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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 total of words, stop words removal 1: 936803  
14  
15 Lemmatisation  
16 total of words, lemmatisation: 936830  
17  
18 Stop Words Removal 2  
19 total of words, stop words removal 2: 890414  
20  
21 Transform the documents to a vectorized form  
22  
23 Number of tokens and documents to train  
24 Number of unique tokens: 31492  
25 Number of documents: 2275  
26  
27 Building the Topic Model  
28  
29 Training model for 2  
30 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/  
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38 alternative uses
39     from imp import reload
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43     from imp import reload
44
45 Training model for 4
46 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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alternative uses
59     from imp import reload
60
61 Training model for 6
62 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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   importlib and slated for removal in Python 3.12; see the module's documentation for
   alternative uses
75   from imp import reload
76
77 Training model for 8
78 /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
     alternative uses
91     from imp import reload
92
93 Training model for 10
94 /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
      alternative uses
107     from imp import reload
108
109 Training model for 12
110 /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
alternative uses
123 from imp import reload
124
125 Training model for 14
126 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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139     from imp import reload
140
141 View the topics in LDA mode
142
143 Topics for a model trained for 2 number of topics
144 [(0,
145     '0.005*"government" + 0.004*"uk" + 0.004*"time" + 0.003*"come" + '
146     '0.003*"putin" + 0.003*"work" + 0.003*"new" + 0.003*"leave" + 0.003*"home" + '
147     '0.003*"family"'),
148 (1,
149     '0.008*"force" + 0.006*"military" + 0.006*"putin" + 0.005*"kyiv" + '
150     '0.005*"president" + 0.004*"moscow" + 0.004*"zelenskiy" + 0.004*"attack" + '
151     '0.004*"invasion" + 0.004*"defence")]
152
153 For model with k = 2
154 Document Topics for document # 2187 = [(1, 0.9983825)]
155 Document Topics for document # 272 = [(1, 0.99836856)]
156 Document Topics for document # 1107 = [(1, 0.9961287)]
157 Document Topics for document # 947 = [(0, 0.032171093), (1, 0.96782887)]
158 Document Topics for document # 525 = [(1, 0.99844813)]
159
160 Topics for a model trained for 4 number of topics
161 [(0,
162     '0.006*"uk" + 0.006*"government" + 0.004*"family" + 0.004*"home" + '
163     '0.004*"time" + 0.004*"work" + 0.004*"refugee" + 0.004*"company" + '
164     '0.003*"new" + 0.003*"come"'),
165 (1,
166     '0.010*"putin" + 0.006*"president" + 0.006*"military" + 0.005*"eu" + '
167     '0.005*"minister" + 0.005*"sanction" + 0.005*"nato" + 0.005*"force" + '
168     '0.005*"invasion" + 0.004*"moscow"),
169 (2,
170     '0.007*"gas" + 0.006*"macron" + 0.006*"price" + 0.005*"energy" + 0.005*"le" +
171     '+ 0.004*"pen" + 0.004*"food" + 0.004*"party" + 0.004*"government" +
172     '0.004*"france"),
173 (3,
174     '0.010*"force" + 0.008*"kyiv" + 0.006*"military" + 0.005*"civilian" + '
175     '0.005*"soldier" + 0.005*"mariupol" + 0.005*"attack" + 0.005*"kill" + '
