

150 issues found in this text

Score: 71 of 100

Report generated on Thu, Jun 19 2014 11:58 PM

Spelling Correction	48 issues	× Spelling (42)× Commonly confused words (1)× Unknown words (5)
Grammar	7 issues	× Passive voice use (7)
Grammar	12 issues	 X Use of articles (6) X Use of nouns (2) X Subject and verb agreement (2) X Verb form use (2)
Punctuation	4 issues	× Punctuation within a clause (3)× Punctuation between clauses (1)
Sentence Structure	6 issues	× Sentence fragment (6)
Enhancement Suggestion	32 issues	× Vocabulary use (32)
Style Check	73 issues	 × Usage of colloquial speech (20) × Improper formatting (51) × Wordiness (2)

do 3: Sentiment analysis as Section 3.3.2, outputting sentiment of m, s m; 4: end 1 (point) for 5: for user u 2 U do 6: the topic distribution is the corresponding component of parameter q, q u; 7: the topics he tweets about are Z u = ft j p (t jq u) > 0; t 2 T g; 8: end 2 (point) for 9: for tweet m 2 Mu do 10: topics 3 (issues, questions) of m can be identified by the topic model, Z m = ft j p (t jq; b; Z u) > 0; t 2 T g; 11: end 4 (point) for 12: for each topic t 2 Z u do 13: for sentiment value s 5 (values) 2 S do 14: count the number of tweets which talk about topic t with sentiment value s, Ns = åm2Mu I (s m); if 6 (if) s m = s&t 2 Z m; 15: end 7 (point) for 16: calculating opinion 8 (view) towards topic t, Ot 9 (Or, Out, On, At, OR) = n Ns ås2S Ns o; 17: end 10 (point) for 18: establishing subjectivity model of user u, P (u) = n t; p (t jq 11 (jg, sq, Sq, JV, JP) u); n Ns ås2S Ns o jt 12 (jet, at, It, jot, jat) 2 Z u; s 2 S o; 19: return P(u); Accordingly subjectivity model P (m) for tweet m as 13 (mas): P (m) = f(t; p (t jq; b); d m;t



