        |     -       |     -     |   12.74
2235    1    |   720   |   0.464831
        |     -       |     -     |   12.73
2236    1    |   740   |   0.457738
        |     -       |     -     |   12.85
2237    1    |   760   |   0.477156
        |     -       |     -     |   13.04
2238    1    |   780   |   0.481510
        |     -       |     -     |   13.01
2239    1    |   800   |   0.463673
        |     -       |     -     |   12.85
2240    1    |   820   |   0.513310
        |     -       |     -     |   12.89
2241    1    |   840   |   0.478030
        |     -       |     -     |   12.93
2242    1    |   860   |   0.468558
        |     -       |     -     |   12.74
2243    1    |   880   |   0.484857
        |     -       |     -     |   12.90
2244    1    |   899   |   0.469570
        |     -       |     -     |   12.11
2245 ------------------------------------------------------------
     --------------------
2246    1    |    -    |   0.507586   |  0.456144  |
     78.56   |  591.38
2247 ------------------------------------------------------------
     --------------------
2248
2249
2250  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2251 ------------------------------------------------------------
     --------------------
2252    2    |   20    |   0.398483
        |     -       |     -     |   13.02
2253    2    |   40    |   0.405991
```

2253		-	-	12.74
2254	2	60	0.421160	
		-	-	12.75
2255	2	80	0.392492	
		-	-	12.73
2256	2	100	0.386318	
		-	-	12.73
2257	2	120	0.398301	
		-	-	12.74
2258	2	140	0.418050	
		-	-	12.73
2259	2	160	0.400900	
		-	-	12.74
2260	2	180	0.386157	
		-	-	12.74
2261	2	200	0.425920	
		-	-	12.74
2262	2	220	0.427566	
		-	-	12.74
2263	2	240	0.438997	
		-	-	12.73
2264	2	260	0.374532	
		-	-	12.74
2265	2	280	0.378664	
		-	-	12.75
2266	2	300	0.435264	
		-	-	12.74
2267	2	320	0.417520	
		-	-	12.76
2268	2	340	0.398007	
		-	-	12.76
2269	2	360	0.378666	
		-	-	12.72
2270	2	380	0.413390	
		-	-	12.74
2271	2	400	0.422147	
		-	-	12.74
2272	2	420	0.433653	
		-	-	12.73
2273	2	440	0.377025	
		-	-	12.76

2274	2	460	0.403511		
	-		-	12.74	
2275	2	480	0.394043		
	-		-	12.74	
2276	2	500	0.414661		
	-		-	12.73	
2277	2	520	0.368870		
	-		-	12.74	
2278	2	540	0.354358		
	-		-	12.72	
2279	2	560	0.406604		
	-		-	12.76	
2280	2	580	0.392412		
	-		-	12.73	
2281	2	600	0.424698		
	-		-	12.73	
2282	2	620	0.425309		
	-		-	12.73	
2283	2	640	0.384824		
	-		-	12.75	
2284	2	660	0.382628		
	-		-	12.75	
2285	2	680	0.376586		
	-		-	12.34	
2286	2	700	0.374261		
	-		-	12.82	
2287	2	720	0.376807		
	-		-	12.36	
2288	2	740	0.426682		
	-		-	12.23	
2289	2	760	0.368641		
	-		-	12.97	
2290	2	780	0.391579		
	-		-	12.64	
2291	2	800	0.400222		
	-		-	12.36	
2292	2	820	0.424752		
	-		-	12.76	
2293	2	840	0.392293		
	-		-	13.64	
2294	2	860	0.389228		

```
2294    |      -       |      -      |   12.70
2295    2    |   880    |   0.390926
        |      -       |      -      |   12.48
2296    2    |   899    |   0.396298
        |      -       |      -      |   11.88
2297 ------------------------------------------------------
     --------------------
2298    2    |    -     |   0.399767   |  0.475224  |
     78.50   |  593.81
2299 ------------------------------------------------------
     --------------------
2300
2301
2302  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2303 ------------------------------------------------------
     --------------------
2304    3    |   20     |   0.318166
        |      -       |      -      |   13.67
2305    3    |   40     |   0.287625
        |      -       |      -      |   12.47
2306    3    |   60     |   0.289214
        |      -       |      -      |   12.45
2307    3    |   80     |   0.293094
        |      -       |      -      |   12.50
2308    3    |   100    |   0.280930
        |      -       |      -      |   12.79
2309    3    |   120    |   0.312737
        |      -       |      -      |   13.51
2310    3    |   140    |   0.311405
        |      -       |      -      |   12.46
2311    3    |   160    |   0.326704
        |      -       |      -      |   12.36
2312    3    |   180    |   0.343368
        |      -       |      -      |   12.38
2313    3    |   200    |   0.289681
        |      -       |      -      |   13.08
2314    3    |   220    |   0.289952
        |      -       |      -      |   12.47
2315    3    |   240    |   0.298890
        |      -       |      -      |   12.50
```

2316	3	|	260	|	0.272266
	|	-	|	-	| 12.49
2317	3	|	280	|	0.289608
	|	-	|	-	| 12.48
2318	3	|	300	|	0.254656
	|	-	|	-	| 13.03
2319	3	|	320	|	0.289241
	|	-	|	-	| 13.19
2320	3	|	340	|	0.329917
	|	-	|	-	| 12.58
2321	3	|	360	|	0.284131
	|	-	|	-	| 12.61
2322	3	|	380	|	0.253287
	|	-	|	-	| 12.63
2323	3	|	400	|	0.297998
	|	-	|	-	| 12.65
2324	3	|	420	|	0.335909
	|	-	|	-	| 12.62
2325	3	|	440	|	0.294653
	|	-	|	-	| 12.62
2326	3	|	460	|	0.282808
	|	-	|	-	| 12.63
2327	3	|	480	|	0.307442
	|	-	|	-	| 12.62
2328	3	|	500	|	0.306576
	|	-	|	-	| 12.61
2329	3	|	520	|	0.299637
	|	-	|	-	| 12.60
2330	3	|	540	|	0.329325
	|	-	|	-	| 12.61
2331	3	|	560	|	0.309010
	|	-	|	-	| 12.61
2332	3	|	580	|	0.295964
	|	-	|	-	| 12.60
2333	3	|	600	|	0.272262
	|	-	|	-	| 12.60
2334	3	|	620	|	0.299662
	|	-	|	-	| 12.62
2335	3	|	640	|	0.282337
	|	-	|	-	| 12.62
2336	3	|	660	|	0.350112

```
2336    |     -      |     -     |   12.62
2337    3    |   680   |   0.342749
        |     -      |     -     |   12.64
2338    3    |   700   |   0.273054
        |     -      |     -     |   12.64
2339    3    |   720   |   0.334112
        |     -      |     -     |   12.63
2340    3    |   740   |   0.296570
        |     -      |     -     |   12.61
2341    3    |   760   |   0.286217
        |     -      |     -     |   12.63
2342    3    |   780   |   0.286154
        |     -      |     -     |   12.62
2343    3    |   800   |   0.320254
        |     -      |     -     |   12.63
2344    3    |   820   |   0.328601
        |     -      |     -     |   12.63
2345    3    |   840   |   0.302159
        |     -      |     -     |   12.63
2346    3    |   860   |   0.312571
        |     -      |     -     |   12.64
2347    3    |   880   |   0.287497
        |     -      |     -     |   12.63
2348    3    |   899   |   0.313054
        |     -      |     -     |   11.99
2349 ------------------------------------------------------
     --------------------
2350    3    |    -    |   0.301374   |  0.526639  |
     77.94   |  590.77
2351 ------------------------------------------------------
     --------------------
2352
2353
2354  Epoch  |  Batch  |  Train Loss  |  Val Loss  |
     Val Acc  |  Elapsed
2355 ------------------------------------------------------
     --------------------
2356    4    |   20    |   0.225757
        |     -      |     -     |   13.98
2357    4    |   40    |   0.210253
        |     -      |     -     |   12.76
```

2358	4	60	0.252347		
	-	-	-	12.50	
2359	4	80	0.250861		
	-	-	-	12.54	
2360	4	100	0.217402		
	-	-	-	12.54	
2361	4	120	0.243693		
	-	-	-	13.52	
2362	4	140	0.221291		
	-	-	-	13.28	
2363	4	160	0.254736		
	-	-	-	12.43	
2364	4	180	0.184062		
	-	-	-	12.42	
2365	4	200	0.224416		
	-	-	-	12.45	
2366	4	220	0.268992		
	-	-	-	13.34	
2367	4	240	0.256386		
	-	-	-	12.46	
2368	4	260	0.232159		
	-	-	-	12.46	
2369	4	280	0.257322		
	-	-	-	13.86	
2370	4	300	0.207063		
	-	-	-	12.05	
2371	4	320	0.196102		
	-	-	-	12.58	
2372	4	340	0.207319		
	-	-	-	12.66	
2373	4	360	0.246618		
	-	-	-	12.67	
2374	4	380	0.222515		
	-	-	-	12.65	
2375	4	400	0.278503		
	-	-	-	12.69	
2376	4	420	0.238174		
	-	-	-	12.64	
2377	4	440	0.251268		
	-	-	-	12.66	
2378	4	460	0.228948		

2378		-	-	12.66
2379	4	480	0.207655	
		-	-	12.66
2380	4	500	0.244720	
		-	-	12.66
2381	4	520	0.208253	
		-	-	12.63
2382	4	540	0.212183	
		-	-	12.65
2383	4	560	0.225118	
		-	-	12.66
2384	4	580	0.245496	
		-	-	12.68
2385	4	600	0.174506	
		-	-	12.66
2386	4	620	0.213140	
		-	-	12.65
2387	4	640	0.246910	
		-	-	12.64
2388	4	660	0.199695	
		-	-	12.66
2389	4	680	0.266263	
		-	-	12.65
2390	4	700	0.204491	
		-	-	12.65
2391	4	720	0.178545	
		-	-	12.66
2392	4	740	0.190351	
		-	-	12.69
2393	4	760	0.191826	
		-	-	12.66
2394	4	780	0.217478	
		-	-	12.65
2395	4	800	0.229072	
		-	-	12.67
2396	4	820	0.243559	
		-	-	12.68
2397	4	840	0.213557	
		-	-	12.67
2398	4	860	0.231024	
		-	-	12.65

```
2399    4    |   880   |   0.205698
        |     -      |     -     |   12.67
2400    4    |   899   |   0.211207
        |     -      |     -     |   12.01
2401 ----------------------------------------------------
     ------------------
2402    4    |    -    |   0.225281   |  0.614680  |
     77.59   |  592.84
2403 ----------------------------------------------------
     ------------------
2404
2405
2406 C:\Users\Luka\anaconda3\envs\Sentiment-Analysis-ML3
     \lib\site-packages\transformers\
     tokenization_utils_base.py:2212: FutureWarning: The
      `pad_to_max_length` argument is deprecated and
     will be removed in a future version, use `padding=
     True` or `padding='longest'` to pad to the longest
     sequence in the batch, or use `padding='max_length
     '` to pad to a max length. In this case, you can
     give a specific length with `max_length` (e.g. `
     max_length=45`) or leave max_length to None to pad
     to the maximal input size of the model (e.g. 512
     for Bert).
2407   warnings.warn(
2408 {'train': {'accuracy': 0.9513125, 'precision': 0.
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2408 9573890016163978}, {'accuracy': 0.9523611111111111
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9516495626420552, 'f1_score': 0.9548061640522425
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9535139595653968, 'recall': 0.9550244507197465, '
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f1_score': 0.7719406674907293}, {'accuracy': 0.
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```
': 0.7693738375697459, 'f1_score': 0.
    77586745858080 64}]}
Epoch 1/100
2021-12-30 14:19:21.829061: I tensorflow/
    stream_executor/cuda/cuda_dnn.cc:366] Loaded cuDNN
    version 8200
498/500 [============================>.] - ETA: 0s
     - loss: 0.6044 - accuracy: 0.6810
Epoch 00001: val_accuracy improved from -inf to 0.
    72075, saving model to ../data/results/models\
    LSTMPrimary.h5
500/500 [==============================] - 45s 64ms
    /step - loss: 0.6040 - accuracy: 0.6814 - val_loss
    : 0.5515 - val_accuracy: 0.7207
Epoch 2/100
498/500 [============================>.] - ETA: 0s
     - loss: 0.5333 - accuracy: 0.7357
Epoch 00002: val_accuracy improved from 0.72075 to
    0.72925, saving model to ../data/results/models\
    LSTMPrimary.h5
500/500 [==============================] - 30s 59ms
    /step - loss: 0.5334 - accuracy: 0.7355 - val_loss
    : 0.5291 - val_accuracy: 0.7293
Epoch 3/100
500/500 [==============================] - ETA: 0s
     - loss: 0.5190 - accuracy: 0.7415
Epoch 00003: val_accuracy improved from 0.72925 to
    0.73488, saving model to ../data/results/models\
    LSTMPrimary.h5
500/500 [==============================] - 29s 58ms
    /step - loss: 0.5190 - accuracy: 0.7415 - val_loss
    : 0.5221 - val_accuracy: 0.7349
Epoch 4/100
500/500 [==============================] - ETA: 0s
     - loss: 0.5099 - accuracy: 0.7479
Epoch 00004: val_accuracy did not improve from 0.
    73488
500/500 [==============================] - 27s 54ms
    /step - loss: 0.5099 - accuracy: 0.7479 - val_loss
    : 0.5196 - val_accuracy: 0.7330
Epoch 5/100
```

