

Irony/Sarcasm detection

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Irony/Sarcasm Detection

This is an irony/sarcasm detection project working with the tweets I collected earlier this year. This will be my second qualifying exam submission.

Methods for building twitter-specific sentiment lexicon

Using mutual information

[This page](#) has quite a bit of information regarding how the mutual information should be computed. I don't think there is any difference between multi-class mutual information and binary mutual information except that the entropy of the class labels is affected.

Using Counts

I could use a simple method based upon counts of occurrences of words both in the negative and in the positive tweets with normalization for frequency of terms

Using Feature Selection Methods

Mutual Information

The issue with using mutual information for this is that, ideally, we would want a two tailed statistical test, while mutual information is a one tailed test. To fix this, there are two different

strategies that I am going to try.

Winner take all Mutual-Information

The winner take all mutual-information is the mutual information calculated for the positive class and the negative class, taking the larger of these two (negative mutual information will be multiplied by -1 to create a two tailed distribution of scores).

Proportional Mutual-Information

In proportional mutual information, the mutual information for the negative class is subtracted from the mutual information for the positive class.

Comparison of two-side MI

As mentioned in [Methods for building twitter-specific sentiment lexicon](#) there are two general ways that I tried to build a twitter specific sentiment lexicon. The first was to calculate the mutual information associated with the positive class and subtract from that the mutual information associated with the negative class. The other option was to take whichever had the higher value as the mutual information score, multiplying the negative class by -1.

However, upon inspection of the results, the winner-take-all method is producing a much more sensible list of vocabulary.

The raw files can be found here

Binary-Based

- [Winner-take-all](#)
- [Relative](#)

Count-Based

- [Winner-take-all](#)
- [Relative](#)

Determining a cutoff

There is some imbalance in how many terms are given higher mutual information for the positive class and the negative class.

For example, the 0 value for the winner take all binary setup occurs about two thirds of the way

through. This imbalance would be problematic if all words were used to compute shifts in sentiment for the sarcasm detection part. The best solution seems to be to make the threshold some number of words from the ends (e.g. we're using a ranking scheme to determine which words are associated strongly enough with each class to be representatives of that class).

My next steps are to determine how much overlap with the content of the sarcasm dataset there is.

Adding a minimum count cutoff

Commit [27dd9e4300](#) adds a cutoff to how low in frequency a given token can occur in order to be considered in the mutual information calculations. The entry is still present in the results array in the program, the mutual information is just automatically set to 0 if there are less than `x` instances of a feature.

Currently the behavior is not special for counts. E.g. when a binary feature matrix has been computed, the minimum cutoff is effectively how many tweets it occurred in. The counts do not try to emulate this and instead just count the frequency of usage including multiple usages in a single tweet.

Results dump

Cross validation character n-grams tfidf

F1-score Task A 0.6440953412784399

| | precision | recall | f1-score | support | | | | |
|--------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| | 0 | 0.64831953 | 0.69214769 | 0.66951710 | 1923 | 1 | 0.66760247 | 0.62218734 |
| 0.64409534 | 1911 | | | | | | | |
| micro avg | 0.65727700 | 0.65727700 | 0.65727700 | 3834 | macro avg | 0.65796100 | 0.65716751 | |
| 0.65680622 | 3834 | | | | | | | |
| weighted avg | 0.65793082 | 0.65727700 | 0.65684601 | 3834 | | | | |

Embeddings with averages

| | | | | | | | | |
|------------------------------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| F1-score Task A 0.5545722713864307 | | | | precision | recall | f1-score | | |
| support | | | | | | | | |
| | 0 | 0.70503597 | 0.62156448 | 0.66067416 | 473 | 1 | 0.51226158 | 0.60450161 |
| 0.55457227 | 311 | | | | | | | |
| micro avg | 0.61479592 | 0.61479592 | 0.61479592 | 784 | macro avg | 0.60864878 | 0.61303304 | |
| 0.60762321 | 784 | | | | | | | |
| weighted avg | 0.62856552 | 0.61479592 | 0.61858527 | 784 | | | | |

Embeddings with sums

| | | | |
|---|-----------|-----------|-----------------------|
| F1-score Task A 0.3297644539614561 | precision | recall | f1-score |
| support | | | |
| 0 0.62738854 0.83298097 0.71571299 | 473 | 1 | 0.49358974 0.24758842 |
| 0.32976445 311 | | | |
| micro avg 0.60076531 0.60076531 0.60076531 | 784 | macro avg | 0.56048914 0.54028470 |
| 0.52273872 784 | | | |
| weighted avg 0.57431274 0.60076531 0.56261351 | 784 | | |

Trial data character n-grams tfidf

| | | | |
|--|--------|-----------|-----------------------|
| { 'classify__C': 100, 'classify__gamma': 'scale', 'reduce_dim__k': 10000 } F1-score Task A | | | |
| 0.6191198786039454 | | | |
| precision | recall | f1-score | support |
| 0 0.75458716 0.69556025 0.72387239 | 473 | 1 | 0.58620690 0.65594855 |
| 0.61911988 311 | | | |
| micro avg 0.67984694 0.67984694 0.67984694 | 784 | macro avg | 0.67039703 0.67575440 |
| 0.67149613 784 | | | |
| weighted avg 0.68779346 0.67984694 0.68231878 | 784 | | |

Trial data character n-grams with cheating to match skew in test data

| | | | |
|--|--------|-----------|-----------------------|
| Best parameters: { 'classify__C': 100, 'classify__class_weight': {0: 0.75, 1: 1.5}, 'classify__gamma': 'scale', 'reduce_dim__k': 10000 } F1-score Task A | | | |
| 0.6388206388206388 | | | |
| precision | recall | f1-score | support |
| 0 0.81850534 0.48625793 0.61007958 | 473 | 1 | 0.51689861 0.83601286 |
| 0.63882064 311 | | | |
| micro avg 0.62500000 0.62500000 0.62500000 | 784 | macro avg | 0.66770197 0.66113539 |
| 0.62445011 784 | | | |
| weighted avg 0.69886287 0.62500000 0.62148069 | 784 | | |

Trial data character n-grams mpqa skew in test data

MI

```
Fitting 5 folds for each of 5 candidates, totalling 25 fits[Parallel(n_jobs=-1)]: Using
backend LokyBackend with 16 concurrent workers.[Parallel(n_jobs=-1)]: Done 20 out of 25 |
elapsed: 14.3s remaining: 3.6s[Parallel(n_jobs=-1)]: Done 25 out of 25 | elapsed:
14.4s finished
Grid scores on training set:
  'precision', 'predicted', average, warn_for)                precision    recall  f1-score
support
          0  0.00000000 0.00000000 0.00000000          473          1  0.39668367 1.00000000
0.56803653          311
    micro avg  0.39668367 0.39668367 0.39668367          784  macro avg  0.19834184 0.50000000
0.28401826          784
weighted avg  0.15735794 0.39668367 0.22533082          784
Best parameters:
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6067415730337078
          precision    recall  f1-score    support
          0  0.87931034 0.21564482 0.34634975          473          1  0.44461078 0.95498392
0.60674157          311
    micro avg  0.50892857 0.50892857 0.50892857          784  macro avg  0.66196056 0.58531437
0.47654566          784
weighted avg  0.70687212 0.50892857 0.44964293          784
Best parameters:
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6211180124223602
          precision    recall  f1-score    support
          0  0.91472868 0.24947146 0.39202658          473          1  0.45801527 0.96463023
0.62111801          311
    micro avg  0.53316327 0.53316327 0.53316327          784  macro avg  0.68637197 0.60705084
0.50657230          784
weighted avg  0.73355793 0.53316327 0.48290341          784
Best parameters:
```

```
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6282722513089005

      precision    recall  f1-score   support

     0   0.92142857  0.27272727  0.42088091         473
     1   0.46583851  0.96463023  0.62827225         311

  micro avg   0.54719388  0.54719388  0.54719388         784
  macro avg   0.69363354  0.61867875  0.52457658         784
 weighted avg   0.74070343  0.54719388  0.50314967         784

Best parameters:
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6251319957761351

      precision    recall  f1-score   support

     0   0.89864865  0.28118393  0.42834138         473
     1   0.46540881  0.95176849  0.62513200         311

  micro avg   0.54719388  0.54719388  0.54719388         784
  macro avg   0.68202873  0.61647621  0.52673669         784
 weighted avg   0.72678948  0.54719388  0.50640501         784

Best parameters:
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6272439281942978

      precision    recall  f1-score   support

     0   0.90540541  0.28329810  0.43156200         473
     1   0.46698113  0.95498392  0.62724393         311

  micro avg   0.54974490  0.54974490  0.54974490         784
  macro avg   0.68619327  0.61914101  0.52940296         784
 weighted avg   0.73148965  0.54974490  0.50918582         784

Best parameters:
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6314677930306231

      precision    recall  f1-score   support

     0   0.91891892  0.28752643  0.43800322         473
     1   0.47012579  0.96141479  0.63146779         311

  micro avg   0.55484694  0.55484694  0.55484694         784
  macro avg   0.69452235  0.62447061  0.53473551         784
 weighted avg   0.74089001  0.55484694  0.51474746         784
```

