Editorial introduction: The power of words and networks

Andrea Fronzetti Colladon [a,*], Peter Gloor [b], Domenica Fioredistella Iezzi [c]

[a] *University of Perugia, Department of Engineering, Via G. Duranti, 93, 06125, Perugia, Italy*
[b] *MIT Center for Collective Intelligence, 245 First Street, 02142, Cambridge, MA, USA*
[c] *University of Rome Tor Vergata, Department of Enterprise Engineering, Via del Politecnico 1, 00133, Rome, Italy*

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ABSTRACT

According to Freud "words were originally magic and to this day words have retained much of their ancient magical power". By words, behaviors are transformed and problems are solved. The way we use words reveals our intentions, goals and values. Novel tools for text analysis help understand the magical power of words. This power is multiplied, if it is combined with the study of social networks, i.e. with the analysis of relationships among social units. This special issue of the International Journal of Information Management, entitled "Combining Social Network Analysis and Text Mining: from Theory to Practice", includes heterogeneous and innovative research at the nexus of text mining and social network analysis. It aims to enrich work at the intersection of these fields, which still lags behind in theoretical, empirical, and methodological foundations. The nine articles accepted for inclusion in this special issue all present methods and tools that have business applications. They are summarized in this editorial introduction.

"Words were originally magic and to this day words have retained much of their ancient magical power. By words one person can make another blissfully happy or drive him to despair" (Freud, 1989). Word were precious in the past and used to cast spells or talk to gods. Human change can be promoted by the use of words. By words, behaviors are transformed and problems are solved (Watzlawick, Weakland, & Fisch, 2011). Nowadays, novel tools for text analysis help understand the magical power of words. The way people express themselves can reveal their intentions, goals and values. Looking at social media posts, for example, we can understand consumers' opinions and emotions, or citizens' vote intentions. Crime investigations were solved by looking at words used by criminals, for example in ransom demands or other threat communications (Olsson & Luchjenbroers, 2014).

In the era of big data, an unimaginable amount of information has become available to scholars, including large text corpora and patterns of social interactions. In the meantime, the primary focus of social and behavioral research has shifted from the study of the attributes of social units to that of their relationships. "The fundamental difference between a social network explanation and a non-network explanation of a process is the inclusion of concepts and information on relationships among units in a study" (Wasserman & Faust, 1994). For this reason, social network analysis (SNA) has become a key discipline for the interpretation of many real world phenomena, in research and in business. The concept of "network" evolved and became flexible: scholars not only study relationships among people, groups and organizations, but also consider networks of words, concepts and ideas.

In such a scenario, the advantage of combining methods and tools of text mining and social network analysis is evident. Honest signals, which are subtle patterns of how we interact with other people (Pentland, 2008), are revealed by the study of language and of social networks, serving multiple goals. For example, actions which support successful relationships with clients, or improve employee communication, come from a better understanding of the impact that language use has within and across organizations (Diesner, Frantz, & Carley, 2005; Fronzetti Colladon, Saint-Charles, & Mongeau, 2018; Gloor, Fronzetti Colladon, Giacomelli, Saran, & Grippa, 2017). The study of response times, rotating leadership and word use in email communication can reveal employees' disengagement and anticipate their intention to resign (Gloor, Fronzetti Colladon, Grippa, & Giacomelli, 2017). Novel approaches in the analysis of networks of words support brand management in the era of big data (Fronzetti Colladon, 2018) and the forecasting of political elections (Fronzetti Colladon, 2019). Analogously, text mining helps brand managers to identify (virtual) consumer tribes (Gloor, Fronzetti Colladon, de Oliveira, Rovelli, Galbier et al., 2019) and to develop customized marketing strategies (He, Zha, & Li, 2013). Business intelligence actions can also be supported by the combination of network and semantic analysis (e.g., Aswani, Kar, Ilavarasan, & Dwivedi, 2018).

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* Corresponding author.

E-mail addresses: andrea.fronzetticolladon@unipg.it (A.F. Colladon); pgloor@mit.edu (P. Gloor); stella.iezzi@uniroma2.it (D.F. Iezzi)

While there are numerous studies on social network analysis and text mining in business, work at the intersection of these fields still lags behind in theoretical, empirical, and methodological foundations. In this special issue, we collect nine papers that all use text mining and network analysis, to present analytics, results and case studies, valuable to support decision-making processes in business.