```
2427 498/500 [============================>.] - ETA: 0s
      - loss: 0.5055 - accuracy: 0.7511
2428 Epoch 00005: val_accuracy improved from 0.73488 to
     0.73625, saving model to ../data/results/models\
     LSTMPrimary.h5
2429 500/500 [==============================] - 29s 59ms
     /step - loss: 0.5054 - accuracy: 0.7510 - val_loss
     : 0.5207 - val_accuracy: 0.7362
2430 Epoch 6/100
2431 499/500 [============================>.] - ETA: 0s
      - loss: 0.5012 - accuracy: 0.7524
2432 Epoch 00006: val_accuracy improved from 0.73625 to
     0.73700, saving model to ../data/results/models\
     LSTMPrimary.h5
2433 500/500 [==============================] - 29s 58ms
     /step - loss: 0.5011 - accuracy: 0.7525 - val_loss
     : 0.5164 - val_accuracy: 0.7370
2434 Epoch 7/100
2435 499/500 [============================>.] - ETA: 0s
      - loss: 0.4986 - accuracy: 0.7570
2436 Epoch 00007: val_accuracy improved from 0.73700 to
     0.73988, saving model to ../data/results/models\
     LSTMPrimary.h5
2437 500/500 [==============================] - 28s 56ms
     /step - loss: 0.4985 - accuracy: 0.7572 - val_loss
     : 0.5122 - val_accuracy: 0.7399
2438 Epoch 8/100
2439 500/500 [==============================] - ETA: 0s
      - loss: 0.4945 - accuracy: 0.7579
2440 Epoch 00008: val_accuracy improved from 0.73988 to
     0.74000, saving model to ../data/results/models\
     LSTMPrimary.h5
2441 500/500 [==============================] - 29s 58ms
     /step - loss: 0.4945 - accuracy: 0.7579 - val_loss
     : 0.5104 - val_accuracy: 0.7400
2442 Epoch 9/100
2443 498/500 [============================>.] - ETA: 0s
      - loss: 0.4909 - accuracy: 0.7597
2444 Epoch 00009: val_accuracy improved from 0.74000 to
     0.74262, saving model to ../data/results/models\
     LSTMPrimary.h5
```

```
2445 500/500 [==============================] - 28s 57ms
     /step - loss: 0.4908 - accuracy: 0.7598 - val_loss
     : 0.5113 - val_accuracy: 0.7426
2446 Epoch 10/100
2447 498/500 [============================>.] - ETA: 0s
      - loss: 0.4883 - accuracy: 0.7619
2448 Epoch 00010: val_accuracy did not improve from 0.
     74262
2449 500/500 [==============================] - 26s 53ms
     /step - loss: 0.4882 - accuracy: 0.7618 - val_loss
     : 0.5160 - val_accuracy: 0.7406
2450 Epoch 11/100
2451 499/500 [============================>.] - ETA: 0s
      - loss: 0.4844 - accuracy: 0.7630
2452 Epoch 00011: val_accuracy did not improve from 0.
     74262
2453 500/500 [==============================] - 26s 53ms
     /step - loss: 0.4844 - accuracy: 0.7629 - val_loss
     : 0.5100 - val_accuracy: 0.7406
2454 Epoch 12/100
2455 500/500 [==============================] - ETA: 0s
      - loss: 0.4814 - accuracy: 0.7648
2456 Epoch 00012: val_accuracy did not improve from 0.
     74262
2457 500/500 [==============================] - 27s 54ms
     /step - loss: 0.4814 - accuracy: 0.7648 - val_loss
     : 0.5139 - val_accuracy: 0.7411
2458 Epoch 13/100
2459 499/500 [============================>.] - ETA: 0s
      - loss: 0.4769 - accuracy: 0.7679
2460 Epoch 00013: val_accuracy improved from 0.74262 to
     0.74563, saving model to ../data/results/models\
     LSTMPrimary.h5
2461 500/500 [==============================] - 29s 57ms
     /step - loss: 0.4769 - accuracy: 0.7678 - val_loss
     : 0.5088 - val_accuracy: 0.7456
2462 Epoch 14/100
2463 500/500 [==============================] - ETA: 0s
      - loss: 0.4718 - accuracy: 0.7703
2464 Epoch 00014: val_accuracy did not improve from 0.
     74563
```

```
2465 500/500 [==============================] - 27s 53ms
     /step - loss: 0.4718 - accuracy: 0.7703 - val_loss
     : 0.5116 - val_accuracy: 0.7450
2466 Epoch 15/100
2467 499/500 [============================>.] - ETA: 0s
      - loss: 0.4703 - accuracy: 0.7716
2468 Epoch 00015: val_accuracy did not improve from 0.
     74563
2469 500/500 [==============================] - 26s 52ms
     /step - loss: 0.4702 - accuracy: 0.7717 - val_loss
     : 0.5200 - val_accuracy: 0.7391
2470 Epoch 16/100
2471 499/500 [============================>.] - ETA: 0s
      - loss: 0.4654 - accuracy: 0.7759
2472 Epoch 00016: val_accuracy did not improve from 0.
     74563
2473 500/500 [==============================] - 26s 53ms
     /step - loss: 0.4656 - accuracy: 0.7755 - val_loss
     : 0.5344 - val_accuracy: 0.7294
2474 Epoch 17/100
2475 499/500 [============================>.] - ETA: 0s
      - loss: 0.4625 - accuracy: 0.7769
2476 Epoch 00017: val_accuracy did not improve from 0.
     74563
2477 500/500 [==============================] - 26s 51ms
     /step - loss: 0.4624 - accuracy: 0.7769 - val_loss
     : 0.5084 - val_accuracy: 0.7440
2478 Epoch 18/100
2479 499/500 [============================>.] - ETA: 0s
      - loss: 0.4578 - accuracy: 0.7792
2480 Epoch 00018: val_accuracy did not improve from 0.
     74563
2481 500/500 [==============================] - 27s 54ms
     /step - loss: 0.4576 - accuracy: 0.7794 - val_loss
     : 0.5087 - val_accuracy: 0.7436
2482 Epoch 19/100
2483 500/500 [==============================] - ETA: 0s
      - loss: 0.4544 - accuracy: 0.7825
2484 Epoch 00019: val_accuracy did not improve from 0.
     74563
2485 500/500 [==============================] - 26s 53ms
```

```
2485 /step - loss: 0.4544 - accuracy: 0.7825 - val_loss
     : 0.5142 - val_accuracy: 0.7437
2486 Epoch 20/100
2487 499/500 [============================>.] - ETA: 0s
      - loss: 0.4517 - accuracy: 0.7842
2488 Epoch 00020: val_accuracy did not improve from 0.
     74563
2489 500/500 [==============================] - 27s 53ms
     /step - loss: 0.4516 - accuracy: 0.7843 - val_loss
     : 0.5135 - val_accuracy: 0.7454
2490 Epoch 21/100
2491 499/500 [============================>.] - ETA: 0s
      - loss: 0.4450 - accuracy: 0.7872
2492 Epoch 00021: val_accuracy did not improve from 0.
     74563
2493 500/500 [==============================] - 27s 54ms
     /step - loss: 0.4451 - accuracy: 0.7871 - val_loss
     : 0.5282 - val_accuracy: 0.7377
2494 Epoch 22/100
2495 499/500 [============================>.] - ETA: 0s
      - loss: 0.4427 - accuracy: 0.7875
2496 Epoch 00022: val_accuracy did not improve from 0.
     74563
2497 500/500 [==============================] - 26s 52ms
     /step - loss: 0.4429 - accuracy: 0.7874 - val_loss
     : 0.5228 - val_accuracy: 0.7412
2498 Epoch 23/100
2499 499/500 [============================>.] - ETA: 0s
      - loss: 0.4374 - accuracy: 0.7909
2500 Epoch 00023: val_accuracy did not improve from 0.
     74563
2501 500/500 [==============================] - 26s 52ms
     /step - loss: 0.4374 - accuracy: 0.7908 - val_loss
     : 0.5184 - val_accuracy: 0.7391
2502 Epoch 24/100
2503 499/500 [============================>.] - ETA: 0s
      - loss: 0.4333 - accuracy: 0.7927
2504 Epoch 00024: val_accuracy did not improve from 0.
     74563
2505 500/500 [==============================] - 26s 52ms
     /step - loss: 0.4333 - accuracy: 0.7928 - val_loss
```

```
2505 : 0.5302 - val_accuracy: 0.7448
2506 Epoch 25/100
2507 499/500 [============================>.] - ETA: 0s
      - loss: 0.4307 - accuracy: 0.7945
2508 Epoch 00025: val_accuracy improved from 0.74563 to
     0.74650, saving model to ../data/results/models\
     LSTMPrimary.h5
2509 500/500 [==============================] - 28s 57ms
     /step - loss: 0.4307 - accuracy: 0.7944 - val_loss
     : 0.5214 - val_accuracy: 0.7465
2510 Epoch 26/100
2511 500/500 [==============================] - ETA: 0s
      - loss: 0.4259 - accuracy: 0.7976
2512 Epoch 00026: val_accuracy did not improve from 0.
     74650
2513 500/500 [==============================] - 26s 52ms
     /step - loss: 0.4259 - accuracy: 0.7976 - val_loss
     : 0.5335 - val_accuracy: 0.7433
2514 Epoch 27/100
2515 499/500 [============================>.] - ETA: 0s
      - loss: 0.4224 - accuracy: 0.7984
2516 Epoch 00027: val_accuracy did not improve from 0.
     74650
2517 500/500 [==============================] - 25s 51ms
     /step - loss: 0.4225 - accuracy: 0.7983 - val_loss
     : 0.5342 - val_accuracy: 0.7451
2518 Epoch 00027: early stopping
2519 (timer) fitClassifier executed in: 776.
     7674233913422 seconds
2520 Epoch 1/100
2521 448/450 [============================>.] - ETA: 0s
      - loss: 0.6204 - accuracy: 0.6688
2522 Epoch 00001: val_accuracy improved from -inf to 0.
     71469, saving model to ../data/results/models\LSTM.
     h5
2523 450/450 [==============================] - 40s 66ms
     /step - loss: 0.6201 - accuracy: 0.6691 - val_loss
     : 0.5625 - val_accuracy: 0.7147
2524 Epoch 2/100
2525 448/450 [============================>.] - ETA: 0s
      - loss: 0.5395 - accuracy: 0.7329
```

```
2526 Epoch 00002: val_accuracy improved from 0.71469 to
     0.74094, saving model to ../data/results/models\
     LSTM.h5
2527 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5396 - accuracy: 0.7327 - val_loss
     : 0.5310 - val_accuracy: 0.7409
2528 Epoch 3/100
2529 448/450 [============================>.] - ETA: 0s
      - loss: 0.5239 - accuracy: 0.7404
2530 Epoch 00003: val_accuracy improved from 0.74094 to
     0.74313, saving model to ../data/results/models\
     LSTM.h5
2531 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5237 - accuracy: 0.7406 - val_loss
     : 0.5258 - val_accuracy: 0.7431
2532 Epoch 4/100
2533 448/450 [============================>.] - ETA: 0s
      - loss: 0.5156 - accuracy: 0.7438
2534 Epoch 00004: val_accuracy did not improve from 0.
     74313
2535 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5155 - accuracy: 0.7439 - val_loss
     : 0.5256 - val_accuracy: 0.7391
2536 Epoch 5/100
2537 450/450 [==============================] - ETA: 0s
      - loss: 0.5101 - accuracy: 0.7483
2538 Epoch 00005: val_accuracy improved from 0.74313 to
     0.74406, saving model to ../data/results/models\
     LSTM.h5
2539 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5101 - accuracy: 0.7483 - val_loss
     : 0.5201 - val_accuracy: 0.7441
2540 Epoch 6/100
2541 448/450 [============================>.] - ETA: 0s
      - loss: 0.5056 - accuracy: 0.7512
2542 Epoch 00006: val_accuracy did not improve from 0.
     74406
2543 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5054 - accuracy: 0.7514 - val_loss
     : 0.5171 - val_accuracy: 0.7441
2544 Epoch 7/100
```

```
2545 450/450 [==============================] - ETA: 0s
      - loss: 0.5003 - accuracy: 0.7536
2546 Epoch 00007: val_accuracy did not improve from 0.
     74406
2547 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5003 - accuracy: 0.7536 - val_loss
     : 0.5165 - val_accuracy: 0.7441
2548 Epoch 8/100
2549 448/450 [============================>.] - ETA: 0s
      - loss: 0.4964 - accuracy: 0.7567
2550 Epoch 00008: val_accuracy improved from 0.74406 to
     0.74750, saving model to ../data/results/models\
     LSTM.h5
2551 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4964 - accuracy: 0.7567 - val_loss
     : 0.5160 - val_accuracy: 0.7475
2552 Epoch 9/100
2553 448/450 [============================>.] - ETA: 0s
      - loss: 0.4938 - accuracy: 0.7588
2554 Epoch 00009: val_accuracy did not improve from 0.
     74750
2555 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4936 - accuracy: 0.7590 - val_loss
     : 0.5195 - val_accuracy: 0.7387
2556 Epoch 10/100
2557 448/450 [============================>.] - ETA: 0s
      - loss: 0.4899 - accuracy: 0.7605
2558 Epoch 00010: val_accuracy did not improve from 0.
     74750
2559 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4898 - accuracy: 0.7607 - val_loss
     : 0.5166 - val_accuracy: 0.7403
2560 Epoch 11/100
2561 450/450 [==============================] - ETA: 0s
      - loss: 0.4864 - accuracy: 0.7652
2562 Epoch 00011: val_accuracy did not improve from 0.
     74750
2563 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4864 - accuracy: 0.7652 - val_loss
     : 0.5202 - val_accuracy: 0.7437
2564 Epoch 12/100
```

```
2565 449/450 [============================>.] - ETA: 0s
      - loss: 0.4828 - accuracy: 0.7645
2566 Epoch 00012: val_accuracy did not improve from 0.
     74750
2567 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4830 - accuracy: 0.7643 - val_loss
     : 0.5157 - val_accuracy: 0.7459
2568 Epoch 13/100
2569 448/450 [============================>.] - ETA: 0s
      - loss: 0.4793 - accuracy: 0.7668
2570 Epoch 00013: val_accuracy did not improve from 0.
     74750
2571 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4792 - accuracy: 0.7668 - val_loss
     : 0.5170 - val_accuracy: 0.7456
2572 Epoch 14/100
2573 448/450 [============================>.] - ETA: 0s
      - loss: 0.4746 - accuracy: 0.7685
2574 Epoch 00014: val_accuracy did not improve from 0.
     74750
2575 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4746 - accuracy: 0.7683 - val_loss
     : 0.5148 - val_accuracy: 0.7453
2576 Epoch 15/100
2577 448/450 [============================>.] - ETA: 0s
      - loss: 0.4723 - accuracy: 0.7740
2578 Epoch 00015: val_accuracy did not improve from 0.
     74750
2579 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4724 - accuracy: 0.7739 - val_loss
     : 0.5118 - val_accuracy: 0.7419
2580 Epoch 16/100
2581 448/450 [============================>.] - ETA: 0s
      - loss: 0.4686 - accuracy: 0.7736
2582 Epoch 00016: val_accuracy did not improve from 0.
     74750
2583 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4687 - accuracy: 0.7736 - val_loss
     : 0.5263 - val_accuracy: 0.7372
2584 Epoch 17/100
2585 448/450 [============================>.] - ETA: 0s
```

