original

Training Data Score: 0.685185185185185

Testing Data Score: 0.6666666666666666

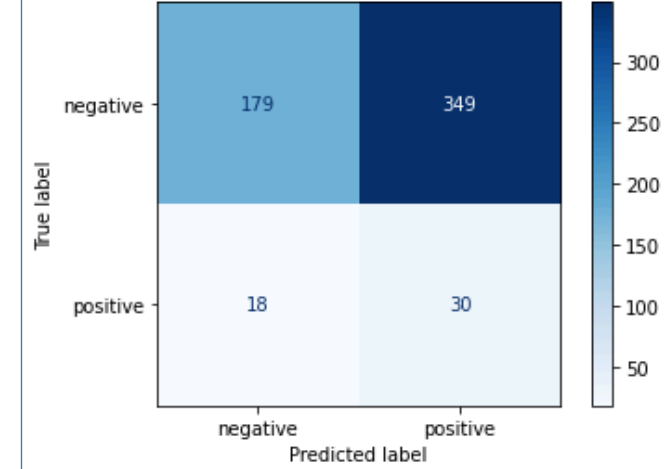|	precision	recall	f1-score	support
negative	0.97	0.66	0.78	528
positive	0.17	0.79	0.28	48
accuracy			0.67	576
macro avg	0.57	0.72	0.53	576
weighted avg	0.91	0.67	0.74	576
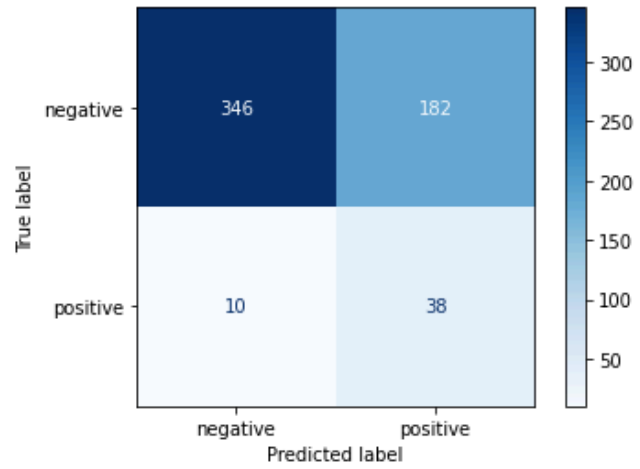
+ artist popularities

Training Data Score: 0.34837962962962965

Testing Data Score: 0.3628472222222222

	precision	recall	f1-score	support
negative	0.91	0.34	0.49	528
positive	0.08	0.62	0.14	48
accuracy			0.36	576
macro avg	0.49	0.48	0.32	576
weighted avg	0.84	0.36	0.46	576

+ genre

Training Data Score: 0.34837962962962965

Testing Data Score: 0.3628472222222222

	precision	recall	f1-score	support
negative	0.91	0.34	0.49	528
positive	0.08	0.62	0.14	48
accuracy			0.36	576
macro avg	0.49	0.48	0.32	576
weighted avg	0.84	0.36	0.46	576
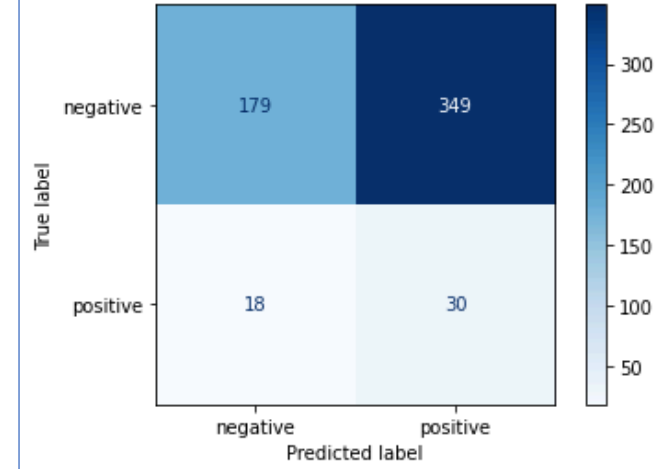
Training Data Score: 1.0
Testing Data Score: 0.8784722222222222

