



## Tutorial

### Title

How to extract knowledge from interactions: combining natural language processing, pragma-linguistics and knowledge engineering techniques

### Abstract

The subject of this tutorial links Natural Language Processing, Interaction and linguistics analysis and knowledge representation. Researchers and PhD students that want to discover social media, e-mails and document analysis and cognitive sharing are interesting on this area. In fact, AI research use generally NLP and TextMining and statistics, or Knowledge engineering and semantic representation. But they are aware, Interactions analysis that uses Prama-linguistics techniques belong to social and human science.

In this tutorial, we present new techniques based on linguistics and pragma-linguistic that help to identify not only semantic relations but also actors' intentions. We show also how to combine these techniques with knowledge engineering in order to reconstitute the meaning of interactions.

Examples on analyzing websites, e-mails and discussion forums will be presented. Finally, Tutorial attendees will apply some of this analysis techniques in given exercises.

### Duration

2 hours

### Motivation -

Knowledge is generally produced in interactions, for instance when actors are face problems, via communication around topics, publication about products, services, etc. Currently, several knowledge management techniques are addressing these aspects. For instance, using natural language processing, building Ontology, managing community of practices, etc. In this tutorial, we present new techniques based on linguistics and pragma-linguistic that help to identify not only semantic relations but also actors' intentions. We show also how to combine these techniques with knowledge engineering in order to reconstitute the meaning of interactions.

### Expected audience

Industry actors and researchers that want to learn more efficient techniques than statistics to analyse social media, e-mails and discussions forums.

## Outline of contents

1. Natural Language Processing: Principles and Techniques  
We present main principles of NLP: syntaxes, grammatical, and pragma-linguistics principles. Then, different Text Mining tools and libraries will be addressed. Examples illustrate the use of these tools.
2. Interaction analysis: Web and social media analysis  
Main interaction analysis approaches will be presented based from one side, on NLP and sentiment analysis, and from another side on communication and pragma-linguistics grids
3. Websites knowledge extraction techniques using NLP applications  
In this paragraph, we show Hypernym and Meronym relations extraction from websites. Python libraries and examples on Business marketing will be explained.
4. E-mails and social media Knowledge extraction using Pragma-linguistics applications  
The use of pragma-linguistics techniques and their contributions will be illustrated on professional e-mails and social media

## Key references

- MATTA, Nour et MATTA, Nada. Structuring Context Entities for Knowledge Discovery. In : *in 2022 International Conference on Computational Science and Computational Intelligence (CSCI)*. 2022
- Merzouki, H. Matta, N. Atifi H.. Competency Detection from Interactions Within Communities of Practice. SN Computer Science, Springer, 2022, 3 (1), {10.1007/s42979-021-00861-9}
- Chehade S., Matta N., Pothin J.P., Cograne R., Handling effective communication to support awareness in rescue operations Special Issue on "Special Issue: Knowledge, Semantics and AI for Risk and Crisis Management" of CONTINGENCIES AND CRISIS MANAGEMENT Journal, Vol 28, N.3, September 2020 (<https://lnkd.in/g5mNHKZ>)
- Menaouer, B., Mohammed, S., & Matta, N. (2020). Towards a Model to Improve Boolean Knowledge Mapping by Using Text Mining and Its Applications: Case Study in Healthcare. *International Journal of Information Retrieval Research (IJIRR)*, 10(3), 35-56.
- Lorette S., Matta N., Sediri M., Hugerot A., Tracking experience of crisis management for decision support, On AI-EDAM special issue of Knowledge, Innovation & Sustainability, Vol 33, N.2, 2019.
- Goepp V., Matta N., Caillaud E., Systematic community of Practice activities evaluation through Natural Language Processing: application to research projects, On AI-EDAM special issue of Knowledge, Innovation & Sustainability, Vol 33, N.2, 2019.
- Daily Knowledge Valuation in Organizations, Matta N., Atifi H., Ducellier G., Wiley 2016.

## List of speakers



**Nada Matta**, Full Professor at the University of Technology of Troyes. I study techniques in knowledge engineering and management and specially to handle cooperative activities as product design, crisis management, etc. I am involved in the organization of several workshops and Tutorials on IJCAI, KMIS, ISCRAM, ECAI, COOP, CTS conferences. I wrote different papers on KM in companies and learning.



**Francois Rauscher** was born in France in 1969. He received his engineering degree from ENSIEE in 1992, M.E. degree from Paris VI University in 1993, a PhD from University of Technology of Troyes in 2016, and MSIE from HEC in 2022. He joined Infopro Group in 2001. Since 2012, he has been with the Tech CICO Team, University of Technology of Troyes, France. His main areas of research interest are computational intelligence, knowledge management, NLP and machine learning. He's currently Head of Research and Development at Infopro-Digital group. Mr. Rauscher is a member of the IEEE since 2011.



**Nour Matta**, PhD student on Natural Language Processing and Machine learning at University of Technology of Troyes in collaboration with Namkin Company. I have a Master degree on Data Science for Risk Management at Lebanese University, Computer Science Department. My main competences are around Natural Language Processing techniques, Context awareness, knowledge representation, Network security, Privacy and Cryptography.