DIPARTIMENTO DI INGEGNERIA
CORSO DI DOTTORATO IN INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE -
PHD COURSE IN INDUSTRIAL AND INFORMATION ENGINEERING -
37TH CYCLE

Title of the research activity:	**Business Intelligence in the Era of Big Data**
State of the Art:	Unconscious social signals complement the conscious language and can be studied to understand the intentions, goals and values of employees and customers. Honest Signals cannot be measured through time-consuming and costly surveys: they are subtle patterns in how we interact with other people [1]. In the last years, computer algorithms have become capable of reading emotions from emails and through body sensors, and to recommend interventions to team members for better collaboration, which have never been possible before. Virtual mirroring of digital communication dynamics makes social actors aware of their behavior, beliefs and emotions; improves collaboration; and nudges change and work-commitment within organizations [2], [3]. At the same time, research on "Words and Networks" has led to eminent work, e.g., on language change, recommender systems, collaborative work, semantic computing, and the diffusion and adoption of (mis)information offline and online. In addition, the study of social networks has emerged as a major trend of research in management science. Methods and tools from these disciplines can serve the business in new radical ways. To face the complexity and unpredictability of today's business and social systems, innovation and rapid adaptation of emerging technologies are a key imperative. The advent of machine learning, natural language processing (NLP), and artificial intelligence allows humans to collaborate and communicate in new ways. While text mining, social network analysis and machine learning have evolved into mature yet still quickly advancing fields, work at their intersection lags behind in theoretical, empirical, and methodological foundations.
Short description and objectives of the research activity:	PhD students are expected to extend the research on the advantages of combining social network analysis, machine learning and text mining for business intelligence [2], [4]. For example, actions meant to support successful interactions with clients and employees' come from a better understanding of the impact that language use has within and across organizations [5]. Analogously, text mining can help brand managers identify (virtual) consumer tribes [6], or develop customized marketing strategies [7]. Students should explore new applications of social network analysis, to support decision-making processes in medium and big enterprises – for example, in the fields of innovation management, human resource management,

brand management, knowledge management and organizational communication [8]–[13]. Social network analysis should be complemented with methods and tools of other disciplines – such as semantic analysis, big data analysis and machine learning.

Students are also encouraged to explore new applications of advanced analytics – such as the Semantic Brand Score - which uses a methodology for the assessment of brand importance that combines text mining and social network analysis [14]. Indeed, brand-management tools should provide answers in almost real time and take into account the 'spontaneous' discourse of a brand's stakeholders. Gaining a deeper understanding of brand importance and image can change the way executives make decisions and manage organizations in the era of big data.

Working on this project requires enthusiasm and competence, **a good knowledge of English**, the ability to work as part of a team, and **full-time commitment**.

Bibliography:

[1] A. Pentland, *Honest Signals: How They Shape Our World*. Cambridge, MA: MIT Press, 2008.

[2] P. Gloor, A. Fronzetti Colladon, G. Giacomelli, T. Saran, and F. Grippa, "The impact of virtual mirroring on customer satisfaction," *Journal of Business Research*, vol. 75, pp. 67–76, Jun. 2017, doi: 10.1016/j.jbusres.2017.02.010.

[3] "A Novel Way to Boost Client Satisfaction," *Harvard Business Review*, no. March-April, pp. 17–21, 2019, [Online]. Available: https://hbr.org/2019/03/a-novel-way-to-boost-client-satisfaction.

[4] A. Fronzetti Colladon, B. Guardabascio, and R. Innarella, "Using social network and semantic analysis to analyze online travel forums and forecast tourism demand," *Decision Support Systems*, vol. 123, p. 113075, Aug. 2019, doi: 10.1016/j.dss.2019.113075.

[5] A. Fronzetti Colladon, J. Saint-Charles, and P. Mongeau, "From words to connections: Word use similarity as an honest signal conducive to employees' digital communication," *Journal of Information Science*, p. in press, Jun. 2020, doi: 10.1177/0165551520929931.

[6] P. Gloor, A. Fronzetti Colladon, J. M. de Oliveira, and P. Rovelli, "Put your money where your mouth is: Using deep learning to identify consumer tribes from word usage," *International Journal of Information Management*, vol. 51, p. 101924, Apr. 2020, doi: 10.1016/j.ijinfomgt.2019.03.011.

[7] A. Fronzetti Colladon, F. Grippa, and R. Innarella, "Studying the association of online brand importance with museum visitors: An application of the semantic brand score," *Tourism Management Perspectives*, vol. 33, p. 100588, Jan. 2020, doi: 10.1016/j.tmp.2019.100588.

[8] P. A. Gloor, A. Fronzetti Colladon, and F. Grippa, "The digital footprint of innovators: Using email to detect the most creative people in your organization," *Journal of Business Research*, vol. 114, pp. 254–264, Jun. 2020, doi: 10.1016/j.jbusres.2020.04.025.

[9] T. J. Allen, P. Gloor, A. Fronzetti Colladon, S. L.

	Woerner, and O. Raz, "The power of reciprocal knowledge sharing relationships for startup success," *Journal of Small Business and Enterprise Development*, vol. 23, no. 3, pp. 636–651, Aug. 2016, doi: 10.1108/JSBED-08-2015-0110. [10] P. A. Gloor, A. Fronzetti Colladon, F. Grippa, B. M. Hadley, and S. Woerner, "The impact of social media presence and board member composition on new venture success: Evidences from VC-backed U.S. startups," *Technological Forecasting & Social Change*, vol. 157, p. 120098, 2020, doi: 10.1016/j.techfore.2020.120098. [11] P. Gloor, A. Fronzetti Colladon, F. Grippa, and G. Giacomelli, "Forecasting managerial turnover through e-mail based social network analysis," *Computers in Human Behavior*, vol. 71, pp. 343–352, Jun. 2017, doi: 10.1016/j.chb.2017.02.017. [12] A. Fronzetti Colladon, "Forecasting election results by studying brand importance in online news," *International Journal of Forecasting*, vol. 36, no. 2, pp. 414–427, Apr. 2020, doi: 10.1016/j.ijforecast.2019.05.013. [13] M. A. Barchiesi and A. Fronzetti Colladon, "Corporate core values and social responsibility: What really matters to whom," *Technological Forecasting and Social Change*, vol. 170, p. 120907, Sep. 2021, doi: 10.1016/j.techfore.2021.120907. [14] A. Fronzetti Colladon, "The Semantic Brand Score," *Journal of Business Research*, vol. 88, pp. 150–160, Jul. 2018, doi: 10.1016/j.jbusres.2018.03.026.
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