Assessing the national variations in political sentiments using Twitter data – A case of Scottish independence

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In the three and half years since the Brexit referendum, the discussions around Scotland’s independence, dampened momentarily by a failed referendum in 2014, has been reinvigorated by the ‘certainty’ of Brexit, thanks to the outcome of last UK general election. A significant amount of these discussions take place on Twitter where people are able to voice their own opinion, free-of-censorship. To data analysts, Twitter provides a valuable source of diverse range of political sentiments subject on Scottish referendum. To date however, sentiment analysis of the Twitter data have focused on the entire United Kingdom in unison, minimizing the ability to reveal the variation of those political sentiments across the constituent nations, namely the England, Scotland, Wales, and Northern Ireland. The nation-based analysis has never been more necessary, when nationalist sentiments are on the rise across each nation, even in Northern Ireland which voted overwhelmingly to remain in the EU. This article provides a glimpse into the variances in the political sentiments about the Scottish referendum prior to the UK exiting the EU on the 31st January 2020.

Using the public twitter API and geospatial (GIS) techniques, I scrapped any tweets that include any of the hashtags: ‘Indiref’, ‘indiref2’, ‘scottishreferendum’, ‘scottishref’, and ‘Scottishindependence’. The data covers the last three weeks before January 31st, producing a total of 1.3 million tweets. In Figure 1, the bar chart shows the density of the ‘tweets’, ‘retweet’ and ‘replies’ across each nation. Scotland carries the largest number of tweets on brexit… The chart indicate a significant inequality in the tweet density with Scotland and England 90% being generated from Scotland, followed by scotland.. .

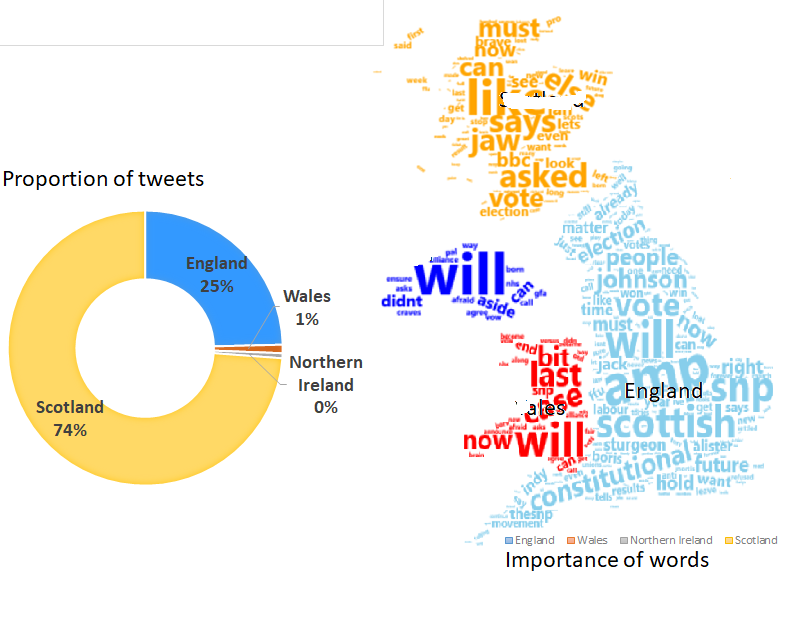
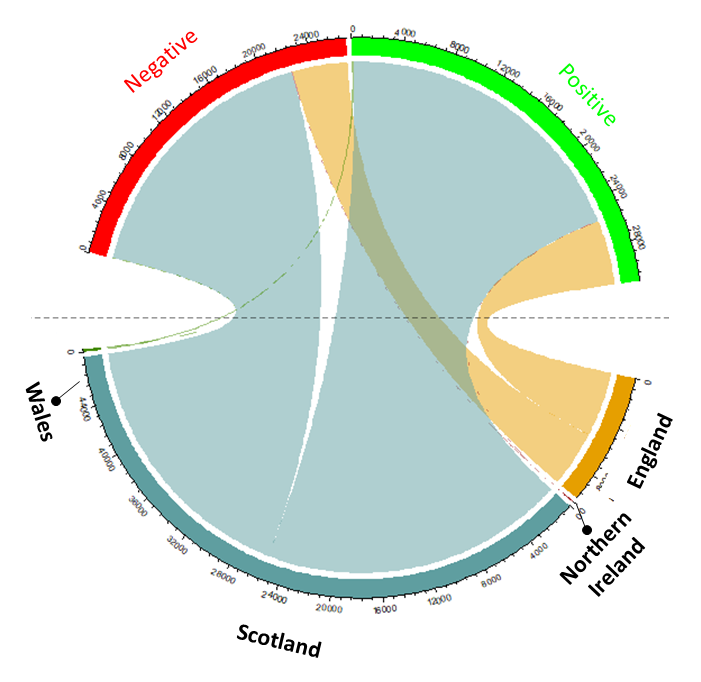


