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| Top WSRs from 3 Aug - 9 Aug 2010                                                                                                                                                                                                                                                                                                 | Top WSRs from 17 Aug - 23 Aug 2010                                                                                                                                                                                                                                                                                           |
| <a href="http://www.espn.com...">http://www.espn.com...</a> :: Reports: Brett Favre tells Minnesota Vikings he will retire - ESPN.com :: Brett Favre has informed his Vikings teammates that he <b>will not return</b> for another season in Minnesota ...                                                                       | <a href="http://www.espn.com...">www.espn.com...</a> :: Brett Favre: 'I owe it' to Minnesota Vikings to <b>return again</b> - ESPN.com :: The Minnesota Vikings say Brett Favre is about to practice with his teammates ...                                                                                                  |
| <a href="http://www.nj.com...">http://www.nj.com...</a> :: Brett Favre plans to play for Vikings if he is healthy   NJ.com :: Vikings offensive coordinator Darrell Bevell and Favre's agent, Bus Cook, ... ankle was not healing and that he <b>wasn't going to return</b> for a second season in Minnesota ...                 | <a href="http://www.nj.com...">www.nj.com...</a> :: Lure of another Super Bowl brings Brett Favre <b>back to Vikings</b>   NJ.com :: Favre underwent left ankle surgery on May 21 and just a few weeks ago texted several teammates and Vikings officials that he would not return because the ...                           |
| <a href="http://www.mprnews.org">http://www.mprnews.org</a> :: Vikings player: Favre tells teammates he's <b>retiring</b>   Minnesota Public :: Minnesota Vikings tight end Visanthe Shiancoe says Brett Favre has texted his ...                                                                                                | <a href="http://content.usatoday.com">content.usatoday.com</a> :: Brett Favre arrives in Minnesota; <b>return to Vikings imminent</b> - USA Today :: The Vikings have not confirmed the news. Favre's agent, Bus Cook, has not returned messages from USA TODAY ...                                                          |
| <a href="http://www.dailymail.co.uk...">http://www.dailymail.co.uk...</a> :: NFL legend Brett Favre stuns Minnesota Vikings by retiring with a ... :: Brett Favre has stunned his Minnesota Vikings team-mates by <b>retiring</b> - and ... has been recovering from ankle surgery but was expected to return for a 20th NFL ... | <a href="http://www.nydailynews.com">www.nydailynews.com</a> :: Brett Favre returns to Minnesota in private jet; no ... - NY Daily News :: Brett Favre is back in the building. The 40-year-old quarterback <b>returned to Minnesota</b> on Tuesday, arriving in a private jet trimmed in the <b>Vikings'</b> purple and ... |

Table 13: WSR evidence over two time periods.

Both tweet level [9] and cluster level [13, 14] features have been explored for real time rumor detection. Tweets or users are classified as being *supportive*, *negating*, *doubting* or *neutral* towards the event based on heuristics using specified lists of positive and negative words. Using pre-specified positive words are difficult to generalize across different events as these words tend to be diverse and context dependent. Our work differs from these approaches as we seek independent evidence from web search results. Our experiments show that features from WSR can be generalized to new events.

The work in [20] proposed a framework called ClaimEval to determine the credibility of subjective claims such as "Turkey meat is healthy" based on relevant webpages and their domains. The claims are assumed to be independent. In contrast, iFACT utilizes the dependencies between claims to obtain a more consistent credibility assessment of claims.

## 5 CONCLUSION

In this work, we have made a step towards putting humans in the loop for credibility assessment of information. We have presented an interactive framework called iFACT to evaluate the credibility of claims from tweets pertaining to major events. In contrast to prior work that focus on features extracted from tweets for credibility classification in a "black box" environment, our proposed approach is based on independent evidence from web search results and claim dependencies. We have provided a platform for the user to examine if a WSR is irrelevant, support or doubt a claim, and modify the type of dependencies between claims.

Experiment results on multiple datasets demonstrate the effectiveness of WSR features and its ability to generalize to new events. Case studies further confirm the importance of taking claim dependencies into consideration, and how iFACT can provide explanations for users to verify the credibility of claims.

## REFERENCES

- [1] S. H. Bach, M. Broecheler, B. Huang, and L. Getoor. Hinge-loss markov random fields and probabilistic soft logic. *CoRR*, abs/1505.04406, 2015.
- [2] C. Boididou, S. Papadopoulos, Y. Kompatsiaris, S. Schifferes, and N. Newman. Challenges of computational verification in social multimedia. In *WWW*, 2014.
- [3] L. Breiman. Random forests. *Mach. Learn.*, 45(1):5-32, Oct. 2001.
- [4] C. Castillo, M. Mendoza, and B. Poblete. Information credibility on twitter. In *WWW*, 2011.
- [5] L. Corro and R. Gemulla. Clause: Clause-based open information extraction. In *WWW*, 2013.
- [6] Y. Freund and R. E. Schapire. A decision-theoretic generalization of on-line learning and an application to boosting. *J. Comput. Syst. Sci.*, 55(1), 1997.
- [7] J. H. Friedman. Greedy function approximation: A gradient boosting machine. *The Annals of Statistics*, 29(5):1189-1232, 2001.
- [8] P. Geurts, D. Ernst, and L. Wehenkel. Extremely randomized trees. *Mach. Learn.*, 63(1):3-42, 2006.
- [9] A. Gupta, P. Kumaraguru, C. Castillo, and P. Meier. Tweetcred: Real-time credibility assessment of content on twitter. In *Social Informatics*, 2014.
- [10] J. H. Lau and T. Baldwin. An empirical evaluation of doc2vec with practical insights into document embedding generation. *ACL*, 2016.
- [11] Q. Le and T. Mikolov. Distributed representations of sentences and documents. In *ICML*, 2014.
- [12] W. Y. Lim, M. L. Lee, and W. Hsu. Claimfinder: A framework for identifying claims in microblogs. In *WWW Workshop on Making Sense of Microposts*, 2016.
- [13] X. Liu, Q. Li, and A. Nourbakhsh et al. Reuters tracer: A large scale system of detecting & verifying real-time news events from twitter. In *CIKM*, 2016.
- [14] X. Liu, A. Nourbakhsh, and Q. Li et al. Real-time rumor debunking on twitter. In *CIKM*, 2015.
- [15] J. Ma, W. Gao, and P. Mitra et al. Detecting rumors from microblogs with recurrent neural networks. In *IJCAI*, 2016.
- [16] M. Mendoza, B. Pobletey, and C. Castillo. Twitter Under Crisis: Can we trust what we RT? In *1st Workshop on Social Media Analytics*, 2010.
- [17] M. J. Metzger and A. J. Flanagan. Credibility and trust of information in online environments: The use of cognitive heuristics. *Journal of Pragmatics*, 59, 2013.
- [18] A. Popoola, D. Krasnoshtan, A.-P. Toth, V. Naroditskiy, C. Castillo, P. Meier, and I. Rahwan. Information verification during natural disasters. In *WWW*, 2013.
- [19] V. Qazvinian, E. Rosengren, and D. Radev et al. Rumor has it: Identifying misinformation in microblogs. In *International Conference on Empirical Methods in Natural Language Processing*, 2011.
- [20] M. Samadi, P. Talukda, M. M. Veloso, and M. Blum. Clameval: Integrated and flexible framework for claim evaluation using credibility of sources. In *AAAI*, 2016.
- [21] F. Yang, Y. Liu, X. Yu, and M. Yang. Automatic detection of rumor on sina weibo. In *ACM SIGKDD Workshop on Mining Data Semantics*, 2012.