Chi2

Grid scores on training set:

Best parameters:

{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A

0.5821596244131456

| | precision | recall | f1-score | support | | | | |
|--------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| | 0 | 0.96666667 | 0.06131078 | 0.11530815 | 473 | 1 | 0.41114058 | 0.99678457 |
| 0.58215962 | 311 | | | | | | | |
| micro avg | 0.43239796 | 0.43239796 | 0.43239796 | 784 | macro avg | 0.68890363 | 0.52904767 | |
| 0.34873389 | 784 | | | | | | | |
| weighted avg | 0.74629854 | 0.43239796 | 0.30050051 | 784 | | | | |

Best parameters:

{'C': 10, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A

0.5944881889763779

| | precision | recall | f1-score | support | | | | |
|--------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| | 0 | 0.88607595 | 0.14799154 | 0.25362319 | 473 | 1 | 0.42836879 | 0.97106109 |
| 0.59448819 | 311 | | | | | | | |
| micro avg | 0.47448980 | 0.47448980 | 0.47448980 | 784 | macro avg | 0.65722237 | 0.55952632 | |
| 0.42405569 | 784 | | | | | | | |
| weighted avg | 0.70451099 | 0.47448980 | 0.38883877 | 784 | | | | |

Best parameters:

{'C': 10, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A

0.59765625

| | precision | recall | f1-score | support | | | | |
|--------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| | 0 | 0.92957746 | 0.13953488 | 0.24264706 | 473 | 1 | 0.42917251 | 0.98392283 |
| 0.59765625 | 311 | | | | | | | |
| micro avg | 0.47448980 | 0.47448980 | 0.47448980 | 784 | macro avg | 0.67937499 | 0.56172886 | |
| 0.42015165 | 784 | | | | | | | |
| weighted avg | 0.73107499 | 0.47448980 | 0.38347341 | 784 | | | | |

Best parameters:

{'C': 10, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A

0.5996093750000001

| | precision | recall | f1-score | support | | | | |
|--------------|------------|------------|------------|------------|-----------|------------|------------|------------|
| | 0 | 0.94366197 | 0.14164905 | 0.24632353 | 473 | 1 | 0.43057504 | 0.98713826 |
| 0.59960938 | 311 | | | | | | | |
| micro avg | 0.47704082 | 0.47704082 | 0.47704082 | 784 | macro avg | 0.68711850 | 0.56439366 | |
| 0.42296645 | 784 | | | | | | | |
| weighted avg | 0.74012876 | 0.47704082 | 0.38646626 | 784 | | | | |

Best parameters:

{'C': 10, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A

```

0.5974781765276431
      precision    recall  f1-score   support

         0       0.95312500  0.12896406  0.22718808         473
         1       0.42777778  0.99035370         311

0.59747818
  micro avg       0.47066327  0.47066327  0.47066327         784
  macro avg       0.69045139  0.55965888         784
 0.41233313
weighted avg       0.74472833  0.47066327  0.37407612         784

Best parameters:
{'C': 10, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.5926640926640927
      precision    recall  f1-score   support

         0       0.93220339  0.11627907  0.20676692         473
         1       0.42344828  0.98713826         311

0.59266409
  micro avg       0.46173469  0.46173469  0.46173469         784
  macro avg       0.67782583  0.55170867         784
 0.39971550
weighted avg       0.73038854  0.46173469  0.35984603         784

Best parameters:
{'C': 100, 'class_weight': {0: 0.7, 1: 1.5}, 'gamma': 'scale'}F1-score Task A
0.6337854500616523
      precision    recall  f1-score   support

         0       0.80985915  0.48625793  0.60766182         473
         1       0.51400000  0.82636656         311

0.63378545
  micro avg       0.62117347  0.62117347  0.62117347         784
  macro avg       0.66192958  0.65631224         784
 0.62072364
weighted avg       0.69249666  0.62117347  0.61802464         784

```

Sentiment feats alone

```

      precision    recall  f1-score   support

         0       0.63468635  0.36363636  0.46236559         473
         1       0.41325536  0.68167203         311

0.51456311
  micro avg       0.48979592  0.48979592  0.48979592         784
  macro avg       0.52397085  0.52265419         784
 0.48846435
weighted avg       0.54684829  0.48979592  0.48307149         784

```

MPQA Sentiment feats + BoW

MI

Best parameters:

{'C': 1, 'gamma': 'scale'}

| F1-score Task A | 0.5987421383647799 | | precision | | recall | | f1-score | |
|-----------------|--------------------|------------|------------|------------|-----------|------------|------------|------------|
| support | | | | | | | | |
| | 0 | 0.75666667 | 0.47991543 | 0.58732212 | 473 | 1 | 0.49173554 | 0.76527331 |
| 0.59874214 | 311 | | | | | | | |
| micro avg | 0.59311224 | 0.59311224 | 0.59311224 | 784 | macro avg | 0.62420110 | 0.62259437 | |
| 0.59303213 | 784 | | | | | | | |
| weighted avg | 0.65157281 | 0.59311224 | 0.59185226 | 784 | | | | |

Best parameters:

{'C': 1, 'gamma': 'scale'}

| F1-score Task A | 0.6122905027932961 | | precision | | recall | | f1-score | |
|-----------------|--------------------|------------|------------|------------|-----------|------------|------------|------------|
| support | | | | | | | | |
| | 0 | 0.81500000 | 0.34460888 | 0.48439822 | 473 | 1 | 0.46917808 | 0.88102894 |
| 0.61229050 | 311 | | | | | | | |
| micro avg | 0.55739796 | 0.55739796 | 0.55739796 | 784 | macro avg | 0.64208904 | 0.61281891 | |
| 0.54834436 | 784 | | | | | | | |
| weighted avg | 0.67781809 | 0.55739796 | 0.53513100 | 784 | | | | |

Best parameters:

{'C': 1, 'gamma': 'scale'}

| F1-score Task A | 0.6160714285714285 | | precision | | recall | | f1-score | |
|-----------------|--------------------|------------|------------|------------|-----------|------------|------------|------------|
| support | | | | | | | | |
| | 0 | 0.82412060 | 0.34672304 | 0.48809524 | 473 | 1 | 0.47179487 | 0.88745981 |
| 0.61607143 | 311 | | | | | | | |
| micro avg | 0.56122449 | 0.56122449 | 0.56122449 | 784 | macro avg | 0.64795774 | 0.61709143 | |
| 0.55208333 | 784 | | | | | | | |
| weighted avg | 0.68435874 | 0.56122449 | 0.53886130 | 784 | | | | |

Best parameters:

{'C': 1, 'gamma': 'scale'}

| F1-score Task A | 0.6155555555555555 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.82564103 0.34038055 0.48203593 | 473 | 1 | 0.47028862 0.89067524 |
| 0.61555556 | 311 | | | |
| micro avg | 0.55867347 0.55867347 0.55867347 | 784 | macro avg | 0.64796483 0.61552790 |
| 0.54879574 | 784 | | | |
| weighted avg | 0.68467853 0.55867347 0.53500098 | 784 | | |

Best parameters:

{'C': 1, 'gamma': 'scale'}

| F1-score Task A | 0.6145374449339207 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.82887701 0.32769556 0.46969697 | 473 | 1 | 0.46733668 0.89710611 |
| 0.61453744 | 311 | | | |
| micro avg | 0.55357143 0.55357143 0.55357143 | 784 | macro avg | 0.64810684 0.61240083 |
| 0.54211721 | 784 | | | |
| weighted avg | 0.68545986 0.55357143 0.52715282 | 784 | | |

Best parameters:

{'C': 1, 'gamma': 'scale'}

| F1-score Task A | 0.6106870229007634 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.82584270 0.31078224 0.45161290 | 473 | 1 | 0.46204620 0.90032154 |
| 0.61068702 | 311 | | | |
| micro avg | 0.54464286 0.54464286 0.54464286 | 784 | macro avg | 0.64394445 0.60555189 |
| 0.53114996 | 784 | | | |
| weighted avg | 0.68153057 0.54464286 0.51471501 | 784 | | |

Best parameters:

{'C': 10, 'gamma': 'scale'}

| F1-score Task A | 0.6352941176470589 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.79393939 0.55391121 0.65255293 | 473 | 1 | 0.53524229 0.78135048 |
| 0.63529412 | 311 | | | |
| micro avg | 0.64413265 0.64413265 0.64413265 | 784 | macro avg | 0.66459084 0.66763084 |
| 0.64392352 | 784 | | | |
| weighted avg | 0.69131848 0.64413265 0.64570664 | 784 | | |

Best parameters:

{'C': 10, 'gamma': 'scale'}

| F1-score Task A | 0.639386189258312 | precision | recall | f1-score |
|-----------------|-------------------|-----------|--------|----------|
|-----------------|-------------------|-----------|--------|----------|

```

support
      0  0.80511182 0.53276956 0.64122137      473      1  0.53078556 0.80385852
0.63938619      311
      micro avg  0.64030612 0.64030612 0.64030612      784  macro avg  0.66794869 0.66831404
0.64030378      784
weighted avg  0.69629107 0.64030612 0.64049339      784
Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.645
      precision  recall  f1-score  support
      0  0.82033898 0.51162791 0.63020833      473      1  0.52760736 0.82958199
0.64500000      311
      micro avg  0.63775510 0.63775510 0.63775510      784  macro avg  0.67397317 0.67060495
0.63760417      784
weighted avg  0.70421713 0.63775510 0.63607595      784

```

Chi2

```

Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.6114352392065344      precision  recall  f1-score
support
      0  0.79411765 0.39957717 0.53164557      473      1  0.47985348 0.84244373
0.61143524      311
      micro avg  0.57525510 0.57525510 0.57525510      784  macro avg  0.63698556 0.62101045
0.57154040      784
weighted avg  0.66945418 0.57525510 0.56329683      784
Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.6084425036390102      precision  recall  f1-score
support
      0  0.75000000 0.64693446 0.69466515      473      1  0.55585106 0.67202572
0.60844250      311
      micro avg  0.65688776 0.65688776 0.65688776      784  macro avg  0.65292553 0.65948009
0.65155383      784
weighted avg  0.67298429 0.65688776 0.66046204      784
Best parameters:

```

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.5892857142857142 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.73286052 0.65539112 0.69196429 | 473 | 1 | 0.54847645 0.63665595 |
| 0.58928571 | 311 | | | |
| micro avg | 0.64795918 0.64795918 0.64795918 | 784 | macro avg | 0.64066849 0.64602353 |
| 0.64062500 | 784 | | | |
| weighted avg | 0.65971837 0.64795918 0.65123337 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.5991058122205664 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74056604 0.66384778 0.70011148 | 473 | 1 | 0.55833333 0.64630225 |
| 0.59910581 | 311 | | | |
| micro avg | 0.65688776 0.65688776 0.65688776 | 784 | macro avg | 0.64944969 0.65507502 |
| 0.64960865 | 784 | | | |
| weighted avg | 0.66827730 0.65688776 0.66004418 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6240928882438316 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.76354680 0.65539112 0.70534699 | 473 | 1 | 0.56878307 0.69131833 |
| 0.62409289 | 311 | | | |
| micro avg | 0.66964286 0.66964286 0.66964286 | 784 | macro avg | 0.66616493 0.67335472 |
| 0.66471994 | 784 | | | |
| weighted avg | 0.68628721 0.66964286 0.67311481 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6195965417867435 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.76059850 0.64482030 0.69794050 | 473 | 1 | 0.56135770 0.69131833 |
| 0.61959654 | 311 | | | |
| micro avg | 0.66326531 0.66326531 0.66326531 | 784 | macro avg | 0.66097810 0.66806931 |
| 0.65876852 | 784 | | | |
| weighted avg | 0.68156293 0.66326531 0.66686273 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6218978102189782 | precision | recall | f1-score |
|-----------------|--------------------|-----------|--------|----------|
| support | | | | |

| | | | | | | | |
|-------------------------------|--------------------|------------|------------|-----------|-----------|------------|------------|
| 0 | 0.76097561 | 0.65961945 | 0.70668177 | 473 | 1 | 0.56951872 | 0.68488746 |
| 0.62189781 | 311 | | | | | | |
| micro avg | 0.66964286 | 0.66964286 | 0.66964286 | 784 | macro avg | 0.66524716 | 0.67225346 |
| 0.66428979 | 784 | | | | | | |
| weighted avg | 0.68502779 | 0.66964286 | 0.67304936 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6440677966101694 | | | precision | recall | f1-score | |
| support | | | | | | | |
| 0 | 0.80487805 | 0.55813953 | 0.65917603 | 473 | 1 | 0.54166667 | 0.79421222 |
| 0.64406780 | 311 | | | | | | |
| micro avg | 0.65178571 | 0.65178571 | 0.65178571 | 784 | macro avg | 0.67327236 | 0.67617588 |
| 0.65162191 | 784 | | | | | | |
| weighted avg | 0.70046639 | 0.65178571 | 0.65318284 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.644918444165621 | | | precision | recall | f1-score | |
| support | | | | | | | |
| 0 | 0.81879195 | 0.51585624 | 0.63294423 | 473 | 1 | 0.52880658 | 0.82636656 |
| 0.64491844 | 311 | | | | | | |
| micro avg | 0.63903061 | 0.63903061 | 0.63903061 | 784 | macro avg | 0.67379927 | 0.67111140 |
| 0.63893134 | 784 | | | | | | |
| weighted avg | 0.70375949 | 0.63903061 | 0.63769420 | 784 | | | |

CoreNLP Sentiment feats + BOW

MI

Best parameters:

{ 'C': 100, 'gamma': 'scale' }

| | | | | |
|-----------------|--------------------|-----------|--------|----------|
| F1-score Task A | 0.5388127853881278 | precision | recall | f1-score |
|-----------------|--------------------|-----------|--------|----------|

```

support
      0  0.69406393 0.64270613 0.66739846      473      1  0.51156069 0.56913183
0.53881279      311
      micro avg  0.61352041 0.61352041 0.61352041      784  macro avg  0.60281231 0.60591898
0.60310562      784
weighted avg  0.62166787 0.61352041 0.61639062      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.5680119581464873      precision      recall  f1-score
support
      0  0.71596244 0.64482030 0.67853170      473      1  0.53072626 0.61093248
0.56801196      311
      micro avg  0.63137755 0.63137755 0.63137755      784  macro avg  0.62334435 0.62787639
0.62327183      784
weighted avg  0.64248227 0.63137755 0.63469032      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.5727272727272729      precision      recall  f1-score
support
      0  0.71954023 0.66173362 0.68942731      473      1  0.54154728 0.60771704
0.57272727      311
      micro avg  0.64030612 0.64030612 0.64030612      784  macro avg  0.63054375 0.63472533
0.63107729      784
weighted avg  0.64893333 0.64030612 0.64313431      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6156111929307806      precision      recall  f1-score
support
      0  0.75480769 0.66384778 0.70641170      473      1  0.56793478 0.67202572
0.61561119      311
      micro avg  0.66709184 0.66709184 0.66709184      784  macro avg  0.66137124 0.66793675
0.66101145      784
weighted avg  0.68067826 0.66709184 0.67039262      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6056971514242879      precision      recall  f1-score
support
      0  0.74532710 0.67441860 0.70810211      473      1  0.56741573 0.64951768
0.60569715      311

```

| | | | | | | | |
|--------------------------------|--------------------|------------|------------|------------|-----------|------------|-----------------------|
| micro avg | 0.66454082 | 0.66454082 | 0.66454082 | 784 | macro avg | 0.65637142 | 0.66196814 |
| | 0.65689963 | | 784 | | | | |
| weighted avg | 0.67475257 | 0.66454082 | 0.66747973 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6217008797653958 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.76029056 | 0.66384778 | 0.70880361 | 473 | 1 | 0.57142857 0.68167203 |
| | 0.62170088 | | 311 | | | | |
| micro avg | 0.67091837 | 0.67091837 | 0.67091837 | 784 | macro avg | 0.66585956 | 0.67275990 |
| | 0.66525225 | | 784 | | | | |
| weighted avg | 0.68537209 | 0.67091837 | 0.67425138 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6133333333333333 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.75238095 | 0.66807611 | 0.70772676 | 473 | 1 | 0.56868132 0.66559486 |
| | 0.61333333 | | 311 | | | | |
| micro avg | 0.66709184 | 0.66709184 | 0.66709184 | 784 | macro avg | 0.66053114 | 0.66683548 |
| | 0.66053005 | | 784 | | | | |
| weighted avg | 0.67951031 | 0.66709184 | 0.67028243 | 784 | | | |
| F1-score Task A | 0.6105263157894737 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.74883721 | 0.68076110 | 0.71317829 | 473 | 1 | 0.57344633 0.65273312 |
| | 0.61052632 | | 311 | | | | |
| micro avg | 0.66964286 | 0.66964286 | 0.66964286 | 784 | macro avg | 0.66114177 | 0.66674711 |
| | 0.66185231 | | 784 | | | | |
| weighted avg | 0.67926251 | 0.66964286 | 0.67245793 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6240713224368498 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.76066351 | 0.67864693 | 0.71731844 | 473 | 1 | 0.58011050 0.67524116 |
| | 0.62407132 | | 311 | | | | |
| micro avg | 0.67729592 | 0.67729592 | 0.67729592 | 784 | macro avg | 0.67038700 | 0.67694405 |
| | 0.67069488 | | 784 | | | | |
| weighted avg | 0.68904108 | 0.67729592 | 0.68032883 | 784 | | | |

Chi2

| | | | | | | | | | |
|--------------------------------|------------|--------------------|------------|------------|-----------|-----------|------------|------------|------------|
| Best parameters: | | | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | | | |
| F1-score | Task A | 0.5799457994579946 | | | precision | | recall | f1-score | |
| support | | | | | | | | | |
| | 0 | 0.72829132 | 0.54968288 | 0.62650602 | 473 | | 1 | 0.50117096 | 0.68810289 |
| 0.57994580 | 311 | | | | | | | | |
| micro avg | 0.60459184 | 0.60459184 | 0.60459184 | | 784 | macro avg | 0.61473114 | 0.61889288 | |
| 0.60322591 | 784 | | | | | | | | |
| weighted avg | 0.63819638 | 0.60459184 | 0.60803634 | | 784 | | | | |
| Best parameters: | | | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | | | |
| F1-score | Task A | 0.5900151285930408 | | | precision | | recall | f1-score | |
| support | | | | | | | | | |
| | 0 | 0.73271889 | 0.67230444 | 0.70121279 | 473 | | 1 | 0.55714286 | 0.62700965 |
| 0.59001513 | 311 | | | | | | | | |
| micro avg | 0.65433673 | 0.65433673 | 0.65433673 | | 784 | macro avg | 0.64493088 | 0.64965704 | |
| 0.64561396 | 784 | | | | | | | | |
| weighted avg | 0.66307075 | 0.65433673 | 0.65710249 | | 784 | | | | |
| Best parameters: | | | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | | | |
| F1-score | Task A | 0.6184012066365008 | | | precision | | recall | f1-score | |
| support | | | | | | | | | |
| | 0 | 0.75462963 | 0.68921776 | 0.72044199 | 473 | | 1 | 0.58238636 | 0.65916399 |
| 0.61840121 | 311 | | | | | | | | |
| micro avg | 0.67729592 | 0.67729592 | 0.67729592 | | 784 | macro avg | 0.66850800 | 0.67419087 | |
| 0.66942160 | 784 | | | | | | | | |
| weighted avg | 0.68630354 | 0.67729592 | 0.67996408 | | 784 | | | | |
| Best parameters: | | | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | | | |
| F1-score | Task A | 0.5988023952095808 | | | precision | | recall | f1-score | |
| support | | | | | | | | | |
| | 0 | 0.74004684 | 0.66807611 | 0.70222222 | 473 | | 1 | 0.56022409 | 0.64308682 |
| 0.59880240 | 311 | | | | | | | | |
| micro avg | 0.65816327 | 0.65816327 | 0.65816327 | | 784 | macro avg | 0.65013546 | 0.65558146 | |

```

0.65051231      784
weighted avg  0.66871409 0.65816327 0.66119727      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6133333333333333      precision      recall      f1-score
support
      0  0.75238095 0.66807611 0.70772676      473      1  0.56868132 0.66559486
0.61333333      311
      micro avg  0.66709184 0.66709184 0.66709184      784      macro avg  0.66053114 0.66683548
0.66053005      784
weighted avg  0.67951031 0.66709184 0.67028243      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6332842415316642      precision      recall      f1-score
support
      0  0.76923077 0.67653277 0.71991001      473      1  0.58423913 0.69131833
0.63328424      311
      micro avg  0.68239796 0.68239796 0.68239796      784      macro avg  0.67673495 0.68392555
0.67659713      784
weighted avg  0.69584761 0.68239796 0.68554698      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6117647058823529      precision      recall      f1-score
support
      0  0.75180723 0.65961945 0.70270270      473      1  0.56368564 0.66881029
0.61176471      311
      micro avg  0.66326531 0.66326531 0.66326531      784      macro avg  0.65774643 0.66421487
0.65723370      784
weighted avg  0.67718246 0.66326531 0.66662908      784
F1-score Task A 0.6172106824925816      precision      recall      f1-score
support
      0  0.75534442 0.67230444 0.71140940      473      1  0.57300275 0.66881029
0.61721068      311
      micro avg  0.67091837 0.67091837 0.67091837      784      macro avg  0.66417359 0.67055736
0.66431004      784
weighted avg  0.68301246 0.67091837 0.67404230      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6140089418777943      precision      recall      f1-score

```

| | | | | | | | | |
|--------------|------------|------------|------------|------------|-----|-----------|------------|-----------------------|
| support | | | | | | | | |
| | 0 | 0.75235849 | 0.67441860 | 0.71125975 | 473 | | 1 | 0.57222222 0.66237942 |
| 0.61400894 | | 311 | | | | | | |
| | micro avg | 0.66964286 | 0.66964286 | 0.66964286 | 784 | macro avg | 0.66229036 | 0.66839901 |
| 0.66263435 | | 784 | | | | | | |
| weighted avg | 0.68090137 | 0.66964286 | 0.67268195 | | 784 | | | |