(s)) = 1:0jt 2 Z m; s 2 Sg (4) Noting that, the opinion towards each topic is a distribution of 14 (Of) 1:0 on a single sentiment value s 15 (values) of tweet m. 3.4 Retweeting Analysis With Subjectivity Model To understand the underlying reasons why a user retweet a message, we try to simulate the subjective decision-making procedure ¹⁶ (*Procedure*) by investigating the relationship among the subjectivity models of a tweet, its author and followers . We assume that a user retweet a message because the user not only finds its topics 17 (subjects) interesting but also shares similar opinions towards these topics . In other words , if the subjectivity models of a tweet and a user are similar enough, the user will have 18 (Have) a very high probability to retweet. We call this phenomenon as " resonance ", and assume that the resonance between a tweet and users will elicit retweeting behavior . With the subjectivity models built for users and tweets, we can define a similarity measurement to quantify the resonance among them. Formally, for a tweet m, the corresponding author a, and a list of followers F = f f! (6) where - I is the coefficient used to control the proportions of topic 19 (Topic) similarity and opinion similarity in the holistic subjective similarity. We initiate it by setting I = 0:5, and adjust its value in the range of [0; 1] to optimize the best performance ²⁰ (Performance) of our ²¹ model. – Dist() is the similarity measurement ²² (measure) between two distribution , we choose cosine distance in our research among different measurements 23 (sizes, measures, analyses) because of its effectiveness. We ²⁴ also assume that a user might retweet another user because of their subjective resonance. Accordingly we define similarity between author a and follower f i as: Sim (a; f i) = I Dist p (t jq a; Z a); $p t^{25}$ (pt) jq^{26} (jg, sq, Sq, JV, JP) fi; Z fi +(1 l) å t 2T Dist (Oa;t; O fi 27 (i, fit, fin, fa, fr) ; t)! (7) 4 Experiment In this section, we investigate whether subjectivity model can 28 (Can) 29 (Can) help retweeting analysis on an 30 (a) Twitter dataset. 4.1 Dataset We adopt an off-the-shelf Twitter dataset of previous work [18], which was created with Twitter API 1. To form ³¹ (create, build, construct) the dataset, 500 randomly selected English target tweets were monitored in the next few days to find followers who would retweet them. Also each target tweet was chosen as starting point to collect ³² (Collect) historical data of its author and followers. ³³ Overall, there are 45,531 followers and 6,277,736 tweets, and 5214 followers 34 (Followers) who have retweeted at least one target tweet during the monitored period . Summary statistics of the dataset are 35 (Are) listed in Table 1. The relations among a target tweet, its author 36 (founder) and followers are illustrated in Figure 2. There is a local network structure for each target tweet as figure shows, consisting of its 37 (Its.) 38 (It's, It is.) author and followers. 1 https://dev.twitter.com/ Resonance Elicits Diffusion: Modeling Subjectivity for Retweeting Behavior Analysis 7 Table 1 Retweet Dataset Statistics Tatget tweets 500 Average number of followers per target tweet 89 Total retweeters 39 (retweets, retweeted, tweeters, tweeter, retweet) 5214 Total non-retweeters 40 (tweeters, retweets, retweeted, tweeter, retweet) 40317 Fig. 2 Relations among a target tweet, its author 41 (founder) and followers . 4.2 Impact Evaluation of Different Factors In Section 3.4, we ⁴² model retweeting probability with subjectivity model in the form of similarity measurements ⁴³ (measures) 6,7. By setting different value to I, the measurements can be transformed into different versions to model different 44 (various) factors that might influence user's retweeting behavior, which are: - TTF: Topic similarity between Tweet and Follower (I = 1 45 (One) in measurement ⁴⁶ (size) 6). – OTF: Opinion similarity between Tweet and Follower (I = 0 in measurement 6). – STF: Subjective similarity between Tweet and Follower (I 2 (0; 1) in measurement 6). - TAF: Topic similarity between Publisher and Follower (I = 1 in measurement 7). - OAF: Opinion similarity between Publisher and Follower (I = 0 in measurement 7). - SAF: Subjective similarity between Publisher and Follower (I 2 (0; 1) in measurement 7). The six similarity measurements could be grouped into two aspects. One is consisted of TTF, OTF and STF, which is direct and explicit by modelling the tweet and its followers; the 47 (The) other is consisted of TAF, OAF and SAF, which is indirect and implicit by modelling the author and follower 48 (consists of TAF \, OAF and SAF\, which is indirect and implicit by modelling th(...)). The two aspects reflect properly 49 (correctly) the local information diffusion structure 50 (Structure) of Twitter at micro-level as illustrated in Figure 2. To evaluate the impact of different 51 (various) factors on



