Sam Hekman

Assignment 3 Evaluations and Results

1. Baseline model evaluation metrics:

```
In [15]: get_results(testing_results, testing_labels)

         --- Results -----------------
         GT same, PRED same: 17418
         GT same, PRED different: 2854
         GT different, PRED same: 2675
         GT different, PRED different: 75843

         Precision: 0.8668690588762256
         Recall: 0.859214680347277
         F1 score: 0.8630248978075066
```

The results were pretty good, especially when I had expected around a 60% precision based on the assignment description.

2. Model 2 using eta as hyperparameter:

```
In [18]: get_results(testing_results, testing_labels)

         --- Results -----------------
         GT same, PRED same: 19720
         GT same, PRED different: 552
         GT different, PRED same: 493
         GT different, PRED different: 78025

         Precision: 0.975609756097561
         Recall: 0.9727703235990529
         F1 score: 0.9741879708534025
```

Using the eta generation of taking categories X dictionary length and counting the frequencies per category, this model also exceeded the precision score in the assignment description.

3. Predicting the categories of newly web scraped articles from the BBC

Out[13]:

	text	type
0	b'EU signs US gas deal to curb reliance on Rus...	business
1	b'US jobless claims at lowest level since 1969...	business
2	b'Calls for P&O Ferries boss Peter Hebblethwai...	business
3	b"'Watch: Beyonc\xc3\xa9's Oscar performance in...	entertainment
4	b'Charity boss on her thoughts for Jada Pinket...	entertainment
5	b'Colin Paterson: I\'m amazed Smith came to th...	entertainment
6	b'Ukraine: No Russia regime change plans, says...	politics
7	b'Ukraine not alone in fight against Russia, s...	politics
8	b'South Sudan forces withdraw from VP Machar\'...	politics
9	b'Joe Root wants to stay as England captain de...	sport
10	b'Women\'s World Cup: England had \'belief\' i...	sport
11	b'Ashleigh Barty retires: Her time at the top ...	sport
12	b'Russia hacked Ukrainian satellite communicat...	tech
13	b'Europe agrees new law to curb Big Tech domin...	tech
14	b'Mobile loophole for gaming drivers is closed...	tech

Here is a snapshot of the preprocessed data from the new articles.

```
correct = 0
incorrect = 0

for n in range(len(check_class)):

    if check_class[n] == num_lab[n]:
        print("Article predicted correctly!")
        correct += 1
    elif check_class[n] != num_lab[n]:
        print("Article predicted incorrectly.")
        incorrect += 1
print("\nNumber of new articles predicted correctly: {}".format(correct))
print("\nNumber of new articles predicted incorrectly: {}".format(incorrect))
```

```
Article predicted correctly!
Article predicted correctly!
Article predicted incorrectly.
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted correctly!
Article predicted incorrectly.
Article predicted correctly!
Article predicted correctly!

Number of new articles predicted correctly: 13

Number of new articles predicted incorrectly: 2
```

Code snippet and results of new article prediction. Model 2 only incorrectly predicted two of the fifteen new articles.