

```

1 /Users/nelsonquintanilla/.conda/envs/dissertation/bin/python /Users/nelsonquintanilla/
  Documents/repos/nfq160/dissertation/main.py
2 Console output is saving to: /Users/nelsonquintanilla/Documents/repos/nfq160/
  dissertation/console_logs
3 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
  builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
  importlib and slated for removal in Python 3.12; see the module's documentation for
  alternative uses
4     from imp import reload
5
6 Data before pre-processing
7 Number of articles: 2275
8 Average word count per article: 864 words
9
10 Normalisation and tokenization
11
12 Stop Words Removal 1
13
14 stop_words: {'thereupon', 'couldn\'t', 'often', "should've", 'top', 'further', 'shouldn\'t', 'since', 'thru', 'hence', 'side', 'amoungst', 'one', 'is', "you'd", 'being', 'just', 'up', 'against', 'down', 'into', 'during', 'made', 'show', 'your', 'should', 'whom', "wouldn't", 'and', 'system', 'after', 'anyway', 'although', 'five', 'own', 'therefore', 'nine', 'now', 'enough', 'along', 'our', "'ve", 'something', 've', 'find', 'where', 'used', 'if', 'de', 'while', 'least', 'due', 'for', "'ll", 'latterly', 'to', "didn't", 'behind', 'go', "wasn't", 'doesn\'t', 'could', 'from', 'because', "needn't", 'indeed', 'whole', 'becoming', 'others', 'though', 'whoever', 'it', 'eg', 'she', 'former', 'hasn', 'below', 'forty', 'say', 'ukrainian', 'much', 'don', "mightn't", 'hadn', 'aren', 'call', 'very', 'get', 'ourselves', 'there', 'six', 'amount', 'him', "hasn't", 'nowhere', 'do', 'rather', 'throughout', 'un', 'four', 'mostly', 'describe', 'seem', 'needn', 'third', 'part', 'their', 'us', 'see', 'ltd', 'another', "n't", 'next', 'under', 'hereupon', 'then', 'somehow', 'at', 'various', 'well', 'nothing', 'anywhere', 'cry', 'everyone', 'yourselves', 'are', 'whether', "'ll", 'ie', 'whatever', 'neither', 'why', 'other', 'shouldn\'t', 'weren', 'was', 'name', 'fifty', 'russian', 'wouldn', 'an', 'did', 'seemed', 'anyone', 'who', 'without', 'both', 'twenty', 'them', 'few', 'its', 'hundred', 'wasn', 'must', 'you', 'hereby', 'meanwhile', 'ours', 'mustn', 'of', 'co', 're', 'this', "'s", 'theirs', "isn't", 'mine', 'nevertheless', 'perhaps', "'ve", 'whereafter', 'would', 'sixty', 'twelve', 'ain', 'won', 'herself', "she's", "'re", 'whereas', 'never', 'on', "'m', 'fill', 'thereby', 'become', 'her', 'several', 'every', 'with', 'many', 'until', 'be', 'himself', 'always', 'whose', 'formerly', 'bottom', 'all', 'whence', 'per', "you'll", 'thick', 'y', 'such', 'everywhere', "ve", 'etc', 'hasnt', 'were', 'haven', 'any', 'by', 'however', "that'll", 'm', "couldn't", 'these', 'con', 'give', 'eight', 'toward', 'onto', 'when', 'n\'t', 'myself', 'unless', 'else', 'but', 'full', 'beyond', 'i', 'itself', 'inc', 'somewhere', 'within', 'd', 'keep', 'over', 'across', 'only', "you've", 'someone', 'ever', 'put', 'done', 'either', 'namely', 'becomes', 'mightn', 'please', 'seems', 'yours', 'eleven', "'d", 'sincere', 'wherein', "won't", 'hadn\'t', 'herein', 'wherever', 'been', 'move', 'most', 'here', 'so', 'as', 'the', 'around', 'anything', 'even', 'cannot', 'yet', 'also', 'thence', 'noone', "don't", 'otherwise', "'ll", 'a', 'alone', "'s", 'afterwards', 'none', 'ca', 'me', 'does', 'people', 'he', 'o', 'interest', 'city', 'still', 'via', 'will', 'take', "haven't", 'front', 'what', 'beside', 'together', 'became', 'cant', 'shan', 'between', 'than', 'beforehand', 'less', "'d", 'except', 'elsewhere', 'can', 're', 'ma', 'once', 'more', 'quite', 'am', 'russia', 'again', 'how', 'same', 'didn', 'amongst', 'thin', 'latter', 'my', 'themselves', 'too', 'off', 'has', 'ten', 's', 'about', 'couldnt', 'ukraine', 'besides', 'back', 'two', 'detail', 'found', "shan't", 'thereafter', 'seeming', "'re", 'hers', 'weren\'t', 'those', 'nobody', 'some', 'really', 'that', "'m", "aren't", 'first', 'using', 'upon', 'sometime', 'thus', 'whenever', 'sometimes', 'out', 'hereafter', "'s", "you're", 'n\'t', 'whereupon', 'make', 'in', 'they', 'anyhow', 'therein', 'whereby', 't', ' '

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14 empty', 'which', 'may', 'nor', 'last', 'or', 'among', 'have', 'fifteen', 'serious', 'towards', 'doing', 'regarding', 'isn', 'might', 'having', "it's", 'war', 'each', "mustn't", 'three', 'everything', 'through', 'mill', 'above', 'had', 'his', 'almost', "'d", 'not', 'moreover', 'before', 'bill', 'no', 'fire', "'m", 'already', 'whither', 'yourself', 'we', 'll'}
```