```
2585  - loss: 0.4634 - accuracy: 0.7760
2586 Epoch 00017: val_accuracy did not improve from 0.
     74750
2587 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4631 - accuracy: 0.7763 - val_loss
     : 0.5190 - val_accuracy: 0.7403
2588 Epoch 18/100
2589 448/450 [============================>.] - ETA: 0s
      - loss: 0.4598 - accuracy: 0.7793
2590 Epoch 00018: val_accuracy did not improve from 0.
     74750
2591 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4598 - accuracy: 0.7792 - val_loss
     : 0.5190 - val_accuracy: 0.7444
2592 Epoch 19/100
2593 448/450 [============================>.] - ETA: 0s
      - loss: 0.4557 - accuracy: 0.7825
2594 Epoch 00019: val_accuracy did not improve from 0.
     74750
2595 450/450 [==============================] - 25s 57ms
     /step - loss: 0.4561 - accuracy: 0.7824 - val_loss
     : 0.5306 - val_accuracy: 0.7387
2596 Epoch 20/100
2597 450/450 [==============================] - ETA: 0s
      - loss: 0.4503 - accuracy: 0.7862
2598 Epoch 00020: val_accuracy did not improve from 0.
     74750
2599 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4503 - accuracy: 0.7862 - val_loss
     : 0.5277 - val_accuracy: 0.7384
2600 Epoch 21/100
2601 448/450 [============================>.] - ETA: 0s
      - loss: 0.4482 - accuracy: 0.7865
2602 Epoch 00021: val_accuracy did not improve from 0.
     74750
2603 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4481 - accuracy: 0.7867 - val_loss
     : 0.5208 - val_accuracy: 0.7384
2604 Epoch 22/100
2605 448/450 [============================>.] - ETA: 0s
      - loss: 0.4426 - accuracy: 0.7909
```

```
2606 Epoch 00022: val_accuracy did not improve from 0.
     74750
2607 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4429 - accuracy: 0.7908 - val_loss
     : 0.5192 - val_accuracy: 0.7356
2608 Epoch 23/100
2609 448/450 [============================>.] - ETA: 0s
      - loss: 0.4385 - accuracy: 0.7923
2610 Epoch 00023: val_accuracy did not improve from 0.
     74750
2611 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4382 - accuracy: 0.7924 - val_loss
     : 0.5287 - val_accuracy: 0.7403
2612 Epoch 24/100
2613 448/450 [============================>.] - ETA: 0s
      - loss: 0.4353 - accuracy: 0.7952
2614 Epoch 00024: val_accuracy did not improve from 0.
     74750
2615 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4353 - accuracy: 0.7950 - val_loss
     : 0.5237 - val_accuracy: 0.7375
2616 Epoch 25/100
2617 448/450 [============================>.] - ETA: 0s
      - loss: 0.4322 - accuracy: 0.7971
2618 Epoch 00025: val_accuracy did not improve from 0.
     74750
2619 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4321 - accuracy: 0.7972 - val_loss
     : 0.5301 - val_accuracy: 0.7359
2620 Epoch 00025: early stopping
2621 Epoch 1/100
2622 450/450 [==============================] - ETA: 0s
      - loss: 0.6134 - accuracy: 0.6721
2623 Epoch 00001: val_accuracy improved from -inf to 0.
     72188, saving model to ../data/results/models\LSTM.
     h5
2624 450/450 [==============================] - 39s 65ms
     /step - loss: 0.6134 - accuracy: 0.6721 - val_loss
     : 0.5561 - val_accuracy: 0.7219
2625 Epoch 2/100
2626 449/450 [============================>.] - ETA: 0s
```

```
2626  - loss: 0.5310 - accuracy: 0.7361
2627 Epoch 00002: val_accuracy improved from 0.72188 to
     0.72969, saving model to ../data/results/models\
     LSTM.h5
2628 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5311 - accuracy: 0.7360 - val_loss
     : 0.5311 - val_accuracy: 0.7297
2629 Epoch 3/100
2630 448/450 [============================>.] - ETA: 0s
      - loss: 0.5174 - accuracy: 0.7444
2631 Epoch 00003: val_accuracy improved from 0.72969 to
     0.73250, saving model to ../data/results/models\
     LSTM.h5
2632 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5174 - accuracy: 0.7443 - val_loss
     : 0.5253 - val_accuracy: 0.7325
2633 Epoch 4/100
2634 448/450 [============================>.] - ETA: 0s
      - loss: 0.5107 - accuracy: 0.7478
2635 Epoch 00004: val_accuracy improved from 0.73250 to
     0.73781, saving model to ../data/results/models\
     LSTM.h5
2636 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5108 - accuracy: 0.7477 - val_loss
     : 0.5227 - val_accuracy: 0.7378
2637 Epoch 5/100
2638 448/450 [============================>.] - ETA: 0s
      - loss: 0.5053 - accuracy: 0.7503
2639 Epoch 00005: val_accuracy improved from 0.73781 to
     0.74000, saving model to ../data/results/models\
     LSTM.h5
2640 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5052 - accuracy: 0.7503 - val_loss
     : 0.5205 - val_accuracy: 0.7400
2641 Epoch 6/100
2642 448/450 [============================>.] - ETA: 0s
      - loss: 0.5016 - accuracy: 0.7536
2643 Epoch 00006: val_accuracy improved from 0.74000 to
     0.74281, saving model to ../data/results/models\
     LSTM.h5
2644 450/450 [==============================] - 26s 58ms
```

```
2644 /step - loss: 0.5016 - accuracy: 0.7535 - val_loss
     : 0.5200 - val_accuracy: 0.7428
2645 Epoch 7/100
2646 448/450 [============================>.] - ETA: 0s
      - loss: 0.4975 - accuracy: 0.7550
2647 Epoch 00007: val_accuracy did not improve from 0.
     74281
2648 450/450 [==============================] - 23s 51ms
     /step - loss: 0.4975 - accuracy: 0.7551 - val_loss
     : 0.5188 - val_accuracy: 0.7381
2649 Epoch 8/100
2650 448/450 [============================>.] - ETA: 0s
      - loss: 0.4934 - accuracy: 0.7596
2651 Epoch 00008: val_accuracy did not improve from 0.
     74281
2652 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4934 - accuracy: 0.7595 - val_loss
     : 0.5176 - val_accuracy: 0.7406
2653 Epoch 9/100
2654 448/450 [============================>.] - ETA: 0s
      - loss: 0.4919 - accuracy: 0.7585
2655 Epoch 00009: val_accuracy did not improve from 0.
     74281
2656 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4920 - accuracy: 0.7584 - val_loss
     : 0.5175 - val_accuracy: 0.7416
2657 Epoch 10/100
2658 448/450 [============================>.] - ETA: 0s
      - loss: 0.4874 - accuracy: 0.7628
2659 Epoch 00010: val_accuracy did not improve from 0.
     74281
2660 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4873 - accuracy: 0.7629 - val_loss
     : 0.5154 - val_accuracy: 0.7391
2661 Epoch 11/100
2662 449/450 [============================>.] - ETA: 0s
      - loss: 0.4843 - accuracy: 0.7640
2663 Epoch 00011: val_accuracy did not improve from 0.
     74281
2664 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4843 - accuracy: 0.7640 - val_loss
```

```
2664 : 0.5142 - val_accuracy: 0.7406
2665 Epoch 12/100
2666 448/450 [============================>.] - ETA: 0s
      - loss: 0.4795 - accuracy: 0.7658
2667 Epoch 00012: val_accuracy did not improve from 0.
     74281
2668 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4798 - accuracy: 0.7658 - val_loss
     : 0.5178 - val_accuracy: 0.7416
2669 Epoch 13/100
2670 448/450 [============================>.] - ETA: 0s
      - loss: 0.4766 - accuracy: 0.7683
2671 Epoch 00013: val_accuracy improved from 0.74281 to
     0.74375, saving model to ../data/results/models\
     LSTM.h5
2672 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4766 - accuracy: 0.7683 - val_loss
     : 0.5201 - val_accuracy: 0.7437
2673 Epoch 14/100
2674 450/450 [==============================] - ETA: 0s
      - loss: 0.4730 - accuracy: 0.7710
2675 Epoch 00014: val_accuracy did not improve from 0.
     74375
2676 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4730 - accuracy: 0.7710 - val_loss
     : 0.5144 - val_accuracy: 0.7437
2677 Epoch 15/100
2678 448/450 [============================>.] - ETA: 0s
      - loss: 0.4680 - accuracy: 0.7757
2679 Epoch 00015: val_accuracy did not improve from 0.
     74375
2680 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4682 - accuracy: 0.7757 - val_loss
     : 0.5182 - val_accuracy: 0.7412
2681 Epoch 16/100
2682 448/450 [============================>.] - ETA: 0s
      - loss: 0.4627 - accuracy: 0.7756
2683 Epoch 00016: val_accuracy improved from 0.74375 to
     0.74406, saving model to ../data/results/models\
     LSTM.h5
2684 450/450 [==============================] - 26s 58ms
```