176     '0.004*"region" + 0.004*"leave")]
177
178 For model with k = 4
179 Document Topics for document # 2187 = [(1, 0.3064757), (3, 0.6923552)]
180 Document Topics for document # 272 = [(3, 0.9984866)]
181 Document Topics for document # 1107 = [(1, 0.9977856)]
182 Document Topics for document # 947 = [(1, 0.20353322), (3, 0.7955876)]
183 Document Topics for document # 525 = [(1, 0.37970638), (3, 0.6193397)]
184
185 Topics for a model trained for 6 number of topics
186 [(0,
187     '0.009*"uk" + 0.008*"government" + 0.006*"sanction" + 0.006*"gas" + '
188     '0.005*"company" + 0.004*"home" + 0.004*"refugee" + 0.004*"include" + '
189     '0.004*"family" + 0.004*"new"),
190 (1,

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191   '0.010*"putin" + 0.007*"president" + 0.006*"military" + 0.006*"minister" + '
192   '0.006*"eu" + 0.006*"nato" + 0.005*"force" + 0.005*"sanction" + '
193   '0.005*"invasion" + 0.005*"zelenskiy"),,
194 (2,
195   '0.008*"macron" + 0.006*"le" + 0.006*"price" + 0.006*"pen" + 0.006*"party" + '
196   '0.006*"food" + 0.005*"election" + 0.005*"vote" + 0.005*"france" + '
197   '0.005*"right"),
198 (3,
199   '0.012*"force" + 0.009*"kyiv" + 0.006*"civilian" + 0.006*"military" + '
200   '0.006*"mariupol" + 0.006*"attack" + 0.005*"soldier" + 0.005*"kill" + '
201   '0.005*"region" + 0.004*"leave"),
202 (4,
203   '0.004*"time" + 0.004*"work" + 0.004*"like" + 0.004*"know" + 0.004*"tell" + '
204   '0.004*"putin" + 0.003*"family" + 0.003*"man" + 0.003*"come" + 0.003*"want"),
205 (5,
206   '0.006*"israel" + 0.005*"world" + 0.005*"israeli" + 0.004*"soviet" + '
207   '0.003*"medvedchuk" + 0.003*"medvedev" + 0.003*"nazi" + 0.003*"palestinian" +
208   '+ 0.002*"abortion" + 0.002*"jewish")]
209
210 For model with k = 6
211 Document Topics for document # 2187 = [(1, 0.29738915), (3, 0.7011237)]
212 Document Topics for document # 272 = [(1, 0.016024388), (3, 0.9827102)]
213 Document Topics for document # 1107 = [(1, 0.99766827)]
214 Document Topics for document # 947 = [(1, 0.23246816), (3, 0.69984585), (4, 0.06686063)
    )]
215 Document Topics for document # 525 = [(1, 0.35901928), (3, 0.63976026)]
216
217 Topics for a model trained for 8 number of topics
218 [(0,
219   '0.010*"government" + 0.009*"uk" + 0.009*"gas" + 0.006*"company" + '
220   '0.006*"refugee" + 0.005*"energy" + 0.005*"home" + 0.005*"visa" + '
221   '0.005*"family" + 0.004*"germany"),
222 (1,
223   '0.008*"putin" + 0.008*"military" + 0.007*"force" + 0.007*"president" + '
224   '0.006*"nato" + 0.006*"minister" + 0.006*"zelenskiy" + 0.005*"moscow" + '
225   '0.005*"defence" + 0.005*"invasion"),
226 (2,
227   '0.010*"macron" + 0.008*"le" + 0.008*"price" + 0.007*"pen" + 0.007*"food" + '
228   '0.006*"france" + 0.006*"grain" + 0.005*"vote" + 0.005*"french" + '
229   '0.005*"port"),
230 (3,
231   '0.011*"force" + 0.009*"kyiv" + 0.007*"civilian" + 0.006*"mariupol" + '
232   '0.006*"soldier" + 0.005*"attack" + 0.005*"kill" + 0.005*"military" + '
233   '0.004*"leave" + 0.004*"region"),
234 (4,
235   '0.005*"tell" + 0.005*"work" + 0.004*"family" + 0.004*"time" + 0.004*"know" +
236   '+ 0.004*"leave" + 0.004*"like" + 0.004*"man" + 0.003*"news" +
237   '0.003*"group"),
238 (5,
239   '0.005*"medvedchuk" + 0.005*"medvedev" + 0.005*"african" + 0.004*"world" +
240   '0.003*"china" + 0.003*"africa" + 0.002*"trophy" + 0.002*"road" +
241   '0.002*"schevchenko" + 0.002*"time"),
242 (6,
243   '0.009*"putin" + 0.005*"soviet" + 0.005*"world" + 0.004*"like" +