15 stops words length: 416

16 total of words, stop words removal 1: 943911

17

18 Lemmatisation

19 total of words, lemmatisation: 943938

20

21 Stop Words Removal 2

22 total of words, stop words removal 2: 902254

23

24 Transform the documents to a vectorized form

25

26 Number of tokens and documents to train

27 Number of unique tokens: 31479

28 Number of documents: 2275

29

30 Building the Topic Model

31

32 Training model for 2

33 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of importlib and slated for removal in Python 3.12; see the module's documentation for alternative uses

34 from imp import reload

35 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of importlib and slated for removal in Python 3.12; see the module's documentation for alternative uses

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46 from imp import reload
47
48 Training model for 4
49 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
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importlib and slated for removal in Python 3.12; see the module's documentation for
alternative uses
62 from imp import reload
63
64 Training model for 6
65 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
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66 from imp import reload
67 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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71 importlib and slated for removal in Python 3.12; see the module's documentation for
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72     from imp import reload
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builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
alternative uses
78     from imp import reload
79
80 Training model for 8
81 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
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82     from imp import reload
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importlib and slated for removal in Python 3.12; see the module's documentation for
alternative uses
94     from imp import reload
95
96 Training model for 10
```

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97 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
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builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
alternative uses
110    from imp import reload
111
112 Training model for 12
113 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
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114    from imp import reload
115 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
alternative uses
126     from imp import reload
127
128 Training model for 14
129 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
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142     from imp import reload
143
144 View the topics in LDA mode
145
146 Topics for a model trained for 2 number of topics
147 [(0,
```

```

148  '0.006*"country" + 0.005*"putin" + 0.005*"year" + 0.005*"government" + '
149  '0.005*"sanction" + 0.005*"eu" + 0.004*"minister" + 0.003*"gas" + '
150  '0.003*"world" + 0.003*"uk"' ),
151 (1,
152  '0.008*"force" + 0.006*"kyiv" + 0.006*"military" + 0.005*"country" + '
153  '0.004*"day" + 0.004*"putin" + 0.004*"attack" + 0.004*"moscow" + '
154  '0.004*"civilian" + 0.004*"zelenskiy"' ])
155
156 Topics for a model trained for 4 number of topics
157 [(0,
158  '0.007*"country" + 0.006*"year" + 0.006*"eu" + 0.005*"gas" + '
159  '0.005*"minister" + 0.005*"government" + 0.004*"china" + 0.004*"putin" + '
160  '0.004*"energy" + 0.004*"sanction"' ),