retweeting behavior, we 52 compare six average similarity scores between 5214 retweeters 53 (retweets, tweeters, tweeter, retweeted, retweet) and 5214 randomly selected nonretweeters ⁵⁴. The values of I for STF and SAF are tuned to produce the largest value difference between retweeters ⁵⁵ (retweets, retweeted, tweeters, tweeter, retweet) and ⁵⁶ (Moreoverl, , Alsol, , So) non- retweeters ⁵⁷ (tweeters, retweets, tweeter, retweeted, retweet), which are I = 0:5 on our ⁵⁸ dataset. Figure 3 shows the result. As the figure illustrated, the **similarities** ⁵⁹ (**similarity's**) ⁶⁰ (similarity) scores of retweeters ⁶¹ (retweets, tweeters, tweeter, retweeted, retweet) are obviously higher than nonretweeters ⁶² for all six factors . Specifically : – TTF score shows that a tweet is more likely to be retweeted by followers who find topics it talks about interesting to them, which is consistent with other studies [19]; Fig. 3 Impact of different factors on retweeting behavior . - OTF score shows that opinions in a tweet is an important indicator to be retweeted by by followers who hold similar opinions, although other studies [27, 22] have shown that sentiment in tweet has impact on retweeting behavior, they have n't consider the opinions of followers and opinion similarity betweet 63 (between, tweet, betwixt, retweet, retweets) tweet and followers; - STF score shows the subjective similarity is the most distinguishable feature among the six factors with the largest value difference, which proves the importance of subjectivity model; - TAF score gives another perspective for retweeting analysis from the topic similarity between author and followers, indicating that followers are more likely to retweet author with similar interests, which verifies the homophily principle of following relation; - OAF score indicates that similar opinions also influence 64 (change) followers decision of retweeting another user, which proves ⁶⁵ (Proves) ⁶⁶ (declares, demonstrates, determines) ⁶⁷ (the , an) opinion homophily of following 68 (the , a) relation . - SAF score is interesting in that it implies that subjective similarity between author and followers might cause retweeting, and we call this phenomenon " tight homophily" of following 69 (the , a) relation because 70 (1) it requires both topic homophily and opinion homophily. 4.3 Performance of Retweeting Prediction The main purpose of retweeting analysis is to help users find interesting information from the overwhelming information streams. Retweeting is an important signal of interestingness because users are prone to broadcast their favorite messages to their followers . Thus , the performance of retweeting prediction is a suitable evaluation for the utility of subjectivity model 71 (Model) in retweeting analysis problem. In our experiment, we evaluate the subjectivity model in supervised machine learning 72 (Learning) framework . As Section 3.2 introduced , the retweeting analysis problem could be formulated as a quadruple < f; a; c; r f am 73 (is) 74 (fam) >. For retweeting prediction, we need to estimate the label r f am 8 Songxian Xie et al. when 75 (When) m; 76 (____) a; and f are known. There are 5,214 retweeters 77 (retweets, tweeters, tweeter, retweeted, retweet) in our dataset who retweet at least one target tweet, so we extract 5214 quadruples as positive instances with their label r f am = 1. For the other 40,317 non-retweeters (retweets, tweeters, retweeted, tweeter, retweet), we also extract quadruples as negative instances with label r f am = 0. To a ⁷⁹ (They) void unbalance ⁸⁰ (unbalancing) bias of training data, we ⁸¹ randomly sample 5,214 negative instances into the test dataset. 4.3.1 Comparison With Other User Models Firstly the comparison between our model with other UGCbased user models (TF-IDF model [18], entity-based model and 82 (Moreoverl,, Alsol,, So) hashta 83 (Calculated) g-based model [1]) in retweeting prediction is investigated. As defined in Section 4.2, the six similarities derived from our model are used for comparison, because they model different factors that influence 84 (affect) retweeting baehavior 85 (behavior, behaviour, behaviors). For the comparing models, cosine similarities are calculated between tweets and followers . We use the logistic regression 86 (Regression) classifier of Scikit-learn machine learning package [24], with 5-fold cross-validation on our ⁸⁷ balance dataset. ⁸⁸ Accuracy is our ⁸⁹ evaluation metric. Performances of our model and ⁹⁰ (Moreover), , Alsol, , So) all other models are shown in Figure 4. Figure 4 also Fig. 4 Comparison of different models. shows that the impact of topic number of LDA on the predicting accuracy, our model arrives its peak when the number is set to 60, so we fix the topic number as 60 in all our experiment . As Figure 4 illustrates , the best accuracy of 68.67% is achieved by the STF (Subjective similarity between tweet and 91 (Moreover), , Also, , So) followers). The accuracies of