Twitter Sentiment feats + BOW

Mutual Information

Best parameters:
{'C': 10, 'gamma': 'scale'}

| | | | | | | | | |
|-----------------|--------------------|------------|------------|------------|--------|-----------|------------|-----------------------|
| F1-score Task A | 0.5710186513629842 | | precision | | recall | | f1-score | |
| support | | | | | | | | |
| | 0 | 0.71859296 | 0.60465116 | 0.65671642 | 473 | | 1 | 0.51554404 0.63987138 |
| 0.57101865 | | 311 | | | | | | |
| | micro avg | 0.61862245 | 0.61862245 | 0.61862245 | 784 | macro avg | 0.61706850 | 0.62226127 |
| 0.61386753 | | 784 | | | | | | |
| weighted avg | 0.63804677 | 0.61862245 | 0.62272151 | | 784 | | | |

Best parameters:
{'C': 10, 'gamma': 'scale'}

| | | | | | | | | |
|-----------------|--------------------|------------|------------|------------|--------|-----------|------------|-----------------------|
| F1-score Task A | 0.5918653576437587 | | precision | | recall | | f1-score | |
| support | | | | | | | | |
| | 0 | 0.73821990 | 0.59619450 | 0.65964912 | 473 | | 1 | 0.52487562 0.67845659 |
| 0.59186536 | | 311 | | | | | | |
| | micro avg | 0.62882653 | 0.62882653 | 0.62882653 | 784 | macro avg | 0.63154776 | 0.63732555 |
| 0.62575724 | | 784 | | | | | | |
| weighted avg | 0.65358971 | 0.62882653 | 0.63276041 | | 784 | | | |

Best parameters:
{'C': 10, 'gamma': 'scale'}

| | | | | |
|-------------------------------|----------------------------------|-----------|-----------|-----------------------|
| F1-score Task A | 0.5963431786216595 | precision | recall | f1-score |
| support | | | | |
| 0 | 0.74218750 0.60253700 0.66511085 | 473 | 1 | 0.53000000 0.68167203 |
| 0.59634318 | 311 | | | |
| micro avg | 0.63392857 0.63392857 0.63392857 | 784 | macro avg | 0.63609375 0.64210451 |
| 0.63072702 | 784 | | | |
| weighted avg | 0.65801618 0.63392857 0.63783184 | 784 | | |
| Best parameters: | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | |
| F1-score Task A | 0.6134800550206327 | precision | recall | f1-score |
| support | | | | |
| 0 | 0.76086957 0.59196617 0.66587396 | 473 | 1 | 0.53605769 0.71704180 |
| 0.61348006 | 311 | | | |
| micro avg | 0.64158163 0.64158163 0.64158163 | 784 | macro avg | 0.64846363 0.65450399 |
| 0.63967701 | 784 | | | |
| weighted avg | 0.67169037 0.64158163 0.64509015 | 784 | | |
| Best parameters: | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | |
| F1-score Task A | 0.6253443526170799 | precision | recall | f1-score |
| support | | | | |
| 0 | 0.77235772 0.60253700 0.67695962 | 473 | 1 | 0.54698795 0.72990354 |
| 0.62534435 | 311 | | | |
| micro avg | 0.65306122 0.65306122 0.65306122 | 784 | macro avg | 0.65967284 0.66622027 |
| 0.65115199 | 784 | | | |
| weighted avg | 0.68295721 0.65306122 0.65648469 | 784 | | |
| Best parameters: | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | |
| F1-score Task A | 0.6233062330623307 | precision | recall | f1-score |
| support | | | | |
| 0 | 0.77310924 0.58350951 0.66506024 | 473 | 1 | 0.53864169 0.73954984 |
| 0.62330623 | 311 | | | |
| micro avg | 0.64540816 0.64540816 0.64540816 | 784 | macro avg | 0.65587546 0.66152968 |
| 0.64418324 | 784 | | | |
| weighted avg | 0.68009979 0.64540816 0.64849711 | 784 | | |
| Best parameters: | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | |
| F1-score Task A | 0.6228187919463087 | precision | recall | f1-score |
| support | | | | |
| 0 | 0.77428571 0.57293869 0.65856622 | 473 | 1 | 0.53456221 0.74598071 |

```

0.62281879      311
  micro avg  0.64158163 0.64158163 0.64158163      784  macro avg  0.65442396 0.65945970
0.64069251      784
weighted avg  0.67919131 0.64158163 0.64438580      784
Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.6251655629139073      precision      recall  f1-score
support
      0  0.77941176 0.56025370 0.65190652      473      1  0.53153153 0.75884244
0.62516556      311
  micro avg  0.63903061 0.63903061 0.63903061      784  macro avg  0.65547165 0.65954807
0.63853604      784
weighted avg  0.68108172 0.63903061 0.64129882      784
Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.6276041666666666      precision      recall  f1-score
support
      0  0.78593272 0.54334038 0.64250000      473      1  0.52735230 0.77491961
0.62760417      311
  micro avg  0.63520408 0.63520408 0.63520408      784  macro avg  0.65664251 0.65913000
0.63505208      784
weighted avg  0.68335809 0.63520408 0.63659107      784

```

Chi-squared

```

Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.6
      precision      recall  f1-score  support
      0  0.76140351 0.45877378 0.57255937      473      1  0.48697395 0.78135048
0.60000000      311
  micro avg  0.58673469 0.58673469 0.58673469      784  macro avg  0.62418873 0.62006213
0.58627968      784
weighted avg  0.65254178 0.58673469 0.58344462      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.5842349304482226      precision      recall  f1-score

```



```

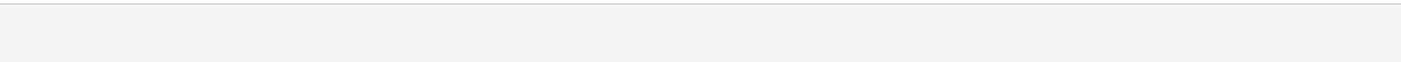
support
      0  0.72767857 0.68921776 0.70792617      473      1  0.56250000 0.60771704
0.58423493      311
      micro avg  0.65688776 0.65688776 0.65688776      784  macro avg  0.64508929 0.64846740
0.64608055      784
weighted avg  0.66215493 0.65688776 0.65885987      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6183431952662721      precision      recall  f1-score
support
      0  0.75656325 0.67019027 0.71076233      473      1  0.57260274 0.67202572
0.61834320      311
      micro avg  0.67091837 0.67091837 0.67091837      784  macro avg  0.66458299 0.67110800
0.66455276      784
weighted avg  0.68358912 0.67091837 0.67410117      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.623688155922039      precision      recall  f1-score
support
      0  0.75934579 0.68710359 0.72142064      473      1  0.58426966 0.66881029
0.62368816      311
      micro avg  0.67984694 0.67984694 0.67984694      784  macro avg  0.67180773 0.67795694
0.67255440      784
weighted avg  0.68989595 0.67984694 0.68265176      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.624813153961136      precision      recall  f1-score
support
      0  0.76056338 0.68498943 0.72080089      473      1  0.58379888 0.67202572
0.62481315      311
      micro avg  0.67984694 0.67984694 0.67984694      784  macro avg  0.67218113 0.67850758
0.67280702      784
weighted avg  0.69044379 0.67984694 0.68272412      784
Best parameters:
{'C': 100, 'gamma': 'scale'}
F1-score Task A 0.6340740740740741      precision      recall  f1-score
support
      0  0.76904762 0.68287526 0.72340426      473      1  0.58791209 0.68810289
0.63407407      311