161 (1,
162  '0.007*"putin" + 0.006*"uk" + 0.005*"year" + 0.005*"government" + '
163  '0.005*"country" + 0.005*"family" + 0.004*"home" + 0.004*"work" + '
164  '0.004*"come" + 0.004*"refugee"' ),
165 (2,
166  '0.008*"company" + 0.007*"sanction" + 0.004*"abramovich" + 0.004*"year" + '
167  '0.004*"include" + 0.003*"yacht" + 0.003*"time" + 0.003*"country" + '
168  '0.003*"bank" + 0.003*"port"' ),
169 (3,
170  '0.010*"force" + 0.008*"military" + 0.007*"kyiv" + 0.005*"attack" + '
171  '0.005*"country" + 0.005*"civilian" + 0.005*"zelenskiy" + 0.005*"defence" + '
172  '0.004*"region" + 0.004*"day"' ])
173
174 Topics for a model trained for 6 number of topics
175 [(0,
176  '0.007*"year" + 0.006*"china" + 0.006*"country" + 0.004*"party" + '
177  '0.004*"government" + 0.004*"macron" + 0.004*"world" + 0.004*"right" + '
178  '0.004*"new" + 0.004*"minister"' ),
179 (1,
180  '0.006*"year" + 0.006*"putin" + 0.006*"day" + 0.005*"leave" + 0.004*"time" + '
181  '0.004*"like" + 0.004*"family" + 0.004*"country" + 0.004*"come" + '
182  '0.004*"work"' ),
183 (2,
184  '0.004*"year" + 0.003*"country" + 0.003*"church" + 0.003*"time" + '
185  '0.003*"know" + 0.003*"work" + 0.003*"syria" + 0.003*"island" + 0.003*"day" '
186  '+ 0.003*"ship"' ),
187 (3,
188  '0.012*"force" + 0.009*"military" + 0.008*"kyiv" + 0.006*"attack" + '
189  '0.005*"civilian" + 0.005*"zelenskiy" + 0.005*"region" + 0.005*"defence" + '
190  '0.005*"moscow" + 0.005*"country"' ),
191 (4,
192  '0.013*"sanction" + 0.010*"putin" + 0.008*"company" + 0.006*"include" + '
193  '0.006*"uk" + 0.005*"government" + 0.005*"state" + 0.005*"abramovich" + '
194  '0.005*"crime" + 0.004*"invasion"' ),
195 (5,
196  '0.012*"eu" + 0.010*"country" + 0.009*"uk" + 0.009*"gas" + 0.008*"nato" + '
197  '0.007*"government" + 0.007*"minister" + 0.006*"sanction" + 0.006*"european" '
198  '+ 0.006*"putin"' ])
199
200 Topics for a model trained for 8 number of topics
201 [(0,
202  '0.006*"year" + 0.006*"country" + 0.006*"world" + 0.005*"minister" + '
203  '0.004*"food" + 0.004*"grain" + 0.004*"new" + 0.003*"party" + 0.003*"crisis" '
204  '+ 0.003*"time"' ),

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205 (1,
206   '0.006*"putin" + 0.006*"year" + 0.006*"day" + 0.005*"leave" + 0.005*"time" + '
207   '0.004*"country" + 0.004*"like" + 0.004*"come" + 0.004*"know" + '
208   '0.004*"want"'),
209 (2,
210   '0.004*"syria" + 0.004*"country" + 0.004*"year" + 0.003*"train" + '
211   '0.003*"work" + 0.003*"day" + 0.003*"ship" + 0.003*"time" + 0.003*"syrian" + '
212   '0.003*"taliban"'),
213 (3,
214   '0.013*"force" + 0.008*"military" + 0.008*"kyiv" + 0.006*"zelenskiy" + '
215   '0.006*"attack" + 0.006*"civilian" + 0.005*"defence" + 0.005*"region" + '
216   '0.005*"country" + 0.005*"moscow"'),
217 (4,
218   '0.016*"sanction" + 0.011*"putin" + 0.009*"company" + 0.007*"include" + '
219   '0.006*"uk" + 0.005*"abramovich" + 0.005*"crime" + 0.005*"government" + '
220   '0.005*"asset" + 0.005*"state"'),
221 (5,
222   '0.014*"uk" + 0.011*"nato" + 0.010*"eu" + 0.010*"country" + 0.009*"refugee" +
223   '+ 0.008*"government" + 0.007*"minister" + 0.006*"support" + 0.006*"visa" +
224   '0.006*"home"'),
225 (6,
226   '0.013*"gas" + 0.008*"energy" + 0.007*"country" + 0.007*"macron" + '
227   '0.007*"germany" + 0.007*"eu" + 0.007*"year" + 0.006*"oil" + '
228   '0.005*"government" + 0.005*"price"'),
229 (7,
230   '0.014*"china" + 0.006*"military" + 0.006*"medium" + 0.005*"invasion" + '
231   '0.005*"chinese" + 0.004*"taiwan" + 0.004*"country" + 0.004*"state" + '
232   '0.004*"government" + 0.004*"report")]
```