	precision	recall	f1-score	support
negative	0.95	0.91	0.93	528
positive	0.34	0.48	0.40	48
accuracy			0.88	576
macro avg	0.64	0.70	0.66	576
weighted avg	0.90	0.88	0.89	576
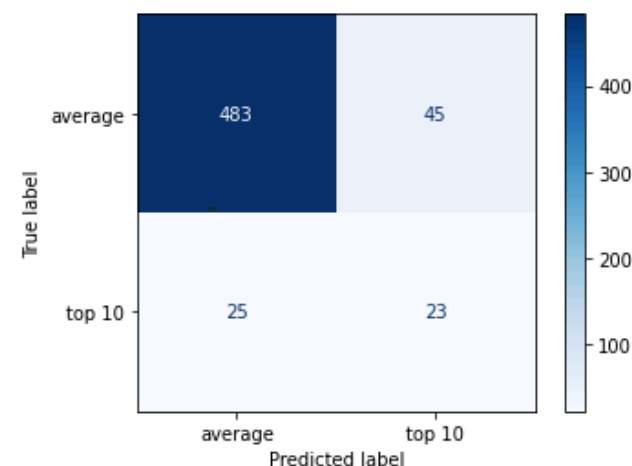

```
[(0.528348523247904, 'popularity'),
 (0.0598721864288015, 'acousticness'),
 (0.056654244199812, 'tempo'),
 (0.0557099374409271, 'duration_ms'),
 (0.0525970658019272, 'speechiness'),
 (0.0505010305923514, 'danceability'),
 (0.046041980251308, 'loudness'),
 (0.0411949186552577, 'liveness'),
 (0.0389512856991919, 'valence'),
 (0.0272877660805126, 'energy'),
 (0.0188096800561241, 'instrumentalness'),
 (0.0146639017574389, 'key'),
 (0.00454118025411977, 'mode'),
 (0.0025139624313195, 'explicit'),
 (0.0023064915175501927, 'time_signature')]
```

Training Data Score: 1.0
Testing Data Score: 0.9149305555555556

	precision	recall	f1-score	support
negative	0.96	0.95	0.95	528
positive	0.49	0.58	0.53	48
accuracy			0.91	576
macro avg	0.73	0.76	0.74	576
weighted avg	0.92	0.91	0.92	576
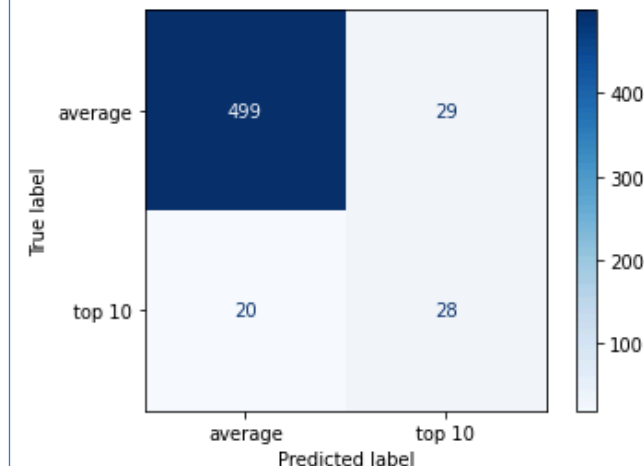

```
[(0.537586975935342, 'song_popularity'),
 (0.08936498754336614, 'artist followers'),
 (0.07246127051449217, 'danceability'),
 (0.06387342059543456, 'speechiness'),
 (0.05593321010161719, 'energy'),
 (0.03962727661631934, 'duration_ms'),
 (0.027777720347706907, 'acousticness'),
 (0.025550508817858246, 'valence'),
 (0.01961500157672535, 'loudness'),
 (0.017605267750843423, 'instrumentalness'),
 (0.01641878283793234, 'liveness'),
 (0.01601908744781471, 'tempo'),
 (0.008723039135949828, 'artist popularity'),
```