```
2684 /step - loss: 0.4626 - accuracy: 0.7757 - val_loss
     : 0.5217 - val_accuracy: 0.7441
2685 Epoch 17/100
2686 448/450 [============================>.] - ETA: 0s
      - loss: 0.4591 - accuracy: 0.7788
2687 Epoch 00017: val_accuracy did not improve from 0.
     74406
2688 450/450 [==============================] - 23s 51ms
     /step - loss: 0.4593 - accuracy: 0.7788 - val_loss
     : 0.5311 - val_accuracy: 0.7412
2689 Epoch 18/100
2690 448/450 [============================>.] - ETA: 0s
      - loss: 0.4561 - accuracy: 0.7794
2691 Epoch 00018: val_accuracy improved from 0.74406 to
     0.74500, saving model to ../data/results/models\
     LSTM.h5
2692 450/450 [==============================] - 26s 57ms
     /step - loss: 0.4562 - accuracy: 0.7793 - val_loss
     : 0.5171 - val_accuracy: 0.7450
2693 Epoch 19/100
2694 450/450 [==============================] - ETA: 0s
      - loss: 0.4514 - accuracy: 0.7822
2695 Epoch 00019: val_accuracy improved from 0.74500 to
     0.75031, saving model to ../data/results/models\
     LSTM.h5
2696 450/450 [==============================] - 26s 57ms
     /step - loss: 0.4514 - accuracy: 0.7822 - val_loss
     : 0.5333 - val_accuracy: 0.7503
2697 Epoch 20/100
2698 448/450 [============================>.] - ETA: 0s
      - loss: 0.4476 - accuracy: 0.7861
2699 Epoch 00020: val_accuracy did not improve from 0.
     75031
2700 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4476 - accuracy: 0.7860 - val_loss
     : 0.5264 - val_accuracy: 0.7397
2701 Epoch 21/100
2702 448/450 [============================>.] - ETA: 0s
      - loss: 0.4423 - accuracy: 0.7883
2703 Epoch 00021: val_accuracy did not improve from 0.
     75031
```

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2704 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4426 - accuracy: 0.7883 - val_loss
     : 0.5462 - val_accuracy: 0.7381
2705 Epoch 00021: early stopping
2706 Epoch 1/100
2707 450/450 [==============================] - ETA: 0s
      - loss: 0.6094 - accuracy: 0.6872
2708 Epoch 00001: val_accuracy improved from -inf to 0.
     72938, saving model to ../data/results/models\LSTM.
     h5
2709 450/450 [==============================] - 39s 64ms
     /step - loss: 0.6094 - accuracy: 0.6872 - val_loss
     : 0.5502 - val_accuracy: 0.7294
2710 Epoch 2/100
2711 448/450 [============================>.] - ETA: 0s
      - loss: 0.5374 - accuracy: 0.7330
2712 Epoch 00002: val_accuracy improved from 0.72938 to
     0.73687, saving model to ../data/results/models\
     LSTM.h5
2713 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5372 - accuracy: 0.7331 - val_loss
     : 0.5189 - val_accuracy: 0.7369
2714 Epoch 3/100
2715 448/450 [============================>.] - ETA: 0s
      - loss: 0.5215 - accuracy: 0.7407
2716 Epoch 00003: val_accuracy improved from 0.73687 to
     0.74406, saving model to ../data/results/models\
     LSTM.h5
2717 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5217 - accuracy: 0.7406 - val_loss
     : 0.5091 - val_accuracy: 0.7441
2718 Epoch 4/100
2719 448/450 [============================>.] - ETA: 0s
      - loss: 0.5147 - accuracy: 0.7453
2720 Epoch 00004: val_accuracy improved from 0.74406 to
     0.75344, saving model to ../data/results/models\
     LSTM.h5
2721 450/450 [==============================] - 25s 56ms
     /step - loss: 0.5147 - accuracy: 0.7453 - val_loss
     : 0.5074 - val_accuracy: 0.7534
2722 Epoch 5/100
```

```
2723 448/450 [============================>.] - ETA: 0s
      - loss: 0.5095 - accuracy: 0.7491
2724 Epoch 00005: val_accuracy did not improve from 0.
     75344
2725 450/450 [==============================] - 24s 54ms
     /step - loss: 0.5092 - accuracy: 0.7494 - val_loss
     : 0.5047 - val_accuracy: 0.7494
2726 Epoch 6/100
2727 449/450 [============================>.] - ETA: 0s
      - loss: 0.5042 - accuracy: 0.7523
2728 Epoch 00006: val_accuracy improved from 0.75344 to
     0.75469, saving model to ../data/results/models\
     LSTM.h5
2729 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5043 - accuracy: 0.7521 - val_loss
     : 0.5008 - val_accuracy: 0.7547
2730 Epoch 7/100
2731 448/450 [============================>.] - ETA: 0s
      - loss: 0.5005 - accuracy: 0.7545
2732 Epoch 00007: val_accuracy did not improve from 0.
     75469
2733 450/450 [==============================] - 23s 52ms
     /step - loss: 0.5004 - accuracy: 0.7548 - val_loss
     : 0.4997 - val_accuracy: 0.7538
2734 Epoch 8/100
2735 448/450 [============================>.] - ETA: 0s
      - loss: 0.4959 - accuracy: 0.7548
2736 Epoch 00008: val_accuracy did not improve from 0.
     75469
2737 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4959 - accuracy: 0.7549 - val_loss
     : 0.5006 - val_accuracy: 0.7531
2738 Epoch 9/100
2739 448/450 [============================>.] - ETA: 0s
      - loss: 0.4918 - accuracy: 0.7580
2740 Epoch 00009: val_accuracy did not improve from 0.
     75469
2741 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4922 - accuracy: 0.7577 - val_loss
     : 0.4976 - val_accuracy: 0.7528
2742 Epoch 10/100
```

```
448/450 [============================>.] - ETA: 0s
 - loss: 0.4895 - accuracy: 0.7604
Epoch 00010: val_accuracy did not improve from 0.
75469
450/450 [==============================] - 24s 52ms
/step - loss: 0.4896 - accuracy: 0.7602 - val_loss
: 0.4984 - val_accuracy: 0.7541
Epoch 11/100
448/450 [============================>.] - ETA: 0s
 - loss: 0.4852 - accuracy: 0.7623
Epoch 00011: val_accuracy improved from 0.75469 to
0.75563, saving model to ../data/results/models\
LSTM.h5
450/450 [==============================] - 26s 58ms
/step - loss: 0.4853 - accuracy: 0.7623 - val_loss
: 0.4983 - val_accuracy: 0.7556
Epoch 12/100
448/450 [============================>.] - ETA: 0s
 - loss: 0.4830 - accuracy: 0.7646
Epoch 00012: val_accuracy improved from 0.75563 to
0.75719, saving model to ../data/results/models\
LSTM.h5
450/450 [==============================] - 26s 57ms
/step - loss: 0.4830 - accuracy: 0.7644 - val_loss
: 0.4977 - val_accuracy: 0.7572
Epoch 13/100
450/450 [==============================] - ETA: 0s
 - loss: 0.4791 - accuracy: 0.7658
Epoch 00013: val_accuracy did not improve from 0.
75719
450/450 [==============================] - 23s 52ms
/step - loss: 0.4791 - accuracy: 0.7658 - val_loss
: 0.4980 - val_accuracy: 0.7550
Epoch 14/100
450/450 [==============================] - ETA: 0s
 - loss: 0.4754 - accuracy: 0.7695
Epoch 00014: val_accuracy did not improve from 0.
75719
450/450 [==============================] - 23s 52ms
/step - loss: 0.4754 - accuracy: 0.7695 - val_loss
: 0.5052 - val_accuracy: 0.7506
```

```
2762 Epoch 15/100
2763 449/450 [============================>.] - ETA: 0s
      - loss: 0.4708 - accuracy: 0.7690
2764 Epoch 00015: val_accuracy improved from 0.75719 to
     0.75813, saving model to ../data/results/models\
     LSTM.h5
2765 450/450 [==============================] - 26s 57ms
     /step - loss: 0.4707 - accuracy: 0.7689 - val_loss
     : 0.5001 - val_accuracy: 0.7581
2766 Epoch 16/100
2767 448/450 [============================>.] - ETA: 0s
      - loss: 0.4679 - accuracy: 0.7709
2768 Epoch 00016: val_accuracy improved from 0.75813 to
     0.76156, saving model to ../data/results/models\
     LSTM.h5
2769 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4677 - accuracy: 0.7712 - val_loss
     : 0.4989 - val_accuracy: 0.7616
2770 Epoch 17/100
2771 448/450 [============================>.] - ETA: 0s
      - loss: 0.4644 - accuracy: 0.7742
2772 Epoch 00017: val_accuracy did not improve from 0.
     76156
2773 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4641 - accuracy: 0.7744 - val_loss
     : 0.5022 - val_accuracy: 0.7572
2774 Epoch 18/100
2775 448/450 [============================>.] - ETA: 0s
      - loss: 0.4601 - accuracy: 0.7762
2776 Epoch 00018: val_accuracy did not improve from 0.
     76156
2777 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4603 - accuracy: 0.7761 - val_loss
     : 0.5047 - val_accuracy: 0.7559
2778 Epoch 19/100
2779 448/450 [============================>.] - ETA: 0s
      - loss: 0.4531 - accuracy: 0.7800
2780 Epoch 00019: val_accuracy did not improve from 0.
     76156
2781 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4531 - accuracy: 0.7801 - val_loss
```

```
2781 : 0.5064 - val_accuracy: 0.7541
2782 Epoch 00019: early stopping
2783 Epoch 1/100
2784 450/450 [==============================] - ETA: 0s
      - loss: 0.6119 - accuracy: 0.6750
2785 Epoch 00001: val_accuracy improved from -inf to 0.
     72094, saving model to ../data/results/models\LSTM.
     h5
2786 450/450 [==============================] - 39s 64ms
     /step - loss: 0.6119 - accuracy: 0.6750 - val_loss
     : 0.5480 - val_accuracy: 0.7209
2787 Epoch 2/100
2788 448/450 [============================>.] - ETA: 0s
      - loss: 0.5383 - accuracy: 0.7329
2789 Epoch 00002: val_accuracy improved from 0.72094 to
     0.72688, saving model to ../data/results/models\
     LSTM.h5
2790 450/450 [==============================] - 26s 57ms
     /step - loss: 0.5384 - accuracy: 0.7328 - val_loss
     : 0.5320 - val_accuracy: 0.7269
2791 Epoch 3/100
2792 449/450 [============================>.] - ETA: 0s
      - loss: 0.5237 - accuracy: 0.7427
2793 Epoch 00003: val_accuracy improved from 0.72688 to
     0.73188, saving model to ../data/results/models\
     LSTM.h5
2794 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5238 - accuracy: 0.7426 - val_loss
     : 0.5301 - val_accuracy: 0.7319
2795 Epoch 4/100
2796 448/450 [============================>.] - ETA: 0s
      - loss: 0.5164 - accuracy: 0.7458
2797 Epoch 00004: val_accuracy improved from 0.73188 to
     0.73875, saving model to ../data/results/models\
     LSTM.h5
2798 450/450 [==============================] - 26s 57ms
     /step - loss: 0.5165 - accuracy: 0.7456 - val_loss
     : 0.5165 - val_accuracy: 0.7387
2799 Epoch 5/100
2800 450/450 [==============================] - ETA: 0s
      - loss: 0.5096 - accuracy: 0.7497
```

```
2801 Epoch 00005: val_accuracy improved from 0.73875 to
     0.74063, saving model to ../data/results/models\
     LSTM.h5
2802 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5096 - accuracy: 0.7497 - val_loss
     : 0.5124 - val_accuracy: 0.7406
2803 Epoch 6/100
2804 448/450 [============================>.] - ETA: 0s
      - loss: 0.5051 - accuracy: 0.7520
2805 Epoch 00006: val_accuracy improved from 0.74063 to
     0.74156, saving model to ../data/results/models\
     LSTM.h5
2806 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5051 - accuracy: 0.7520 - val_loss
     : 0.5079 - val_accuracy: 0.7416
2807 Epoch 7/100
2808 448/450 [============================>.] - ETA: 0s
      - loss: 0.5004 - accuracy: 0.7548
2809 Epoch 00007: val_accuracy improved from 0.74156 to
     0.74281, saving model to ../data/results/models\
     LSTM.h5
2810 450/450 [==============================] - 25s 57ms
     /step - loss: 0.5003 - accuracy: 0.7550 - val_loss
     : 0.5079 - val_accuracy: 0.7428
2811 Epoch 8/100
2812 449/450 [============================>.] - ETA: 0s
      - loss: 0.4973 - accuracy: 0.7579
2813 Epoch 00008: val_accuracy did not improve from 0.
     74281
2814 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4971 - accuracy: 0.7579 - val_loss
     : 0.5109 - val_accuracy: 0.7422
2815 Epoch 9/100
2816 448/450 [============================>.] - ETA: 0s
      - loss: 0.4916 - accuracy: 0.7599
2817 Epoch 00009: val_accuracy improved from 0.74281 to
     0.74375, saving model to ../data/results/models\
     LSTM.h5
2818 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4918 - accuracy: 0.7597 - val_loss
     : 0.5066 - val_accuracy: 0.7437
```

```
2819 Epoch 10/100
2820 450/450 [==============================] - ETA: 0s
      - loss: 0.4892 - accuracy: 0.7620
2821 Epoch 00010: val_accuracy improved from 0.74375 to
     0.75031, saving model to ../data/results/models\
     LSTM.h5
2822 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4892 - accuracy: 0.7620 - val_loss
     : 0.5021 - val_accuracy: 0.7503
2823 Epoch 11/100
2824 448/450 [============================>.] - ETA: 0s
      - loss: 0.4871 - accuracy: 0.7630
2825 Epoch 00011: val_accuracy did not improve from 0.
     75031
2826 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4869 - accuracy: 0.7632 - val_loss
     : 0.5023 - val_accuracy: 0.7484
2827 Epoch 12/100
2828 448/450 [============================>.] - ETA: 0s
      - loss: 0.4832 - accuracy: 0.7645
2829 Epoch 00012: val_accuracy improved from 0.75031 to
     0.75187, saving model to ../data/results/models\
     LSTM.h5
2830 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4832 - accuracy: 0.7646 - val_loss
     : 0.4973 - val_accuracy: 0.7519
2831 Epoch 13/100
2832 448/450 [============================>.] - ETA: 0s
      - loss: 0.4797 - accuracy: 0.7668
2833 Epoch 00013: val_accuracy did not improve from 0.
     75187
2834 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4798 - accuracy: 0.7667 - val_loss
     : 0.4987 - val_accuracy: 0.7513
2835 Epoch 14/100
2836 448/450 [============================>.] - ETA: 0s
      - loss: 0.4750 - accuracy: 0.7699
2837 Epoch 00014: val_accuracy improved from 0.75187 to
     0.75531, saving model to ../data/results/models\
     LSTM.h5
2838 450/450 [==============================] - 26s 59ms
```

```
2838 /step - loss: 0.4754 - accuracy: 0.7697 - val_loss
     : 0.4983 - val_accuracy: 0.7553
2839 Epoch 15/100
2840 448/450 [============================>.] - ETA: 0s
      - loss: 0.4716 - accuracy: 0.7739
2841 Epoch 00015: val_accuracy did not improve from 0.
     75531
2842 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4714 - accuracy: 0.7740 - val_loss
     : 0.5049 - val_accuracy: 0.7506
2843 Epoch 16/100
2844 450/450 [==============================] - ETA: 0s
      - loss: 0.4676 - accuracy: 0.7752
2845 Epoch 00016: val_accuracy did not improve from 0.
     75531
2846 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4676 - accuracy: 0.7752 - val_loss
     : 0.4957 - val_accuracy: 0.7522
2847 Epoch 17/100
2848 449/450 [============================>.] - ETA: 0s
      - loss: 0.4636 - accuracy: 0.7770
2849 Epoch 00017: val_accuracy improved from 0.75531 to
     0.75719, saving model to ../data/results/models\
     LSTM.h5
2850 450/450 [==============================] - 27s 59ms
     /step - loss: 0.4636 - accuracy: 0.7770 - val_loss
     : 0.4948 - val_accuracy: 0.7572
2851 Epoch 18/100
2852 448/450 [============================>.] - ETA: 0s
      - loss: 0.4594 - accuracy: 0.7814
2853 Epoch 00018: val_accuracy improved from 0.75719 to
     0.75937, saving model to ../data/results/models\
     LSTM.h5
2854 450/450 [==============================] - 27s 59ms
     /step - loss: 0.4595 - accuracy: 0.7813 - val_loss
     : 0.4933 - val_accuracy: 0.7594
2855 Epoch 19/100
2856 448/450 [============================>.] - ETA: 0s
      - loss: 0.4554 - accuracy: 0.7849
2857 Epoch 00019: val_accuracy did not improve from 0.
     75937
```

```
2858 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4550 - accuracy: 0.7851 - val_loss
     : 0.4935 - val_accuracy: 0.7588
2859 Epoch 20/100
2860 448/450 [============================>.] - ETA: 0s
      - loss: 0.4502 - accuracy: 0.7862
2861 Epoch 00020: val_accuracy did not improve from 0.
     75937
2862 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4503 - accuracy: 0.7861 - val_loss
     : 0.5005 - val_accuracy: 0.7538
2863 Epoch 21/100
2864 448/450 [============================>.] - ETA: 0s
      - loss: 0.4449 - accuracy: 0.7904
2865 Epoch 00021: val_accuracy did not improve from 0.
     75937
2866 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4449 - accuracy: 0.7904 - val_loss
     : 0.5003 - val_accuracy: 0.7566
2867 Epoch 22/100
2868 448/450 [============================>.] - ETA: 0s
      - loss: 0.4419 - accuracy: 0.7919
2869 Epoch 00022: val_accuracy did not improve from 0.
     75937
2870 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4418 - accuracy: 0.7918 - val_loss
     : 0.5043 - val_accuracy: 0.7544
2871 Epoch 23/100
2872 448/450 [============================>.] - ETA: 0s
      - loss: 0.4361 - accuracy: 0.7943
2873 Epoch 00023: val_accuracy did not improve from 0.
     75937
2874 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4361 - accuracy: 0.7944 - val_loss
     : 0.5133 - val_accuracy: 0.7506
2875 Epoch 24/100
2876 449/450 [============================>.] - ETA: 0s
      - loss: 0.4323 - accuracy: 0.7965
2877 Epoch 00024: val_accuracy did not improve from 0.
     75937
2878 450/450 [==============================] - 24s 54ms
```

```
2878 /step - loss: 0.4320 - accuracy: 0.7967 - val_loss
     : 0.5047 - val_accuracy: 0.7541
2879 Epoch 25/100
2880 448/450 [============================>.] - ETA: 0s
      - loss: 0.4271 - accuracy: 0.7995
2881 Epoch 00025: val_accuracy did not improve from 0.
     75937
2882 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4270 - accuracy: 0.7995 - val_loss
     : 0.5084 - val_accuracy: 0.7475
2883 Epoch 26/100
2884 448/450 [============================>.] - ETA: 0s
      - loss: 0.4251 - accuracy: 0.8022
2885 Epoch 00026: val_accuracy did not improve from 0.
     75937
2886 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4251 - accuracy: 0.8022 - val_loss
     : 0.5213 - val_accuracy: 0.7519
2887 Epoch 27/100
2888 448/450 [============================>.] - ETA: 0s
      - loss: 0.4179 - accuracy: 0.8047
2889 Epoch 00027: val_accuracy did not improve from 0.
     75937
2890 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4181 - accuracy: 0.8047 - val_loss
     : 0.5065 - val_accuracy: 0.7491
2891 Epoch 28/100
2892 448/450 [============================>.] - ETA: 0s
      - loss: 0.4158 - accuracy: 0.8048
2893 Epoch 00028: val_accuracy did not improve from 0.
     75937
2894 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4155 - accuracy: 0.8048 - val_loss
     : 0.5112 - val_accuracy: 0.7550
2895 Epoch 00028: early stopping
2896 Epoch 1/100
2897 449/450 [============================>.] - ETA: 0s
      - loss: 0.6178 - accuracy: 0.6653
2898 Epoch 00001: val_accuracy improved from -inf to 0.
     73344, saving model to ../data/results/models\LSTM.
     h5
```

```
2899 450/450 [==============================] - 39s 64ms
     /step - loss: 0.6177 - accuracy: 0.6654 - val_loss
     : 0.5451 - val_accuracy: 0.7334
2900 Epoch 2/100
2901 448/450 [============================>.] - ETA: 0s
      - loss: 0.5380 - accuracy: 0.7343
2902 Epoch 00002: val_accuracy improved from 0.73344 to
     0.74344, saving model to ../data/results/models\
     LSTM.h5
2903 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5380 - accuracy: 0.7342 - val_loss
     : 0.5205 - val_accuracy: 0.7434
2904 Epoch 3/100
2905 448/450 [============================>.] - ETA: 0s
      - loss: 0.5240 - accuracy: 0.7408
2906 Epoch 00003: val_accuracy improved from 0.74344 to
     0.75344, saving model to ../data/results/models\
     LSTM.h5
2907 450/450 [==============================] - 27s 59ms
     /step - loss: 0.5240 - accuracy: 0.7407 - val_loss
     : 0.5089 - val_accuracy: 0.7534
2908 Epoch 4/100
2909 449/450 [============================>.] - ETA: 0s
      - loss: 0.5150 - accuracy: 0.7452
2910 Epoch 00004: val_accuracy did not improve from 0.
     75344
2911 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5150 - accuracy: 0.7452 - val_loss
     : 0.5094 - val_accuracy: 0.7503
2912 Epoch 5/100
2913 448/450 [============================>.] - ETA: 0s
      - loss: 0.5105 - accuracy: 0.7477
2914 Epoch 00005: val_accuracy improved from 0.75344 to
     0.75906, saving model to ../data/results/models\
     LSTM.h5
2915 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5102 - accuracy: 0.7481 - val_loss
     : 0.4986 - val_accuracy: 0.7591
2916 Epoch 6/100
2917 448/450 [============================>.] - ETA: 0s
      - loss: 0.5048 - accuracy: 0.7523
```

```
2918 Epoch 00006: val_accuracy did not improve from 0.
     75906
2919 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5051 - accuracy: 0.7521 - val_loss
     : 0.4982 - val_accuracy: 0.7588
2920 Epoch 7/100
2921 450/450 [==============================] - ETA: 0s
      - loss: 0.5027 - accuracy: 0.7524
2922 Epoch 00007: val_accuracy improved from 0.75906 to
     0.76250, saving model to ../data/results/models\
     LSTM.h5
2923 450/450 [==============================] - 27s 60ms
     /step - loss: 0.5027 - accuracy: 0.7524 - val_loss
     : 0.4942 - val_accuracy: 0.7625
2924 Epoch 8/100
2925 448/450 [============================>.] - ETA: 0s
      - loss: 0.4992 - accuracy: 0.7562
2926 Epoch 00008: val_accuracy did not improve from 0.
     76250
2927 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4996 - accuracy: 0.7559 - val_loss
     : 0.4924 - val_accuracy: 0.7625
2928 Epoch 9/100
2929 449/450 [============================>.] - ETA: 0s
      - loss: 0.4946 - accuracy: 0.7581
2930 Epoch 00009: val_accuracy did not improve from 0.
     76250
2931 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4947 - accuracy: 0.7581 - val_loss
     : 0.4995 - val_accuracy: 0.7575
2932 Epoch 10/100
2933 448/450 [============================>.] - ETA: 0s
      - loss: 0.4926 - accuracy: 0.7613
2934 Epoch 00010: val_accuracy improved from 0.76250 to
     0.76531, saving model to ../data/results/models\
     LSTM.h5
2935 450/450 [==============================] - 27s 61ms
     /step - loss: 0.4926 - accuracy: 0.7613 - val_loss
     : 0.4887 - val_accuracy: 0.7653
2936 Epoch 11/100
2937 448/450 [============================>.] - ETA: 0s
```

```
2937  - loss: 0.4895 - accuracy: 0.7622
2938 Epoch 00011: val_accuracy did not improve from 0.
     76531
2939 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4893 - accuracy: 0.7623 - val_loss
     : 0.4894 - val_accuracy: 0.7653
2940 Epoch 12/100
2941 449/450 [============================>.] - ETA: 0s
      - loss: 0.4860 - accuracy: 0.7647
2942 Epoch 00012: val_accuracy did not improve from 0.
     76531
2943 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4859 - accuracy: 0.7648 - val_loss
     : 0.4864 - val_accuracy: 0.7650
2944 Epoch 13/100
2945 448/450 [============================>.] - ETA: 0s
      - loss: 0.4818 - accuracy: 0.7657
2946 Epoch 00013: val_accuracy improved from 0.76531 to
     0.76688, saving model to ../data/results/models\
     LSTM.h5
2947 450/450 [==============================] - 26s 59ms
     /step - loss: 0.4819 - accuracy: 0.7657 - val_loss
     : 0.4838 - val_accuracy: 0.7669
2948 Epoch 14/100
2949 450/450 [==============================] - ETA: 0s
      - loss: 0.4784 - accuracy: 0.7682
2950 Epoch 00014: val_accuracy did not improve from 0.
     76688
2951 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4784 - accuracy: 0.7682 - val_loss
     : 0.4799 - val_accuracy: 0.7663
2952 Epoch 15/100
2953 448/450 [============================>.] - ETA: 0s
      - loss: 0.4739 - accuracy: 0.7709
2954 Epoch 00015: val_accuracy did not improve from 0.
     76688
2955 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4740 - accuracy: 0.7708 - val_loss
     : 0.4838 - val_accuracy: 0.7628
2956 Epoch 16/100
2957 448/450 [============================>.] - ETA: 0s
```