Figure 1. Proportion of tweets and the importance of words tweeted

Figure 1 illustrates the relative important of terminologies been used in the tweets within each country. The ‘importance’, represented by the font size is quantified in terms of the number of times a word has appeared across all tweets. In Scotland, words, such as are most frequently used and they all have almost equal importance. This implies that the discussions around the referendum are very focussed. This is followed by England with higher variances in the importances. Both Wales and . Northern Ireland has the highest variances.

Fig. 1.



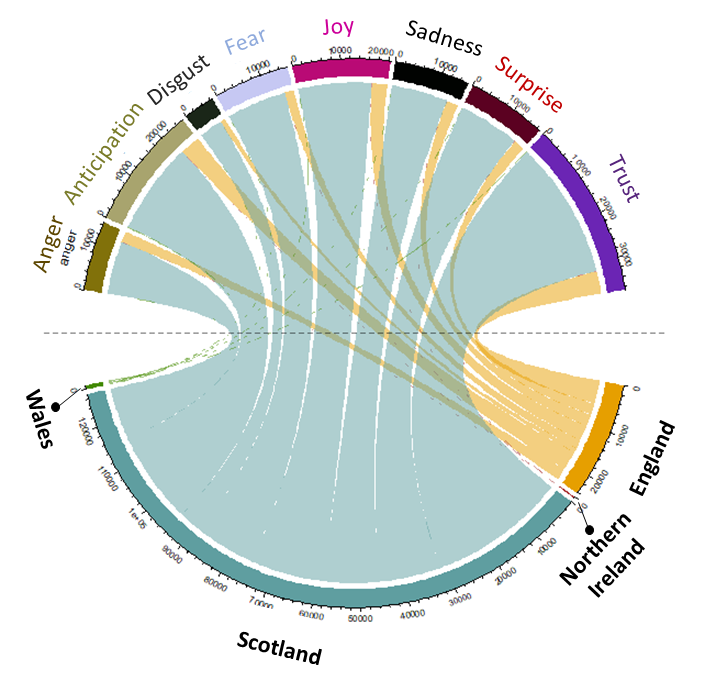


Fig. 2. Sentiments across the countries

I employ a naïve Bayes classifier technique to classify the tweets in different types of emotion: anger, disgust, fear, joy, sadness, and surprise.

The Topic analysis is used to examine the type of adjacent is most common in the tweets of each nation. Figure 1 maps the top 10 words. It can be seen that appears in the top 5, only 1 appear in top 1.

Comparing the polarity of expressions

it extracts the polarity of the expressed opinion in a range spanning from positive to negative. As a result, one may also refer to sentiment analysis as opinion mining (Pang and Lee 2008).

### **Comparison Cloud**

A comparison cloud compares the relative frequency with which a term was used in two or more documents. It does not simply merge two word clouds. Rather, it plots the difference between the word usage in the documents. For example, in 2008, President Bush used the word “america” 30 times. In 2016, President Obama used it 21 times. In the word cloud below, “america” is printed on President Bush’s side with a frequency of 9. It does not appear at all on President Obama’s side because it is “cancelled out.” So this shows you that President Bush used the word “america” more.