Training Data Score: 1.0
Testing Data Score: 0.9253472222222222

	precision	recall	f1-score	support
negative	0.97	0.95	0.96	528
positive	0.55	0.62	0.58	48
accuracy			0.93	576
macro avg	0.76	0.79	0.77	576
weighted avg	0.93	0.93	0.93	576
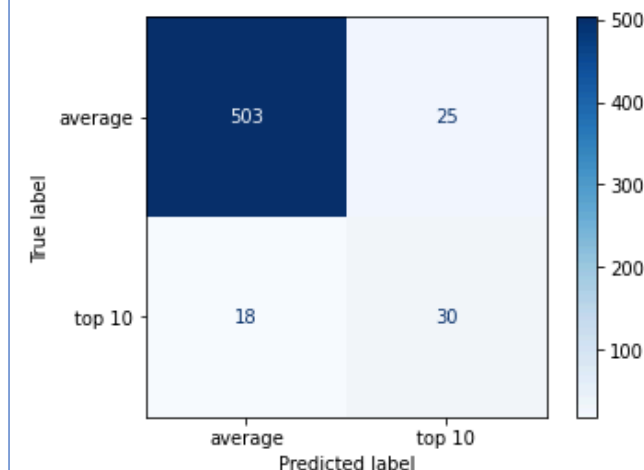

```
[(0.5259707316546101, 'song_popularity'),
 (0.08257538348756294, 'artist followers'),
 (0.06358520388823245, 'danceability'),
 (0.06258688770958004, 'speechiness'),
 (0.04439303694754756, 'energy'),
 (0.03461600705131955, 'liveness'),
 (0.03099303449882052, 'loudness'),
 (0.024284921276438432, 'tempo'),
 (0.023253119713014987, 'acousticness'),
 (0.02306787212812288, 'duration_ms'),
 (0.022156515187585664, 'valence'),
 (0.016545333025264706, 'instrumentalness'),
 (0.012690482219670832, 'artist popularity'),
 (0.011754225673341995, 'pop'),
 (0.010045975805350741, 'key'),
 (0.006106584878459023, 'rap'),
 (0.0023194675063302923, 'time_signature'),
```

original

```
Training Data Score: 1.0
Testing Data Score: 0.9201388888888888

              precision    recall  f1-score   support

    negative       0.93      0.99      0.96       528
    positive       0.56      0.19      0.28        48

    accuracy                           0.92       576
   macro avg       0.75      0.59      0.62       576
weighted avg       0.90      0.92      0.90       576
```
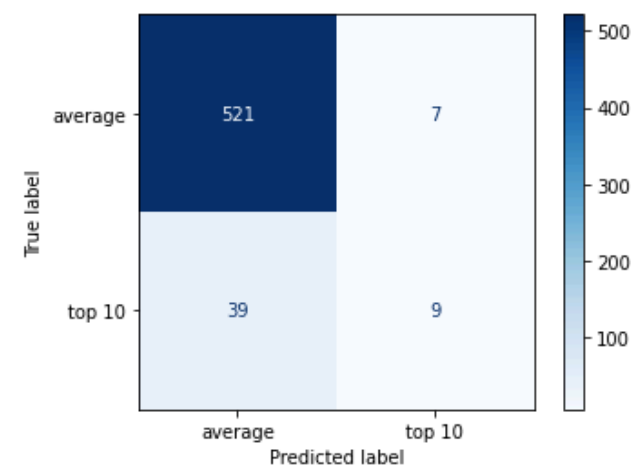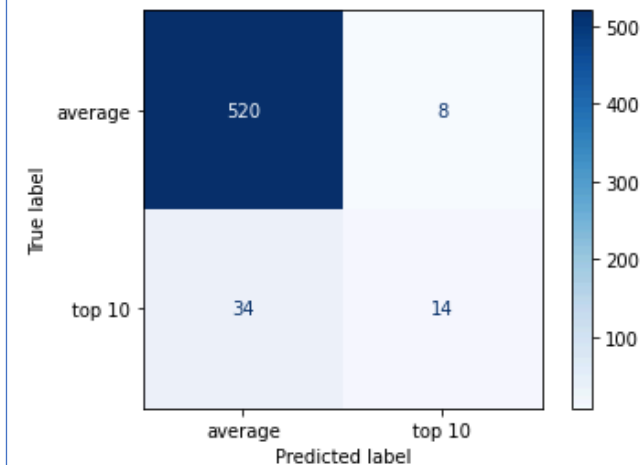
[(0.27970284929467304, 'popularity'),
 (0.07948023129516711, 'danceability'),
 (0.076965743426412, 'valence'),
 (0.0745277059054043, 'speechiness'),
 (0.0698504157621813, 'duration_ms'),
 (0.067478522722198132, 'loudness'),
 (0.0648841415257062, 'acousticness'),
 (0.063704560617894777, 'tempo'),
 (0.0636619546267585085, 'energy'),
 (0.06033192590816892, 'liveness'),
 (0.03822110190518949, 'key'),
 (0.035099232936630742, 'instrumentalness'),
 (0.01116166744779492, 'explicit'),
 (0.0094181026529162, 'mode'),
 (0.0055162235032011, 'time_signature')]