Three papers leverage the information contained in social media, with the aim of profiling users, digging into their opinions and topics of interest. Wu, Li, Shen, and He (2019) propose an opinion summarization method for microblog texts based on emotion modeling and deep learning. They use the Ortony-Clore-Collins model of emotion and convolutional neural networks, to automatically evaluate the sentiment of posts that appeared on Chinese microblogging systems. Their model is validated by comparing results with a manually annotated dataset. In the work of Greco and Polli (2019) customers are profiled through the analysis of their tweets, using the Emotional Text Mining approach. The procedure, applied to tweets about a well-known sportswear brand, is useful to identify user communities and categorize customers and potential customers in terms of product preferences, sentiment and representations of the brand. Similarly, Gloor, Fronzetti Colladon, de Oliveira, Rovelli et al. (2019) develop a tool for the automatic categorization of virtual consumer tribes. They build a web app, named *Tribefinder*, able to reveal Twitter users' tribal affiliations, by analyzing the language of their tweets. In their case study, the authors consider three tribal macro-categories (alternative realities, lifestyle, and recreation), useful to investigate users' lifestyle, hobbies, and political or ideological orientations. The social behavior of tribe members is further analyzed through social network analysis.

Misuraca, Scepi, and Spano (2019) also focus on customers and analyze tweets, but considering post-sale interactions. They present a methodology to automatically manage the information listed in the requests that customers send to the social media accounts of companies. Their procedure relies on the use of clustering and network techniques for extracting high-level structures from texts, considering relationships between concepts and co-occurring words. A similar goal is pursued by Celardo and Everett (2019), who review many approaches of text clustering and propose one based on the use of the Louvain algorithm and the study of one- and two-mode networks.

Lannigan (2019) looks at text from a different perspective and is interested in the comparison of online and face-to-face discourse dynamics. He uses networks and text mining to compare discourse employed in-person and on social media platforms of four specialty coffee events in Canada. He finds that language has an impact on the choice of coffee tastes and important implications for business. The author maintains that taste is not just an individual matter, even though it is in the individual that the combination of olfactory and discursive elements (used to explain sensory input) resides (Lannigan, 2019).

Chartier, Saint-Charles, and Mongeau (2019) are interested in studying people preferences, expressed as journalists' inclination to use certain words in their writing. In their case study, the authors compare three different collaborative filtering algorithms applied to articles published by the New York Times. Results surprisingly show that, while similarities in actors' neighborhoods are a good predictor of semantic preferences, information on the individual social network adds little to the prediction accuracy.

The last two works in the issue (Aloini, Benevento, Stefanini, & Zerbino, 2019; Nolasco & Oliveira, 2019) extend the application fields of words and networks, showing that these techniques are extremely flexible. Aloini et al. (2019) use a combined approach, based on process mining, SNA and text mining, to improve process coordination dynamics in marine logistics. By adding text mining to traditional approaches they propose solutions for reducing process fragmentation and communication switching, which both negatively affect information exchange of port actors.

Lastly, Nolasco and Oliveira (2019) are interested in the study of the relationship between science and society and the impact they have on each other. They use topic modelling algorithms to extract and label social subjects and research themes, and then topic correlation metrics to create links among them. The efficacy of their approach is tested on a large Twitter corpus and on a PubMed article corpus, both about the Zika epidemic. Their results open new opportunities for the forecasting of social behaviors.

This is a special collection of heterogeneous and innovative research at the nexus of text mining and social network analysis. Our goal is to show the power of words and networks and solicit future research on this topic – while paying attention to the methodological issues arising when extracting networks from textual data (Diesner, 2013), or when combining social network, discourse and semantic analysis (Gloor, 2017; Saint-Charles & Mongeau, 2018).

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References

Aloini, D., Benevento, E., Stefanini, A., & Zerbino, P. (2019). Process fragmentation and port performance: Merging SNA and text mining. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.03.012.

Aswani, R., Kar, A. K., Ilavarasan, P. V., & Dwivedi, Y. K. (2018). Search engine marketing is not all gold: Insights from Twitter and SEOClerks. International Journal of Information Management, 38(1), 107–116. doi:10.1016/j.ijinfomgt.2017.07.005.

Celardo, L., & Everett, M. G. (2019). Network text analysis: A two-way classification approach. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.09.005. in press.

Chartier, J.-F., Saint-Charles, J., & Mongeau, P. (2019). Predicting Semantic Preferences in a Socio-Semantic System with Collaborative Filtering: A Case Study. International Journal of Information Management. in press.