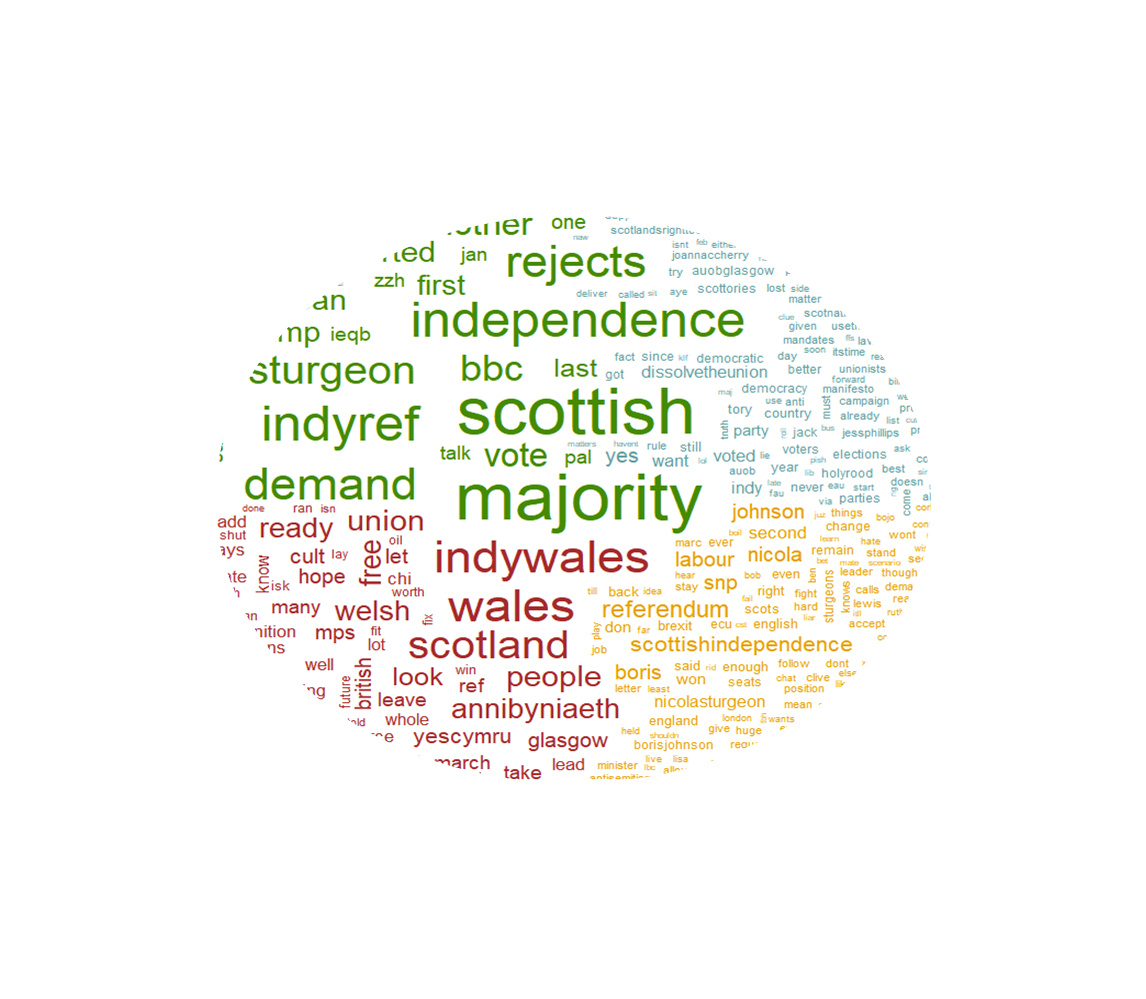
The comparison.cloud() function takes as an argument the Term Document Matrix created above with separate columns for each document. The rest of the arguments are for customization.