+ artist popularities

```
Training Data Score: 1.0
Testing Data Score: 0.9270833333333334

              precision    recall  f1-score   support

    negative       0.94      0.98      0.96       528
    positive       0.64      0.29      0.40        48

    accuracy                           0.93       576
   macro avg       0.79      0.64      0.68       576
weighted avg       0.91      0.93      0.91       576
```

[(0.29041359979897174, 'song_popularity'),
 (0.07468795411001057, 'artist followers'),
 (0.06887695986689917, 'danceability'),
 (0.06801497511433212, 'artist popularity'),
 (0.06571307631593669, 'valence'),
 (0.05808719116336162, 'speechiness'),
 (0.05562094017437894, 'duration_ms'),
 (0.05326072491683146, 'acousticness'),
 (0.05041190038080096, 'energy'),
 (0.04940891044004234, 'loudness'),
 (0.0490219954787651, 'liveness'),
 (0.04684340977833277, 'tempo'),
 (0.02725603844545869, 'key'),

+ genre

```
Training Data Score: 1.0
Testing Data Score: 0.9270833333333334

              precision    recall  f1-score   support

    negative       0.93      0.99      0.96       528
    positive       0.69      0.23      0.34        48

    accuracy                           0.93       576
   macro avg       0.81      0.61      0.65       576
weighted avg       0.91      0.93      0.91       576
```
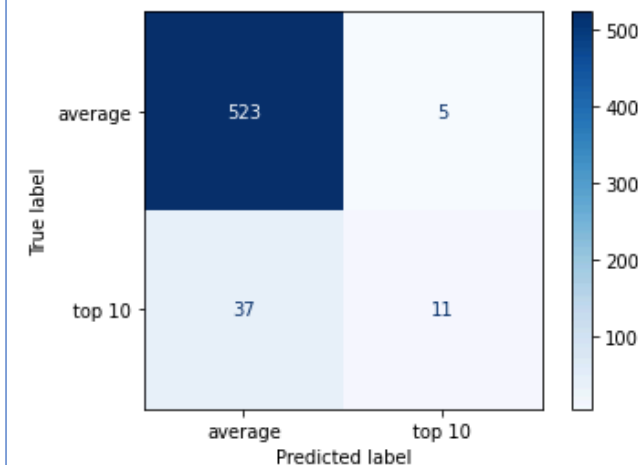
[(0.2752329713593419, 'song_popularity'),
 (0.06671946079820044, 'danceability'),
 (0.06307350374025933, 'valence'),
 (0.060300916392830105, 'artist followers'),
 (0.05843861034243135, 'artist popularity'),
 (0.05386007139283261, 'duration_ms'),
 (0.05299162214849465, 'speechiness'),
 (0.05279964908414771, 'liveness'),
 (0.05164024777071229, 'acousticness'),
 (0.0505534108718187, 'loudness'),
 (0.04957649349321102, 'energy'),
 (0.0462273719791089, 'tempo'),
 (0.0298913274785263, 'key'),
 (0.024635217899766457, 'instrumentalness'),
 (0.00903615139096958, 'mode'),
 (0.007877022226080728, 'pop'),
 (0.007699165472621905, 'hiphop'),

```
Training Data Score: 0.920138888888888
Testing Data Score: 0.918027777777778
```