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2957  - loss: 0.4711 - accuracy: 0.7720
2958 Epoch 00016: val_accuracy did not improve from 0.
     76688
2959 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4709 - accuracy: 0.7720 - val_loss
     : 0.4772 - val_accuracy: 0.7641
2960 Epoch 17/100
2961 448/450 [============================>.] - ETA: 0s
      - loss: 0.4664 - accuracy: 0.7754
2962 Epoch 00017: val_accuracy did not improve from 0.
     76688
2963 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4661 - accuracy: 0.7755 - val_loss
     : 0.4797 - val_accuracy: 0.7644
2964 Epoch 18/100
2965 448/450 [============================>.] - ETA: 0s
      - loss: 0.4606 - accuracy: 0.7787
2966 Epoch 00018: val_accuracy did not improve from 0.
     76688
2967 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4606 - accuracy: 0.7787 - val_loss
     : 0.4788 - val_accuracy: 0.7600
2968 Epoch 19/100
2969 448/450 [============================>.] - ETA: 0s
      - loss: 0.4571 - accuracy: 0.7787
2970 Epoch 00019: val_accuracy did not improve from 0.
     76688
2971 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4570 - accuracy: 0.7788 - val_loss
     : 0.4787 - val_accuracy: 0.7647
2972 Epoch 20/100
2973 450/450 [==============================] - ETA: 0s
      - loss: 0.4514 - accuracy: 0.7832
2974 Epoch 00020: val_accuracy did not improve from 0.
     76688
2975 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4514 - accuracy: 0.7832 - val_loss
     : 0.4832 - val_accuracy: 0.7659
2976 Epoch 21/100
2977 448/450 [============================>.] - ETA: 0s
      - loss: 0.4455 - accuracy: 0.7884
```

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2978 Epoch 00021: val_accuracy did not improve from 0.
     76688
2979 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4453 - accuracy: 0.7884 - val_loss
     : 0.4851 - val_accuracy: 0.7616
2980 Epoch 22/100
2981 448/450 [============================>.] - ETA: 0s
      - loss: 0.4431 - accuracy: 0.7891
2982 Epoch 00022: val_accuracy did not improve from 0.
     76688
2983 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4425 - accuracy: 0.7895 - val_loss
     : 0.4830 - val_accuracy: 0.7663
2984 Epoch 23/100
2985 448/450 [============================>.] - ETA: 0s
      - loss: 0.4385 - accuracy: 0.7906
2986 Epoch 00023: val_accuracy did not improve from 0.
     76688
2987 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4385 - accuracy: 0.7906 - val_loss
     : 0.4830 - val_accuracy: 0.7556
2988 Epoch 24/100
2989 448/450 [============================>.] - ETA: 0s
      - loss: 0.4335 - accuracy: 0.7970
2990 Epoch 00024: val_accuracy did not improve from 0.
     76688
2991 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4338 - accuracy: 0.7967 - val_loss
     : 0.4842 - val_accuracy: 0.7659
2992 Epoch 25/100
2993 450/450 [==============================] - ETA: 0s
      - loss: 0.4300 - accuracy: 0.7969
2994 Epoch 00025: val_accuracy did not improve from 0.
     76688
2995 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4300 - accuracy: 0.7969 - val_loss
     : 0.4902 - val_accuracy: 0.7613
2996 Epoch 26/100
2997 449/450 [============================>.] - ETA: 0s
      - loss: 0.4252 - accuracy: 0.7983
2998 Epoch 00026: val_accuracy did not improve from 0.
```