TF-IDF model and entitybased ⁹² (entity based) model are 63.45% and 62.12%, which are very close to TTF (Topic similarity between Tweet and Followers, 63.88%) and 93 (Moreover), Also), So) OAF (Opinion similarity between Publisher and Followers, 62.96%). While for hashtag-based model , its accuracy is 94 (Is) 50.76 $\,\%$, 95 ($\,\%$) which is only a little better than random selection (50%) 96 (1) but not significant. 97 The reason might lie in Table 2 Prediction Accuracy of Different Models. Significant improvement over baseline with star () and LUO' model with dagger (‡) (p<0.05). Feature Set Accuracy(%) RB 60.85 LUO 68.76 SM6 69.12 LUO()+TTF 69.20 LUO()+TAF (...) a 98 (A) 99 (A) very low usage of 100 (the, an) hashtag in our 101 data. The accuracies of the other three model are OTF (Opinion similarity between Tweet and Followers, 64.80%), TAF (Topic similarity between Publisher and Followers, 62.58%) and SAF (Subjective similarity between Publisher and Followers, 66.95%) model . The results show that subjectivity model can better help understanding retweeting behavior than the other user models . 4.3.2 Comparison with Other Factors In this section , we feed the six similarities of our model as features into a retweeting classification framework 102 (structure) to verify the 103 (The) effectiveness of subjectivity model. 104 We compare the performance of our model with method of Luo et al. [18] which uses four feature families: Retweet History (follower who retweeted a user before is likely to retweet the user again), Follower Status (for a follower, the number of tweets, followers, friends, being listed 105 (recorded) and whether he is verified), Follower Active Time (the time users interact with others) and Follower Interests (common interests between tweet and followers . TF-IDF model). We use LinearSVM of Scikit-learn package to build a retweeting prediction framework, leveraging two different $\frac{106}{2}$ (Features) $\frac{107}{2}$ (set). One includes the six features derived from subjectivity model (marked as "SM6"). The other is the feature set 108 (Set) 109 (Set) from Luo et al. [18] (marked as "LUO"). We use the same dataset as Section 4.3.1 with 5-fold cross-validation, and 110 (Moreoverly, Alsoly, So) accuracy as evaluation metric. In addition, we set a baseline (marked as "RB"), for which followers who have retweeted the author 's previous tweets are predicted as retweeters 111 (retweets, tweeters, tweeter, retweet, retweeted) of current 112 (Current) 113 (is , was) tweet. The result is listed in Table 2. The accuracy of baseline is 60.85%, and two prediction models (LUO and our 114 (Our) (Our) 116 SM6) both outperform the baseline significantly. But the prediction 117 (Prediction) model based on our 118 feature set shows no significant improvement over LUO feature set. The reason might be that our model only tries to reflect the retweeting motivation of users based on content, whereas other important 119 (essential) factors associated with retweeting behavior are not consid 120 (consider, cons, consist, consign, onside) - Resonance Elicits Diffusion: Modeling Subjectivity for Retweeting Behavior Analysis 9 ered 121 (red, ere, reed, erased, eared), such as network topology and tweeting habit of the user 122 (User), etc 123. Since it is proved that subjectivity model outperforms TF-IDF model in Section 4.3.1, which is used in LUO feature set, we propose that retweeting prediction performance could 124 (Could) be improved by using features derived from subjectivity model . As denoted by "LUO()+" in the table, the Follower Interests features of LUO are replaced with our six 125 (Six) features one by one. The accuracies are all improved . It shows that our 126 model is of great importance for retweeting prediction . Noticing that, the most significant improvement (LUO() +STF 127, 72.86% versus 68.76%) is the subjective similarity feature between tweet and followers, which verifies our assumption that subjective resonance between tweet 128 (Tweet) 129 (Tweet) and followers can be considered as the underlying reason that elicits retweeting behavior . Besides, the improvement by adding subjective similarity features between aauthor 130 (author, authors, a author) and followers (LUO() +SAF 131, 72.05% versus 68.76%) is also obvious in that the resonance between author and follower 132 (Follower) indicates the tight homophily between them. Finally, the last row of table is the complete combination of two sets of features (LUO()+All) by adding all six features into LUO feature set. The performance shows no significant improvement over adding STF feature only, in that subjectivity model combines both topic and opinion information, and STF is a integral feature to model both topic similarity and opinion similarity between tweet and followers, so it is