|	precision	recall	f1-score	support
negative	0.92	1.00	0.96	528
positive	0.00	0.00	0.00	48
accuracy			0.92	576
macro avg	0.46	0.50	0.48	576
weighted avg	0.84	0.92	0.88	576
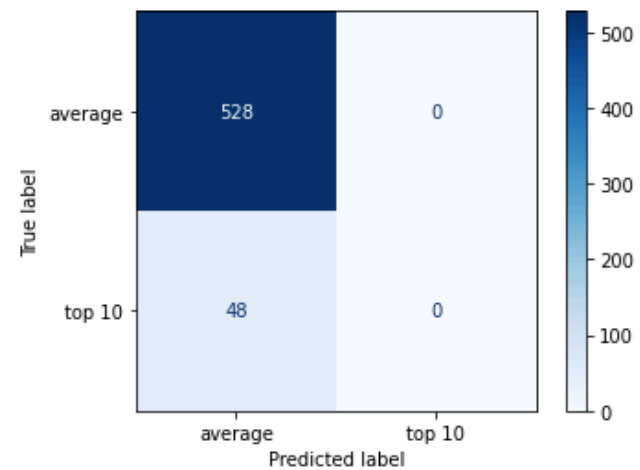

```
[(0.27970284929467304, 'popularity'),
 (0.079480231295167111, 'danceability'),
 (0.076965743426412, 'valence'),
 (0.0745377059054043, 'speechiness'),
 (0.0698504157621813, 'duration_ms'),
 (0.0674785272198132, 'loudness'),
 (0.0648841415257062, 'acousticness'),
 (0.063704560617789477, 'tempo'),
 (0.063661954626675085, 'energy'),
 (0.06033192590816892, 'liveness'),
 (0.038221101905189494, 'key'),
 (0.035099293936630742, 'instrumentalness'),
 (0.0111616674457799492, 'explicit'),
 (0.0094181026529162, 'mode'),
 (0.0055162235032017117, 'time_signature')]
```

```
Training Data Score: 0.9230324074074074
Testing Data Score: 0.920138888888888
```

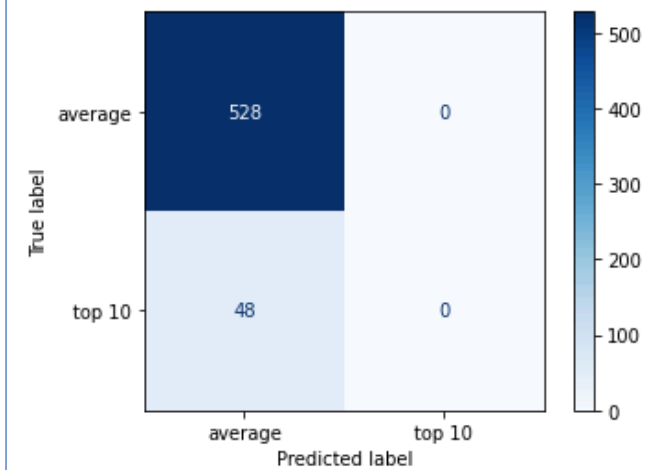|	precision	recall	f1-score	support
negative	0.92	1.00	0.96	528
positive	0.00	0.00	0.00	48
accuracy			0.92	576
macro avg	0.46	0.50	0.48	576
weighted avg	0.84	0.92	0.88	576
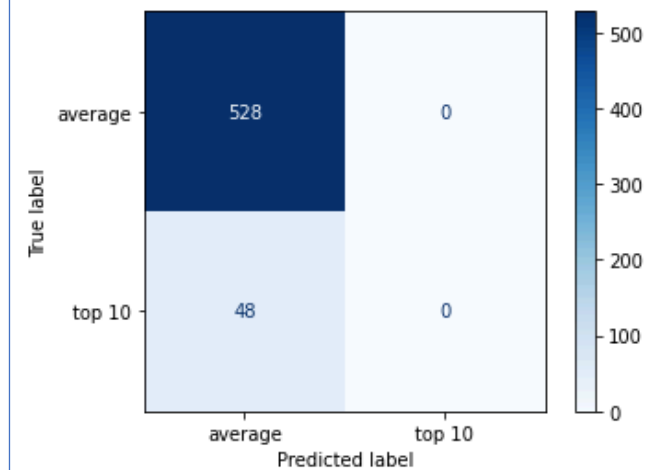

```
[(0.29041359979897174, 'song_popularity'),
 (0.07468795411001057, 'artist followers'),
 (0.06887695986689917, 'danceability'),
 (0.06801497511433212, 'artist popularity'),
 (0.06571307631593669, 'valence'),
 (0.058087191163361626, 'speechiness'),
 (0.05562094017437894, 'duration_ms'),
 (0.05326072491683146, 'acousticness'),
 (0.05041190038080096, 'energy'),
 (0.04940891044004234, 'loudness'),
 (0.0490219954787651, 'liveness'),
 (0.046843409778332776, 'tempo'),
 (0.02725603844545860, 'key'),
```

```
Training Data Score: 0.9224537037037037
Testing Data Score: 0.920138888888888
```