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2998 76688
2999 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4252 - accuracy: 0.7983 - val_loss
     : 0.4890 - val_accuracy: 0.7631
3000 Epoch 00026: early stopping
3001 Epoch 1/100
3002 449/450 [============================>.] - ETA: 0s
      - loss: 0.6100 - accuracy: 0.6788
3003 Epoch 00001: val_accuracy improved from -inf to 0.
     72875, saving model to ../data/results/models\LSTM.
     h5
3004 450/450 [==============================] - 39s 64ms
     /step - loss: 0.6100 - accuracy: 0.6789 - val_loss
     : 0.5420 - val_accuracy: 0.7287
3005 Epoch 2/100
3006 448/450 [============================>.] - ETA: 0s
      - loss: 0.5342 - accuracy: 0.7350
3007 Epoch 00002: val_accuracy improved from 0.72875 to
     0.73937, saving model to ../data/results/models\
     LSTM.h5
3008 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5346 - accuracy: 0.7345 - val_loss
     : 0.5240 - val_accuracy: 0.7394
3009 Epoch 3/100
3010 450/450 [==============================] - ETA: 0s
      - loss: 0.5186 - accuracy: 0.7432
3011 Epoch 00003: val_accuracy improved from 0.73937 to
     0.74781, saving model to ../data/results/models\
     LSTM.h5
3012 450/450 [==============================] - 26s 57ms
     /step - loss: 0.5186 - accuracy: 0.7432 - val_loss
     : 0.5153 - val_accuracy: 0.7478
3013 Epoch 4/100
3014 448/450 [============================>.] - ETA: 0s
      - loss: 0.5103 - accuracy: 0.7479
3015 Epoch 00004: val_accuracy did not improve from 0.
     74781
3016 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5106 - accuracy: 0.7477 - val_loss
     : 0.5135 - val_accuracy: 0.7462
3017 Epoch 5/100
```

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3018 450/450 [==============================] - ETA: 0s
      - loss: 0.5069 - accuracy: 0.7491
3019 Epoch 00005: val_accuracy did not improve from 0.
     74781
3020 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5069 - accuracy: 0.7491 - val_loss
     : 0.5098 - val_accuracy: 0.7472
3021 Epoch 6/100
3022 448/450 [============================>.] - ETA: 0s
      - loss: 0.5017 - accuracy: 0.7536
3023 Epoch 00006: val_accuracy did not improve from 0.
     74781
3024 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5020 - accuracy: 0.7534 - val_loss
     : 0.5108 - val_accuracy: 0.7441
3025 Epoch 7/100
3026 448/450 [============================>.] - ETA: 0s
      - loss: 0.4978 - accuracy: 0.7576
3027 Epoch 00007: val_accuracy did not improve from 0.
     74781
3028 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4977 - accuracy: 0.7575 - val_loss
     : 0.5101 - val_accuracy: 0.7466
3029 Epoch 8/100
3030 450/450 [==============================] - ETA: 0s
      - loss: 0.4944 - accuracy: 0.7563
3031 Epoch 00008: val_accuracy improved from 0.74781 to
     0.75250, saving model to ../data/results/models\
     LSTM.h5
3032 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4944 - accuracy: 0.7563 - val_loss
     : 0.5039 - val_accuracy: 0.7525
3033 Epoch 9/100
3034 448/450 [============================>.] - ETA: 0s
      - loss: 0.4912 - accuracy: 0.7593
3035 Epoch 00009: val_accuracy did not improve from 0.
     75250
3036 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4913 - accuracy: 0.7591 - val_loss
     : 0.5044 - val_accuracy: 0.7494
3037 Epoch 10/100
```

```
3038 449/450 [============================>.] - ETA: 0s
      - loss: 0.4885 - accuracy: 0.7621
3039 Epoch 00010: val_accuracy did not improve from 0.
     75250
3040 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4882 - accuracy: 0.7624 - val_loss
     : 0.5076 - val_accuracy: 0.7453
3041 Epoch 11/100
3042 448/450 [============================>.] - ETA: 0s
      - loss: 0.4826 - accuracy: 0.7659
3043 Epoch 00011: val_accuracy improved from 0.75250 to
     0.75406, saving model to ../data/results/models\
     LSTM.h5
3044 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4826 - accuracy: 0.7659 - val_loss
     : 0.5038 - val_accuracy: 0.7541
3045 Epoch 12/100
3046 448/450 [============================>.] - ETA: 0s
      - loss: 0.4812 - accuracy: 0.7675
3047 Epoch 00012: val_accuracy did not improve from 0.
     75406
3048 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4810 - accuracy: 0.7676 - val_loss
     : 0.5096 - val_accuracy: 0.7478
3049 Epoch 13/100
3050 450/450 [==============================] - ETA: 0s
      - loss: 0.4765 - accuracy: 0.7685
3051 Epoch 00013: val_accuracy improved from 0.75406 to
     0.75625, saving model to ../data/results/models\
     LSTM.h5
3052 450/450 [==============================] - 26s 59ms
     /step - loss: 0.4765 - accuracy: 0.7685 - val_loss
     : 0.5047 - val_accuracy: 0.7563
3053 Epoch 14/100
3054 448/450 [============================>.] - ETA: 0s
      - loss: 0.4727 - accuracy: 0.7715
3055 Epoch 00014: val_accuracy improved from 0.75625 to
     0.75781, saving model to ../data/results/models\
     LSTM.h5
3056 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4727 - accuracy: 0.7715 - val_loss
```

```
3056 : 0.4992 - val_accuracy: 0.7578
3057 Epoch 15/100
3058 448/450 [============================>.] - ETA: 0s
      - loss: 0.4693 - accuracy: 0.7731
3059 Epoch 00015: val_accuracy did not improve from 0.
     75781
3060 450/450 [==============================] - 23s 52ms
     /step - loss: 0.4692 - accuracy: 0.7729 - val_loss
     : 0.5045 - val_accuracy: 0.7503
3061 Epoch 16/100
3062 450/450 [==============================] - ETA: 0s
      - loss: 0.4657 - accuracy: 0.7749
3063 Epoch 00016: val_accuracy did not improve from 0.
     75781
3064 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4657 - accuracy: 0.7749 - val_loss
     : 0.4997 - val_accuracy: 0.7556
3065 Epoch 17/100
3066 448/450 [============================>.] - ETA: 0s
      - loss: 0.4614 - accuracy: 0.7785
3067 Epoch 00017: val_accuracy improved from 0.75781 to
     0.75906, saving model to ../data/results/models\
     LSTM.h5
3068 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4614 - accuracy: 0.7783 - val_loss
     : 0.5052 - val_accuracy: 0.7591
3069 Epoch 18/100
3070 450/450 [==============================] - ETA: 0s
      - loss: 0.4590 - accuracy: 0.7790
3071 Epoch 00018: val_accuracy did not improve from 0.
     75906
3072 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4590 - accuracy: 0.7790 - val_loss
     : 0.4974 - val_accuracy: 0.7569
3073 Epoch 19/100
3074 450/450 [==============================] - ETA: 0s
      - loss: 0.4533 - accuracy: 0.7833
3075 Epoch 00019: val_accuracy did not improve from 0.
     75906
3076 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4533 - accuracy: 0.7833 - val_loss
```

```
3076 : 0.5033 - val_accuracy: 0.7509
3077 Epoch 20/100
3078 448/450 [============================>.] - ETA: 0s
      - loss: 0.4491 - accuracy: 0.7844
3079 Epoch 00020: val_accuracy did not improve from 0.
     75906
3080 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4496 - accuracy: 0.7842 - val_loss
     : 0.5101 - val_accuracy: 0.7541
3081 Epoch 21/100
3082 450/450 [==============================] - ETA: 0s
      - loss: 0.4447 - accuracy: 0.7882
3083 Epoch 00021: val_accuracy did not improve from 0.
     75906
3084 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4447 - accuracy: 0.7882 - val_loss
     : 0.5145 - val_accuracy: 0.7556
3085 Epoch 22/100
3086 448/450 [============================>.] - ETA: 0s
      - loss: 0.4404 - accuracy: 0.7910
3087 Epoch 00022: val_accuracy did not improve from 0.
     75906
3088 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4404 - accuracy: 0.7910 - val_loss
     : 0.5078 - val_accuracy: 0.7556
3089 Epoch 23/100
3090 448/450 [============================>.] - ETA: 0s
      - loss: 0.4379 - accuracy: 0.7925
3091 Epoch 00023: val_accuracy did not improve from 0.
     75906
3092 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4377 - accuracy: 0.7925 - val_loss
     : 0.5280 - val_accuracy: 0.7497
3093 Epoch 24/100
3094 450/450 [==============================] - ETA: 0s
      - loss: 0.4325 - accuracy: 0.7959
3095 Epoch 00024: val_accuracy did not improve from 0.
     75906
3096 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4325 - accuracy: 0.7959 - val_loss
     : 0.5139 - val_accuracy: 0.7500
```

```
3097 Epoch 25/100
3098 448/450 [============================>.] - ETA: 0s
      - loss: 0.4286 - accuracy: 0.7973
3099 Epoch 00025: val_accuracy did not improve from 0.
     75906
3100 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4286 - accuracy: 0.7973 - val_loss
     : 0.5183 - val_accuracy: 0.7556
3101 Epoch 26/100
3102 450/450 [==============================] - ETA: 0s
      - loss: 0.4243 - accuracy: 0.7996
3103 Epoch 00026: val_accuracy did not improve from 0.
     75906
3104 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4243 - accuracy: 0.7996 - val_loss
     : 0.5156 - val_accuracy: 0.7494
3105 Epoch 27/100
3106 448/450 [============================>.] - ETA: 0s
      - loss: 0.4189 - accuracy: 0.8027
3107 Epoch 00027: val_accuracy did not improve from 0.
     75906
3108 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4188 - accuracy: 0.8026 - val_loss
     : 0.5317 - val_accuracy: 0.7513
3109 Epoch 28/100
3110 449/450 [============================>.] - ETA: 0s
      - loss: 0.4173 - accuracy: 0.8027
3111 Epoch 00028: val_accuracy did not improve from 0.
     75906
3112 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4172 - accuracy: 0.8027 - val_loss
     : 0.5196 - val_accuracy: 0.7503
3113 Epoch 00028: early stopping
3114 Epoch 1/100
3115 448/450 [============================>.] - ETA: 0s
      - loss: 0.6177 - accuracy: 0.6679
3116 Epoch 00001: val_accuracy improved from -inf to 0.
     72250, saving model to ../data/results/models\LSTM.
     h5
3117 450/450 [==============================] - 40s 65ms
     /step - loss: 0.6174 - accuracy: 0.6682 - val_loss
```

```
3117 : 0.5576 - val_accuracy: 0.7225
3118 Epoch 2/100
3119 448/450 [============================>.] - ETA: 0s
      - loss: 0.5357 - accuracy: 0.7336
3120 Epoch 00002: val_accuracy improved from 0.72250 to
     0.73500, saving model to ../data/results/models\
     LSTM.h5
3121 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5354 - accuracy: 0.7338 - val_loss
     : 0.5401 - val_accuracy: 0.7350
3122 Epoch 3/100
3123 450/450 [==============================] - ETA: 0s
      - loss: 0.5208 - accuracy: 0.7415
3124 Epoch 00003: val_accuracy improved from 0.73500 to
     0.73813, saving model to ../data/results/models\
     LSTM.h5
3125 450/450 [==============================] - 27s 60ms
     /step - loss: 0.5208 - accuracy: 0.7415 - val_loss
     : 0.5327 - val_accuracy: 0.7381
3126 Epoch 4/100
3127 448/450 [============================>.] - ETA: 0s
      - loss: 0.5140 - accuracy: 0.7452
3128 Epoch 00004: val_accuracy did not improve from 0.
     73813
3129 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5138 - accuracy: 0.7453 - val_loss
     : 0.5290 - val_accuracy: 0.7344
3130 Epoch 5/100
3131 450/450 [==============================] - ETA: 0s
      - loss: 0.5084 - accuracy: 0.7498
3132 Epoch 00005: val_accuracy did not improve from 0.
     73813
3133 450/450 [==============================] - 24s 54ms
     /step - loss: 0.5084 - accuracy: 0.7498 - val_loss
     : 0.5273 - val_accuracy: 0.7375
3134 Epoch 6/100
3135 449/450 [============================>.] - ETA: 0s
      - loss: 0.5034 - accuracy: 0.7539
3136 Epoch 00006: val_accuracy did not improve from 0.
     73813
3137 450/450 [==============================] - 25s 56ms
```

```
3137 /step - loss: 0.5037 - accuracy: 0.7537 - val_loss
     : 0.5309 - val_accuracy: 0.7378
3138 Epoch 7/100
3139 448/450 [============================>.] - ETA: 0s
      - loss: 0.5011 - accuracy: 0.7540
3140 Epoch 00007: val_accuracy improved from 0.73813 to
     0.74094, saving model to ../data/results/models\
     LSTM.h5
3141 450/450 [==============================] - 27s 60ms
     /step - loss: 0.5009 - accuracy: 0.7543 - val_loss
     : 0.5214 - val_accuracy: 0.7409
3142 Epoch 8/100
3143 448/450 [============================>.] - ETA: 0s
      - loss: 0.4965 - accuracy: 0.7557
3144 Epoch 00008: val_accuracy did not improve from 0.
     74094
3145 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4966 - accuracy: 0.7556 - val_loss
     : 0.5226 - val_accuracy: 0.7409
3146 Epoch 9/100
3147 448/450 [============================>.] - ETA: 0s
      - loss: 0.4942 - accuracy: 0.7581
3148 Epoch 00009: val_accuracy did not improve from 0.
     74094
3149 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4940 - accuracy: 0.7582 - val_loss
     : 0.5257 - val_accuracy: 0.7303
3150 Epoch 10/100
3151 450/450 [==============================] - ETA: 0s
      - loss: 0.4907 - accuracy: 0.7578
3152 Epoch 00010: val_accuracy did not improve from 0.
     74094
3153 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4907 - accuracy: 0.7578 - val_loss
     : 0.5260 - val_accuracy: 0.7378
3154 Epoch 11/100
3155 448/450 [============================>.] - ETA: 0s
      - loss: 0.4864 - accuracy: 0.7629
3156 Epoch 00011: val_accuracy improved from 0.74094 to
     0.74156, saving model to ../data/results/models\
     LSTM.h5
```

```
3157 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4863 - accuracy: 0.7629 - val_loss
     : 0.5242 - val_accuracy: 0.7416
3158 Epoch 12/100
3159 448/450 [============================>.] - ETA: 0s
      - loss: 0.4846 - accuracy: 0.7630
3160 Epoch 00012: val_accuracy improved from 0.74156 to
     0.74531, saving model to ../data/results/models\
     LSTM.h5
3161 450/450 [==============================] - 27s 59ms
     /step - loss: 0.4845 - accuracy: 0.7632 - val_loss
     : 0.5164 - val_accuracy: 0.7453
3162 Epoch 13/100
3163 448/450 [============================>.] - ETA: 0s
      - loss: 0.4803 - accuracy: 0.7652
3164 Epoch 00013: val_accuracy did not improve from 0.
     74531
3165 450/450 [==============================] - 24s 52ms
     /step - loss: 0.4805 - accuracy: 0.7651 - val_loss
     : 0.5274 - val_accuracy: 0.7422
3166 Epoch 14/100
3167 449/450 [============================>.] - ETA: 0s
      - loss: 0.4775 - accuracy: 0.7682
3168 Epoch 00014: val_accuracy did not improve from 0.
     74531
3169 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4773 - accuracy: 0.7683 - val_loss
     : 0.5163 - val_accuracy: 0.7425
3170 Epoch 15/100
3171 448/450 [============================>.] - ETA: 0s
      - loss: 0.4736 - accuracy: 0.7700
3172 Epoch 00015: val_accuracy did not improve from 0.
     74531
3173 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4740 - accuracy: 0.7697 - val_loss
     : 0.5171 - val_accuracy: 0.7441
3174 Epoch 16/100
3175 448/450 [============================>.] - ETA: 0s
      - loss: 0.4699 - accuracy: 0.7735
3176 Epoch 00016: val_accuracy improved from 0.74531 to
     0.74813, saving model to ../data/results/models\
```

```
LSTM.h5
450/450 [==============================] - 27s 60ms
    /step - loss: 0.4701 - accuracy: 0.7735 - val_loss
    : 0.5237 - val_accuracy: 0.7481
Epoch 17/100
448/450 [============================>.] - ETA: 0s
     - loss: 0.4675 - accuracy: 0.7749
Epoch 00017: val_accuracy did not improve from 0.
    74813
450/450 [==============================] - 24s 52ms
    /step - loss: 0.4674 - accuracy: 0.7751 - val_loss
    : 0.5233 - val_accuracy: 0.7447
Epoch 18/100
448/450 [============================>.] - ETA: 0s
     - loss: 0.4623 - accuracy: 0.7758
Epoch 00018: val_accuracy did not improve from 0.
    74813
450/450 [==============================] - 24s 54ms
    /step - loss: 0.4620 - accuracy: 0.7760 - val_loss
    : 0.5183 - val_accuracy: 0.7425
Epoch 19/100
448/450 [============================>.] - ETA: 0s
     - loss: 0.4583 - accuracy: 0.7789
Epoch 00019: val_accuracy did not improve from 0.
    74813
450/450 [==============================] - 24s 54ms
    /step - loss: 0.4581 - accuracy: 0.7791 - val_loss
    : 0.5193 - val_accuracy: 0.7456
Epoch 20/100
448/450 [============================>.] - ETA: 0s
     - loss: 0.4536 - accuracy: 0.7823
Epoch 00020: val_accuracy did not improve from 0.
    74813
450/450 [==============================] - 24s 54ms
    /step - loss: 0.4536 - accuracy: 0.7822 - val_loss
    : 0.5228 - val_accuracy: 0.7450
Epoch 21/100
448/450 [============================>.] - ETA: 0s
     - loss: 0.4492 - accuracy: 0.7844
Epoch 00021: val_accuracy did not improve from 0.
    74813
```

```
3197 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4492 - accuracy: 0.7845 - val_loss
     : 0.5351 - val_accuracy: 0.7428
3198 Epoch 22/100
3199 449/450 [==============================>.] - ETA: 0s
      - loss: 0.4446 - accuracy: 0.7882
3200 Epoch 00022: val_accuracy did not improve from 0.
     74813
3201 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4446 - accuracy: 0.7882 - val_loss
     : 0.5194 - val_accuracy: 0.7453
3202 Epoch 23/100
3203 448/450 [==============================>.] - ETA: 0s
      - loss: 0.4411 - accuracy: 0.7891
3204 Epoch 00023: val_accuracy did not improve from 0.
     74813
3205 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4415 - accuracy: 0.7891 - val_loss
     : 0.5277 - val_accuracy: 0.7456
3206 Epoch 24/100
3207 448/450 [==============================>.] - ETA: 0s
      - loss: 0.4375 - accuracy: 0.7943
3208 Epoch 00024: val_accuracy did not improve from 0.
     74813
3209 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4374 - accuracy: 0.7943 - val_loss
     : 0.5328 - val_accuracy: 0.7416
3210 Epoch 00024: early stopping
3211 Epoch 1/100
3212 450/450 [==============================] - ETA: 0s
      - loss: 0.6182 - accuracy: 0.6638
3213 Epoch 00001: val_accuracy improved from -inf to 0.
     73094, saving model to ../data/results/models\LSTM.
     h5
3214 450/450 [==============================] - 40s 65ms
     /step - loss: 0.6182 - accuracy: 0.6638 - val_loss
     : 0.5397 - val_accuracy: 0.7309
3215 Epoch 2/100
3216 448/450 [==============================>.] - ETA: 0s
      - loss: 0.5406 - accuracy: 0.7312
3217 Epoch 00002: val_accuracy improved from 0.73094 to
```

```
3217 0.74187, saving model to ../data/results/models\
     LSTM.h5
3218 450/450 [==============================] - 27s 60ms
     /step - loss: 0.5403 - accuracy: 0.7312 - val_loss
     : 0.5192 - val_accuracy: 0.7419
3219 Epoch 3/100
3220 448/450 [============================>.] - ETA: 0s
      - loss: 0.5225 - accuracy: 0.7409
3221 Epoch 00003: val_accuracy improved from 0.74187 to
     0.75031, saving model to ../data/results/models\
     LSTM.h5
3222 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5224 - accuracy: 0.7410 - val_loss
     : 0.5083 - val_accuracy: 0.7503
3223 Epoch 4/100
3224 448/450 [============================>.] - ETA: 0s
      - loss: 0.5156 - accuracy: 0.7434
3225 Epoch 00004: val_accuracy did not improve from 0.
     75031
3226 450/450 [==============================] - 24s 54ms
     /step - loss: 0.5152 - accuracy: 0.7440 - val_loss
     : 0.5039 - val_accuracy: 0.7484
3227 Epoch 5/100
3228 448/450 [============================>.] - ETA: 0s
      - loss: 0.5082 - accuracy: 0.7471
3229 Epoch 00005: val_accuracy did not improve from 0.
     75031
3230 450/450 [==============================] - 25s 55ms
     /step - loss: 0.5080 - accuracy: 0.7473 - val_loss
     : 0.5022 - val_accuracy: 0.7497
3231 Epoch 6/100
3232 448/450 [============================>.] - ETA: 0s
      - loss: 0.5045 - accuracy: 0.7506
3233 Epoch 00006: val_accuracy did not improve from 0.
     75031
3234 450/450 [==============================] - 24s 54ms
     /step - loss: 0.5046 - accuracy: 0.7506 - val_loss
     : 0.5028 - val_accuracy: 0.7475
3235 Epoch 7/100
3236 448/450 [============================>.] - ETA: 0s
      - loss: 0.5003 - accuracy: 0.7517
```

```
3237 Epoch 00007: val_accuracy improved from 0.75031 to
     0.75187, saving model to ../data/results/models\
     LSTM.h5
3238 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5002 - accuracy: 0.7517 - val_loss
     : 0.5058 - val_accuracy: 0.7519
3239 Epoch 8/100
3240 448/450 [============================>.] - ETA: 0s
      - loss: 0.4972 - accuracy: 0.7564
3241 Epoch 00008: val_accuracy did not improve from 0.
     75187
3242 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4972 - accuracy: 0.7565 - val_loss
     : 0.4991 - val_accuracy: 0.7487
3243 Epoch 9/100
3244 448/450 [============================>.] - ETA: 0s
      - loss: 0.4938 - accuracy: 0.7593
3245 Epoch 00009: val_accuracy improved from 0.75187 to
     0.75313, saving model to ../data/results/models\
     LSTM.h5
3246 450/450 [==============================] - 26s 59ms
     /step - loss: 0.4938 - accuracy: 0.7593 - val_loss
     : 0.4965 - val_accuracy: 0.7531
3247 Epoch 10/100
3248 448/450 [============================>.] - ETA: 0s
      - loss: 0.4908 - accuracy: 0.7604
3249 Epoch 00010: val_accuracy did not improve from 0.
     75313
3250 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4905 - accuracy: 0.7607 - val_loss
     : 0.4954 - val_accuracy: 0.7516
3251 Epoch 11/100
3252 448/450 [============================>.] - ETA: 0s
      - loss: 0.4856 - accuracy: 0.7628
3253 Epoch 00011: val_accuracy did not improve from 0.
     75313
3254 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4856 - accuracy: 0.7628 - val_loss
     : 0.4970 - val_accuracy: 0.7503
3255 Epoch 12/100
3256 448/450 [============================>.] - ETA: 0s
```

```
3256  - loss: 0.4839 - accuracy: 0.7634
3257 Epoch 00012: val_accuracy did not improve from 0.
     75313
3258 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4839 - accuracy: 0.7634 - val_loss
     : 0.5009 - val_accuracy: 0.7513
3259 Epoch 13/100
3260 448/450 [============================>.] - ETA: 0s
      - loss: 0.4801 - accuracy: 0.7661
3261 Epoch 00013: val_accuracy improved from 0.75313 to
     0.75500, saving model to ../data/results/models\
     LSTM.h5
3262 450/450 [==============================] - 27s 59ms
     /step - loss: 0.4802 - accuracy: 0.7661 - val_loss
     : 0.4960 - val_accuracy: 0.7550
3263 Epoch 14/100
3264 448/450 [============================>.] - ETA: 0s
      - loss: 0.4756 - accuracy: 0.7688
3265 Epoch 00014: val_accuracy improved from 0.75500 to
     0.75594, saving model to ../data/results/models\
     LSTM.h5
3266 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4760 - accuracy: 0.7685 - val_loss
     : 0.4953 - val_accuracy: 0.7559
3267 Epoch 15/100
3268 448/450 [============================>.] - ETA: 0s
      - loss: 0.4720 - accuracy: 0.7695
3269 Epoch 00015: val_accuracy did not improve from 0.
     75594
3270 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4717 - accuracy: 0.7699 - val_loss
     : 0.4943 - val_accuracy: 0.7531
3271 Epoch 16/100
3272 448/450 [============================>.] - ETA: 0s
      - loss: 0.4680 - accuracy: 0.7720
3273 Epoch 00016: val_accuracy improved from 0.75594 to
     0.76031, saving model to ../data/results/models\
     LSTM.h5
3274 450/450 [==============================] - 27s 61ms
     /step - loss: 0.4678 - accuracy: 0.7721 - val_loss
     : 0.4913 - val_accuracy: 0.7603
```

```
Epoch 17/100
448/450 [============================>.] - ETA: 0s
 - loss: 0.4643 - accuracy: 0.7749
Epoch 00017: val_accuracy did not improve from 0.
76031
450/450 [==============================] - 24s 53ms
/step - loss: 0.4641 - accuracy: 0.7752 - val_loss
: 0.4978 - val_accuracy: 0.7566
Epoch 18/100
448/450 [============================>.] - ETA: 0s
 - loss: 0.4604 - accuracy: 0.7762
Epoch 00018: val_accuracy did not improve from 0.
76031
450/450 [==============================] - 25s 55ms
/step - loss: 0.4605 - accuracy: 0.7761 - val_loss
: 0.5001 - val_accuracy: 0.7528
Epoch 19/100
449/450 [============================>.] - ETA: 0s
 - loss: 0.4567 - accuracy: 0.7807
Epoch 00019: val_accuracy did not improve from 0.
76031
450/450 [==============================] - 25s 55ms
/step - loss: 0.4569 - accuracy: 0.7805 - val_loss
: 0.4929 - val_accuracy: 0.7600
Epoch 20/100
448/450 [============================>.] - ETA: 0s
 - loss: 0.4526 - accuracy: 0.7808
Epoch 00020: val_accuracy did not improve from 0.
76031
450/450 [==============================] - 24s 54ms
/step - loss: 0.4529 - accuracy: 0.7806 - val_loss
: 0.4948 - val_accuracy: 0.7566
Epoch 21/100
448/450 [============================>.] - ETA: 0s
 - loss: 0.4515 - accuracy: 0.7842
Epoch 00021: val_accuracy did not improve from 0.
76031
450/450 [==============================] - 24s 54ms
/step - loss: 0.4514 - accuracy: 0.7841 - val_loss
: 0.5294 - val_accuracy: 0.7453
Epoch 22/100
```

```
3296 448/450 [============================>.] - ETA: 0s
      - loss: 0.4445 - accuracy: 0.7859
3297 Epoch 00022: val_accuracy did not improve from 0.
     76031
3298 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4443 - accuracy: 0.7859 - val_loss
     : 0.4985 - val_accuracy: 0.7538
3299 Epoch 23/100
3300 449/450 [============================>.] - ETA: 0s
      - loss: 0.4401 - accuracy: 0.7883
3301 Epoch 00023: val_accuracy did not improve from 0.
     76031
3302 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4400 - accuracy: 0.7883 - val_loss
     : 0.4957 - val_accuracy: 0.7575
3303 Epoch 24/100
3304 448/450 [============================>.] - ETA: 0s
      - loss: 0.4350 - accuracy: 0.7911
3305 Epoch 00024: val_accuracy did not improve from 0.
     76031
3306 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4353 - accuracy: 0.7908 - val_loss
     : 0.5037 - val_accuracy: 0.7550
3307 Epoch 25/100
3308 450/450 [==============================] - ETA: 0s
      - loss: 0.4298 - accuracy: 0.7935
3309 Epoch 00025: val_accuracy did not improve from 0.
     76031
3310 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4298 - accuracy: 0.7935 - val_loss
     : 0.5204 - val_accuracy: 0.7481
3311 Epoch 26/100
3312 448/450 [============================>.] - ETA: 0s
      - loss: 0.4272 - accuracy: 0.7952
3313 Epoch 00026: val_accuracy did not improve from 0.
     76031
3314 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4273 - accuracy: 0.7949 - val_loss
     : 0.5028 - val_accuracy: 0.7563
3315 Epoch 00026: early stopping
3316 Epoch 1/100
```

```
3317 450/450 [==============================] - ETA: 0s
      - loss: 0.6080 - accuracy: 0.6758
3318 Epoch 00001: val_accuracy improved from -inf to 0.
     71844, saving model to ../data/results/models\LSTM.
     h5
3319 450/450 [==============================] - 39s 65ms
     /step - loss: 0.6080 - accuracy: 0.6758 - val_loss
     : 0.5493 - val_accuracy: 0.7184
3320 Epoch 2/100
3321 448/450 [============================>.] - ETA: 0s
      - loss: 0.5318 - accuracy: 0.7359
3322 Epoch 00002: val_accuracy improved from 0.71844 to
     0.72781, saving model to ../data/results/models\
     LSTM.h5
3323 450/450 [==============================] - 26s 59ms
     /step - loss: 0.5318 - accuracy: 0.7361 - val_loss
     : 0.5323 - val_accuracy: 0.7278
3324 Epoch 3/100
3325 448/450 [============================>.] - ETA: 0s
      - loss: 0.5177 - accuracy: 0.7459
3326 Epoch 00003: val_accuracy did not improve from 0.
     72781
3327 450/450 [==============================] - 24s 53ms
     /step - loss: 0.5175 - accuracy: 0.7462 - val_loss
     : 0.5355 - val_accuracy: 0.7259
3328 Epoch 4/100
3329 448/450 [============================>.] - ETA: 0s
      - loss: 0.5113 - accuracy: 0.7473
3330 Epoch 00004: val_accuracy did not improve from 0.
     72781
3331 450/450 [==============================] - 24s 54ms
     /step - loss: 0.5116 - accuracy: 0.7472 - val_loss
     : 0.5292 - val_accuracy: 0.7272
3332 Epoch 5/100
3333 448/450 [============================>.] - ETA: 0s
      - loss: 0.5069 - accuracy: 0.7506
3334 Epoch 00005: val_accuracy improved from 0.72781 to
     0.73000, saving model to ../data/results/models\
     LSTM.h5
3335 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5069 - accuracy: 0.7506 - val_loss
```

```
3335 : 0.5235 - val_accuracy: 0.7300
3336 Epoch 6/100
3337 448/450 [============================>.] - ETA: 0s
      - loss: 0.5025 - accuracy: 0.7530
3338 Epoch 00006: val_accuracy improved from 0.73000 to
     0.73344, saving model to ../data/results/models\
     LSTM.h5
3339 450/450 [==============================] - 27s 60ms
     /step - loss: 0.5023 - accuracy: 0.7534 - val_loss
     : 0.5237 - val_accuracy: 0.7334
3340 Epoch 7/100
3341 448/450 [============================>.] - ETA: 0s
      - loss: 0.4977 - accuracy: 0.7567
3342 Epoch 00007: val_accuracy did not improve from 0.
     73344
3343 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4976 - accuracy: 0.7568 - val_loss
     : 0.5261 - val_accuracy: 0.7284
3344 Epoch 8/100
3345 450/450 [==============================] - ETA: 0s
      - loss: 0.4947 - accuracy: 0.7585
3346 Epoch 00008: val_accuracy did not improve from 0.
     73344
3347 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4947 - accuracy: 0.7585 - val_loss
     : 0.5182 - val_accuracy: 0.7312
3348 Epoch 9/100
3349 450/450 [==============================] - ETA: 0s
      - loss: 0.4915 - accuracy: 0.7609
3350 Epoch 00009: val_accuracy did not improve from 0.
     73344
3351 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4915 - accuracy: 0.7609 - val_loss
     : 0.5186 - val_accuracy: 0.7306
3352 Epoch 10/100
3353 448/450 [============================>.] - ETA: 0s
      - loss: 0.4868 - accuracy: 0.7633
3354 Epoch 00010: val_accuracy did not improve from 0.
     73344
3355 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4869 - accuracy: 0.7632 - val_loss
```

```
3355 : 0.5227 - val_accuracy: 0.7303
3356 Epoch 11/100
3357 448/450 [============================>.] - ETA: 0s
      - loss: 0.4846 - accuracy: 0.7650
3358 Epoch 00011: val_accuracy improved from 0.73344 to
     0.73563, saving model to ../data/results/models\
     LSTM.h5
3359 450/450 [==============================] - 26s 59ms
     /step - loss: 0.4845 - accuracy: 0.7651 - val_loss
     : 0.5172 - val_accuracy: 0.7356
3360 Epoch 12/100
3361 448/450 [============================>.] - ETA: 0s
      - loss: 0.4815 - accuracy: 0.7654
3362 Epoch 00012: val_accuracy improved from 0.73563 to
     0.73750, saving model to ../data/results/models\
     LSTM.h5
3363 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4815 - accuracy: 0.7653 - val_loss
     : 0.5192 - val_accuracy: 0.7375
3364 Epoch 13/100
3365 448/450 [============================>.] - ETA: 0s
      - loss: 0.4759 - accuracy: 0.7688
3366 Epoch 00013: val_accuracy did not improve from 0.
     73750
3367 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4761 - accuracy: 0.7686 - val_loss
     : 0.5212 - val_accuracy: 0.7331
3368 Epoch 14/100
3369 450/450 [==============================] - ETA: 0s
      - loss: 0.4723 - accuracy: 0.7706
3370 Epoch 00014: val_accuracy improved from 0.73750 to
     0.73875, saving model to ../data/results/models\
     LSTM.h5
3371 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4723 - accuracy: 0.7706 - val_loss
     : 0.5213 - val_accuracy: 0.7387
3372 Epoch 15/100
3373 448/450 [============================>.] - ETA: 0s
      - loss: 0.4691 - accuracy: 0.7735
3374 Epoch 00015: val_accuracy did not improve from 0.
     73875
```

```
3375 450/450 [==============================] - 24s 53ms
     /step - loss: 0.4691 - accuracy: 0.7734 - val_loss
     : 0.5185 - val_accuracy: 0.7297
3376 Epoch 16/100
3377 449/450 [==============================>.] - ETA: 0s
      - loss: 0.4642 - accuracy: 0.7763
3378 Epoch 00016: val_accuracy did not improve from 0.
     73875
3379 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4643 - accuracy: 0.7761 - val_loss
     : 0.5194 - val_accuracy: 0.7347
3380 Epoch 17/100
3381 449/450 [==============================>.] - ETA: 0s
      - loss: 0.4608 - accuracy: 0.7781
3382 Epoch 00017: val_accuracy improved from 0.73875 to
     0.74063, saving model to ../data/results/models\
     LSTM.h5
3383 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4607 - accuracy: 0.7782 - val_loss
     : 0.5344 - val_accuracy: 0.7406
3384 Epoch 18/100
3385 449/450 [==============================>.] - ETA: 0s
      - loss: 0.4563 - accuracy: 0.7815
3386 Epoch 00018: val_accuracy did not improve from 0.
     74063
3387 450/450 [==============================] - 26s 57ms
     /step - loss: 0.4566 - accuracy: 0.7813 - val_loss
     : 0.5266 - val_accuracy: 0.7378
3388 Epoch 19/100
3389 450/450 [==============================] - ETA: 0s
      - loss: 0.4509 - accuracy: 0.7846
3390 Epoch 00019: val_accuracy did not improve from 0.
     74063
3391 450/450 [==============================] - 31s 68ms
     /step - loss: 0.4509 - accuracy: 0.7846 - val_loss
     : 0.5331 - val_accuracy: 0.7372
3392 Epoch 20/100
3393 448/450 [==============================>.] - ETA: 0s
      - loss: 0.4483 - accuracy: 0.7862
3394 Epoch 00020: val_accuracy did not improve from 0.
     74063
```