Diesner, J., Frantz, T. L., & Carley, K. M. (2005). Communication networks from the Enron email corpus "It's always about the people. Enron is no different". Computational and Mathematical Organization Theory, 11(3), 201–228. doi:10.1007/s10588-005-5377-0.

Diesner, J. (2013). From texts to networks: Detecting and managing the impact of methodological choices for extracting network data from text data. KI - Künstliche Intelligenz, 27(1), 75–78. doi:10.1007/s13218-012-0225-0.

Freud, S. (1989). New introductory lectures on psychoanalysis. New York, NY: Norton & Company.

Fronzetti Colladon, A. (2018). The semantic brand score. Journal of Business Research, 88, 150–160. doi:10.1016/j.jbusres.2018.03.026.

Fronzetti Colladon, A. (2019). Forecasting election results by studying brand importance in online news. International Journal of Forecasting. doi:10.1016/j.ijforecast.2019.05.013. in press.

Fronzetti Colladon, A., Saint-Charles, J., & Mongeau, P. (2018). The impact of language homophily and similarity of social position on employees' digital communication. In Iezzi, D. F., Celardo, L., & Misuraca, M. (Eds.), JADT' 18. Proceedings of the 14th International Conference on statistical analysis of textual data (pp. 293–297). Rome, Italy: Universitalia.

Gloor, P., Fronzetti Colladon, A., de Oliveira, J. M., & Rovelli, P. (2019). Put your money where your mouth is: Using deep learning to identify consumer tribes from word usage. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.03.011. in press.

Gloor, P., Fronzetti Colladon, A., Giacomelli, G., Saran, T., & Grippa, F. (2017). The impact of virtual mirroring on customer satisfaction. Journal of Business Research, 75, 67–76. doi:10.1016/j.jbusres.2017.02.010.

Gloor, P. A. (2017). Sociometrics and human relationships: Analyzing social networks to manage brands, predict trends, and improve organizational performance. London, UK: Emerald Publishing Limited.

Gloor, P. A., Fronzetti Colladon, A., Grippa, F., & Giacomelli, G. (2017). Forecasting managerial turnover through e-mail based social network analysis. Computers in Human Behavior, 71, 343–352. doi:10.1016/j.chb.2017.02.017.

Gloor, P. A., Fronzetti Colladon, A., de Oliveira, J. M., Rovelli, P., Galbier, M., & Vogel, M. (2019). Identifying tribes on twitter through shared context. In Song, Y., Grippa, F., Gloor, P., & Leitão, J. (Eds.), Collaborative innovation networks (pp. 91–111). doi:10.1007/978-3-030-17238-1_5.

Greco, F., & Polli, A. (2019). Emotional text mining: Customer profiling in brand management. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.04.007. in press.

He, W., Zha, S., & Li, L. (2013). Social media competitive analysis and text mining: A case study in the pizza industry. International Journal of Information Management, 33(3), 464–472. doi:10.1016/j.ijinfomgt.2013.01.001.

Lannigan, J. (2019). Making a space for taste: Context and discourse in the specialty coffee scene. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.07.013. in press.

Misuraca, M., Scepi, G., & Spano, M. (2019). A network-based concept extraction for managing customer requests in a social media care context. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.05.012. in press.

Nolasco, D., & Oliveira, J. (2019). Mining Social Influence in Science and Vice-Versa: A Topic Correlation Approach. International Journal of Information Management. in press.

Olsson, J., & Luchjenbroers, J. (2014). Forensic linguistics. London, UK: Bloomsbury Academic.

Pentland, A. (2008). Honest signals. Cambridge, MA: MIT Press.

Saint-Charles, J., & Mongeau, P. (2018). Social influence and discourse similarity networks in workgroups. Social Networks, 52, 228–237. doi:10.1016/j.socnet.2017.09.001.

Wasserman, S., & Faust, K. (1994). Social network analysis: Methods and applications. doi:10.1525/ae.1997.24.1.219.

Watzlawick, P., Weakland, J. H., & Fisch, R. (2011). Change: Principles of problem formation and problem resolution. New York, NY: Norton & Company.

Wu, P., Li, X., Shen, S., & He, D. (2019). Social media opinion summarization using emotion cognition and convolutional neural networks. International Journal of Information Management. doi:10.1016/j.ijinfomgt.2019.07.004. in press.