redundant 133 (Redundant) to add other separate parts. 4.4 Case Study In this section we give an vivid example to illustrate the subjectivity model and its ability in explaining the retweet behavior. The subjectivity models for one of the 500 target tweets, its author, and two followers (one retweeter 134 (tweeter, retweet, retweeted, retweets, retweeting), the other non-retweeter 135 (retweets, retweet, tweeter, retweeted, retweeting) 136 (Non-Retweeter)) are shown as Figure 5. The right part of each sub-figure 137 (Sub-Figure) illustrates topic distribution and the left part illustrates opinions towards each topic. It is the 14 th 138 (the, tah, Thu, tho, THC) topic that the (The) tweet talks about in the local topic space. Figure 6 shows top words of the 14 th 140 (the, tah, Thu, tho, THC) topic, the tweets of author and two followers in a word cloud 2. Content of the tweet is: Tweet: " Sometimes the right person for you was there all along . You just didnt 141 (didn't, did, dint, didst, dent) see it because the wrong one was blocking the sight " The topic of this tweet is about " love between people " and the opinion 142 (view) is neutral, which is in accordance with the 14 th 143 (the, tah, Thu, tho, THC) topic word cloud in Figure 6 and subjectivity model of tweet in Firgure 144 (Figure, Figures) 5. The author concentrates on the 14 th 145 (the, tah, Thu, tho, THC) topic with 208 tweets , 146 (____) and his opinions are mainly neutral (as Figure 5, 6 demonstrate). As for two followers , the retweeter 147 (retweet, retweets, tweeter, retweeted, retweeting) 2 We use TagCrowd (http://tagcrowd.com/) to produce word cloud. Fig. 6 Word cloud of 14 th 148 (the, tah, Thu, tho, THC) topic 149 (Topic) 150 (text, subject), author and followers . has published 250 tweets about two topics 151 (issues, questions) (the 14 th 152 (the, tah, Thu, tho, THC) and 52 nd topic 153 (text, question, problem)) uniformly and his opinions towards the two topics are mainly 154 (Mainly) neutral. While the other one, the nonretweeter 155 (retweet, tweeter, retweeted, retweets, retweeting) has also talked about two topics 156 (issues) (14 th 157 (the, tah, Thu, tho, THC) and 56 th 158 (the, tah, Thu, tho, THC) topic) with 188 tweets, but he is mainly interested in the 14 th 159 (the, tah, Thu, tho, THC) topic and his opinion 160 (Opinion) is positive. Although two followers have same interest (the 14 th 161 (the, tah, Thu, tho, THC) topic), their different opinions elicit their different decision, which verifies subjectivity model can help better understanding the retweeting behavior not only from topics 162 (Topics) 163 (questions) but also opinions. 5 Conclusion In this paper, we propose a subjectivity model to analyze user 164 (User) retweeting behavior on Twitter. We assume that retweeting should be elicited by the subjective resonance between the 165 (The) tweet and its followers. We define the subjectivity model formally as the combination of topics 166 (issues) and opinions, and we put forward an algorithm to establish the subjectivity model leveraging 167 (Leveraging) statistical topic model and sentiment analysis techniques . We demonstrate the effectiveness of our model for retweeting analysis problem and show that subjectivity model is 168 (Is) able to 169 (Can) 170 (Can) reach better understanding of retweeting behavior. 171 Our 172 future work mainly lie in two directions. Firstly, the 173 (The) subjectivity model is established through simple combination of topics 174 (issues) and opinions. It is an interesting direction to establish it under the framework of generative topicsentiment ¹⁷⁵ model, which has been applied in reviews and citation network. Secondly, we will apply subjectivity model to other social media analysis task such as connection prediction and friend recommendation.

Writing issues in this paragraph:

- 1 Overused word: end
- 2 Overused word: end
- 3 Overused word: topics
- 4 Overused word: end
- 5 Misspelled word: value s
- 6 Misspelled word: i f
- 7 Overused word: end



53

Misspelled word: retweeters

8 Overused word: opinion 9 Misspelled word: Ot 10 Overused word: end 11 Misspelled word: jq 12 Misspelled word: jt 13 Misspelled word: m as 14 Capitalization at the beginning of a sentence 15 Misspelled word: value s 16 Capitalization at the beginning of a sentence 17 Overused word: topics 18 Capitalization at the beginning of a sentence 19 Capitalization at the beginning of a sentence 20 Capitalization at the beginning of a sentence 21 Informal pronouns 22 Overused word: measurement 23 Overused word: measurements 24 Informal pronouns 25 Misspelled word: p t 26 Misspelled word: jq 27 Misspelled word: fi 28 Capitalization at the beginning of a sentence 29 Capitalization at the beginning of a sentence The use of <i>a</i> versus <i>an</i> 31 Overused word: form 32 Capitalization at the beginning of a sentence 33 Sentence fragment 34 Capitalization at the beginning of a sentence 35 Capitalization at the beginning of a sentence 36 Overused word: author 37 Capitalization at the beginning of a sentence 38 Confused possessive and contraction 39 Misspelled word: retweeters 40 Misspelled word: retweeters 41 Overused word: author 42 Informal pronouns 43 Overused word: measurements 44 Overused word: different 45 Numerals instead of words 46 Overused word: measurement 47 Capitalization at the beginning of a sentence 48 Intransitive verb in passive voice 49 Vague word: properly 50 Capitalization at the beginning of a sentence 51 Overused word: different 52 Informal pronouns