```

| | | | | | | | |
|--------------------------------|--------------------|------------|------------|------------|-----------|------------|-----------------------|
| micro avg | 0.68494898 | 0.68494898 | 0.68494898 | 784 | macro avg | 0.67847985 | 0.68548908 |
| | 0.67873916 | | 784 | | | | |
| weighted avg | 0.69719411 | 0.68494898 | 0.68796843 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.609720176730486 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.75000000 | 0.65961945 | 0.70191226 | 473 | 1 | 0.56250000 0.66559486 |
| | 0.60972018 | | 311 | | | | |
| micro avg | 0.66198980 | 0.66198980 | 0.66198980 | 784 | macro avg | 0.65625000 | 0.66260715 |
| | 0.65581622 | | 784 | | | | |
| weighted avg | 0.67562181 | 0.66198980 | 0.66534117 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6244477172312224 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.76201923 | 0.67019027 | 0.71316085 | 473 | 1 | 0.57608696 0.68167203 |
| | 0.62444772 | | 311 | | | | |
| micro avg | 0.67474490 | 0.67474490 | 0.67474490 | 784 | macro avg | 0.66905309 | 0.67593115 |
| | 0.66880429 | | 784 | | | | |
| weighted avg | 0.68826293 | 0.67474490 | 0.67796980 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6311688311688313 | | | precision | recall | f1-score | |
| support | | | | | | | |
| | 0 | 0.79076923 | 0.54334038 | 0.64411028 | 473 | 1 | 0.52941176 0.78135048 |
| | 0.63116883 | | 311 | | | | |
| micro avg | 0.63775510 | 0.63775510 | 0.63775510 | 784 | macro avg | 0.66009050 | 0.66234543 |
| | 0.63763955 | | 784 | | | | |
| weighted avg | 0.68709299 | 0.63775510 | 0.63897662 | 784 | | | |

Bow alone

Mutual Information



Best parameters:

{'C': 0.01, 'gamma': 'scale'}

| F1-score Task A | 0.6146788990825688 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.80717489 0.38054968 0.51724138 | 473 | 1 | 0.47771836 0.86173633 |
| 0.61467890 | 311 | | | |
| micro avg | 0.57142857 0.57142857 0.57142857 | 784 | macro avg | 0.64244662 0.62114301 |
| 0.56596014 | 784 | | | |
| weighted avg | 0.67648486 0.57142857 0.55589325 | 784 | | |

Best parameters:

{'C': 0.1, 'gamma': 'scale'}

| F1-score Task A | 0.6074766355140188 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.78661088 0.39746300 0.52808989 | 473 | 1 | 0.47706422 0.83601286 |
| 0.60747664 | 311 | | | |
| micro avg | 0.57142857 0.57142857 0.57142857 | 784 | macro avg | 0.63183755 0.61673793 |
| 0.56778326 | 784 | | | |
| weighted avg | 0.66381877 0.57142857 0.55958131 | 784 | | |

Best parameters:

{'C': 10, 'gamma': 'scale'}

| F1-score Task A | 0.6084507042253521 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.75324675 0.61310782 0.67599068 | 473 | 1 | 0.54135338 0.69453376 |
| 0.60845070 | 311 | | | |
| micro avg | 0.64540816 0.64540816 0.64540816 | 784 | macro avg | 0.64730007 0.65382079 |
| 0.64222069 | 784 | | | |
| weighted avg | 0.66919211 0.64540816 0.64919867 | 784 | | |

Best parameters:

{'C': 10, 'gamma': 'scale'}

| F1-score Task A | 0.6022727272727273 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74680307 0.61733615 0.67592593 | 473 | 1 | 0.53944020 0.68167203 |
| 0.60227273 | 311 | | | |
| micro avg | 0.64285714 0.64285714 0.64285714 | 784 | macro avg | 0.64312164 0.64950409 |
| 0.63909933 | 784 | | | |
| weighted avg | 0.66454561 0.64285714 0.64670890 | 784 | | |

Best parameters:

{'C': 10, 'gamma': 'scale'}

| F1-score Task A | 0.5991316931982634 | precision | recall | f1-score |
|-----------------|--------------------|-----------|--------|----------|
|-----------------|--------------------|-----------|--------|----------|

```

support
      0  0.74257426 0.63424947 0.68415051      473      1  0.54473684 0.66559486
0.59913169      311
      micro avg  0.64668367 0.64668367 0.64668367      784  macro avg  0.64365555 0.64992216
0.64164110      784
weighted avg  0.66409538 0.64668367 0.65042494      784
Best parameters:
{'C': 10, 'gamma': 'scale'}
F1-score Task A 0.6080691642651297      precision      recall  f1-score
support
      0  0.75062344 0.63636364 0.68878719      473      1  0.55091384 0.67845659
0.60806916      311
      micro avg  0.65306122 0.65306122 0.65306122      784  macro avg  0.65076864 0.65741011
0.64842817      784
weighted avg  0.67140190 0.65306122 0.65676766      784
Best parameters:
{'C': 1, 'gamma': 'scale'}
F1-score Task A 0.6242038216560509      precision      recall  f1-score
support
      0  0.78709677 0.51585624 0.62324393      473      1  0.51687764 0.78778135
0.62420382      311
      micro avg  0.62372449 0.62372449 0.62372449      784  macro avg  0.65198721 0.65181879
0.62372388      784
weighted avg  0.67990525 0.62372449 0.62362471      784
Best parameters:
{'C': 1, 'gamma': 'scale'}
F1-score Task A 0.6221662468513853      precision      recall  f1-score
support
      0  0.78737542 0.50105708 0.61240310      473      1  0.51138716 0.79421222
0.62216625      311
      micro avg  0.61734694 0.61734694 0.61734694      784  macro avg  0.64938129 0.64763465
0.61728467      784
weighted avg  0.67789538 0.61734694 0.61627598      784
Best parameters:
{'C': 1, 'gamma': 'scale'}
F1-score Task A 0.6262376237623762      precision      recall  f1-score
support
      0  0.79790941 0.48414376 0.60263158      473      1  0.50905433 0.81350482
0.62623762      311

```

| | | | | | | | |
|--------------|------------|------------|------------|-----|-----------|------------|------------|
| micro avg | 0.61479592 | 0.61479592 | 0.61479592 | 784 | macro avg | 0.65348187 | 0.64882429 |
| 0.61443460 | | | | 784 | | | |
| weighted avg | 0.68332531 | 0.61479592 | 0.61199571 | 784 | | | |

Chi2

| | | | | | | | |
|--------------------------------|--------------------|------------|------------|------------|-----------|------------|-----------------------|
| Best parameters: | | | | | | | |
| { 'C': 0.1, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.616822429906542 | | | precision | | recall | f1-score |
| support | | | | | | | |
| | 0 | 0.80334728 | 0.40591966 | 0.53932584 | 473 | 1 | 0.48440367 0.84887460 |
| 0.61682243 | | 311 | | | | | |
| micro avg | 0.58163265 | 0.58163265 | 0.58163265 | 784 | macro avg | 0.64387548 | 0.62739713 |
| 0.57807414 | | 784 | | | | | |
| weighted avg | 0.67682756 | 0.58163265 | 0.57006747 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 0.1, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6134259259259259 | | | precision | | recall | f1-score |
| support | | | | | | | |
| | 0 | 0.80086580 | 0.39112051 | 0.52556818 | 473 | 1 | 0.47920434 0.85209003 |
| 0.61342593 | | 311 | | | | | |
| micro avg | 0.57397959 | 0.57397959 | 0.57397959 | 784 | macro avg | 0.64003507 | 0.62160527 |
| 0.56949705 | | 784 | | | | | |
| weighted avg | 0.67326795 | 0.57397959 | 0.56041991 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6005830903790088 | | | precision | | recall | f1-score |
| support | | | | | | | |
| | 0 | 0.74327628 | 0.64270613 | 0.68934240 | 473 | 1 | 0.54933333 0.66237942 |
| 0.60058309 | | 311 | | | | | |
| micro avg | 0.65051020 | 0.65051020 | 0.65051020 | 784 | macro avg | 0.64630481 | 0.65254278 |
| 0.64496275 | | 784 | | | | | |
| weighted avg | 0.66634228 | 0.65051020 | 0.65413303 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6051873198847262 | | | precision | | recall | f1-score |
| support | | | | | | | |