233

```

234 Topics for a model trained for 10 number of topics
235 [(0,
236   '0.008*"country" + 0.006*"world" + 0.006*"minister" + 0.006*"grain" + '
237   '0.005*"year" + 0.005*"food" + 0.004*"export" + 0.004*"president" + '
238   '0.004*"global" + 0.004*"leader"'),
239 (1,
240   '0.013*"putin" + 0.006*"country" + 0.006*"year" + 0.005*"soviet" + '
241   '0.005*"world" + 0.004*"nuclear" + 0.004*"moscow" + 0.004*"time" + '
242   '0.004*"invasion" + 0.004*"state"'),
243 (2,
244   '0.005*"country" + 0.004*"year" + 0.004*"syria" + 0.004*"ship" + '
245   '0.003*"syrian" + 0.003*"time" + 0.003*"assad" + 0.003*"work" + '
246   '0.003*"taliban" + 0.003*"art"'),
247 (3,
248   '0.013*"force" + 0.009*"military" + 0.008*"kyiv" + 0.006*"zelenskiy" + '
249   '0.006*"attack" + 0.006*"civilian" + 0.006*"defence" + 0.006*"region" + '
250   '0.005*"country" + 0.005*"moscow"'),
251 (4,
252   '0.018*"sanction" + 0.011*"putin" + 0.010*"company" + 0.007*"include" + '
253   '0.007*"uk" + 0.006*"abramovich" + 0.005*"asset" + 0.005*"government" + '
254   '0.005*"bank" + 0.005*"state"'),
255 (5,
256   '0.015*"uk" + 0.011*"eu" + 0.011*"nato" + 0.010*"country" + 0.010*"refugee" +
257   '+ 0.009*"government" + 0.008*"minister" + 0.006*"support" + 0.006*"visa" +
258   '0.006*"home"'),
259 (6,
260   '0.013*"gas" + 0.009*"energy" + 0.007*"macron" + 0.007*"year" + '
261   '0.007*"country" + 0.007*"eu" + 0.006*"oil" + 0.006*"germany" + '
```

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262   '0.006*"government" + 0.005*"price"' ),
263 (7,
264   '0.014*"china" + 0.006*"medium" + 0.006*"military" + 0.006*"invasion" + '
265   '0.005*"chinese" + 0.005*"report" + 0.005*"taiwan" + 0.005*"country" + '
266   '0.005*"state" + 0.005*"government"' ),
267 (8,
268   '0.009*"day" + 0.007*"leave" + 0.007*"year" + 0.006*"child" + 0.006*"family" '
269   '+ 0.006*"home" + 0.005*"like" + 0.005*"time" + 0.005*"come" + 0.005*"know"' ),
270 (9,
271   '0.009*"rape" + 0.008*"genocide" + 0.007*"court" + 0.007*"icc" + '
272   '0.007*"crime" + 0.006*"medvedchuk" + 0.005*"sexual" + 0.005*"case" + '
273   '0.005*"zelenskiy" + 0.004*"international"' ])
274
275 Topics for a model trained for 12 number of topics
276 [(0,
277   '0.011*"grain" + 0.009*"food" + 0.009*"country" + 0.007*"world" + '
278   '0.007*"export" + 0.006*"port" + 0.005*"global" + 0.005*"year" + 0.005*"sea" '
279   '+ 0.005*"minister"' ),
280 (1,
281   '0.011*"putin" + 0.006*"country" + 0.006*"year" + 0.005*"soviet" + '
282   '0.004*"moscow" + 0.004*"world" + 0.004*"time" + 0.004*"nuclear" + '
283   '0.004*"state" + 0.004*"invasion"' ),
284 (2,
285   '0.008*"syria" + 0.007*"syrian" + 0.005*"ship" + 0.005*"assad" + '
286   '0.004*"country" + 0.004*"taliban" + 0.004*"year" + 0.004*"know" + '
287   '0.003*"day" + 0.003*"man"' ),
288 (3,
289   '0.014*"force" + 0.009*"military" + 0.009*"kyiv" + 0.006*"attack" + '
290   '0.006*"civilian" + 0.006*"region" + 0.006*"defence" + 0.005*"zelenskiy" + '
291   '0.005*"moscow" + 0.005*"mariupol"' ),
292 (4,
293   '0.020*"sanction" + 0.012*"company" + 0.011*"putin" + 0.009*"uk" + '
294   '0.007*"include" + 0.007*"abramovich" + 0.006*"asset" + 0.006*"bank" + '
295   '0.006*"government" + 0.005*"business"' ),
296 (5,
297   '0.017*"eu" + 0.016*"uk" + 0.012*"nato" + 0.011*"country" + 0.010*"refugee" '
298   '+ 0.010*"government" + 0.009*"minister" + 0.007*"european" + 0.007*"visa" + '
299   '0.007*"support"' ),
300 (6,
301   '0.013*"gas" + 0.009*"energy" + 0.008*"year" + 0.008*"macron" + '
302   '0.006*"government" + 0.006*"country" + 0.006*"germany" + 0.006*"price" + '
303   '0.006*"le" + 0.005*"oil"' ),
304 (7,
305   '0.017*"china" + 0.007*"medium" + 0.007*"military" + 0.006*"taiwan" + '
306   '0.006*"chinese" + 0.006*"government" + 0.005*"invasion" + 0.005*"country" + '
307   '0.005*"report" + 0.005*"beijing"' ),
308 (8,
309   '0.006*"year" + 0.006*"child" + 0.005*"johnson" + 0.005*"time" + '
310   '0.004*"school" + 0.004*"day" + 0.004*"come" + 0.004*"work" + 0.004*"like" + '
311   '0.004*"week"' ),
312 (9,
313   '0.021*"crime" + 0.018*"prosecutor" + 0.014*"rape" + 0.010*"icc" + '
314   '0.009*"case" + 0.008*"body" + 0.008*"sexual" + 0.007*"evidence" + '
315   '0.007*"investigation" + 0.007*"woman"' ),
316 (10,
317   '0.012*"putin" + 0.009*"president" + 0.007*"country" + 0.007*"zelenskiy" + '
318   '0.005*"leader" + 0.005*"minister" + 0.004*"biden" + 0.004*"invasion" + '