244   '0.004*"time" + 0.004*"think" + 0.003*"right" + 0.003*"crime" + 0.003*"new" +
245   '+ 0.003*"gorbachev"),
246 (7,

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247 '0.011*"eu" + 0.010*"sanction" + 0.009*"putin" + 0.006*"government" + '
248 '0.005*"uk" + 0.005*"european" + 0.004*"abramovich" + 0.004*"minister" + '
249 '0.004*"include" + 0.003*"party"')]
250
251 For model with k = 8
252 Document Topics for document # 2187 = [(1, 0.49443886), (3, 0.50389796)]
253 Document Topics for document # 272 = [(1, 0.05923906), (3, 0.93934876)]
254 Document Topics for document # 1107 = [(1, 0.9975692)]
255 Document Topics for document # 947 = [(1, 0.2922416), (3, 0.66729), (6, 0.039444804)]
256 Document Topics for document # 525 = [(1, 0.43441004), (3, 0.564225)]
257
258 Topics for a model trained for 10 number of topics
259 [(0,
260   '0.012*"gas" + 0.010*"company" + 0.008*"government" + 0.007*"sanction" + '
261   '0.007*"energy" + 0.005*"germany" + 0.005*"include" + 0.005*"state" + '
262   '0.004*"business" + 0.004*"supply"'),
263 (1,
264   '0.009*"force" + 0.009*"military" + 0.007*"putin" + 0.007*"president" + '
265   '0.006*"zelenskiy" + 0.006*"nato" + 0.006*"defence" + 0.006*"moscow" + '
266   '0.006*"minister" + 0.005*"invasion"),
267 (2,
268   '0.011*"price" + 0.010*"food" + 0.010*"grain" + 0.009*"port" + 0.008*"world" +
269   '+ 0.007*"export" + 0.006*"global" + 0.006*"oil" + 0.005*"crisis" +
270   '0.005*"sea"),
271 (3,
272   '0.010*"force" + 0.009*"kyiv" + 0.006*"civilian" + 0.006*"soldier" + '
273   '0.006*"mariupol" + 0.005*"kill" + 0.005*"leave" + 0.005*"attack" + '
274   '0.004*"military" + 0.004*"child"),
275 (4,
276   '0.005*"tell" + 0.004*"time" + 0.004*"man" + 0.004*"military" + 0.004*"work" +
277   '+ 0.004*"family" + 0.004*"know" + 0.003*"group" + 0.003*"soldier" +
278   '0.003*"official"),
279 (5,
280   '0.006*"medvedchuk" + 0.006*"african" + 0.004*"world" + 0.003*"africa" +
281   '0.003*"western" + 0.003*"china" + 0.003*"group" + 0.002*"time" +
282   '0.002*"soviet" + 0.002*"road"),
283 (6,
284   '0.010*"putin" + 0.007*"soviet" + 0.006*"world" + 0.005*"crime" +
285   '0.004*"gorbachev" + 0.004*"court" + 0.004*"international" +
286   '0.003*"president" + 0.003*"state" + 0.003*"time"),
287 (7,
288   '0.014*"eu" + 0.010*"putin" + 0.010*"sanction" + 0.006*"european" +
289   '0.006*"government" + 0.005*"uk" + 0.004*"minister" + 0.004*"germany" +
290   '0.004*"leader" + 0.004*"president"),
291 (8,
292   '0.007*"uk" + 0.007*"government" + 0.006*"refugee" + 0.006*"home" +
293   '0.006*"macron" + 0.005*"family" + 0.005*"right" + 0.005*"china" +
294   '0.004*"visa" + 0.004*"new"),
295 (9,
296   '0.010*"putin" + 0.008*"protest" + 0.006*"opposition" + 0.006*"medium" +
297   '0.006*"orban" + 0.005*"channel" + 0.005*"kremlin" + 0.005*"moscow" +
298   '0.005*"invasion" + 0.004*"russians")]
299
300 For model with k = 10
301 Document Topics for document # 2187 = [(1, 0.72843766), (3, 0.26979005)]
302 Document Topics for document # 272 = [(1, 0.10887956), (3, 0.87060857), (9, 0.019195644)
  )]

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303 Document Topics for document # 1107 = [(1, 0.89407754), (7, 0.10370304)]
304 Document Topics for document # 947 = [(1, 0.33632138), (3, 0.63750285), (8, 0.025031192)
  )]
305 Document Topics for document # 525 = [(1, 0.51375586), (3, 0.48478976)]
306
307 Topics for a model trained for 12 number of topics
308 [(0,
309   '0.015*"sanction" + 0.011*"company" + 0.009*"uk" + 0.008*"government" + '