| | | | | | | | |
|-------------------------------|--------------------|------------|------------|-----------|-----------|------------|------------|
| 0 | 0.74812968 | 0.63424947 | 0.68649886 | 473 | 1 | 0.54830287 | 0.67524116 |
| 0.60518732 | 311 | | | | | | |
| micro avg | 0.65051020 | 0.65051020 | 0.65051020 | 784 | macro avg | 0.64821627 | 0.65474531 |
| 0.64584309 | 784 | | | | | | |
| weighted avg | 0.66886165 | 0.65051020 | 0.65424390 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.5979971387696709 | | | precision | recall | f1-score | |
| support | | | | | | | |
| 0 | 0.74242424 | 0.62156448 | 0.67663982 | 473 | 1 | 0.53865979 | 0.67202572 |
| 0.59799714 | 311 | | | | | | |
| micro avg | 0.64158163 | 0.64158163 | 0.64158163 | 784 | macro avg | 0.64054202 | 0.64679510 |
| 0.63731848 | 784 | | | | | | |
| weighted avg | 0.66159421 | 0.64158163 | 0.64544355 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6189111747851003 | | | precision | recall | f1-score | |
| support | | | | | | | |
| 0 | 0.76070529 | 0.63847780 | 0.69425287 | 473 | 1 | 0.55813953 | 0.69453376 |
| 0.61891117 | 311 | | | | | | |
| micro avg | 0.66071429 | 0.66071429 | 0.66071429 | 784 | macro avg | 0.65942241 | 0.66650578 |
| 0.65658202 | 784 | | | | | | |
| weighted avg | 0.68035076 | 0.66071429 | 0.66436605 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 10, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.6221590909090909 | | | precision | recall | f1-score | |
| support | | | | | | | |
| 0 | 0.76470588 | 0.63213531 | 0.69212963 | 473 | 1 | 0.55725191 | 0.70418006 |
| 0.62215909 | 311 | | | | | | |
| micro avg | 0.66071429 | 0.66071429 | 0.66071429 | 784 | macro avg | 0.66097890 | 0.66815769 |
| 0.65714436 | 784 | | | | | | |
| weighted avg | 0.68241228 | 0.66071429 | 0.66437346 | 784 | | | |
| Best parameters: | | | | | | | |
| { 'C': 1, 'gamma': 'scale' } | | | | | | | |
| F1-score Task A | 0.628498727735369 | | | precision | recall | f1-score | |
| support | | | | | | | |
| 0 | 0.79288026 | 0.51797040 | 0.62659847 | 473 | 1 | 0.52000000 | 0.79421222 |
| 0.62849873 | 311 | | | | | | |
| micro avg | 0.62755102 | 0.62755102 | 0.62755102 | 784 | macro avg | 0.65644013 | 0.65609131 |

| | | | | | | | | | |
|------------------------------|------------|------------|------------|------------|-----------|------------|------------|------------|--|
| 0.62754860 | 784 | | | | | | | | |
| weighted avg | 0.68463312 | 0.62755102 | 0.62735227 | 784 | | | | | |
| Best parameters: | | | | | | | | | |
| { 'C': 1, 'gamma': 'scale' } | | | | | | | | | |
| F1-score Task A | 0.62360248 | 44720497 | | | precision | recall | f1-score | | |
| support | | | | | | | | | |
| | 0 | 0.79310345 | 0.48625793 | 0.60288336 | 473 | 1 | 0.50809717 | 0.80707395 | |
| 0.62360248 | 311 | | | | | | | | |
| micro avg | 0.61352041 | 0.61352041 | 0.61352041 | 784 | macro avg | 0.65060031 | 0.64666594 | | |
| 0.61324292 | 784 | | | | | | | | |
| weighted avg | 0.68004611 | 0.61352041 | 0.61110230 | 784 | | | | | |

Combined

Chi2

| | | | | | | | | | |
|--------------------------------|------------|------------|------------|------------|-----------|------------|------------|------------|--|
| Best parameters: | | | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | | | |
| F1-score Task A | 0.56637168 | 14159292 | | | precision | recall | f1-score | | |
| support | | | | | | | | | |
| | 0 | 0.71462830 | 0.63002114 | 0.66966292 | 473 | 1 | 0.52316076 | 0.61736334 | |
| 0.56637168 | 311 | | | | | | | | |
| micro avg | 0.62500000 | 0.62500000 | 0.62500000 | 784 | macro avg | 0.61889453 | 0.62369224 | | |
| 0.61801730 | 784 | | | | | | | | |
| weighted avg | 0.63867625 | 0.62500000 | 0.62868897 | 784 | | | | | |
| Best parameters: | | | | | | | | | |
| { 'C': 100, 'gamma': 'scale' } | | | | | | | | | |
| F1-score Task A | 0.57530120 | 48192772 | | | precision | recall | f1-score | | |
| support | | | | | | | | | |
| | 0 | 0.72157773 | 0.65750529 | 0.68805310 | 473 | 1 | 0.54107649 | 0.61414791 | |
| 0.57530120 | 311 | | | | | | | | |
| micro avg | 0.64030612 | 0.64030612 | 0.64030612 | 784 | macro avg | 0.63132711 | 0.63582660 | | |
| 0.63167715 | 784 | | | | | | | | |
| weighted avg | 0.64997583 | 0.64030612 | 0.64332626 | 784 | | | | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.5954198473282442 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.73636364 0.68498943 0.70974808 | 473 | 1 | 0.56686047 0.62700965 |
| 0.59541985 | 311 | | | |
| micro avg | 0.66198980 0.66198980 0.66198980 | 784 | macro avg | 0.65161205 0.65599954 |
| 0.65258397 | 784 | | | |
| weighted avg | 0.66912450 0.66198980 0.66439594 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.600609756097561 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74031891 0.68710359 0.71271930 | 473 | 1 | 0.57101449 0.63344051 |
| 0.60060976 | 311 | | | |
| micro avg | 0.66581633 0.66581633 0.66581633 | 784 | macro avg | 0.65566670 0.66027205 |
| 0.65666453 | 784 | | | |
| weighted avg | 0.67315861 0.66581633 0.66824727 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6255639097744361 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.76046512 0.69133192 0.72425249 | 473 | 1 | 0.58757062 0.66881029 |
| 0.62556391 | 311 | | | |
| micro avg | 0.68239796 0.68239796 0.68239796 | 784 | macro avg | 0.67401787 0.68007111 |
| 0.67490820 | 784 | | | |
| weighted avg | 0.69188069 0.68239796 0.68510434 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6216216216216217 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.75757576 0.68710359 0.72062084 | 473 | 1 | 0.58309859 0.66559486 |
| 0.62162162 | 311 | | | |
| micro avg | 0.67857143 0.67857143 0.67857143 | 784 | macro avg | 0.67033717 0.67634922 |
| 0.67112123 | 784 | | | |
| weighted avg | 0.68836351 0.67857143 0.68134947 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6077844311377245 | precision | recall | f1-score |
|-----------------|--------------------|-----------|--------|----------|
|-----------------|--------------------|-----------|--------|----------|

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6066066066066067 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74592075 0.67653277 0.70953437 | 473 | 1 | 0.56901408 0.64951768 |
| 0.60660661 | 311 | | | |
| micro avg | 0.66581633 0.66581633 0.66581633 | 784 | macro avg | 0.65746742 0.66302523 |
| 0.65807049 | 784 | | | |
| weighted avg | 0.67574476 0.66581633 0.66870461 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6059701492537314 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74588235 0.67019027 0.70601336 | 473 | 1 | 0.56545961 0.65273312 |
| 0.60597015 | 311 | | | |
| micro avg | 0.66326531 0.66326531 0.66326531 | 784 | macro avg | 0.65567098 0.66146170 |
| 0.65599176 | 784 | | | |
| weighted avg | 0.67431160 0.66326531 0.66632785 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.608955223880597 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74823529 0.67230444 0.70824053 | 473 | 1 | 0.56824513 0.65594855 |
| 0.60895522 | 311 | | | |
| micro avg | 0.66581633 0.66581633 0.66581633 | 784 | macro avg | 0.65824021 0.66412650 |
| 0.65859788 | 784 | | | |
| weighted avg | 0.67683613 0.66581633 0.66885567 | 784 | | |