54	Unknown word: nonretweeters
55	Misspelled word: retweeters
56	Conjunction at the Beginning of Sentence
57	Misspelled word: retweeters
58	Informal pronouns
59	Plural instead of possessive
60	Incorrect noun form
61	Misspelled word: retweeters
62	Unknown word: nonretweeters
63	Misspelled word: betweet
64	Overused word: influence
65	Capitalization at the beginning of a sentence
66	Overused word: proves
67	Missing article
68	Missing article
69	Missing article
70	Missing comma after introductory phrase
71	Capitalization at the beginning of a sentence
72	Capitalization at the beginning of a sentence
73	Incorrect verb form with singular subject
74	Misspelled word: f am
75	Capitalization at the beginning of a sentence
76	Redundant indefinite article
77	Misspelled word: retweeters
78	Misspelled word: retweeters
79	Capitalization at the beginning of a sentence
80	Infinitive instead of gerund
81	Informal pronouns
82	Conjunction at the Beginning of Sentence
83	Capitalization at the beginning of a sentence
84	Overused word: influence
85	Misspelled word: baehavior
86	Capitalization at the beginning of a sentence
87	Informal pronouns
88	Sentence fragment
89	Informal pronouns
90	Conjunction at the Beginning of Sentence
91	Conjunction at the Beginning of Sentence
92	Misspelled word: entitybased
93	Conjunction at the Beginning of Sentence
94	Capitalization at the beginning of a sentence
95	Spaces before/after punctuation marks
96	Missing comma in compound sentence
97	Missing subject
98	Capitalization at the beginning of a sentence
99	Capitalization at the beginning of a sentence



100	Missing article
101	Informal pronouns
102	Overused word: framework
103	Capitalization at the beginning of a sentence
104	Sentence fragment
105	Overused word: listed
106	Capitalization at the beginning of a sentence
107	Incorrect verb form with plural subject
108	Capitalization at the beginning of a sentence
109	Capitalization at the beginning of a sentence
110	Conjunction at the Beginning of Sentence
111	Misspelled word: retweeters
112	Capitalization at the beginning of a sentence
113	Missing verb
114	Capitalization at the beginning of a sentence
115	Capitalization at the beginning of a sentence
116	Informal pronouns
117	Capitalization at the beginning of a sentence
118	Informal pronouns
119	Vague word: important
120	Misspelled word: consid
121	Misspelled word: ered
122	Capitalization at the beginning of a sentence
123	"Etc." and "So On" in formal writing
124	Capitalization at the beginning of a sentence
125	Capitalization at the beginning of a sentence
126	Informal pronouns
127	Unknown word: +STF
128	Capitalization at the beginning of a sentence
129	Capitalization at the beginning of a sentence
130	Misspelled word: aauthor Unknown word: +SAF
131 132	
133	Capitalization at the beginning of a sentence Capitalization at the beginning of a sentence
134	Misspelled word: retweeter
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136	Capitalization at the beginning of a sentence
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140	Misspelled word: th
141	Misspelled word: didnt
142	Overused word: opinion
143	Misspelled word: th
144	Misspelled word: Firgure
145	Misspelled word: th



- 146 Improper comma in compound subject
- 147 Misspelled word: retweeter
- 148 Misspelled word: th
- 149 Capitalization at the beginning of a sentence
- 150 Overused word: topic
- 151 Overused word: topics
- 152 Misspelled word: th
- 153 Overused word: topic
- 154 Capitalization at the beginning of a sentence
- 155 Misspelled word: retweeter
- 156 Overused word: topics
- 157 Misspelled word: th
- 158 Misspelled word: th
- 159 Misspelled word: th
- 160 Capitalization at the beginning of a sentence
- 161 Misspelled word: th
- 162 Capitalization at the beginning of a sentence
- 163 Overused word: topics
- 164 Capitalization at the beginning of a sentence
- 165 Capitalization at the beginning of a sentence
- 166 Overused word: topics
- 167 Capitalization at the beginning of a sentence
- 168 Capitalization at the beginning of a sentence
- 169 Wordiness (redundant phrases)
- 170 Wordiness (circumlocutions)
- 171 Missing subject
- 172 Informal pronouns
- 173 Capitalization at the beginning of a sentence
- 174 Overused word: topics
- 175 Unknown word: topicsentiment