From the comparison cloud, we can see that issues like Iraq were more front-and-center in 2008 than in 2016. We also see ISIL, which didn’t exist (at least by that name) in 2008, pop up in President Obama’s speech. “Change” was used more by President Obama and, interestingly, “hope” was used more often in President Bush’s 2008 speech.

par(mfrow=c(1,1))

comparison.cloud(tdm, random.order=FALSE, colors = c("indianred3","lightsteelblue3"),

title.size=2.5, max.words=400)



### **Commonality Cloud**

The commonality cloud is the complement to the comparison cloud. It shows only those words that appear in all documents and their combined frequency across documents. A commonality cloud is useful for showing the amount of conceptual overlap between two documents.

It’s understandable that all presidents would use words like “people” and “america.” Perhaps most interesting here is that the commonality cloud makes it obvious that the SOTU is about the “future,” “american” and “world” issues, and “new” proposals. Also prominent are words like “security” which at least for the recent past has been a hot topic.

**library**(RColorBrewer)

commonality.cloud(tdm, random.order=FALSE, scale=c(5, .5),colors = brewer.pal(4, "Dark2"), max.words=400)

Expanded sentiments

* It can classify emotions (anger, disgust, fear, joy, sadness, surprise); trained using Naive Bayes on a dataset of approximately 1500 words [Carlo Strapparava and Alessandro Valitutti, “WordNet-Affect: an affective extension of WordNet”. In Proceedings of the 4th International Conference on Language Resources and Evaluation (LREC 2004), Lisbon, May 2004, pp. 1083-1086].
* It can also classify polarity (positive/negative); trained using Naive Bayes classifier on Janyce Wiebe’s subjectivity lexicon [Riloff and Wiebe (2003). Learning extraction patterns for subjective expressions. EMNLP-2003].

The sentiment analysis is conducted using text mining techniques. For a comprehensive analysis, we employ the three different sentiment lexicons (‘bing’, ‘abing’ and ‘other’) in order to map the tones and emotion of the tweets. Each dictionary contains starts by comparing relative number tweets with of positive, negative and neutral sentiments. We can see that ..

With nationalist sentiments appearing to be on the rise, particularly in Northern Ireland and Wales, the national level analysis has better potentials to highlights the sentiments of the people on the state of the union.

Which which originated from

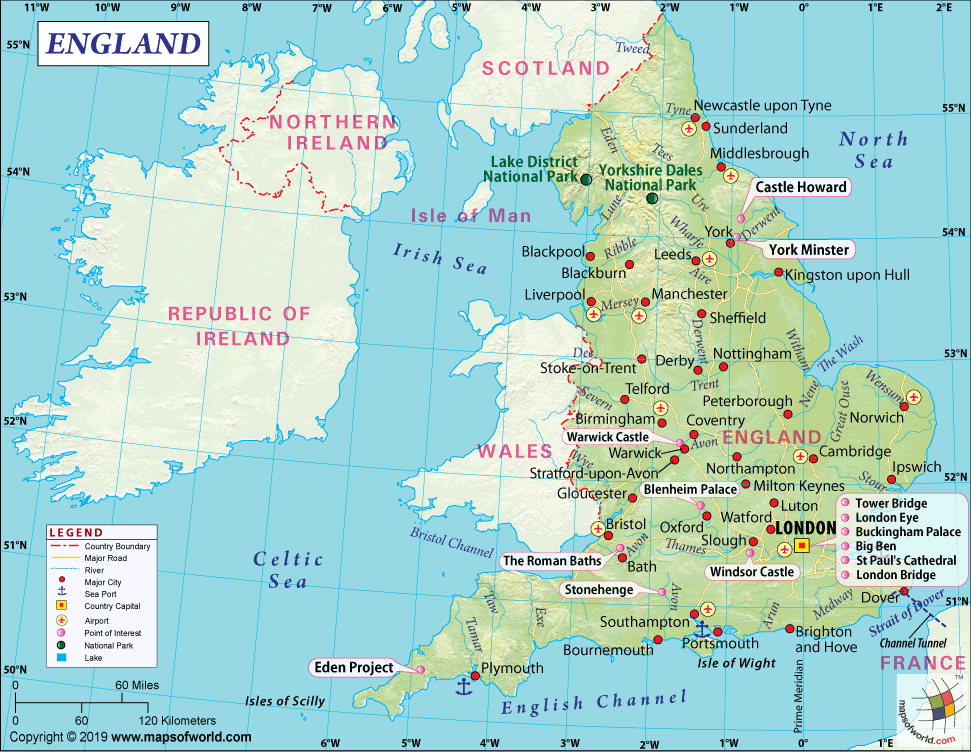
I then employ used another sentiment lexison to generate a much richer categorization of the tweets for each nation.