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319   '0.004*"world" + 0.004*"foreign"' ),
320   (11,
321     '0.008*"day" + 0.007*"leave" + 0.006*"family" + 0.006*"year" + 0.006*"home" +
322     '+ 0.005*"like" + 0.005*"come" + 0.005*"child" + 0.004*"time" +
323     '0.004*"know"' )
324
325 Topics for a model trained for 14 number of topics
326 [(0,
327   '0.012*"grain" + 0.010*"food" + 0.010*"country" + 0.008*"world" +
328   '0.008*"export" + 0.007*"port" + 0.006*"global" + 0.005*"sea" + 0.005*"year" +
329   '+ 0.005*"deal"' ),
330   (1,
331     '0.012*"putin" + 0.006*"country" + 0.006*"year" + 0.006*"soviet" +
332     '0.005*"moscow" + 0.005*"world" + 0.004*"nuclear" + 0.004*"time" +
333     '0.004*"invasion" + 0.004*"state"' ),
334   (2,
335     '0.007*"syria" + 0.006*"church" + 0.005*"syrian" + 0.005*"assad" +
336     '0.004*"ship" + 0.004*"country" + 0.004*"know" + 0.004*"year" + 0.004*"day" +
337     '+ 0.003*"man"' ),
338   (3,
339     '0.014*"force" + 0.009*"military" + 0.009*"kyiv" + 0.007*"attack" +
340     '0.006*"civilian" + 0.006*"defence" + 0.006*"region" + 0.006*"zelenskiy" +
341     '0.006*"moscow" + 0.005*"country"' ),
342   (4,
343     '0.015*"sanction" + 0.012*"company" + 0.011*"putin" + 0.010*"abramovich" +
344     '0.007*"uk" + 0.006*"include" + 0.005*"asset" + 0.005*"yacht" + 0.005*"link" +
345     '+ 0.005*"government"' ),
346   (5,
347     '0.019*"uk" + 0.017*"refugee" + 0.014*"nato" + 0.012*"government" +
348     '0.011*"visa" + 0.010*"country" + 0.009*"home" + 0.009*"finland" +
349     '0.008*"family" + 0.007*"sweden"' ),
350   (6,
351     '0.012*"gas" + 0.010*"macron" + 0.009*"energy" + 0.008*"year" + 0.007*"le" +
352     '0.007*"germany" + 0.006*"pen" + 0.006*"party" + 0.006*"vote" +
353     '0.006*"france"' ),
354   (7,
355     '0.017*"china" + 0.007*"medium" + 0.007*"military" + 0.006*"taiwan" +
356     '0.006*"chinese" + 0.005*"government" + 0.005*"invasion" + 0.005*"country" +
357     '0.005*"state" + 0.005*"report"' ),
358   (8,
359     '0.007*"child" + 0.006*"johnson" + 0.006*"year" + 0.005*"school" +
360     '0.005*"time" + 0.005*"day" + 0.004*"student" + 0.004*"like" + 0.004*"come" +
361     '+ 0.004*"tell"' ),
362   (9,
363     '0.032*"crime" + 0.020*"prosecutor" + 0.015*"rape" + 0.014*"court" +
364     '0.013*"case" + 0.012*"icc" + 0.009*"evidence" + 0.009*"investigation" +
365     '0.008*"criminal" + 0.008*"sexual"' ),
366   (10,
367     '0.011*"putin" + 0.008*"president" + 0.007*"country" + 0.007*"zelenskiy" +
368     '0.005*"biden" + 0.005*"leader" + 0.005*"minister" + 0.004*"nato" +
369     '0.004*"invasion" + 0.004*"support"' ),
370   (11,
371     '0.009*"day" + 0.007*"leave" + 0.006*"family" + 0.006*"year" + 0.006*"home" +
372     '+ 0.005*"soldier" + 0.005*"come" + 0.005*"old" + 0.005*"child" +
373     '0.005*"know"' ),
374   (12,
375     '0.021*"eu" + 0.017*"sanction" + 0.009*"country" + 0.009*"european" +