Best parameters:

{'C': 100, 'gamma': 'scale'}

| F1-score Task A | 0.6063348416289592 | precision | recall | f1-score |
|-----------------|----------------------------------|-----------|-----------|-----------------------|
| support | | | | |
| 0 | 0.74537037 0.68076110 0.71160221 | 473 | 1 | 0.57102273 0.64630225 |
| 0.60633484 | 311 | | | |
| micro avg | 0.66709184 0.66709184 0.66709184 | 784 | macro avg | 0.65819655 0.66353168 |
| 0.65896853 | 784 | | | |
| weighted avg | 0.67620951 0.66709184 0.66984436 | 784 | | |

Todo: Coding

1. Implement sentiment value creator with `fit()` and `transform()`.
2. Integrate `coreNlpSentimentAnalyzer` code into `fit()` and `transform()` framework
3. Add `FeatureUnion` component to pipeline
4. Dig up MPQA feature creation in git repo
5. Implement MPQA estimator

Irony/Sarcasm Detection

Log

Fixed issue where the server would not work with the sentiment analysis annotator enabled by upgrading to corenlp v 3.9.2

F-score for positive class analysis

Bag of Words alone

| Count | Feat | Mutual Information | Chi-Squared |
|-------|---------|--------------------|-------------|
| 100 | 0.61468 | 0.681682 | |
| 500 | 0.60748 | 0.7481343 | |
| 1000 | 0.60845 | 0.8450058 | |
| 2000 | 0.60727 | 0.70519 | |
| 3000 | 0.59915 | 0.59800 | |
| 5000 | 0.60807 | 0.71891 | |
| 10000 | 0.62426 | 0.82216 | |
| 12000 | 0.62217 | 0.72850 | |
| 15000 | 0.62623 | 0.8360 | |

MPQA + BOW

| Count | Feat | Mutual Information | Chi-Squared |
|-------|---------|--------------------|-------------|
| 100 | 0.59876 | 0.71435 | |
| 500 | 0.61229 | 0.8443 | |

| Batch Size | Mean | Std | Chi-Squared |
|------------|----------|----------|-------------|
| 100 | 0.610058 | 0.007892 | 857 |
| 200 | 0.615559 | 0.005910 | 58 |
| 300 | 0.614567 | 0.004092 | 29 |
| 500 | 0.610667 | 0.005965 | |
| 1000 | 0.635292 | 0.001897 | 8 |
| 1200 | 0.639386 | 0.004067 | 8 |
| 1500 | 0.645644 | 0.004918 | 4 |

CoreNLP + BOW

| Batch Size | Mean | Std | Chi-Squared |
|------------|----------|----------|-------------|
| 100 | 0.538817 | 0.009457 | |
| 500 | 0.568052 | 0.00151 | |
| 1000 | 0.572767 | 0.004012 | |
| 2000 | 0.615651 | 0.008024 | |
| 3000 | 0.605697 | 0.003333 | |
| 5000 | 0.621763 | 0.003284 | |
| 10000 | 0.613363 | 0.001764 | |
| 12000 | 0.610565 | 0.002106 | |
| 15000 | 0.624067 | 0.004089 | |

Twitter Sentiment Queues + BOW

| Batch Size | Mean | Std | Chi-Squared |
|------------|------|-----|-------------|
|------------|------|-----|-------------|

| | | |
|-------|----------------|--|
| 100 | 0.571051799457 | |
| 500 | 0.59185500151 | |
| 1000 | 0.59634384012 | |
| 2000 | 0.61345988024 | |
| 3000 | 0.62534133333 | |
| 5000 | 0.6332842 | |
| 10000 | 0.633617647 | |
| 12000 | 0.62516244477 | |
| 15000 | 0.62766311688 | |

Macro f-score analysis

General sentiment features (MPQA)

| Feature Count | Macro F1 | Mutual Information | Chi-Squared |
|---------------|----------|--------------------|-------------|
| 100 | 0.59305 | 0.57154 | |
| 500 | 0.54836 | 0.5155 | |
| 1000 | 0.55206 | 0.4063 | |
| 2000 | 0.54886 | 0.4961 | |
| 3000 | 0.54212 | 0.6472 | |
| 5000 | 0.53115 | 0.5877 | |
| 10000 | 0.64392 | 0.6429 | |
| 12000 | 0.64036 | 0.5162 | |
| 15000 | 0.63766 | 0.3893 | |

CoreNLP Sentiment features

| Feature Count | Macro F1 | Mutual Information | Chi-Squared |
|---------------|----------|--------------------|-------------|
| 100 | 0.6031 | 0.0323 | |
| 500 | 0.6232 | 0.4561 | |

| Feature | Mutual Information | Chi-Squared |
|---------|--------------------|-------------|
| 100 | 0.63108 | 6942 |
| 200 | 0.65101 | 5051 |
| 300 | 0.65096 | 6053 |
| 500 | 0.65525 | 7660 |
| 1000 | 0.65053 | 5723 |
| 1200 | 0.66185 | 6431 |
| 1500 | 0.67069 | 6263 |

Twitter Sentiment Features

| Feature | Mutual Information | Chi-Squared |
|---------|--------------------|-------------|
| 100 | 0.61385 | 78628 |
| 500 | 0.62576 | 4608 |
| 1000 | 0.63076 | 6455 |
| 2000 | 0.63968 | 7255 |
| 3000 | 0.65115 | 7281 |
| 5000 | 0.64418 | 7874 |
| 10000 | 0.64069 | 5582 |
| 12000 | 0.63859 | 6880 |
| 15000 | 0.63505 | 3764 |

Bow alone

| Feature | Mutual Information | Chi-Squared |
|---------|--------------------|-------------|
|---------|--------------------|-------------|

| | | |
|-------|---------|-------|
| 100 | 0.56595 | 57807 |
| 500 | 0.56773 | 6950 |
| 1000 | 0.64222 | 4496 |
| 2000 | 0.63916 | 4584 |
| 3000 | 0.64164 | 3732 |
| 5000 | 0.64846 | 5658 |
| 10000 | 0.62376 | 5714 |
| 12000 | 0.61729 | 2755 |
| 15000 | 0.61446 | 1324 |

Precision and Recall for top performers (macro f-score)

MI features

| | at | Ng | g | Bo | Positive |
|------------------------------|------|------|------|--------|----------|
| | ated | Rec | Rec | Recall | |
| BOW only | 500 | 0.05 | 0.03 | 0.06 | 0.457 |
| Generic Sentiment Features | 100 | 0.03 | 0.03 | 0.03 | 0.135 |
| + BOW | | | | | |
| Syntactic Sentiment Features | 500 | 0.05 | 0.03 | 0.06 | 0.459 |
| + BoW | | | | | |
| Twitter Sentiment Features | 500 | 0.03 | 0.03 | 0.03 | 0.125 |
| + BoW | | | | | |

Chi squared features

| | at | Ng | g | Bo | Positive |
|--|------|-----|-----|--------|----------|
| | ated | Rec | Rec | Recall | |

| | | | | |
|-------------------------------|--------|------|------|--------|
| BOW only | 500.00 | 0.50 | 0.33 | 169453 |
| Generic Sentiment Fea | 100.00 | 0.50 | 0.50 | 568289 |
| + BOW | | | | |
| Syntactic Sentiment Fea | 500.00 | 0.50 | 0.33 | 132 |
| + BoW | | | | |
| Twitter Sentiment Fea | 500.00 | 0.50 | 0.33 | 81 |
| + BoW | | | | |