In order to examine the actual topics that people discussion, we mapped out most common words in the tweets. Most common words

Histograme on 3d map

Although Scottish referendum is

Shows that independence.



amount of discussion. , which shows that most of the discussion. is a chart showing relative size of the positive and negative tweets in each constituent nations (i.e. England, Scotland, Wales, and Northern Ireland), that made up the United Kingdom. This is further In Figure 2 which shows the , the relative number of tweets relating to . The generalization of . the concern may be different.

Sentiment

. Further complicated by the cated In particular, now that the U.K. is leaving the EU – an outcome that was overwhelmingly rejected in Scotland and Northern Ireland - some have raised the question of whether the status quo can be begun to question whether devolved powers alone are enough.

tweet evident that a wide variety of perspectives will be provided.

point of view

for example, calls for a similar referendum, particularly in Northern Ireland and Wales, has been on the increase in each nation, it is apparent that

It has become imperative that sentiment regarding Scottish referendum may vary. This require an indepth nation-based analysis

Call for sIn each nation tweets references With the nationalist sentiments in each nation, particularly in Wales and Northern Ireland, appearing to be rising, references are being made to the Scottish referendum.

Referencing Scottish referendum, certain nationalist sentiments appear to be rising, even in WalesMany

Clearly taking precedence

It is known that there have been calls for a similar poll in Northern Ireland with references to the Scottish referendum. have been , which would raise the [prospect of reunification](https://www.theatlantic.com/international/archive/2019/10/ireland-britain-brexit-reunification/600328/) with the Republic of Ireland, have grown. Even in Wales—which, unlike Scotland and Northern Ireland, favored leaving the EU—nationalist sentiment appears to be [increasing](https://www.politicshome.com/news/uk/uk-regions/wales/news/106511/shock-poll-reveals-four-ten-welsh-voters-would-back).

Hope

Asfdl

Sfdasf

The United Kingdom is made up of four nations: England, Scotland, Wales, and Northern Ireland. Since the first Calls for a similar poll in Northern Ireland, which would raise the [prospect of reunification](https://www.theatlantic.com/international/archive/2019/10/ireland-britain-brexit-reunification/600328/) with the Republic of Ireland, have grown. Even in Wales—which, unlike Scotland and Northern Ireland, favored leaving the EU—nationalist sentiment appears to be [increasing](https://www.politicshome.com/news/uk/uk-regions/wales/news/106511/shock-poll-reveals-four-ten-welsh-voters-would-back). Which participation across different nations, with some .. .. .