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3395 450/450 [==============================] - 27s 59ms
     /step - loss: 0.4484 - accuracy: 0.7863 - val_loss
     : 0.5319 - val_accuracy: 0.7366
3396 Epoch 21/100
3397 449/450 [============================>.] - ETA: 0s
      - loss: 0.4445 - accuracy: 0.7885
3398 Epoch 00021: val_accuracy did not improve from 0.
     74063
3399 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4444 - accuracy: 0.7887 - val_loss
     : 0.5222 - val_accuracy: 0.7384
3400 Epoch 00021: early stopping
3401 Epoch 1/100
3402 450/450 [==============================] - ETA: 0s
      - loss: 0.6072 - accuracy: 0.6739
3403 Epoch 00001: val_accuracy improved from -inf to 0.
     72906, saving model to ../data/results/models\LSTM.
     h5
3404 450/450 [==============================] - 42s 69ms
     /step - loss: 0.6072 - accuracy: 0.6739 - val_loss
     : 0.5425 - val_accuracy: 0.7291
3405 Epoch 2/100
3406 449/450 [============================>.] - ETA: 0s
      - loss: 0.5337 - accuracy: 0.7332
3407 Epoch 00002: val_accuracy improved from 0.72906 to
     0.73656, saving model to ../data/results/models\
     LSTM.h5
3408 450/450 [==============================] - 28s 63ms
     /step - loss: 0.5338 - accuracy: 0.7331 - val_loss
     : 0.5268 - val_accuracy: 0.7366
3409 Epoch 3/100
3410 448/450 [============================>.] - ETA: 0s
      - loss: 0.5204 - accuracy: 0.7429
3411 Epoch 00003: val_accuracy improved from 0.73656 to
     0.74406, saving model to ../data/results/models\
     LSTM.h5
3412 450/450 [==============================] - 28s 61ms
     /step - loss: 0.5208 - accuracy: 0.7426 - val_loss
     : 0.5244 - val_accuracy: 0.7441
3413 Epoch 4/100
3414 448/450 [============================>.] - ETA: 0s
```

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3414  - loss: 0.5129 - accuracy: 0.7477
3415 Epoch 00004: val_accuracy improved from 0.74406 to
     0.74719, saving model to ../data/results/models\
     LSTM.h5
3416 450/450 [==============================] - 28s 61ms
     /step - loss: 0.5129 - accuracy: 0.7476 - val_loss
     : 0.5192 - val_accuracy: 0.7472
3417 Epoch 5/100
3418 449/450 [============================>.] - ETA: 0s
      - loss: 0.5074 - accuracy: 0.7501
3419 Epoch 00005: val_accuracy did not improve from 0.
     74719
3420 450/450 [==============================] - 25s 55ms
     /step - loss: 0.5073 - accuracy: 0.7502 - val_loss
     : 0.5215 - val_accuracy: 0.7444
3421 Epoch 6/100
3422 448/450 [============================>.] - ETA: 0s
      - loss: 0.5038 - accuracy: 0.7530
3423 Epoch 00006: val_accuracy did not improve from 0.
     74719
3424 450/450 [==============================] - 26s 58ms
     /step - loss: 0.5040 - accuracy: 0.7528 - val_loss
     : 0.5175 - val_accuracy: 0.7450
3425 Epoch 7/100
3426 448/450 [============================>.] - ETA: 0s
      - loss: 0.4990 - accuracy: 0.7545
3427 Epoch 00007: val_accuracy did not improve from 0.
     74719
3428 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4990 - accuracy: 0.7543 - val_loss
     : 0.5165 - val_accuracy: 0.7462
3429 Epoch 8/100
3430 449/450 [============================>.] - ETA: 0s
      - loss: 0.4956 - accuracy: 0.7572
3431 Epoch 00008: val_accuracy improved from 0.74719 to
     0.74844, saving model to ../data/results/models\
     LSTM.h5
3432 450/450 [==============================] - 28s 63ms
     /step - loss: 0.4959 - accuracy: 0.7571 - val_loss
     : 0.5147 - val_accuracy: 0.7484
3433 Epoch 9/100
```