310   '0.007*"include" + 0.007*"putin" + 0.006*"abramovich" + 0.006*"state" + '
311   '0.005*"asset" + 0.005*"business"'),
312 (1,
313   '0.013*"force" + 0.009*"military" + 0.007*"kyiv" + 0.007*"defence" + '
314   '0.006*"zelenskiy" + 0.006*"president" + 0.006*"moscow" + 0.006*"region" + '
315   '0.006*"attack" + 0.005*"official"),
316 (2,
317   '0.020*"grain" + 0.019*"port" + 0.012*"ship" + 0.012*"sea" + 0.009*"export" +
318   '+ 0.009*"black" + 0.007*"turkey" + 0.007*"vessel" + 0.007*"island" +
319   '0.006*"odesa"),
320 (3,
321   '0.008*"kyiv" + 0.007*"soldier" + 0.007*"leave" + 0.006*"force" + '
322   '0.006*"civilian" + 0.005*"mariupol" + 0.005*"child" + 0.005*"come" + '
323   '0.005*"kill" + 0.005*"town"),
324 (4,
325   '0.005*"north" + 0.005*"tell" + 0.005*"man" + 0.004*"missile" + 0.004*"time" +
326   '+ 0.004*"military" + 0.003*"death" + 0.003*"family" + 0.003*"work" +
327   '0.003*"know"),
328 (5,
329   '0.004*"world" + 0.004*"road" + 0.003*"trophy" + 0.003*"petrakov" +
330   '0.003*"tajikistan" + 0.003*"leopard" + 0.003*"stamp" + 0.002*"kit" +
331   '0.002*"hunt" + 0.002*"soviet"),
332 (6,
333   '0.010*"crime" + 0.006*"court" + 0.004*"international" + 0.004*"church" +
334   '0.004*"rape" + 0.004*"work" + 0.004*"museum" + 0.003*"world" +
335   '0.003*"evidence" + 0.003*"cultural"),
336 (7,
337   '0.005*"government" + 0.004*"world" + 0.004*"time" + 0.003*"putin" +
338   '0.003*"nuclear" + 0.003*"party" + 0.003*"israel" + 0.003*"work" +
339   '0.003*"come" + 0.003*"right"),
340 (8,
341   '0.008*"uk" + 0.008*"refugee" + 0.007*"government" + 0.007*"macron" +
342   '0.006*"home" + 0.006*"family" + 0.006*"right" + 0.005*"visa" + 0.005*"le" +
343   '0.005*"pen"),
344 (9,
345   '0.011*"orban" + 0.009*"protest" + 0.008*"opposition" + 0.007*"hungary" +
346   '0.007*"hungarian" + 0.006*"arrest" + 0.005*"moscow" + 0.005*"medium" +
347   '0.005*"channel" + 0.005*"anti"),
348 (10,
349   '0.014*"gas" + 0.011*"eu" + 0.010*"energy" + 0.008*"oil" + 0.008*"germany" +
350   '0.007*"price" + 0.006*"government" + 0.006*"supply" + 0.005*"sanction" +
351   '0.005*"german"),
352 (11,
353   '0.014*"putin" + 0.007*"china" + 0.005*"leader" + 0.005*"president" +
354   '0.005*"nato" + 0.005*"invasion" + 0.005*"minister" + 0.004*"world" +
355   '0.004*"foreign" + 0.004*"support")]
356
357 For model with k = 12
358 Document Topics for document # 2187 = [(1, 0.99796927)]

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359 Document Topics for document # 272 = [(1, 0.34133235), (3, 0.657101)]
360 Document Topics for document # 1107 = [(1, 0.53489023), (11, 0.4627975)]
361 Document Topics for document # 947 = [(1, 0.29137954), (3, 0.5428061), (4, 0.02361514),
    (11, 0.1411093)]
362 Document Topics for document # 525 = [(1, 0.70817447), (3, 0.29031107)]
363
364 Topics for a model trained for 14 number of topics
365 [(0,
366     '0.015*"sanction" + 0.013*"company" + 0.009*"uk" + 0.008*"include" + '
367     '0.008*"government" + 0.006*"putin" + 0.006*"state" + 0.005*"asset" + '
368     '0.005*"medium" + 0.005*"business"'),
369     (1,
370         '0.010*"nato" + 0.009*"military" + 0.007*"force" + 0.006*"moscow" + '
371         '0.006*"president" + 0.005*"putin" + 0.005*"finland" + 0.005*"minister" + '
372         '0.005*"invasion" + 0.005*"security"'),
373     (2,
374         '0.023*"grain" + 0.022*"port" + 0.014*"ship" + 0.013*"sea" + 0.010*"export" +
375         '+ 0.010*"black" + 0.008*"turkey" + 0.007*"vessel" + 0.007*"odesa" +
376         '0.007*"food"'),
377     (3,