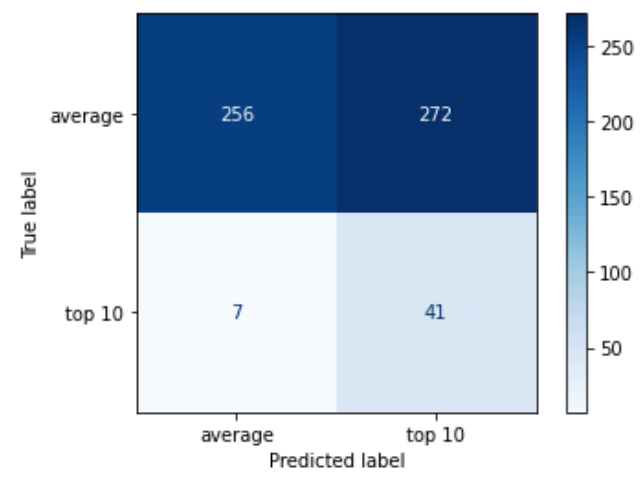|	precision	recall	f1-score	support
negative	0.92	1.00	0.96	528
positive	0.00	0.00	0.00	48
accuracy			0.92	576
macro avg	0.46	0.50	0.48	576
weighted avg	0.84	0.92	0.88	576


```
[(0.275232971359341, 'song_popularity'),
 (0.06671946079820044, 'danceability'),
 (0.06307350374025933, 'valence'),
 (0.06030091639283010, 'artist followers'),
 (0.05843610342431335, 'artist popularity'),
 (0.05386007139283261, 'duration_ms'),
 (0.05299162214849465, 'speechiness'),
 (0.05279964908414771, 'liveness'),
 (0.05164024777071229, 'acousticness'),
 (0.05055341087181187, 'loudness'),
 (0.04957649349321102, 'energy'),
 (0.0462273719791089, 'tempo'),
 (0.02989132747852663, 'key'),
 (0.02463521789976645, 'instrumentalness'),
 (0.009036151390969588, 'mode'),
 (0.007877022226080728, 'pop'),
 (0.007699165472621905, 'hiphop'),
```

original

```
Training Data Score: 0.5329861111111112
Testing Data Score: 0.515625
```

	precision	recall	f1-score	support
negative	0.97	0.48	0.65	528
positive	0.13	0.85	0.23	48
accuracy			0.52	576
macro avg	0.55	0.67	0.44	576
weighted avg	0.90	0.52	0.61	576

+ artist popularities

```
Training Data Score: 0.5306712962962963
Testing Data Score: 0.5121527777777778
```

	precision	recall	f1-score	support
negative	0.97	0.48	0.64	528
positive	0.13	0.83	0.22	48
accuracy			0.51	576
macro avg	0.55	0.66	0.43	576
weighted avg	0.90	0.51	0.61	576
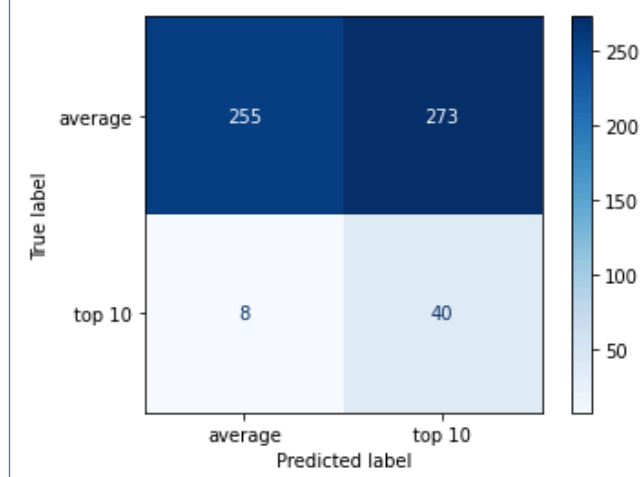
+ genre

```
Training Data Score: 0.5578703703703703
Testing Data Score: 0.5434027777777778
```

	precision	recall	f1-score	support
negative	0.97	0.52	0.67	528
positive	0.14	0.83	0.23	48
accuracy			0.54	576
macro avg	0.55	0.68	0.45	576
weighted avg	0.90	0.54	0.64	576