In the three and half years since the Brexit referendum, Scotland’s independence movement, which was dampened momentarily by a failed referendum in 2014 (Indiref1), has been reinvigorated with the certainty of Brexit. Debate

However, Although, most of the sentiment analysis to date have focused on without looking at the national variation across the country. This article provides

, researchers in the analysis of the subject of Scottish referendum. Whist the referendum issue is an issue of national

political sentiments around the country. However, sentiment analysis

source to gain insights into the

of on the issues of Scottish referendum. Whilst a number of analysis of the political sentiment have the sentiment analysis of these tweets data analysts have provided sentiment analysis of politicallymotivated tweets, limited attention has been paid to how the output might vary in relation to each constituent geographical contexts.

around issues that have dominated political discussion within the last five years, such as

have do so by analyzing all data together, ignoring the significance of constituent nations.

Limited attention.

the data of the entire country considering the entire United Kingdom in Unision.

of national interests, including as Brexit, general elections, and Scottish referendum. Dominated political discussion within the last 5 years.

To provide Political analysts have used twitter contents to provide general analysis on people’s services analyse to gain insights into which may be valuable for campaigning prediction and policy decisions. attempted informing real decision making. Gain valuable insights Whilst the analysis of tweets relating to these issues have focused on the entire Unison

one of the most widely used social media platforms for voicing political sentiments about issues of national concerns in the UK. In the last three yearsThe body of content available on Twitter provides a valuable channel into a diverse range of political sentiments and commentaries amongst the citizens.

An open research question is how might we analyse this data to produce results that approximate what can be achieved through traditional market research.

In recent years, . . . . .The body of content available on Twitter provides a valuable channel into a diverse range of political sentiments and commentaries amongst the citizens.

Iincreasingly being used election campaign

A great source of political insights and commentary.

Nowadays, the body of content available on social media has provided the opportunity to analyse a diverse range of political opinion and commentary.valuable platform for voicing political opinion, though the use of hashtags

Valuable window into

Out of c0ncern for National unity or motivated for . . Sentiment national movement in each nation.

Provided a window into a diverse range of political opinion about issues of national interest. Such is are the hashtags relating to the Scottish referendum

Nowadays, social media has become a major source of political sentiments voicing political opinion been the easiest means has taken a wide range of channels

Has become a major source of political sentiments around the world.

Channel for voicing political opinion around the world.

The United Kingdom is made up of four nations: England, Scotland, Wales, and Northern Ireland. In the three and half years since the Brexit referendum, Scotland’s independence movement, which was dampened momentarily by a failed referendum in 2014 (Indiref1), has been reinvigorated with the certainty of Brexit. Debate

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Abstract

The field of text sentiment analysis provides a unique indication of the electorate's response towards political issues. The topic of social media campaigns has grown in interest as political decisions appear to have hung on these strategies of outreach to the electorate. We address this question by making use of a sentiment analysis lexicon, which specifically analyse microblog corpora, and statistical methods for temporal analysis. This approach was utilised to analyse the Facebook pages of the Leave campaign and the largest Remain advocacy group on social media for the UK-EU membership referendum of 2016, to test the hypothesis that sentiment is contagious through social media, and enquire if emotion acts as the backbone of the electorate's decision. Our findings suggest that contrary to popular belief, the Leave campaign Facebook audience of Facebook followers became no more positive after the initial sentiment spike of the referendum results, and moreover sentiment polarized in the negative scale. Additionally, the sentiment expressed by the Leave campaign statuses was not significantly higher but was maintained more continuously in the lead up to the referendum date. The implications of these findings are that a successful political campaign through social media requires constant maintenance and coverage for followers to experience a continuous news-stream as described in the relevant literature. Lastly, we discuss the use of microblogging message content as a valid gauge of political sentiment and glean suggestions for further research

Political opinions has transcended the mainstream channels, such is the Scottish referendum, which is being discussed under the various hashtags such as ‘indiref1’, scotref etc.

has never gained so much momentum than now, when it almost certain that the UK will leave the EU. Debates

#Indiref2: Mapping the political sentiments across the United Kingdoms

How sentiments on Scottish referendum vary across the United Kingdom.

which was stymied by a failed referendum in 2014,[has resurfaced](https://www.theatlantic.com/international/archive/2017/04/scotland-sturgeon-may-brexit-britain-independence/523623/).