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376     '0.009*"oil" + 0.008*"putin" + 0.008*"uk" + 0.007*"minister" + '
377     '0.007*"government" + 0.006*"foreign"'),
378 (13,
379     '0.006*"year" + 0.005*"report" + 0.005*"time" + 0.004*"guardian" + '
380     '0.004*"new" + 0.004*"day" + 0.004*"covid" + 0.004*"story" + '
381     '0.004*"government" + 0.003*"good"')]
382
383 Compute Perplexity
384
385 Compute Topic Coherence Score
386 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
importlib and slated for removal in Python 3.12; see the module's documentation for
alternative uses
387     from imp import reload
388 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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404 importlib and slated for removal in Python 3.12; see the module's documentation for
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449 from imp import reload
450 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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450 builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
     importlib and slated for removal in Python 3.12; see the module's documentation for
     alternative uses
451     from imp import reload
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     builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
     importlib and slated for removal in Python 3.12; see the module's documentation for
     alternative uses
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     importlib and slated for removal in Python 3.12; see the module's documentation for
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     importlib and slated for removal in Python 3.12; see the module's documentation for
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     importlib and slated for removal in Python 3.12; see the module's documentation for
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     importlib and slated for removal in Python 3.12; see the module's documentation for
     alternative uses
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     importlib and slated for removal in Python 3.12; see the module's documentation for
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     builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
     importlib and slated for removal in Python 3.12; see the module's documentation for
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472 alternative uses
473     from imp import reload
474 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
    builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
        importlib and slated for removal in Python 3.12; see the module's documentation for
        alternative uses
475     from imp import reload
476 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
    builtins/misc.py:45: DeprecationWarning: the imp module is deprecated in favour of
        importlib and slated for removal in Python 3.12; see the module's documentation for
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        importlib and slated for removal in Python 3.12; see the module's documentation for
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483     from imp import reload
484 (list_index, number_topics, c_v_coherence, perplexity)
485 [(1, 2, 0.409897665518985, -8.187331355903876),
486 (2, 4, 0.4375290747071674, -8.1442822991621),
487 (3, 6, 0.4315833669209684, -8.114784829058024),
488 (4, 8, 0.40896485345567646, -8.115799308744018),
489 (5, 10, 0.4447006862875006, -8.110046096796106),
490 (6, 12, 0.46366106983519484, -8.112495287901943),
491 (7, 14, 0.4604767535691332, -8.114067678003286)]
492
493 Visualize the topics
494 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/pyLDAvis
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    /_prepare.py:247: FutureWarning: In a future version of pandas all arguments of
        DataFrame.drop except for the argument 'labels' will be keyword-only.
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874 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/pyLDAvis
     /_prepare.py:247: FutureWarning: In a future version of pandas all arguments of
     DataFrame.drop except for the argument 'labels' will be keyword-only.
875     by='saliency', ascending=False).head(R).drop('saliency', 1)
876 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/joblib/
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966
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