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3434 450/450 [==============================] - ETA: 0s
      - loss: 0.4930 - accuracy: 0.7585
3435 Epoch 00009: val_accuracy did not improve from 0.
     74844
3436 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4930 - accuracy: 0.7585 - val_loss
     : 0.5119 - val_accuracy: 0.7453
3437 Epoch 10/100
3438 450/450 [==============================] - ETA: 0s
      - loss: 0.4890 - accuracy: 0.7619
3439 Epoch 00010: val_accuracy improved from 0.74844 to
     0.75031, saving model to ../data/results/models\
     LSTM.h5
3440 450/450 [==============================] - 29s 64ms
     /step - loss: 0.4890 - accuracy: 0.7619 - val_loss
     : 0.5121 - val_accuracy: 0.7503
3441 Epoch 11/100
3442 448/450 [============================>.] - ETA: 0s
      - loss: 0.4851 - accuracy: 0.7630
3443 Epoch 00011: val_accuracy improved from 0.75031 to
     0.75125, saving model to ../data/results/models\
     LSTM.h5
3444 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4848 - accuracy: 0.7631 - val_loss
     : 0.5104 - val_accuracy: 0.7513
3445 Epoch 12/100
3446 448/450 [============================>.] - ETA: 0s
      - loss: 0.4824 - accuracy: 0.7652
3447 Epoch 00012: val_accuracy improved from 0.75125 to
     0.75625, saving model to ../data/results/models\
     LSTM.h5
3448 450/450 [==============================] - 28s 62ms
     /step - loss: 0.4824 - accuracy: 0.7651 - val_loss
     : 0.5083 - val_accuracy: 0.7563
3449 Epoch 13/100
3450 448/450 [============================>.] - ETA: 0s
      - loss: 0.4774 - accuracy: 0.7689
3451 Epoch 00013: val_accuracy did not improve from 0.
     75625
3452 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4774 - accuracy: 0.7689 - val_loss
```

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3452 : 0.5091 - val_accuracy: 0.7559
3453 Epoch 14/100
3454 448/450 [============================>.] - ETA: 0s
      - loss: 0.4738 - accuracy: 0.7685
3455 Epoch 00014: val_accuracy did not improve from 0.
     75625
3456 450/450 [==============================] - 26s 57ms
     /step - loss: 0.4740 - accuracy: 0.7684 - val_loss
     : 0.5086 - val_accuracy: 0.7491
3457 Epoch 15/100
3458 449/450 [============================>.] - ETA: 0s
      - loss: 0.4700 - accuracy: 0.7713
3459 Epoch 00015: val_accuracy did not improve from 0.
     75625
3460 450/450 [==============================] - 24s 54ms
     /step - loss: 0.4702 - accuracy: 0.7712 - val_loss
     : 0.5108 - val_accuracy: 0.7525
3461 Epoch 16/100
3462 448/450 [============================>.] - ETA: 0s
      - loss: 0.4666 - accuracy: 0.7741
3463 Epoch 00016: val_accuracy did not improve from 0.
     75625
3464 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4665 - accuracy: 0.7742 - val_loss
     : 0.5046 - val_accuracy: 0.7547
3465 Epoch 17/100
3466 449/450 [============================>.] - ETA: 0s
      - loss: 0.4613 - accuracy: 0.7783
3467 Epoch 00017: val_accuracy did not improve from 0.
     75625
3468 450/450 [==============================] - 25s 55ms
     /step - loss: 0.4614 - accuracy: 0.7782 - val_loss
     : 0.5107 - val_accuracy: 0.7550
3469 Epoch 18/100
3470 448/450 [============================>.] - ETA: 0s
      - loss: 0.4602 - accuracy: 0.7799
3471 Epoch 00018: val_accuracy did not improve from 0.
     75625
3472 450/450 [==============================] - 25s 57ms
     /step - loss: 0.4601 - accuracy: 0.7800 - val_loss
     : 0.5128 - val_accuracy: 0.7538
```

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3473 Epoch 19/100
3474 450/450 [==============================] - ETA: 0s
      - loss: 0.4528 - accuracy: 0.7839
3475 Epoch 00019: val_accuracy did not improve from 0.
     75625
3476 450/450 [==============================] - 27s 60ms
     /step - loss: 0.4528 - accuracy: 0.7839 - val_loss
     : 0.5094 - val_accuracy: 0.7556
3477 Epoch 20/100
3478 450/450 [==============================] - ETA: 0s
      - loss: 0.4503 - accuracy: 0.7867
3479 Epoch 00020: val_accuracy improved from 0.75625 to
     0.75656, saving model to ../data/results/models\
     LSTM.h5
3480 450/450 [==============================] - 30s 66ms
     /step - loss: 0.4503 - accuracy: 0.7867 - val_loss
     : 0.5199 - val_accuracy: 0.7566
3481 Epoch 21/100
3482 450/450 [==============================] - ETA: 0s
      - loss: 0.4456 - accuracy: 0.7882
3483 Epoch 00021: val_accuracy did not improve from 0.
     75656
3484 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4456 - accuracy: 0.7882 - val_loss
     : 0.5152 - val_accuracy: 0.7563
3485 Epoch 22/100
3486 448/450 [============================>.] - ETA: 0s
      - loss: 0.4416 - accuracy: 0.7889
3487 Epoch 00022: val_accuracy improved from 0.75656 to
     0.75969, saving model to ../data/results/models\
     LSTM.h5
3488 450/450 [==============================] - 29s 65ms
     /step - loss: 0.4414 - accuracy: 0.7892 - val_loss
     : 0.5086 - val_accuracy: 0.7597
3489 Epoch 23/100
3490 449/450 [============================>.] - ETA: 0s
      - loss: 0.4365 - accuracy: 0.7924
3491 Epoch 00023: val_accuracy did not improve from 0.
     75969
3492 450/450 [==============================] - 28s 62ms
     /step - loss: 0.4363 - accuracy: 0.7925 - val_loss
```

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3492 : 0.5203 - val_accuracy: 0.7547
3493 Epoch 24/100
3494 448/450 [============================>.] - ETA: 0s
      - loss: 0.4321 - accuracy: 0.7955
3495 Epoch 00024: val_accuracy did not improve from 0.
     75969
3496 450/450 [==============================] - 26s 58ms
     /step - loss: 0.4320 - accuracy: 0.7957 - val_loss
     : 0.5145 - val_accuracy: 0.7569
3497 Epoch 25/100
3498 448/450 [============================>.] - ETA: 0s
      - loss: 0.4303 - accuracy: 0.7957
3499 Epoch 00025: val_accuracy did not improve from 0.
     75969
3500 450/450 [==============================] - 25s 56ms
     /step - loss: 0.4302 - accuracy: 0.7959 - val_loss
     : 0.5195 - val_accuracy: 0.7575
3501 Epoch 26/100
3502 450/450 [==============================] - ETA: 0s
      - loss: 0.4246 - accuracy: 0.7991
3503 Epoch 00026: val_accuracy did not improve from 0.
     75969
3504 450/450 [==============================] - 27s 60ms
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     : 0.5213 - val_accuracy: 0.7472
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['NaiveBayes', 'BERT', 'LSTM']

Process finished with exit code 0

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