378         '0.008*"soldier" + 0.007*"leave" + 0.007*"kyiv" + 0.006*"child" + '
379         '0.005*"come" + 0.005*"home" + 0.005*"family" + 0.005*"force" + 0.004*"old" +
380         '+ 0.004*"know"'),
381     (4,
382         '0.005*"tell" + 0.005*"north" + 0.004*"missile" + 0.004*"man" + 0.004*"time" +
383         '+ 0.004*"state" + 0.003*"death" + 0.003*"force" + 0.003*"family" +
384         '0.003*"korea"'),
385     (5,
386         '0.007*"drone" + 0.005*"road" + 0.004*"world" + 0.004*"tank" + '
387         '0.004*"petrakov" + 0.003*"stamp" + 0.003*"belt" + 0.003*"initiative" +
388         '0.003*"wto" + 0.003*"anti"'),
389     (6,
390         '0.008*"crime" + 0.005*"court" + 0.005*"museum" + 0.004*"cultural" +
391         '0.004*"work" + 0.004*"icc" + 0.004*"church" + 0.003*"zelenskiy" +
392         '0.003*"world" + 0.003*"genocide"'),
393     (7,
394         '0.006*"government" + 0.005*"putin" + 0.003*"world" + 0.003*"abramovich" +
395         '0.003*"time" + 0.003*"sanction" + 0.003*"party" + 0.003*"uk" +
396         '0.003*"include" + 0.003*"support"'),
397     (8,
398         '0.009*"uk" + 0.008*"refugee" + 0.008*"macron" + 0.007*"government" +
399         '0.007*"home" + 0.006*"family" + 0.006*"right" + 0.006*"visa" + 0.006*"le" +
400         '0.005*"pen"'),
401     (9,
402         '0.017*"orban" + 0.013*"hungary" + 0.011*"hungarian" + 0.009*"opposition" +
403         '0.009*"protest" + 0.007*"ovsyannikova" + 0.006*"medium" + 0.005*"election" +
404         '+ 0.005*"arrest" + 0.005*"budapest"'),
405     (10,
406         '0.014*"gas" + 0.012*"eu" + 0.010*"energy" + 0.008*"oil" + 0.008*"germany" +
407         '0.007*"price" + 0.006*"government" + 0.006*"supply" + 0.006*"sanction" +
408         '0.005*"european"'),
409     (11,
410         '0.018*"putin" + 0.006*"leader" + 0.005*"president" + 0.005*"world" +
411         '0.005*"invasion" + 0.004*"west" + 0.004*"soviet" + 0.004*"minister" +
412         '0.004*"nato" + 0.004*"support"'),
413     (12,
414         '0.015*"force" + 0.009*"kyiv" + 0.008*"military" + 0.007*"zelenskiy" +

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415   '0.007*civilian" + 0.007*attack" + 0.007*defence" + 0.006*president" + '
416   '0.006*missile" + 0.006*weapon"'),
417 (13,
418   '0.021*china" + 0.007*chinese" + 0.007*taiwan" + 0.005*security" + '
419   '0.005*beijing" + 0.005*government" + 0.005*new" + 0.004*japan" + '
420   '0.004*invasion" + 0.004*military"')]
421
422 For model with k = 14
423 Document Topics for document # 2187 = [(1, 0.24552003), (12, 0.75258046)]
424 Document Topics for document # 272 = [(3, 0.3497853), (7, 0.05504004), (11, 0.085588
), (12, 0.50824076)]
425 Document Topics for document # 1107 = [(1, 0.74059963), (11, 0.2570241)]
426 Document Topics for document # 947 = [(1, 0.14081097), (3, 0.5199547), (4, 0.025468612
), (11, 0.13504082), (12, 0.17767307)]
427 Document Topics for document # 525 = [(1, 0.21853988), (3, 0.22446752), (12, 0.5555645
)]
428
429 Compute Perplexity
430
431 Compute Topic Coherence Score
432 /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
433   from imp import reload
434 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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446 importlib and slated for removal in Python 3.12; see the module's documentation for
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488 /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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490 /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
491 from imp import reload
492 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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492 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
493     from imp import reload
494 /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
495     from imp import reload
496 /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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     alternative uses
497     from imp import reload
498 /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
499     from imp import reload
500 /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
501     from imp import reload
502 /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
503     from imp import reload
504 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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     importlib and slated for removal in Python 3.12; see the module's documentation for
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505     from imp import reload
506 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/past/
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     importlib and slated for removal in Python 3.12; see the module's documentation for
     alternative uses
507     from imp import reload
508 /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
509     from imp import reload
510 /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
511     from imp import reload
512 /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
513     from imp import reload
514 /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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514 alternative uses
515     from imp import reload
516 /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
517     from imp import reload
518 /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
519     from imp import reload
520 /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
521     from imp import reload
522 /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
523     from imp import reload
524 /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
525     from imp import reload
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530 (list_index, number_topics, c_v_coherence, perplexity)
531 [(1, 2, 0.37807315316139867, -8.218326769449),
532 (2, 4, 0.4385142539823086, -8.1588748466458),
533 (3, 6, 0.4154494435587679, -8.160747537346543),
534 (4, 8, 0.40886869300478706, -8.164581199888314),
535 (5, 10, 0.4156638767054496, -8.161410444726444),
536 (6, 12, 0.4518203370837608, -8.139532130079141),
537 (7, 14, 0.4529110586520998, -8.145416417683519)]
538
539 Visualize the topics
540 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/pyLDAvis
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740 /Users/nelsonquintanilla/.conda/envs/dissertation/lib/python3.10/site-packages/pyLDAvis
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740 /_prepare.py:247: FutureWarning: In a future version of pandas all arguments of
    DataFrame.drop except for the argument 'labels' will be keyword-only.
741     by='saliency', ascending=False).head(R).drop('saliency', 1)
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920 /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.
921     by='saliency', ascending=False).head(R).drop('saliency', 1)
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1012
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